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BRUSSELS, EUROPEAN COMMISSION, SPORT UNIT

THE NORMALITY OF EU SPORT POLICY STUDIES: DISCIPLINARY LOCUS IN POLITICAL SCIENCE, SPORT SCIENCE OR ELSEWHERE?

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SUMMARY

Mainstream European integration research has shown that research on the EU tends to follow the conjunctures of European integration itself. This realisation has led to some debate on which branch of political science – international relations or government – or indeed other academic disciplines is/are the most appropriate locus for such research. The paper takes these debates one step further by looking at the occurrence of 'EU & sport' studies within the wider field of EU studies. The main material used comes from the ECLAS database. Findings lead to a discussion of whether 'EU & sport' studies should rather be for EU specialists or for sport specialists and a plea for disciplinary normalisation whereby sport science would need to get more directly involved (without necessarily overwriting political science). Some ideas are added regarding the need for a mapping of Central & Eastern European scholarship.

Keywords: European Union, European integration, EU studies, sport policy, sport science, research agenda

Derice: That's a bobsled.
Sanka: Oh, so a bobsled is a push-cart with no wheels.
Derice: That's what it looks like here.
(*Cool Runnings*, 1993)[2]

INTRODUCTION

Picking up on Sanka's question from the sports comedy film *Cool Runnings* (an epic much concerned with the idiosyncratic nature of sports rules), if a bobsled is a push-cart with no wheels, so a push-cart may well as conceptualised as a bobsled is *with* wheels:

[1] The author is a civil servant in the European Commission but opinions expressed are strictly those of the author and do not render any official positions of the European Commission or the European Union.
[2] Source: Wikiquotes, http://en.wikiquote.org/wiki/Cool_Runnings (accessed 14 May 2013).

but what does this mean for the study of EU sport policy-making – should such research be EU research informed by sport knowledge, or rather sport research informed by EU knowledge? What came first: the hen or the egg? (Kornbeck, 2012) Is it true that political scientists know too little about the Olympics, an 'under-explored phenomenon in the study of international politics,' in spite of the Games being 'one of the longest standing forums for global interaction that has evolved along with the international political environment' (Cottrell & Nelson, 2010, p. 745)? Or is it conversely the academic discipline of sport studies or 'sport science' which needs to know more about the methods and achievements of political science?

Whether the word 'science' should be taken at face value in a positivistic sense is another matter (yet the same applies to political science): the words will be used here in recognition of their widespread use in actual practice. The purpose is neither to verify nor to falsify whether 'sport science' (or political science) is 'a misnomer' and a symptom of the 'desperation of many of those working in this area to generate respect and credibility' (Ryall, 2011, p. 171),[3] but rather to look for indications of where the most appropriate locus for research on the 'EU & sport' subject matter may be: in political science – and if so, in the branches of International Relations (IR) or Government – or in specialised (non-EU) disciplines, including (but not limited to) sport studies and 'sport science'?

Within mainstream European integration debates (which are not focussed on specific apsects of integration but look at integration itself), one strand of reflection has come to deal with the question whether the EC/EU should be conceptualised as an international (inter-state, intergovernmental) system, or whether it should indeed be seen as a domestic system in its own right: the transformation of national polities from '*nation-states to member states*' (Bickerton, 2013) obscures the fact that traits of inter-governmentalism as well as of supra-nationalism can be observed simultaneously. Each of these theoretical positions has epistemological and methodological implications, as the study of European integration becomes a matter either for the IR branch of political science or the branch of Government. Of these options, the latter even leads to the question whether political science and EU law are best placed to inform such debates: or would it not rather be the usual academic disciplines, education for education matters, for instance? If the EU is '*a normal political system*', then EU studies may perhaps not be for '*EU specialists per se*' (Kreppel, 2012, p. 639)?

PURPOSE

The aim of this paper is to apply this line of reflection to the subsystem of EU sport policy making. The paper will show that EU sport policy research seems to follow the same conjunctures as European integration research in general. This will lead to a discussion of what the most appropriate disciplinary locus for studying this subject matter should be.

[3] 'This I suspect is due to a combination of the low value that the study of sport is given in academic circles, as well as a desperation of many of those working in this area to generate respect and credibility through emulating the methods and tangible results that appear to be displayed by the so-called "hard sciences".' (Ryall, 2011, p. 171)

METHODS

Drawing on a more detailed working paper published in German (Kornbeck, 2012) this paper discusses the results from database searches using the online catalogue of the European Commission's Central Library.[4] Methodological issues – including addressing sources of bias – are discussed in the substantive under Results. The research aimed at revisiting results from mainstream European integration research (Keeler, 2005; Andrews, 2012; Kreppel, 2012) and identifying implications for the study of what may be called (tentatively) 'EU sport policy research'.

FINDINGS

Findings from generic European integration research

The rhythm of mainstream integration research output has proved to follow the rhythm of European integration at the policy level, a finding now backed by a limited yet growing body of empirical scholarship drawing on the systematic examination of extensive database material (Keeler, 2005; Andrews, 2012; Kreppel, 2012). Interest in the correlation was sparked by Makin's (1998, p. 5) belief that by comparing research output with policy change, and by quantifying the findings, new connections and trends may be unearthed.

This inspired Keeler (2005) to undertake comprehensive database research which showed, for instance, that the frequency of US political science PhD theses written on EC/EU topics increased and decreased, over time, in close correlation with key EC/EU policy developments. The French policy of the 'empty chair' (1960s), PAC and budget crises (1970s), passing of the Single European Act (1980s) and conclusion of the Single Market (1990s) were all followed by increases in the frequency of PhD theses; after these peaks followed inevitable flaws (Keeler, 2005, pp. 555–6). While these figures may appear slightly crude, the trend is confirmed by other types of evidence, such as the percentage of PhD theses on EC/EU topics compared with total US PhD theses (ibid., p. 556), papers published in 24 leading journals (ibid., p. 572) or the global development of citations (ibid., p. 556). Although peaks and flaws in scholarship typically follow a few years after the corresponding political peaks and flaws, the conclusion was clear:

'However important the impact of external funding might prove to be, it appears evident that the principle determinant of the status of EU studies will continue to be the development of the European Union itself. The data in this study demonstrate vividly the extent to which the ups and downs of the integration process affect the propensity of young scholars to commit to a career of research on the EU and the inclination of established academics to incorporate the EU into their projects.' (Keeler, 2005, p. 579)

For empirical scholarship it ought not to be shocking news that researchers react to trends in the 'real world' rather than building their own ivory tower models and theories.

[4] European Commission Library System (ECLAS), http://ec.europa.eu/eclas/F.

The findings directly inspired two more recent papers by other scholars (Andrews, 2012; Kreppel, 2012), in the field of mainstream integration research, as well as a working paper directly concerned with EU sports policy research (Kornbeck, 2012).

One crucial implication is the realisation that scholarly debates are *less crucial* than policy developments in sparking new research:

'[…] US scholarly interest in European integration did not begin in the 1960s, with the competing paradigms of neofunctionalism and intergovernmentalism; instead, there has been concerted attention since very shortly after the end of World War Two. Interest has periodically surged in response to important events on the ground, such as the announcement of the Marshall Plan in 1947 and the founding of the Organization for European Economic Co-operation in 1948, the Schuman Declaration in 1950 and the formation of the European Coal and Steel Community in 1951, the treaty forming a European Defence Community in 1952 and the demise of the same in 1954.' (Andrews, 2012, p. 766)

This research of Andrews (2012) and Kreppel (2012) has produced comprehensive empirical output with graphs much resembling those of Keeler (2005). Apart from many other implications, it has led to reflections on the proper disciplinary locus for European integration research:

'Different responses to the core question of "what is the EU?" result in very different approaches in the realm of EU studies, which in turn lead to distinct patterns of research productivity. This variation occurs in terms of who chooses to focus their research on the EU as well as what aspects of the EU get analysed and how the research is pursued methodologically.' (Kreppel, 2012, p. 635)

If the EU is a 'normal' political system, surely it can be researched by those with expertise in the subject matter, and not just by generic EU specialists from the academic communities of political science and law. Indeed, database material suggested that political science scholars of the IR branch reacted less to EC/EU-level policy developments than did their colleagues from the Government branch; some peaks were not even reflected in IR journals (Kreppel, 2012, p. 637). If colleagues from the Government branch show a stronger awareness and expertise in this field, this could be seen as evidence favouring a more 'domestic' interpretation of EU policy files. For the study of EU sport policy matters, the implication could be, *either* that scholars from the political science branch of Government should take the lead; *or* that such should be the province of researchers from sport science, physical education, etc.; *or* any combination of these. If a 'science of sport' is to include a 'political science of sport', then this would certainly be a natural core activity for researchers belonging to this type of sub-discipline.

Findings from EU sport policy research

The main findings from generic integration research have been summarised above. One graph taken from Keeler (2005, p. 556) had been added for illustration (*Figure 1*). It will be seen that EU sport policy research shows trends which are fundamentally the same, except that the policy developments leading to 'ups and downs' in research output are sport-specific: in the 1990s, the Maastricht Treaty has been less instrumental in sparking research than the Bosman ruling.

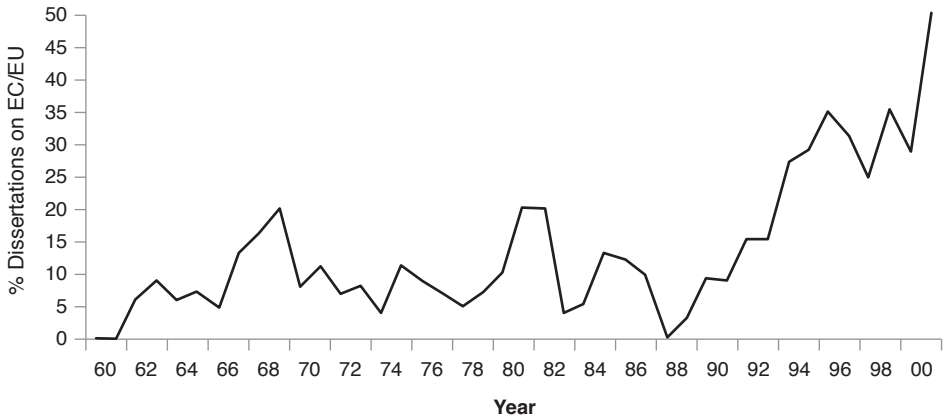

Figure 1. % of political science dissertations in West European Area with focus on the EC/EU, 1960–2001. Source: Keeler (2005, p. 556)

Drawing inspiration from the three papers discussed above (Keeler, 2005; Andrews, 2012; Kreppel, 2012), database material was collected from the online catalogue of the European Commission's Central Library[5] and analysed (Kornbeck, 2012). Despite the obvious methodological fallacies linked to relying solely on one (very specific) data source, no sport-specific literature database[6] was seen to have a comparative European coverage. The option of compounding from individual journal databases was considered but eschewed on grounds of practicality. Again, no EU journal would seem to have sufficient sport coverage and no sport journal would have sufficient EU coverage, while newsletters with limited circulation[7] were conceptually excluded from the exercise.

The bias built into this type of source (ECLAS records) seems to flow primarily from the selective purchasing behaviour of its librarians, being on the pay-roll of the European Commission, itself a political actor: whatever an extract from this database may show, it cannot be an objective 'radiography' of EU-related research. However, bias is diminished by the fact that the library, as a Commission sub-entity, is not itself entrusted with political roles (its staff may actually take decisions on the basis of what they believe to be most appropriate in relation to their own professional integrity of librarianship), while fluctuations over time are bound to be heuristically interesting in themselves. On the basis of extracts using the search concepts 'sport', 'doping', 'football' and 'Bosman,' graphs were produced (Kornbeck, 2012, tables 7–11) in analogy with those quoted above (Keeler, 2005; Andrews, 2012; Kreppel, 2012). The results from this exercise are presented synoptically in *Figure 2*.

[5] European Commission Library System (ECLAS), http://ec.europa.eu/eclas/F.

[6] The following were considered: ZBSport, SPOWIS des IAT, SPONET des IAT, Focus On Sports Medicine, Current Contents Sport, Datenbank Spolit, Pressemitteilung der Deutschen Sporthochschule, Zeitschriften-Datenbank Sportzeitschriften. The obvious German bias in this selection is recognised.

[7] Examples include: *EU & Sport Newsletter* of the Assocation for the Study of Sport and the European Union, Loughborough University, UK; *Newsletter Sportpolitik* published by Deutsche Sporthochschule Köln, Institut für Europäische Sportentwicklung und Freizeitforschung, Cologne, Germany.

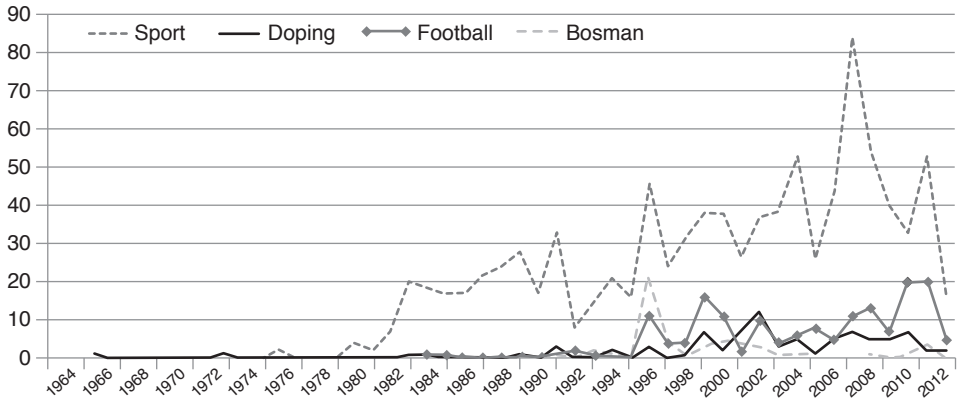

Figure 2. Prevalence of terms related to the 'EU & sport' topic in the ECLAS database, 1964–2012
Source: Kornbeck (2012, p. 21)

Another source of bias has to do with the polysemic nature of certain concepts. The word 'sport' for instance may occur because a book or article is genuinely about the EU and sport, or it may occur within a longer title, including the relevant European Parliament Committee (even in a document dealing with another policy area within its portfolio). Nevertheless it was revealing to find papers in professional journals dealing with the taxation of professional athletes' income in an EC/EU perspective as early as the early 1990s (no doubt a result of the build-up to the magic date 1 January 1993 when the Single Market was completed). In the 1990s papers in professional and academic journals started dealing with the free movement of professional athletes (before the Court's 1995 Bosman ruling), and already around 1991 (the year before the Olympic Games of Barcelona and Albertville, where there was a visible EU presence) a number of publications specifically dealing with the relevance of EC/EU law to sporting activities were published. Nevertheless the year 1996 (just after the Bosman ruling) saw a particularly steep increase in the number of hits recorded, and subsequent peaks have tended to follow shortly after major developments in EU sport policy, such as the Declarations of Amsterdam (1997) and Nice (2000), the unsuccessful draft Constitution (2005–7) and finally the Lisbon Treaty (2009–10) which added sport to the EU's Treaty-based competencies (see *Figure 2*) (for more details, see Kornbeck, 2012).

Although some sources of bias make it plain that every single hit does not need to be taken at face value (see above), the curves shown in *Figure 2* are nevertheless strikingly similar, by analogy, to those resulting from the US research of generic EC/EU issues discussed above (Keeler, 2005; Andrews, 2012; Kreppel, 2005). The hits for the word 'doping' follow the trends shown for the word 'sport', except that in this case, developments linked to other actors than the EC/EU can be recognised as having driven publication activities, such as the foundation of the World Anti-Doping Agency (WADA) in 1999. Nevertheless, the 'doping' curve does seem to reflect some EU-specific developments, such as the Court's Meca Medina ruling (the first to deal with doping) in 2006, the Lisbon Treaty or the EU's increasing relevance in connection with data protection since c. 2008.

Hits for the words 'football' and 'Bosman' basically confirm the trend (although the Name 'Bosman' occasionally occurs in relation to other persons than the Belgian football player: a reminder of the crude nature of the figures used here). The high recent scores for football may reflect the Court's QC Leisure ruling (2012).

DISCUSSION

The option of conceptualising 'EU sport policy studies' as 'normal'

Running all four curves together synoptically provides the most stunning impression of a visible trend in publication activities, suggesting that publications dealing with the 'EU & sport' topic are not fundamentally different from generic EU research (*Figure 2*). This leads to the realisation that 'EU sport policy' research may not be so idiosyncratic after all. The questions raised in this paper touch upon issues which are fundamental to sport studies and a 'sport science', the existence of which may still be debatable, as well as to European integration research. For while sport research took a long time to take policy aspects on board (even today most academic departments in this area seem to be lacking in policy expertise, retaining a strong focus on training future PE teachers and possibly physiotherapists), European integration research started by analysing the integration process like a case of intergovernmental cooperation and only later turned towards 'the analysis of // policymaking within this new polity' (Woll & Jacquot, 2010, 111–112).

If the intergovernmentalist perspective is kept, the EU can (with some modifications) be studied along the same lines as the Council of Europe or the UN, but if the policy perspective is chosen, the scope becomes a supranational one: the EU polity then emerges as strikingly similar to a national polity, and the attribution of the subject matter to the IR branch of political science becomes much less evident. Yet this in turn raises the question of the (real, feigned or imagined) homogeneity of EU studies (Woll & Jacquot, 2010, p. 121).[8] Some would argue that this problem is a misnomer in relation to sport policy, simply because mainstream political scientists have too often snubbed sport as a research subject. Indeed one study of protests at the Olympic Games finds it

'puzzling that such a significant global event with potentially broad theoretical appeal is largely overlooked by both the mainstream International Relations (IR) and broader transnational literatures'. (Cotrell & Nelson, 2010, p. 730)[9]

[8] 'Understanding why individual initiatives succeed and fail to gather collective support, which ideas are carried within groups and which institutional conditions limit political creativity are therefore necessary parts of a research agenda concentrating on the micro-level of political change in the European Union. For traditional EU theorists, this might be an uncomfortable exercise, because it makes the study of the European Union as complex as the study of all human action and therefore drives another nail in the coffin of a unitary "EU theory".' (Woll & Jacquot, 2010, p. 121)

[9] Further: 'The Olympics, after all, represent the largest regularly scheduled international gathering in the world. More states participate in the Summer and Winter Games than belong to the United Nations, and up to 90 percent of the world's television sets tune in to at least some portion of the virtually ubiquitous Olympic media coverage. The Olympics represent one of the world's oldest symbols of cooperation and sportsmanship, yet the athletic competition also stokes nationalistic passions and informs identity formation. Moreover, there is a great deal of prestige and perceived economic benefit attached to hosting the Olympics, as US President Obama's failed bid to land the 2016 Summer Olympics in Chicago would attest.' (Cotrell & Nelson, 2010, p. 730)

While there may be a disinterest in these matters among IR scholars, it should be maintained that studies of political and policy aspects of sport do exist, in particular within other academic (sub-)disciplines, not least in the legal field. Many of the topic areas of an 'EU & sport' sub-discipline may be easily recognisable in terms of subject matter as well as methodology: sports law may, for instance, be discerned as a discrete research area based upon ECJ jurisprudence, as posited already a decade ago (Parrish, 2003). This may in part be explained with reference to the tension between ECJ case law and the private 'lex sportiva' of the sport movement, with the lead question being whether the ECJ is basically neutralising or respecting the latter (Parrish, 2012). It seems to emerge from this analysis that 'EU sports law only patrols the outer limits of the lex sportiva, thus helping to shape the standards with which the CAS develops this law' (ibid., p. 733); yet it is precisely *due to* (not in spite of) the discrete nature of the 'lex sportiva' that such a thing as 'EU sports law' can be discerned within EU law and ECJ jurisprudence. Yet this is an empirical fact rather than a piece of theoretical guidance. The 'EU & sport' field is not fundamentally different from generic EU studies, inasmuch as the sheer mass of empirical knowledge has grown to a point where ontological clarification may become the only way out (Kauppia, 2010, p. 19).

Does this mean that 'EU & sport' studies need to become more theoretical? We can easily share the analysis of Simon Hix regarding the uncertain usefulness of a general EU theory – 'We have no general theory of American or German government, so why should there be a general theory of the EU?' (Hix, 1998, p. 46)[10] –, so why deploy serious efforts to elaborate a general 'EU & sport' theory? 'The maturation of sports law as an academic discipline is also reflected in the growing volume of academic texts on the subject' (Parrish, 2003, p. 23), yet this cumulative effect does not in itself solve any epistemological problems. According to a pragmatic perspective, cumulative or additive effects are not a problem *per se* but need to be managed (Gabel, Hix & Schneider, 2002):[11] it is not information overkill but rather incompatible data and inconsistent (and possibly irresponsible) use of them which need to be tackled. This can only be done if conceptual and epistemological issues have been clarified beforehand. Drawing on Carnap (1950), Kauppia (2010, p. 32) has claimed that such an exercise can overcome imprecisions which follow from (the reductionism involved in) empirical observation.[12] The 'EU & sport' field will

[10] 'We have no general theory of American or German government, so why should there be a general theory of the EU? What we do have are particular explanations of phenomena that exist in all political systems: such as executive-legislative relations, policy-making, interest representation, public opinion, voting and party behaviour. If we accept the critique levelled at the new governance empirical conception of the EU, these phenomena can be studied in the EU using methods, concepts and theories from the general fields of comparative politics and comparative public policy.' (Hix, 1998, p. 46)

[11] 'Obviously, more data are generally better than fewer data,' but 'we tend to focus on one episode' and 'it seems that our personal predilections often guide our research design.' (Gabel, Hix & Schneider, 2002, p. 494). According to this viewpoint, four recommendations need to be followed: 'Rewarding systematic data collection […] Encouraging collaborative data collection […] Inciting measurement discussions […] Making institutions (and researchers) more accountable.' (ibid., pp. 495–6)

[12] According to this view, empirical research may generate a range of predictable 'dualisms […] (objective–subjective, individual–institution, socialization–calculation, interest–norm, supranational–national and so on)' (Kauppia, 2010, p. 32) without enabling to make much sense of the knowledge generated: 'Institutions are automatons and actors interchangeable (ibid., p. 32). Yet in line with "Carnap's classical statement (1950), that several ontological frameworks are possible, depending on their purposes," it is possibly that 'there is no answer to the classical philosophical and metaontological question of the objective criteria for deciding if the realists or // the anti-realists (or nominalists) are right' (Kauppia, 2010, 19–20).

have to grapple with the same dilemma: as much evidence as possible and as much (or as little?) theory as needed.

As the paper has shown, the findings from generic integration research (Keeler, 2005; Andrews, 2012; Kreppel, 2012) indicate that the conjunctures of this research are essentially driven by developments within the political dynamics under scrutiny, and the same appears to apply to 'EU & sport' research (Kornbeck, 2012) (*Figure 2*). This result will not only comfort those preferring empirical knowledge to airy theory: it also points to an interesting feedback loop, given that early integration was largely influenced by theories published prior to concrete political action (see Rosamond, 2000; Mittag & Groll, 2010).[13] Within the field of sport, many crucial developments at the level of policy or jurisprudence may have been well known before they emerged at that level: in the field of sport, the 1995 ECJ Bosman ruling is the most natural case to study. According to an ECJ judge, 'Bosman itself was not a complete revolution' (Ilešič (2010, p. 478) (inasmuch as the rules of free movement for workers had already been in force for decades), so that the effect generated by the Court was rather a psychological one: 'after Bosman, the sports associations suddenly and definitively lost their aura of inviolability' (Van den Bogaert, 2010, p. 493).[14] Feedback loops can thus be found in both directions – from action (policy, jurisprudence) to research, and vice-versa.

This means, in turn, that if integration research can benefit from being conducted in part by researchers from the thematically relevant disciplines (social policy for EU social policy research, etc.), this must apply *mutatis mutandis* to 'EU & sport' research also: the 'normality' of the EU as a polity and a research subject then implies the 'normality' of 'EU sport policy' or 'EU sport law' as well. Yet this does not solve the problem whether 'EU sport policy' is better researched by political scientists, sport scientists or a combination of both. The only conclusion which seems halfway certain, at this stage, seems to be that within political science, the branch of Government is more appropriate than that of IR: the 'normalisation of the European Union' as a research matter (Kreppel, 2012) can then apply to the 'EU & sport' field, too.

The implications of 'normality'

Until this stage, drawing conclusions and identifying implications may have been rather straightforward and painless, yet what exactly are the implications of 'normality'? If generic integration research is 'normal', and if 'EU sport policy' is normal too, is 'normality' significant at all? (If everything is normal, what is significant about being normal?) At least one implication can be identified – one which relates to the disciplinary locus of such research.

[13] This applies to a number of programmatic words which, in retrospective, must be called seminal. Richard Coudenhove-Kalergi (1926) published three decades before the EEC Treaty was even being negotiated; David Mitrany (1933) in the year when Hitler took power (a moment in time when the idea of European integration based on democratic and voluntary association must have seen more improbable than seldom before or after); Ernst B. Haas (1958) in the very year when the EEC Treaty entered into force and the EEC and EAEA Commissions started working. (The ECSC Treaty and High Authority had been a reality for only half a decade by then.)

[14] See also the consultancy report by Coopers & Lybrand (1994).

If a sub-discipline of 'EU & sport' studies will wish to pick up on the lessons which can be drawn from this material and take the lead in conceptualising its own discursive future, it will need to address the underlying epistemological questions. It will have to come to terms with the fact that (otherwise sympathetic) commentators still doubt if it actually exists (see Tokarski, et al., 2010, p. 7) and 'a political science of sport needs – just like a political science of social welfare or labour relations – to limit and define its own subject matter' (Lösche, 2010, p. 25). Ironically, while many sports governing bodies continue deploying considerable efforts in defending their notion of a 'specificity' of sport (implying its idiosyncratic nature and incompatibility with rules complied with in other sectors), a 'political science of sport' will have to insist that it addresses the subject matter 'EU & sport' in basically the same way as other political phenomena, while at the same time arguing in favour of a sport-informed approach to this discourse – one which mainstream political science may be unlikely to deliver. Regarding the choice of disciplinary locus between the IR and Government branches of political science, recent research output has shown that a non-IR perspective can be very effective and convincing (e.g., García & Meier, 2012; García & Weatherill, 2012).

Central and Eastern European research questions

In a Central and Eastern European readership, the findings will probably prompt additional questions regarding past, present and future directions of sport-related research in the 'Old' versus the 'New' EU Member States. Differences between national contexts with and without an experience of state socialism exist at all levels of society and the world of academia is no exception in this regard. Different socio-economic and socio-cultural realities lead to variegating patterns in sport and physical activity behaviour and thence to diverging sport policy choices. Among the post-socialist states, eleven joined the EU in 2004, 2007 and 2013 respectively (alongside two countries without this previous experience).[15] The new reality of EU membership led to new opportunities for staff and student exchange, research cooperation, involvement in policy and practice development projects, access to EU funding, etc. At the same time C&E European societies, including their sport and physical activity sectors, found themselves confronted with many new impulses resulting from EU-led or EU-inspired processes and trends. Yet C&E Europeans have not merely been recipients of these new changes: the ECJ judge quoted above (Ilešič, 2010) is Slovenian.

A mapping exercise of sport-related research in C&E Europe would be a most rewarding exercise, especially if coupled with a comparison with research in 'Old' Member States. It could uncover differences in research trends and point to their root causes. While a simple juxtaposition of 'Old' and 'New' ('capitalist' versus 'post-socialist') EU members might lead to some irritation, it could be avoided by dividing 'Old' Member

[15] In the autumn of 2013 the Member States of the EU (with year of entry) were Austria (1995), Belgium (1952), Bulgaria (2007), Croatia (2013), Cyprus (2004), Czech Republic (2004), Denmark (1973), Estonia (2004), Finland (1995), France (1952), Germany (1952), Greece (1981), Hungary (2004), Ireland (1973), Italy (1952), Latvia (2004), Lithuania (2004), Luxembourg (1952), Malta (2004), Netherlands (1952), Poland (2004), Portugal (1986), Romania (2007), Slovakia (2004), Slovenia (2004), Spain (1986), Sweden (1995), and the United Kingdom (1973).

States into Nordic, Anglo-Saxon, Continental and Southern, for instance. It may also be salutary when comparative research detects some of the problems commonly attributed to 'socialist' sport policy systems in 'capitalist' systems; in August 2013, for instance, a German report pointing to state-sponsored West German doping during the Cold War attracted massive media coverage, including outside of Germany (BBC, 2013). Crucially, such research should address the extent to which research has shifted as a result of EU membership. A recent piece of British scholarship has characterised the East German sport policy and sport science model as instrumental, while also showing that recent British sport policy shows some convergence with this past 'socialist' model, on account of the recent emphasis on investment and training as a means to achieve medals as a public policy goal (Dennis & Grix, 2012). Following this line of thought, it would be interesting to see whether directions in 'EU & sport' research have converged since 2004.

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NORMALITA POLITICKÝCH STUDIÍ EU V OBLASTI SPORTU: MÍSTO V OBORECH POLITOLOGIE, SPORTOVNÍCH VĚDÁCH ČI JINDE?

JACOB KORNBECK

SOUHRN

Hlavní integrační proudy v evropském výzkumu dokumentují, že výzkum v EU má tendenci zkoumat evropskou integraci jako takovou. Toto poznání vedlo k diskusi, v kterém oboru politologie – mezinárodní vztahy či vláda – nebo i v jiných akademických disciplínách je nejvhodnější místo pro takový výzkum. Stať se pokouší posunout tyto diskuse o krok dále tím, že studie o „EU a sportu“ se posuzují v širším záběru EU studií. Hlavní informační zdroje pocházejí z databáze ECLAS. Naše zjištění vedou k diskusi o problematice „EU a sportu“ v tom smyslu, zda by tyto studie měly být spíše určeny odborníkům EU, nebo sportovním specialistům. Důležitá je otázka disciplinární začlenění této problematiky, s širším zapojením sportovních věd (aniž by se nutně přepisovaly politické vědy). Některé přidané myšlenky se týkají potřeb stipendií pro země Střední a Východní Evropy.

Klíčová slova: Evropská unie, Evropská integrace, studie EU ve sportovní politice, sportovní vědy, výzkumné programy

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SPECIALIZED TRAINING OF CHILDREN AND YOUNGSTERS IN SELECTED SPORTS GAMES

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SUMMARY

The study has two principal goals. The first one is the analysis of personal characteristics of coaches, who function with teams of youth in clubs participating in the top and second to top competitions of adults in handball, tennis and volleyball. Analysis brakes data down following criteria of age, level of education reached and gender. The second goal of our study is the analysis of the sport preparation of children and youth in mentioned sports games on their observation of federations' recommendations about the content of training in respective age groups, including detection of their opinions on the beginning of specialized training for respective playing functions.

Research sample was created all-together by 234 coaches (102 volleyball, 69 tennis, 63 handball), who responded to sent non-standard questionnaire with closed and half-opened queries (total rate of return was 67%). Used questionnaire contained eight identifying and five factual questions. Quantitative characteristics were expressed in absolute and relative frequencies, for synoptic presentation of results we have used graphical illustration of responses. Questions concerned players participating in competitions of age groups from about 8 to 19 years.

As far as personal composition concerns, the prevailing part of observed sample is created by coaches of age category 30–40 years, out of which about 1/4 are women. We have found significant differences among respective games in the educational sphere. While in tennis and volleyball the university educated coaches creates simple majority (65% and 76% respectively), their portion in handball is only about 40%. The representation of P.E. teachers among respective sports games is similarly different – 83% and 76% respectively in tennis and volleyball, on the contrary to 29% in handball. Tennis possesses very low portion of coaches working with category of youngsters (6%). We have found also differences in opinions regarding to the necessity of preparatory phases, i.e. categories preceding younger pupils. Primarily coaches of tennis assume this phase as inevitable.

On the contrary we find the distinctive agreement in opinions concerning early specialization – only a narrow minority of coaches is assured about its benefits (8%). Coaches of tennis and volleyball are in agreement as concerns the start of specialization according to

playing functions in older pupils category. The selection of one age category in our group of tennis coaches is impossible.

Keywords: training of children and youth, education of coaches, age categories, early specialization

INTRODUCTION

Sports games belong to the most complicated sport branches when it comes to consider their movement content. Systematics of basic skills in majority of games has several categories. Team sports games, however, contain yet two higher level constituent game's elements – game combinations or and game systems. The process of game is very variable phenomenon and a number of authors acknowledges its complicatedness and irregularity (Táborský et al., 2007). The nature of game process enables utilization of various skills to solve the same or similar game tasks. Players that acquired higher amount of game skills then possess an advantage. It is possible to assert that one of the demands creating an elite player is mastering of the greatest possible amount of skills and in the highest possible variety of their executions. That is why the acquisition of necessary motion skills itself requests a lot of time. However also the improvement of mentioned skills due to training and regarding to their use in a game performance means from the time point of view very demanding affair, specifically thanks to their requested variability.

The long-term improvement of movement skills means therefore one of the crucial tasks solved in sports games primarily by coaches of children and youngsters. To acquire basics of all skills' executions possible to use while solving game tasks within the one or two year-long training cycles is clearly unrealistic. Principal motivational presupposition for taking part in long-term sport activity is to play. That's why it is recommended in beginners to use a principle of didactic reduction. This principle consists of the selection of skills necessary for participation in the most elementary form of a match. Their command means the prerequisite for gradual acquisition of further skills enabling the transition to higher level of game performance. The volume of motion skills, necessary to master in top matches is extensive. And this is also one of the important reasons why in sports games we experience so often discussions about the two possible training concepts:

a) early specialization in training,
b) training adequate or appropriate to the age.

Principal difference among them need not be in the final outcome (examples of attainment of outstanding top performance by the help of either one of these concepts are well known), but in the course of the training itself. To simplify the problem we could say that using early specialization approach children themselves adapt to the training, while the approach of the training appropriate to age means that training itself is being adapted to children (Perič, 2012).

Importance of the problem from the coaches point of view is best documented by the amount of contributions, seen e.g. on various web sites dedicated to the training of children

and youngsters. Just at random only it is possible to visit e.g. http://www.ncbi.nlm.nih.gov /pubmed/22174125, www.healio.com/ or http://researchrepository.murdoch.edu.au/4422/, etc. It is important to note that above mentioned nature of sports games (considerable volume of skills necessary for the top game performance) supports rather the concept of training adequate to age. Early specialization, aimed at the fastest possible attainment of top performance, seems to be easier in sports with lesser number of necessary skills or with pronounced dominance of dependence upon only one motor ability. In these sports it is therefore often possible to achieve top performance level in the relatively young age. Top performance in sports games requests high level of tactical skills that are dependent on the abstract thinking, which is not yet fully developed in children's age.

In spite of that it had occurred in Czech expert circles during the last time period several recommendations indicating a departure from traditional request of the appropriate to age training's concept. We have encountered them during various seminaries (only seldom in literature) and it should be noted, according to our opinion, it seems rather the effort to find out a new view upon the concept of appropriate to age training than the real preference of the early specialization. In general the universal training is supposed to be one of the principal characteristics of this concept. The universality according to Perič (2012) can be broken down to:

1. general (exercise, its content does not relate to content of the specialization),
2. specialized (uses instruments, their character corresponds to motion activity of the given sport branch),
3. special in the frame of the selected sport (e.g. in order a soccer player to be able to play in all players' functions – defender, halfback, etc.).

Based on own empirical experiences we assume that in many cases is the universality narrowed to the activities presented in category one. And its absolute preference is the cause of certain criticism of the appropriate to age concept.

Above given facts led us to considerations, whether training of children and youngsters (whose traditionally requested character is described in the following paragraphs) runs in concordance with demands determined by respective sports federations also in the new social conditions. Whether at all and if yes then by what way the nature of children and youngsters' training keeps changing in sport games generally or in respective single games (handball, tennis, volleyball) specifically.

For better orientation in the entire set of issues we specify brief review of basic requests upon the training of children and youngsters in selected sports games yet before formulating our goals, scientific questions and research methods.

YOUTH TRAINING IN SELECTED SPORTS GAMES

Handball

Handball's concept of progress in onset of learning and training (disregarding whether in environment of schools or clubs) respects the stages of sports training. In the stage

of sports pre-preparation it however has its specific features, for the general awareness about the nature of handball is smaller than in some other sports games (as e.g. volleyball, soccer). Besides self-creating the relationship to playing sports at all and the habit of the regular sports activity, it is necessary on top of that to familiarize beginners not only with elementary skills, but also with elementary rules enabling realization of matches.

The general principle of beginners' game simplification is practically applied by utilization of "minihandball" (in some sources named as "handball 4 + 1"). Our (Černý, 2007) as well as foreign (Hjorth, 2009) authors coincide in opinion that diminished playing court, decreased number of players and simplified rules determining playing the ball enable quick comprehension of the game principles. Having in the field four team players facilitates relatively high frequency of direct ball's contacts and due to it also increases the probability of successful intervention into the process of game. All of that influences positively the motivation to further activity. Enjoyment of the game itself is in this particular stage preferred over the match result and over the competition's rank (often even not determined). From the content point of view the training is aimed at acquisition of elementary skills as throw, jump, and movements with changing directions or assuming defensive positions. Man to man defensive system and attack against it are applied during the game.

In the stage of basic training the focus on acquiring basic skills persists further, including the enlargement of their "reservoir". We emphasize their initial learning by the form of presenting game tasks (Šafaříková, 1998), while prioritizing the correct task's solution. The degree of competence in solving game tasks is checked in matches. Therefore this is why further prevails the preference of tasks solving evaluation over the result itself.

Regarding to the stage of biological development it is recommended to promote the "universality" of players. By other words, during this training stage the specialization for respective playing functions is not desirable. On the opposite, it is recommended, players to rotate in respective playing functions (within the initial phase of this stage, including the position of goalkeeper) during season. Due to this approach and beside other, players gain important experiences for initial learning of cooperation. Even though the participation in regular competitions is necessary, the final rank should be the secondary factor.

With regard to the fact that players have already gained certain experiences with playing, the time occurs for transfer from minihandball to competitions with standard rules. This stage falls usually to the period susceptible for development of velocity. Priority should be given to velocity exercises, and not only in the sphere of general universality, but also in the frame of already acquired skills' improvement. In this particular place we consider as necessary for this stage to mention importance of the educational influence. Taking part in regular competitions with need to respect other participants of a match (teammates, opponents, referees, etc.) offers a lot of occasions to such activities. Through the creation of necessary playing relations within a team it is possible, as well, to influence upon and to create further (formal as well as informal) relations and influence thus upon the process of respective players' socialization.

During the stage of "specialized training" the training focus moves to cooperation, specifically in small groups of players. In elementary forms of cooperation (elementary game combinations) it is supposed, players will acquire them to such extend in order everybody to be able to realize them with everybody. On the other hand this stage is connected with

the outset of narrower specialization of single players to their respective playing functions. The initial teaching by the form of exposing players to the game tasks persists also in this stage. For players being motion-wise well prepared from the previous stage it is then also possible to increase emphasis upon the tactical aspect of a game task's solution. As far as basic skills are concerned, we focus in this stage on their variability. Unless the quality of execution will not drop down, will this stage mean the occasion for granting players some space to create their own game style. The growth of game skills quality significantly influences the character of operations aimed at the development of respective motor skills. Specifically in the sphere of strength preparation it is possible, thanks to the period of biological development, to apply more demanding methodical procedures. The placement in regular competitions (especially in later phases of this stage) is now already an important factor for evaluation of the training's quality as well as of the game performance. Priority given to the competition rank and points gained assigns, however, at the same time higher demands upon moral and ethical qualities of each individual player. The educational potential of competitions therefore is not negligible.

Tennis

Tennis is primarily an individual sport. Provided that players specialize themselves for doubles, it happens as a rule in the second half of their careers, when – because of condition reasons – it is possible to play longer on the elite level. Up to 12 years of age the most important factor in match is created by the technique. Afterwards it increases the significance of the condition and mental strength that become the most important factors in the adulthood (Crespo, 2005). There is relatively large variability of approaches to training of youth in tennis; the opinions about early specialization are summarized e.g. by Šafařík (2012).

In the stage of sports pre-preparation it is recommended to adjust tennis to children by such a way in order them to be able to realize all game situations in training matches in regard to their body proportions. In practice it means diminishing the court, lowering the net height and use of special balls. The rules are significantly simplified (mini-tennis, baby-tennis) and also score's calculation is different. Up to 10 years of age there are no rating standings and girls play together with boys. Individual and team competitions are organized, their intention, however, is the introduction of young players into the competition's system and acquainting them with the competition environment. The result itself should be understood as a byproduct and the course of a match means feedback enabling further planning of training. The content of training, beside general development of coordination, is created by basics of tennis technique and elementary tactics realized in different game situations. Tennis strokes result predominantly from movement patterns of throws. Because of purely practical reasons mini-tennis courts use to be marked off on regular tennis courts. It is, of course, necessary to have portable low net. Slow and low bouncing balls facilitate realization of larger number of tactical variants (e.g. movement to the net). Using these balls makes also easier to keep the ball under control and therefore alive longer, what decreases frustration from failed strokes and increases motivation.

Acquisition of the special tennis strokes follows also in the stage of basic training. Singles game is added by doubles which contains usually more game skills at the net

(volley, smash). In spite of the fact that doubles are very good supplement to training, their utilization in practice is often insufficient.

It is suitable to use larger scale of didactic styles, especially in case of preparatory games, where players themselves can discover possible solutions of game situations. It is recommended to alternate types of balls and transfer practice to the larger courts. In conditioning there is further developed coordination and velocity, where the focus goes to their special forms with short dashes and changes of directions. As important there is also the initial teaching of specific ways of tennis locomotion. Some matches in singles competitions are played without a referee and that is why it is necessary to familiarize players with principles of fair play and respect to an opponent.

In the stage of specialized training players already profile themselves to the certain style of play. High level technique's mastery enables transfer of attention to its efficient utilization. Speed and placement's accuracy together with variability of strokes and court's cover becomes main tasks of training. In correlation with the performance also the player's mentality gets the importance – that is in tennis, regarding to its demands, one of the most important factors. In conditioning it is used a lot of methods and importance of the strength training increases. Velocity or agility continues to be the principal prerequisite for success. Because of tennis being an individual sport, its training requests for considerable individual planning. That must be adapted not only to somatic characteristics, but also to assumptions from the point of condition view and to the personality of a player. Standing's rank already use to have a great importance in the entire system specially regarding to the further selection to training centers. A coach is also responsible for development of will and ethical principles, for players are often exposed to excessive pressure, resulting from the competition system, variable duration of matches, and ban of coaching or nature of the game with permanent interruptions.

Volleyball

Volleyball is the team, net and non-contact game. It means, there are no personal contacts on the court that could lead to injury of players. Volleyball lays certain demands from the technical-tactical aspects. Players must cope with ball's volleys and hits performed by various techniques, but within the frame created by rules. These ball contacts then allow for realization of basic skills and their sequences again for game combinations. These two phenomena create the real beauty of the game. During its development volleyball has become good-looking, exciting and often also thrilling game attracting large amounts of spectators both directly in stadias as well as in front of TV sets (Buchtel et al., 2005a).

In children and youngsters categories volleyball training posseses task to develop sufficient level of the motor abilities' complex, which will prepare its participants to achieve optimally maximal, and long-term lasting performances. The attainment of a high performance during major competition events, like OG, WCH and ECH, use to be assessed as the most valuable in majority of instances.

Above given goals make clear that youth volleyball training should come out from the general orientation, which however have to be in concordance with the specialized focus. General part then will be realized together with the specialized part, it means with

that, which aims predominantly at the elementary learning and improvement of volleyball game skills and knowledge (Šrámek, 2011; Buchtel, Ejem, Vorálek, 2011). The accomplishment of knowledge and skills enables future desirable performance, which we understand as behavior of a team (a player) in the course of a match (sets). As specialized training concerns, we can look at it from two points of view:

a) Regarding of the volleyball game skills, resulting from initial learning and improvement of all game elements, theirs acquisition is necessary for realization of the game on elite and advanced levels;
b) Regarding of the training adapted to requests of specialized playing functions in a match (Buchtel, 2005b; Zapletalová, Přidal, Tokár, 2005).

Content of volleyball training is created by four components – technical-tactical development, conditioning, psychic development and regeneration (Buchtel, Ejem, Vorálek, 2011).

Technical-tactical development requests to cope with basic skills in order to enable execution of respective ways of ball contacts from the technical-tactical aspect. It is performed in training by the help of corresponding organizational forms and didactic methods leading to the final phase of motor learning. In connection with above it is not possible during initial learning and training to omit the unity of technical and tactical aspects of all game elements, providing the tactical aspects (selection of the most suitable solution of a game situation) is dominating and the technical aspect (the way of ball handling) is inferior. Basic skills then facilitate successful match utilization of game combinations by what we mean the mutual cooperation of two up to six players that collaborate for fulfillment of a game task in momentary game situation.

Into the motor program built by technical-tactical development it is yet necessary to embed another component of training content, by which we mean further dynamic characteristics of a movement, as parameters of velocity, strength, coordination, etc.

The third component of the youth training's content – psychic development – strongly effects and influences predominantly upon the fact, players strive, in the course of a match, to realize all what they had earlier mastered both from the mental and motor aspects. Moreover without stress, which develops mentally demanding and difficult states. Tuning to such actual psychic state, which enables realization of all, what they have already mastered, that is the task of players' mental development.

The fourth content's component – regeneration – plays in current advanced and top training of youth permanently increasing role. Using all its means and forms, it effects the removal of fatigue after training and game loads and leads to preparation to further stress loading, that will be brought by next training units and competition matches.

GOAL

Opening chapter of our contribution provides readers by review of advantageous procedures recommended for the training of children and youngsters in order them to reach high and permanent game performance in adulthood. The authors repeatedly dealt with

a question, how these procedures, theirs basics originated yet from the times of significantly different social conditions, function in contemporary situation. Pronounced orientation of the society to profit and the endeavor for the quickest possible return of expended effort and means could significantly influenced the approach of coaches and clubs.

Goal of our research was to find out – based upon coaches' responses – the current situation concerning content, organization and forms of children and youngsters training in selected sports games. Regarding to the professional orientation of authors the research subject focuses on handball, volleyball and tennis. This composition – one goal game, one net game, and one individual game – can serve as a certain profile of sports games.

Scientific questions

What are the personal characteristics of coaches, who shares the conduct of training in clubs participating in top competitions of selected sports games?

How does the training of children and youngsters in respective sports games progresses and to what extent it respects above described procedures?

Presupposed research outcome should be the acquirement of information about situation in sport training of children and youngsters in sports games – handball, tennis and volleyball – which consequently can become an impulse for possible corrections of coaches' educational systems in respective sports federations.

METHODS

Method of data acquiring

For our research we have used the method of questioning by the form of non-standardized questionnaire with closed and half-opened queries (Bedrnová, Nový, 2007; Punce, 2008). This questionnaire was distributed to 125 handball, 78 tennis and 147 volleyball coaches using the below given way. The total number thus reached 350 coaches.

Questionnaires were sent electronically to e-mail addresses of coaches. Distribution of questionnaire to respondents, and its simple completion by answering questions, was performed by the help of Internet software www.vyplnto.cz. Coaches marked their answers just by a click only and then followed by successive marking of all other questions which were in total 18. After completing the last one a coach marked command "send questionnaire". By this final step the questionnaire was returned to sender. The questionnaires were anonymous.

Characteristics of the research sample

Respondents – coaches, who returned completed questionnaires, were totally 234, and created research sample. Out of this number there were 102 volleyball, 63 handball, and 69 tennis coaches.

Return rate calculated from all questionnaires was considerable – it totaled 66.86%. Above mentioned games were selected intentionally because they could be broken down following a few classification keys: "invasive and non-invasive", "goal and net", and finally "team and individual" games.

Method and data elaboration

To collect and elaborate data we have used method of questioning by the help of non-standardized questionnaire with closed and half-opened questions. We expected that such selected and adapted methods can provide inspiring responses based on highest possible number of returned questionnaires (Pauknerová et al., 2006; Surynek, Komárková, Kašparová, 2001). Acquired data was analyzed specifically to respective questions and in sequence with their order in questionnaire. Quantitative characteristics were expressed in absolute and relative frequencies. To exemplify presentation of results we have used graphical illustration of answers. Results are arranged according to questions in the questionnaire and supplemented by discussion to respective subjects of our study.

With regard to the research intention we have divided team coaches according to the below given age categories of teams' players that ranged from six to eighteen years of age. The observed sample therefore contained teams of:

- mini-pupils (preparatory units, pre-preparation),
- younger pupils,
- older pupils,
- so called "youth" or "cadets" (younger teenagers),
- juniors (older teenagers).

These were teams of youngsters from clubs, theirs teams will in current season participate in one of the two top state competitions – extra league and I. national league of senior men and women. We supposed, this means teams on elite or advanced levels. Regarding to clubs of such performance level it is possible to deduce that their care for youth teams is well established from all possible aspects. And this care is primarily motivated by the objective to educate young players of both genders capable to present optimal performances on elite level in adulthood.

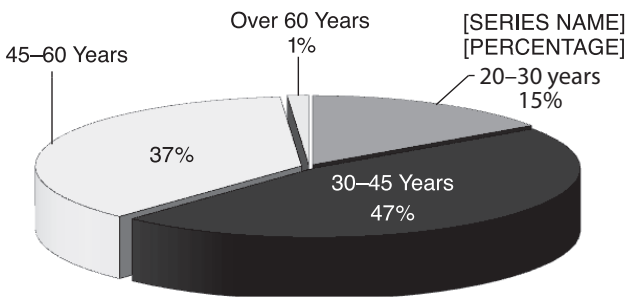
Utilized questionnaire was in the very first part created by eight identifying questions. We have expected they provide information about each individual respondent (e.g. age, civil and coach's education, duration of coaching practice, etc.) The second part was created by five factual questions. These questions were aimed at providing information relating directly or indirectly to the subject of study – in our case to the field of children and youngsters training's specialization in sports games. The third, and the last part of questions, was aimed at the training field again, but resulting from the peculiarities of each of the three studied sports games. It contained five to eight questions and obtained information will suit primarily to each individual sports federation handball, tennis and volleyball respectively. Results of this part therefore are not topic of our contribution.

RESULTS AND DISCUSSION

Question No. 1 ascertained gender of respondents. The composition of observed sample from the point of gender view is very imbalanced. Women create not full quarter (23%). We only can speculate that the predominant part of our sample performs coaching as free-time activity (the rate of professional coaches was not observed) and in most part of cases men have apparently for this particular type of voluntary activity much better conditions. On the other hand our society accepts just as a mere fact high rate of females among school teachers. And regarding to the fact that representatives of educational professions make 57% of observed sample, we could assume higher percentage of women. In the reality, however, women create also only 23% from our sample's "educational" subpart. Whether is this phenomenon specific for P.E. teachers only we, however, cannot assert, for we do not have trustworthy data concerning the ratio of women in P.E. teaching at schools. Distinctive differences we, however, find in respective sports games. While the percentual representation of women in volleyball and handball (25% and 28% respectively) resembles their representation in the entire studied sample, the share of women in tennis creates only 13% of the observed sample of tennis coaches.

An interesting phenomenon was found by analysis of achieved level of coaching education. While in the group of coaches with highest possible license the ratio of women (25%) corresponds to the entire sample, in the lower group (license B, second degree) the ratio of women drops to mere 11% and on the opposite in groups with lowest qualification or without qualification at all the share of women increases to its highest values (33% or 28% respectively). Also in this particular case we find differences among respective sports games. Tennis creates the significant extreme, where all women in studied sample (n = 9) possess the highest coaching license! In handball and volleyball we find the same percentual representation of women in the entire sample and in the group of lower (B, second class) licenses (14 and 15 respectively). The higher share of women in the group of coaches with highest license was found in handball (42%, while volleyball 31% only); on the opposite, then, the ratio of women in the group of coaches with the lowest or none licenses is higher in volleyball (35% and 40%) than in handball (30% and 17%).

Question No. 2 dealt with the age of respondents. For this reason the below given categories were created in advance. Age distribution of studied sample is illustrated on graph 1.



Graph 1. Age group of coaches

Age group 30–45 years scores the highest number of cases. According to our opinion this fact suits to long-term trend of transition to coaching activities after finishing playing career. Moreover it is possible to consider also current tendency of delayed parenthood, which finds the age of 40–45 years as period when own children grow to the age of beginners (around 10 years). A lot of coaches recruits from among of parents.

As a positive phenomenon we consider also the not negligible occurrence of the age category 20–35 years. Younger coaches mostly understand better to the needs and behavior of children and shorter age difference may mean also an advantage in establishing communication. In many cases this age group possesses also better time possibilities (specifically at the beginning of this period the group does not use to be bothered by worries about family). On the opposite quite exceptional occurrence of category over 60 years is, according to our opinion, clear reflection of hardness induced by coaching work with children and youngsters. A majority of higher age categories' citizens considers this activity as something beyond their possibilities and interests.

Should we evaluate the age composition according to respective sports games, we are finding the correspondence in the case of category 20–30 years (handball and tennis 16%, volleyball 15%). As to some extent alarming fact for volleyball seems that reprezentantives of the group of 45–60 years of age create over the half (53%) of observed sample. The hypothetical question emerges whether this fact cannot reflect into the preference of more conservative approaches to training. On the other hand in tennis the category of 30–45 years significantly dominates (71%). We can only speculate, whether in this case the role plays the combination of adequate game experience and at the same time yet sufficient condition preparedness or some other causes. Taking into account this point of view the coaches of handball are distributed the most evenly (44% and 35% respectively); on the opposite, however, it is necessary to mention that sporadic representatives of the category over 60 years can be found exclusively in handball only.

Question No. 3 asked about civic occupation. This was a half-opened question. As the very gratifying reality we assume that P.E. teachers create almost three fifth of our sample. That's because training of children and youngsters needs to respect the whole number of laws and procedures, teachers are acquainted with much deeper during their preparation for occupation than it could be enabled by any coaches' courses or instructions. With regard to the main orientation of this article it is therefore possible to suppose that major part of the observed sample is familiarized in detail with the topics of early specialization or appropriate to age training. That appeared also in answers to further items of our survey. A number of parents possesses job duties until late afternoon hours and have not, then, possibility to accompany children to training units in sports clubs (especially in larger cities, where it is for small children indispensable). The sport training of mini and younger pupils in school groups or in school's sports clubs (together with support of organized sports clubs) seems to be an optimal solution. Children stay in known environment, being observed by known persons and thus to carry on sports activity is for parents much more acceptable and easier solution.

Also in this particular case the overall sample's characteristics is influenced by different situation in respective sports games. While in tennis and volleyball P.E. teachers create more than 3/4 of all coaches (83% and 76% respectively), their portion in handball

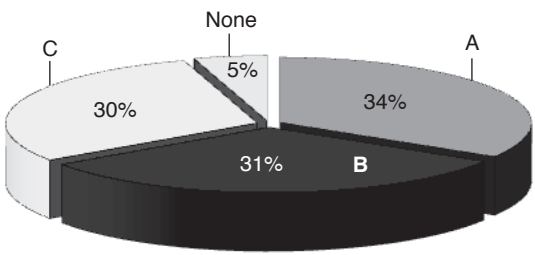
reaches neither the entire 1/3 (29%). With a really high probability this situation can reflect into the qualitative aspect of training process, especially then in younger age categories.

Question No. 4 detected general education of coaches. 65% of surveyed sample reported university education. And regarding to the age composition of our respondents we have to state that this result was not influenced by a certain "inflation" of higher education, which could be observed within society during last years. To complete the information we indicate that university educated P.E. teachers create 41% of our entire sample.

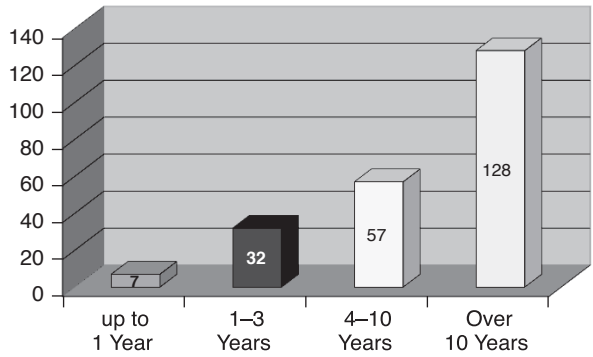
Similarly to the previous characteristics we find also here marked difference between volleyball and tennis on the one side and handball on the other. While in volleyball and tennis more than half of coaches possesses university education (76% and 65% respectively), the part of coaches with the same education in handball is significantly lower (41%). The decesive role in this case can play the fact that volleyball and tennis belong among traditional university sports.

Question No. 5 concerned the special education, therefore the coaching qualifications. The sample, followed up by us, possessed the uniform representation of coaches from each of the three qualification grades, what is well seen on the graph 2. Without coaching education there were only 5% of responding persons. They were dominantly coaches of younger categories. Even though coaches of youngest categories also need coaching education and some practical experiences, it is understandable that commencing coaches often start in these mini-categories. The most coaches bearing licence A was in the sample observed by us among tennis coaches (69%), handball and volleyball then identically hit 19%.

Question No. 6 identified the duration of coaching practice. Respondents were asked to mark one of the four below given possibilities. Practice duration within the group of queried coaches is shown on the graph 3. The most frequently coaches completed practice longer than 10 years. These coaches obviously work often with teams participating in highest competitions and leagues. 84% out of them are men, it means that in this subgroup the ratio of men is larger than in the entire observed sample. It is also interesting that women with such length of practice work with practically all categories of youngsters. Taking into account the length of coaching practice differences among respective sports



Graph 2. Coaches according to coaching education



Graph 3. Coaches according to practice duration

games were insignificant. Coaches with practice longer than 10 years created majority in all three games. They created 58% in tennis, 55% in volleyball and 51% among handballers.

Question No. 7 concerned age categories. As for categories of players coaches work with, there was the possibility to mark more answers. Totally 79 coaches got involved with the youngest category, up to 10 years of age, called by us altogether as "mini". Out of this group 67% are teachers or professional coaches. Majority of them falls into the age category 30–45.

Majority of them falls into the age category 30–45. The largest share of coaches in this age category was found in tennis (41%), followed by handball (38%) and finally in volleyball (26%). 87 (37%) and 69 (29%) coaches worked with categories of younger and older pupils respectively. So called "youth" category attracted 47 coaches. Tennis recognizes only one category for "teenagers", which takes four years – in this particular group we found only 6% of responding coaches. Category of juniors (older "teenagers") then contains results from handball and volleyball only and the entire number of coaches, who marked this category, was 49 (21%). Out of these two sports games volleyball prevails having 29% while handball only 16% working with this category of category of children.

Question No. 8 ascertained the highest competition level youth teams of surveyed sport clubs participate at present year. Regarding to the state of performance in sports games studied by us we had created the three levels. The very first level occupied the highest possible national competitions. The second one made the lower competitions on national level and the last level was set for the competitions on regional and district levels. We had to adjust the partition of competitions in each sports game to both member base of players licensed in Czech Republic and our own experiences. Distribution of coaches according to the competition to which they prepare their teams of youngsters and starting from the highest competition yielded following percentages – 28%, 24%, and 48%. Out of all coaches working with teams in highest divisions 43% owns also the highest degree of coaching education, this amount slightly drops to 40% in the second level and

significantly lower, to 25% only, was reported this level of education in the competitions' the lowest level.

Looking at the studied criterion from the point of view of respective sports games, the largest ratio of teams in highest competitions grasped tennis. This is due to different structure of competitions in this sport, for the top regular youngsters' competitions in tennis are competitions in regions. And that's the reason why they are most frequent in the frame of the entire Czech Republic. The same percentages in volleyball and handball arrived both at about 25% of clubs.

Question No. 9 detected attitudes of coaches to the importance of mini-categories for the given sports game. The question was closed and offered four possible answers shown below. Only one tenth of all coaches is fully convinced about the necessity to complete mini-categories. The support of realization yet preparatory phase before the stage of younger pupils in this group of respondents is small because these coaches are not ensured sufficiently about its importance for further education of young players.

The most frequent defenders of preparatory stage's inevitability are tennis coaches (27%) comparing to volleyball (6%) and handball (4%). It results from the fact that initial learning and following improvement of skills in tennis request longer time as well as by experience that young players must be able to rival evenly adult players already in the age of 16–18 years, if they should get success in adulthood.

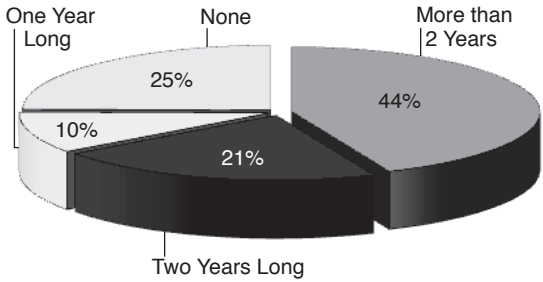
The next group, containing almost half of all coaches, these mini-groups recommends. This is surprisingly high percentage. It could be caused by the low level of work in preparatory phases where there are employed coaches with inferior levels of theoretical knowledge and practical skills.

Another 22% of coaches responded that children rather do not need to go through such preparatory phase of training and 27% supposes children do not need to complete it at all. These opinions were more presented at handball coaches (37%) followed then by coaches of volleyball (17%). They were in majority of cases coaches from the age group 45–60 years of age, therefore the generation that perhaps did not catch up flexibly enough the introduction of new training and teaching procedures. These situation did not occur in coaches of tennis.

Question No. 10 requested respondents, whether clubs, they are working in, have teams participating in competitions of younger pupils and whether there function yet teams belonging to so called preparatory categories. They are created by children of still younger age. Teams of mini-pupils use to be divided according to age and undergo one-year, two-year or longer training aimed at sports games. There, however, can also happen, clubs have no teams of mini-categories.

Results obtained to this question are well shown on the graph 4. This graph shows convincingly that almost half of all clubs possesses preparatory groups, which realize training longer than two years before they enter category of younger pupils. Clubs with mini-groups of two or one year durations exhibit the very same percentage value (21%). And one tenth of clubs only have no preparatory unit in mini-categories.

Taking into account just only selected sports games, we see, the highest percentage in using preparatory units occurs in volleyball (94%) and handball follows with (87%).



Graph 4. Preparatory categories in clubs

Tennis also organizes individual competitions for players of age from 6–9 years. Our question, however, dealt with competitions of teams only and that's why the obtained data point from tennis is the lowest one (29%).

Results of our survey can create a good news for training of sports games in pupils' categories. This information could activate and lead coaches to better quality training in categories of pupils, possibly also in youth categories. This activity could also be one of the pronounced factors, which improve players' prerequisites to their high performance level in adulthood.

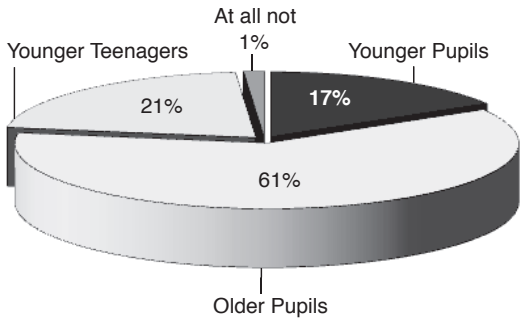
Question No. 11 requested the choice of one from two alternatives concerning training. The first one expressed focus on elementary learning and acquisition of such game skills, which can also be used by other sports games. The same was valid for general development of motor skills, too.

The second alternative expressed focus on elementary learning and acquisition of such specific constituent game elements that will be needed in the next years for realization the game ensuing from team systems with specialized functions of players.

The question was therefore aimed at the degree of early specialization in practice of youngest categories. The first alternative was selected by 92% of coaches, while the second one by the remaining 8% only. The opinions of coaches were distributed equally in all three sports games (handball 94%, volleyball 88%, tennis 87%). It is therefore possible to claim that very significant part of coaches supported the universality in the training of young players.

Question No. 12 pointed out that realization of elementary learning and training adapted to specialized demands of playing functions is based upon the game systems of top senior teams. Coaches were asked to express their opinion on at which age category it seems suitable to start players' specialization in selected game systems used in senior age. They could select from categories existing in Czech Republic, namely: younger and/or older pupils, younger and/or older "teenagers". They also could express opinion saying there should be no specialization at all.

Opinions resulting from answers to this question are illustrated in graph 5 in percentages. The best chance to start specialization admitted by more than half of respondents means its beginning in the older pupils' category. Percentages defending the same opinion

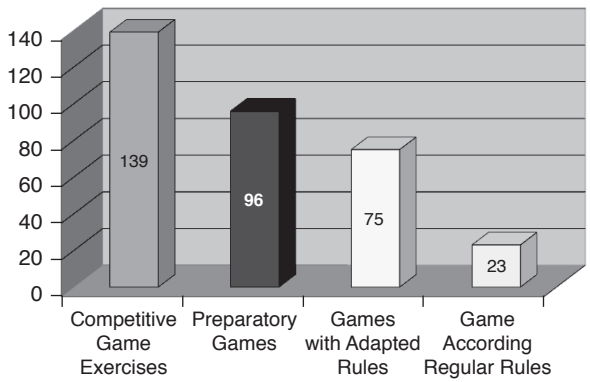


Graph 5. Since what category specialization is recommended

in other categories – younger pupils and older "teenagers" – are significantly lower. Obtained responses correspond to current opinions on training in other sports games, too.

Aiming at the respective sports games we get following responses: 76% of respondents in volleyball agree with the specialization's beginning in the category of older pupils. In handball 60% of coaches recommends to start specialization in older pupils category, but 19% of respondents would prefere starting already in younger pupils. The view upon specialization in tennis seems to be to some extent different; this is due to the fact, there do not exist specialization in playing functions. The question, therefore, aimed at the game styles and in connection with that 32% of coaches recommended to start with specialization in category of younger pupils, 36% would select older pupils and finally 32% opt for category of cadets.

Question No. 13 inquired about methodically-organizational forms used by respondents in elementary learning and improvement. The answer is evident from the graph 6, which revealed that the highest frequency was registered by the utilization of competitive game



Graph 6. Use of methodically-organizational forms

exercises. Preparatory games ranked second and the third place was occupied by games with modified rules. Quite low frequency was hit by games with valid regular rules.

Building upon the results obtained in our survey it is possible to deduce that the frequency distribution of responses correspond to current theory dealing with training issues. Coaches not only know it, but they also utilize it in their training practice. This fact entitles us to express very good opinion about theoretical knowledge and practical command used in training of pupil and teenager categories.

CONCLUSIONS

Our survey provided information about opinions of coaches upon conduct of training and its realization in various categories of youngsters in the Czech Republic. It had shown also the organizational level and conditions secured in sports clubs enabling education and upbringing of young players.

As concern the sphere of coach's qualification we consider the even distribution of coaches of all three grades as satisfactory. Also younger coaches gradually engage into practice what provides clear presupposition for introduction of newer procedures, forms, means and methods – acquired from educational institutions – into real practice.

Positive finding is also the unequivocal preference of all-round training to training specialization. It is recommended by majority of coaches as late as from the category of older pupils. Next positive aspect is fact that in full half of clubs, especially where questioned coaches function more years, there operate preparatory units for the period longer than two years yet before the category of younger pupils. Preparatory units operating two and one year record the same frequency – 21%.

Negative ascertainment was revealed by information that only one tenth of coaches assumes as the necessity, players yet before the transition into the category of pupils went through preparatory units in their own or other clubs.

Comparing handball on the one side with combined volleyball and tennis on the other, we find there less coaches with university diploma and less coaches being professional in their coaching job. Tennis possesses more often younger coaches (30–45 years) holding university degree. Also volleyball includes into training process coaches with university diploma, however they are older in average. Comparing to handball and tennis volleyball owns also the largest amount of preparatory units in clubs.

As the conclusion it is possible to state that performed survey brought interesting and imaginative information that can help in improvement of training in handball, tennis and volleyball. Attained knowledge can also be used by corresponding sports federations in the area of coaching education, dedicated to coaches of pupil and teenager teams of all performance levels.

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SPECIALIZOVANÝ TRÉNINK DĚTÍ A MLÁDEŽE VE VYBRANÝCH SPORTOVNÍCH HRÁCH

JAROSLAV BUCHTEL, TOMÁŠ KOČÍB, MARTIN TŮMA

SOUHRN

Studie má dva základní cíle. Prvním je analýza osobních charakteristik trenérů působících u družstev mládeže v klubech hrajících první a druhou nejvyšší soutěž dospělých v házené, tenisu a volejbalu. Rozbor je proveden z hlediska kritérií věkových, úrovně edukace a pohlavního složení. Druhým cílem je analýza průběhu sportovní přípravy dětí a mládeže v uvedených sportovních hrách z hlediska respektování svazových doporučení týkajících se obsahu tréninku v jednotlivých věkových kategoriích včetně zjišťování názorů na počátek specializovaného tréninku pro jednotlivé hráčské funkce.

Výzkumný soubor tvořilo celkem 234 trenérů (102 volejbal, 69 tenis, 63 házená) kteří odpověděli na zaslaný nestandardizovaný dotazník s polouzavřenými a uzavřenými otázkami (celková návratnost činila 67 %). Použitý dotazník obsahoval osm identifikačních a pět meritorních otázek. Kvantitativní charakteristiky jsou vyjádřeny v absolutních a relativních četnostech, pro přehlednou prezentaci výsledků jsme využili grafického znázornění odpovědí. Otázka se týkaly hráčů a hráček startujících v soutěžích v kategoriích od cca 8 do 19 let.

Co se kádrového složení týče, převážnou část sledované skupiny tvoří trenéři věkové kategorie 30–45 let, přičemž žen je asi jedna čtvrtina celého souboru. Výrazné rozdíly mezi jednotlivými hrami jsme nalezli v oblasti edukační. Zatímco v tenisu a volejbalu tvoří vysokoškolsky vzdělaní trenéři nadpoloviční většinu (65, resp. 76 %), v házené je jejich podíl jen cca 40 %. Stejně tak rozdílné je i zastoupení učitelů TV v rámci jednotlivých sportovních her – 83 resp. 76 % v tenisu a volejbalu oproti 29 % v házené. V tenisu je velmi nízké zastoupení trenérů, kteří se věnují dorostenecké kategorii (6 %). Rozdíly jsme nalezli i v názorech na nutnost existence

přípravek, tj. kategorií, které předcházejí mladšímu žactvu. Za nezbytnou ji považují především trenéři tenisu. Naopak výraznou shodu nacházíme v názorech na problematiku rané specializace – o její výhodnosti je přesvědčena jen úzká menšina trenérů (8 %). Trenéři volejbalu a tenisu se shodují v začátku specializace dle hráčských funkcí v kategorii staršího žactva, ve skupině tenisových trenérů nelze preferenci jedné věkové kategorie určit.

Klíčová slova: trénink dětí a mládeže, vzdělání trenérů, věkové kategorie, raná specializace

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TURNING AROUND A VERTICAL AXIS AS A MANIFESTATION OF HUMAN ROTATION AND ITS RELATION TO CONCEPTS OF UPPER AND LOWER LIMB PREFERENCE, DIFFERENCES IN RELATION TO GENDER IN ADOLESCENT POPULATION*

MARTIN MUSÁLEK, ŠÁRKA HONSOVÁ

SUMMARY

The current study was conducted in order to examine the structure and relation between rotation, item (turning around a vertical axis) and validated preference tasks for the evaluation of the concepts of handedness and footedness in the adolescent population. A total of 220 individuals from Prague high schools (males = 104, females = 116) in the 17–19 age range (mean age 18.1 years) participated. Structural equation modelling, specifically MIMIC models, showed that turning behaviour has a significant regression relation to the concept of "lower limb preference" $p < 0.001$. Participants with a right foot preference had a tendency to do rotation on the left side, whereas participants who showed a left foot preference in the tasks tested had a tendency to rotate on the right side. Moreover, in further processing of data by multigroup modelling it was found that the female population showed a slightly more stable preference of both locomotive organs than males, but a poor tendency in rotating. By contrast, the male population showed a significantly ($p < 0.01$) strong relation of lower limb preference and rotating around a vertical axis, in the sense of rotating on the opposite side than the preferred lower limb. The limitations of the study and further suggestions are discussed.

Keywords: laterality, turning behavior, asymmetry, preference, structural equation modeling, MIMIC models

INTRODUCTION

Human motor laterality manifestation is a multidimensional trait that is mostly perceived as a preference or higher performance in the use of one locomotive or sensor organ

* This study was supported by project PRVOUK039.

(Bryden, Steenhuis, 1991; Reiss, 1999; Rigal, 1992). An infinite number of experimental works has been conducted to examine human handedness and footedness; however, few of these studies were focused on the link between motor laterality manifestation and the attribute of rotation. This attribute involves rotation direction preference (turning around a vertical axis, circling when walking, etc.) (Patla, Prentice, Robinson, Neufeld, 1991) but its correct place in the structure of functional laterality in humans is still not fully understood. Current research suggests that the problem of turning behaviour and rotation is in humans related to the dopaminergic system, which some authors consider to be linked with handedness (Bracha, Livingston, Clothier, Linington, 1993). This hypothesis was established on the basis of results from animal models, when animals like rodents, rats and cats turn preferentially on the side of the motoric dominance hemisphere with a higher level of neurotransmiter dopamine (Glick, Ross, 1981; Pycock, 1983). The key role of dopamine was suggested in studies focused on turning bias in populations with dopamine-related diseases (Bracha, Shults, Glick, Kleinman, 1987). Later, some studies proved that right-handers from the general child population, as well as from the adult population, prefer left-side turning (Day, Day, 1997; Mohr, Landis, Bracha, Brugger, 2003). However, research that tried to support this hypothesis by repeating measures of turning in daily routine processes, aimed at confirming its stability, did not find any significant relation to either handedness or footedness (Mohr, Lievesley, 2007). The majority of previous researchers were focused only on the expression of a direct relation between preferred side of rotation and indicators evaluating handedness and footedness. Štochl and Croudace (2013) proved a deeper view of the relation of rotation attribute and other concepts of motor laterality manifestation. These authors modelled, by means of the structural equation modelling method, several rotation items divided into specific concepts of local rotation (circular hand movement) and global rotation (turning of a whole body) with aspects of handedness as well as footedness. This research suggested that handedness and footedness are significant predictors of rotation (Stochl, Croudace, 2013). Nevertheless, this study, as well as most previous studies, used a questionnaire inventory to determine motor laterality manifestation. This meant that the attribute of rotation was not modelled with observable preference motor tasks for assessing the concepts of handedness and footedness.

The importance of evaluating rotation direction and its relation to motor laterality manifestation is evident in movement behaviour and in the field of sport, particularly in the process of talented children selection, space orientation (figure skating, gymnastics) and for solving key situations in team sports.

Therefore, the purpose of this study was to examine relation of rotation item (turning around vertical axis) with preference tasks to evaluate the concepts of handedness and footedness in the adolescent population. These tasks were taken from a recently developed test battery (Musálek, 2012). To determine the role of rotation in the structure of motor laterality manifestation, we used the structural equation modelling (SEM) method, a concrete confirmatory factor analysis approach with covariates (MIMIC) and categorical ordered indicators.

METHODS

Participants

A total of 220 individuals from Prague high schools (males = 104, females = 116) in the 17–19 age range (mean age 18.1 years) participated.

In order to support the selection, we used a complete list of high schools from Prague. With respect to the complexity of a randomized selection of probands from Prague schools and an accurate definition of the area of the City of Prague, we decided to obtain a research sample based on the method of purposive sampling which met the following conditions. In co-operation with the Institute of Educational and Psychological Counselling, high schools from each district of the city were selected. The probands representing the adolescent category were students of Prague general high schools without a specific specialization (art, technology, sports, languages). As we set the number of tested individuals at one school to 20, only those schools attended by at least 30 individuals of the given age were selected. Out of these schools, a list was created from which one high school was randomly selected from each district of Prague.

Indicators

A total number of 8 tasks include rotation item were used. Four indicators in upper limb preference part and three indicators in lower limb preference part. All chosen tasks were validated in study Musálek (2012). Its validity to individual concepts is in range r = 0.48−0.96. Reliability of both concepts expressed by coefficient McDonald ω:

Upper limb preference McDonald ω = 0.89
Lower limb preference McDonald ω = 0.85.

Used items:
Upper limb:
Throw the ball at the target. **THR (three repeating attempts)**
Erase the lines. **ER**
Use the pointer to point at the following objects. **POC (three repeating attempts)**, (participant have to show objects which are opossite to preferred upper limb)
Clap your hands. **CL**

Lower limb:
Demonstrate how you would write the letter T on the floor using one of your feet. **WT**
Kick the ball at the target. **KB (repeating attempts)**
Perform jumps forward using one leg. **HOP**

Rotation task:
Make a 360-degree turn. **TU**

Indicators: throw the ball at the target, use the pointer to point at the following objective, and kick the ball at the target are scored polytomously; other tasks are scored dichotomously.

Analysis

Since the study is focused on the modelling of relations between manifest and latent continuous variables, we decided to use the method of structural equation modelling. Specifically, we used confirmatory factor analysis with covariates (MIMIC) with categorical ordered indicators and multiply group confirmatory factor analysis with covariates (MIMIC) with categorical ordered indicators. These approaches provide appropriate techniques to evaluate structures in which reflective as well as formative relations of manifest variables are defined (Kaplan, 2009). In these techniques tetrachoric correlations for categorical binary data and polychoric correlations for categorical ordered data (polytomous) are used. Thus MIMIC for categorical data represents a suitable method for modelling ordinal categorical data, even if the data have a multidimensional character (Forero, Maydeu-Olivares, 2009). For parameter estimation we used, on the recommendation of Muthén and Asparouhov (2002), a robust weighted least square estimator. In order to determine the quality of a model, we also used several model fit indices: chi-square, model discrepancy (badness of fit) (Marsh, Hau, Grayson, 2005), and root mean square error of approximation (RMSEA) value lower than 0.06 indicate good fit of model (Browne, Cudeck, 1993). Furthermore we used comparative fit index (CFI) value higher than 0.95 indicates acceptable fit of model (Bentler, 1990) and weighted root mean square residual (WRMR) value lower than 1 indicate acceptable fit of model (Muthén, Muthén, 2010). Data were analysed in M-plus software version 6 (Muthén, Muthén, 2010).

RESULTS

We first tested one factor model upper limb and lower limb preference together with formative relation of rotation task on this factor called "preference of locomotive organs". We decided to evaluate how well a human global rotation attribute can be predicted by means of the concept of locomotive organs preference.

Table 1. Fit of the 1-factor model preference tasks with formative relation of item turning on "preference of locomotive organs" factor

Model	Chi-square	P-value	df	CFI	RMSEA	WRMR
1-factor	32.11	0.042	20	0.96	0.068	0.773

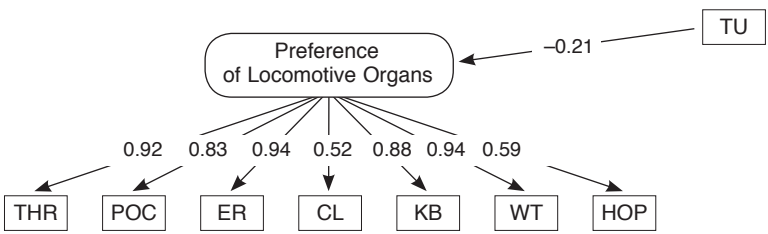


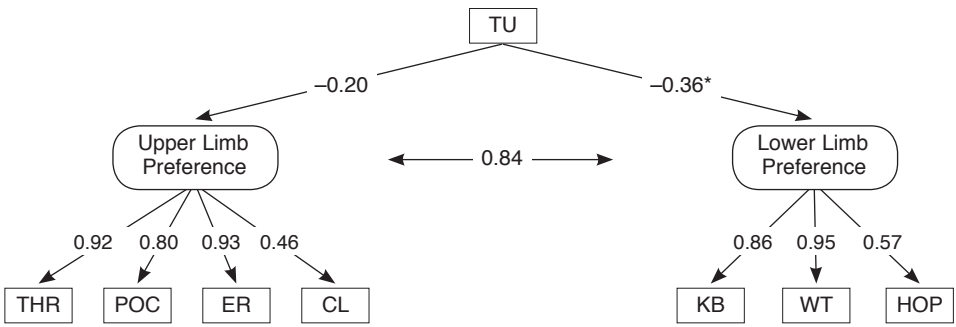
Figure 1. Path diagram of the 1-factor model preference tasks with formative relation of item turning (TU) to the factor "preference of locomotive organs"

The proposed model with a formative relation of TU item (make a 360-degree turn) on the "preference of locomotive organs" factor showed only average values of fit of the model, particularly indices RMSEA = 0.069 and WRMR = 0.976. Also P-value represented significance of model was under rule of thumb value 0.05. Further, from Fig. 1 it is evident that manifest variable TU, which represents the global rotation attribute, has a poor non-significant regression coefficient TU = −0.21 on "preference of locomotive organs" factor. Negative value means an inverse proportion between manifest variable TU and the "preference of locomotive organs" factor.

In next step we tested two factor models with separate dimensions of upper limb and lower limb preference and formative relation of rotation task on both factors.

Table 2. Fit of the 2-factor model preference tasks with formative relation of item turning to both limb preference factors

Model	Chi-square	P-value	df	CFI	RMSEA	WRMR
2-factors	12.11	0.417	18	0.99	0.012	0.238



* signigicant regression on level $p < 0.05$

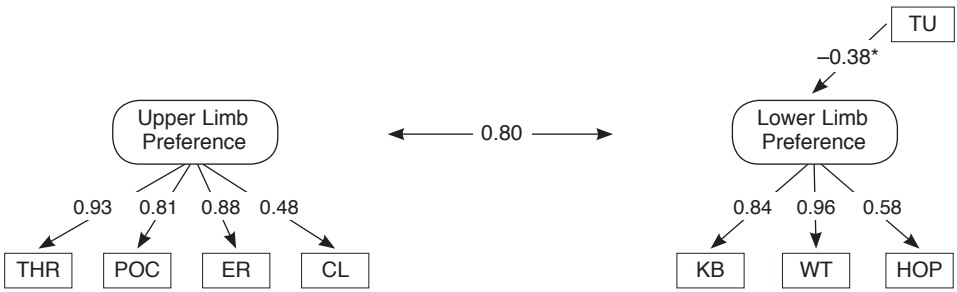
Figure 2. Path diagram of the 2-factor model preference tasks with formative relation of item turning (TU) on both factors

The proposed model with a formative relation of TU item (make a 360-degree turn) to the both factor showed above average values of fit of the model, particularly P-value = 0.417 and indices RMSEA = 0.012 and WRMR = 0.238. Further, from Fig. 1 it is evident that manifest variable TU, has significant regression on $p < 0.05$ to "lower limb preference" factor TU = −0.36. Generally a quite strong correlation between both factors was confirmed r = 0.84. Despite this strong relation, the entire structure could not be determined as a single factor because the fit of the model immediately deteriorated (compare Tab. 1 and Tab. 2). This finding supports results from the study Musálek (2012). The strong correlation is obviously due to the basic character of the factors. Both represent an assessment of the motor preference of paired locomotive organs; however, their uniqueness function (upper limb for manipulation and lower limbs for posture and walking) precluded modelling them together.

In subsequent modelling item TU left and modelled on the "lower limb preference" factor due to significance regression on this factor.

Table 3. Fit of the 2-factor model preference tasks with formative relation of item turning on lower limb preference factor

Model	Chi-square	P-value	df	CFI	RMSEA	WRMR
2-factors	15.64	0.386	20	0.99	0.023	0.434



* signigicant regression on level $p < 0.05$

Figure 3 Path diagram of the 2-factor model preference tasks with formative relation of item turning (TU) on "Lower limb preference" factor

After modelling the item TU to the "lower limb preference factor", the model fit was not significantly deteriorate and all indices expressed still above-average values. Moreover from Fig. 2, it is apparent that formative relation of item TU = −0.38 on "lower limb preference" factor remain significant on level $p < 0.05$. In addition, this relation means that right-footed people have a tendency to rotate on the left side and left-footed people on the right side. This means that footedness can in some way predict the rotation of a person. We assume that this result may be due to uniqueness function of lower limbs, posture, balance and locomotion (walking) where the rotation attribute probably plays an important role.

In further modelling we suggested that item TU expressing preference of rotation around the vertical axis could possibly have a different power of relation in the male and female population. Therefore we tested a so-called multigroup MIMIC model. This multigroup MIMIC models content overall chi-square value with the possibility to see definite chi-square for each sub-population. In tables it is seen as a value in brackets. The question was if items' factor loadings and the regression coefficient of the rotation item inside the structure in each analysed sub-population was also the same. The female subpopulation was tested first.

Table 4. Fit of the 2-factor model preference tasks with formative relation of item turning on lower limb preference factor – female sub-population

Model	Chi-square	P-value	df	CFI	RMSEA	WRMR
2-factors	43.53 (16.21)	0.099	41	0.98	0.066	0.786

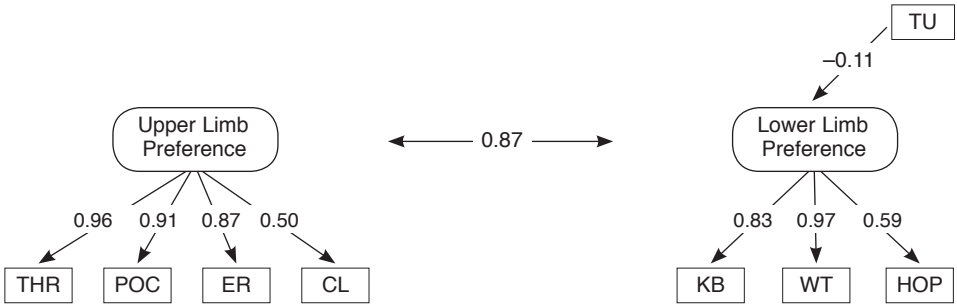


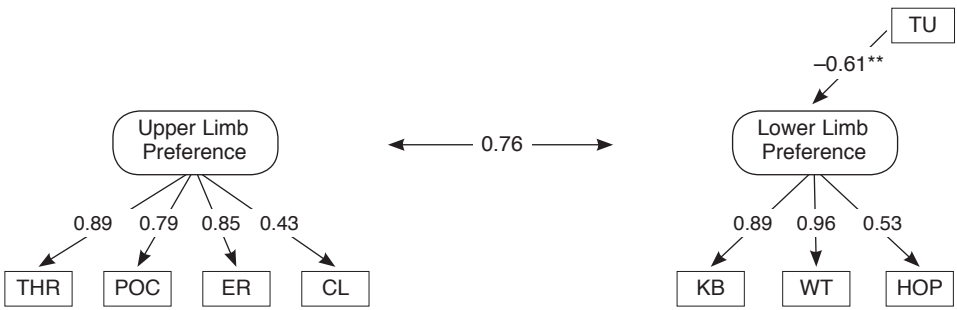
Figure 4. Path diagram of the 2-factor model preference tasks with formative relation of item turning (TU) on "Lower limb preference" factor – female population

Results from the female sub-population showed that items evaluating hand and foot preference have a slightly stronger relation to both concepts. However, item TU has with its value TU = −0.11 a non-significant formative relation on the "lower limb preference" factor. This finding can be explained in that females are probably more stable in hand and foot preference, but do not have a significant tendency in turning. Moreover, the correlation of factors was stronger in the female sub-population than in modelling with both genders together.

Based on these result we assume that the male sub-population will have significant formative relation of TU item to the "lower limb preference" factor.

Table 5. Fit of the 2-factor model preference tasks with formative relation of item turning on lower limb preference factor – male sub-population

Model	Chi-square	P-value	df	CFI	RMSEA	WRMR
2-factors	43.53 (27.32)	0.099	45	0.98	0.066	0.786



** signigicant regression on level p < 0.01

Figure 5. Path diagram of the 2-factor model preference tasks with formative relation of item turning (TU) on "Lower limb preference" factor – male population

By contrast with the female model, the male sub-population showed slightly weaker factor loadings of indicators assessing the preference of both locomotive organs. This result is also seen in the correlation between both factors, which is lower than in female model. However, from Fig. 4 is evident that the regression coefficient of TU indicator on "lower limb preference" factor was significantly increased compared to the female model. The difference between both regression coefficients was statistically significant at the level of $p < 0.01$. This outcome suggests that our male population is more stable in relation of lower limb preference and the rotation attribute. The negative value of the regression coefficient indicates again that there is an inverse relation between lower limb preference and rotation around a vertical axis.

DISCUSSION

The aim of this study was to examine the relation between preference tasks focusing on evaluating the concepts of handedness and footedness and the item expressing global rotation TU (turning around vertical axis) in adolescent population n = 220. The diagnostic quality and structure of the used indicator preference tasks, except for TU, was known from the study Musálek (2012). Since we evaluated the formative relation of item TU on the latent variables "upper limb preference" and "lower limb preference", we used the method of structural equation modelling concrete MIMIC models. First our results supported hypothesis that concepts preference of upper and lower limb measured by observed tasks is appropriate modelled rather as two factors structure. In addition structural hypothesis about the formative relation of item TU on both factors was defined. This modelling showed above-average values of fit P- value = 0.417 and fit indices RMSEA = 0.012 and WRMR = 0.238, however poor non-significant regression TU = −0.20 on "upper limb factor" was found. This result is not in absolutely conformity with the current suggestion of a Stochl and Croudace study (2013), where even handedness was a significant predictor of rotation attribute. These authors, who used a questionnaire approach for assessing motor laterality manifestation, modelled hand and foot preference factors together due to collinearity. A possible explanation of this difference could be in approach to assessing motor laterality, when we used directly observable preference tasks. The second model which contains the relation TU on the "lower limb preference" factor showed a non-significant deterioration fit and all fit indices values, regression coefficient of TU in this model TU = −0.38. This result suggests that the concept of lower limb preference can be in some way a predictor of rotation, with the conclusion that right-footed persons tend to rotate on the left side and left-footed person on the right side. This result supported the assumption of Mohr et al. (2003) about a link between opposite turning behaviour and side preference. To get more information about the rotation attribute in the adolescent population we modelled item TU in each gender. The results of multigroup MIMIC models showed that females have a slightly more stable preference in both preference concepts. This is obvious from different factor loadings in both models. This result is in conformity with the study Tan (1988). Item POC (Use the pointer to point at the following objective), when a tested person worked across natural axis of preference part of body from "upper limb preference" factor in particular proved this difference (see Fig. 3

and Fig. 4). In addition, it was found that relation of rotation attribute evaluated by item TU to "lower limb preference" factor modelled on both populations was significantly different $p < 0.01$. Relation of female TU to "lower limb preference" factor TU = −0.11, male TU to "lower limb preference" factor TU = −0.61. This outcome suggests that our male population is more stable with regard to lower limb preference and rotating around a vertical axis.

LIMITATIONS

The current study examined a large sample of individuals with respect to rotation and preference. However, there was one major limitation. It was not feasible to administer all aspects of rotation to the entire sample, and hence the item that expresses only the global aspect of rotation was chosen. Therefore, our results can be generalised only with regard to the relation between hand preference and foot preference and the item "turning around a vertical axis".

CONCLUSION

In summary, the current study assessed the relation of turning behaviour (turning around a vertical axis) (TU) as a manifestation of global rotation attribute to factors of hand and foot preference. The method of structural equation modelling, specifically MIMIC models, was used to express the relation. It was found that turning behaviour has significant regression relation to the concept of "lower limb preference" $p < 0.05$. Participants with a right foot preference had a tendency to do rotation on the left side, whereas participants who showed a left foot preference in the tasks tested had a tendency to rotate on the right side. In a further process, we assessed this model by means of a multigoup approach, separately in the male and female sub-populations. This modelling produced two basic results. First that the female population showed a slightly more stable preference of both locomotive organs. Especially in the "upper limb preference" factor in item POC (Use the pointer to point at the following objective) when the tested person could also work across the natural axis of preference part of body a statistical significant difference was found between values for males $r = 0.79$ and females population $r = 0.91$ at a level of $p < 0.01$. Second that the male population showed a significantly closer relation between TU and "lower limb preference" factor $p < 0.01$. This outcome suggests that our male population is more stable in relation of lower limb preference and rotating around a vertical axis in the sense of rotating on the opposite side than is the preferred lower limb. This finding could play an important role in the field of sport with regard to the development of rotation habit and its stabilization (track and field, ice hockey, handball). On the other hand, we realize that the multigroup modelling had a pilot character, due to insufficient sample size. Therefore, we suggest the verification of our pilot finding about the different relations of rotation (turning around a vertical axis) in the male and female population. Moreover, it would be beneficial if future research were to use more items relating to the rotation attribute and modelled this relation at child population.

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OTÁČENÍ KOLEM VERTIKÁLNÍ OSY JAKO PROJEV LIDSKÉ ROTACE A JEHO VZTAH KE KONCEPTŮM PREFERENCE HORNÍ A DOLNÍ KONČETINY, ROZDÍLY V ZÁVISLOSTI NA POHLAVÍ U POPULACE ADOLESCENTŮ

MARTIN MUSÁLEK & ŠÁRKA HONSOVÁ

SOUHRN

Cílem studie bylo modelovat manifestní proměnnou preferenci rotace (otáčení kolem vertikální osy) a zjistit její vztah ke specifickým konceptům hodnotících preferenci horní a dolní končetiny u populace adolescentů. Studie se zúčastnilo 220 studentů pražských gymnázií (muži = 104, ženy = 116) ve věkovém rozpětí 17–19 let (průměrný věk 18,1 roku). Preference horní i dolní končetiny byla zjišťována prostřednictvím validizovaných testů. Použitá metoda strukturálního modelování konkrétně MIMIC modely ukázala, že indikátor otáčení kolem vertikální osy má na hladině $p < 0,05$ signifikantní regresní vztah ke konceptu hodnotícího preferenci dolní končetiny. Testované osoby, s pravostrannou preferencí dolní končetiny měli tendenci provádět otočení kolem vertikální osy doleva. Toto zjištění bylo dále modelováno pro každé pohlaví zvlášť. Z výsledků tohoto modelování vyplývá, ženská subpopulace má stabilnější preferenci lokomočních orgánů ovšem ne signifikantně regresní vztah mezi preferencí dolní končetiny a otočením kolem vertikální osy. Mužská subpopulace vykázala signifikantní regresní inverzní vztah mezi konceptem preference dolní končetiny a otočením se kolem vertikální osy $p < 0,01$. Ve studii jsou diskutována omezení tohoto výzkumu i další doporučení zkoumání fenoménu rotace ve vztahu k motorickým projevům laterality.

Klíčová slova: lateralita, rotace, asymetrie, preference, strukturální modelování, MIMIC modely

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PURISTS, PARTISANS, AND THE AESTHETIC DIMENSION OF SPORT

CHARLES ROBINSON

SUMMARY

Stephen Mumford, in his book *Watching Sport*, identifies two types of sports spectator – partisans and purists. Partisans are more concerned to see their team win, whether they do so in an aesthetically pleasing way or not, while purists have no such irrational commitment, and instead pursues the higher aesthetic experience of sport. The purist, Mumford argues, is superior because she watches sport for aesthetic and intellectual reasons and sees the game, it seems, more objectively, whereas the partisan is emotional and victory-seeking, experiencing the game through the lens of their desire for victory. But this distinction, I argue, doesn't do justice to the actual experience of spectators. Whilst Mumford is correct to suggest that the aesthetic dimension is vital in our enjoyment of sport, there is no reason to suppose that the partisan cannot partake in the aesthetic appreciation of sport. Furthermore, whilst winning is obviously hugely important in judging the quality of sports teams, they are likely to be more fondly regarded if they do so through the demonstration of virtues that are aesthetic in nature. Even the most vociferous of partisans are capable of appreciating such teams.

Keywords: sport, aesthetics, partisans, purists

INTRODUCTION

After watching a local derby between Nottingham Forest and Notts County in 1934, the novelist and playwright J. B. Priestley (1933/2012, p. 239) observed, amongst other things and with no little disdain, "the monstrous partisanship of the crowds, with their idiotic cries of 'Play the game, ref!' when any decision against their side has been given". To an outside observer, the supposed tribalism of football crowds appears irrational and base. The word tribalism itself carries strong pejorative connotations, a primitive bestiality and a blind obedience to the group. Such partisans are the very antithesis of the purist, an altogether rarer breed. The purist is the embodiment of the rational and unbiased football supporter, a fan of football itself, able to enjoy a heightened aesthetic experience because untainted by the irrational biases of tribal support.

Priestly might be thought to be simply describing the average football spectator – blind, irrational, partisan. However, despite his disparaging initial remarks, Priestley goes on to say that partisans are "not mere spectators in the sense of being idle and indifferent lookers on; though only vicariously, yet they run and leap and struggle and sweat, are driven into despair, and raised to triumph; and there is thrust into their lives of monotonous tasks and grey streets an epic hour of colour and strife that is no more a mere matter of other men's boots and a leather ball, than a violin concerto is a mere matter of some other man's cat gut and rosin" (Priestley, 1933/2012, p. 240). To enjoy the festival of the crowd, almost a conscious organism in its own right, is part of the aesthetic enjoyment of any sporting event – to lose oneself in the heaving, swaying, singing, braying mass. The psychological benefits of partisanship extend even further, to feelings of identification with the local area, civic pride, and comradeship.

The apparent and supposed superiority of the partisan over the purist is emphasised by the philosopher Nicholas Dixon. In a paper entitled "The Ethics of Supporting Sports Teams", Dixon (2001) argues that the partisan not only enjoys the psychological benefits associated with offering unconditional support to the local team, but also has an ethical advantage, in that her commitment and passion is *more virtuous*. He says, for example, that she exhibits "the great virtue of steadfast allegiance to her team even if its fortunes decline" (Dixon, 2001, p. 153).

Dixon thinks the same thing happens when one is in love, romantically speaking. At the beginning of a romantic relationship, we come to love our partner's good qualities, but over time we develop something deeper, namely a love of their "unique instantiation of those qualities", their special identity (Dixon, 2001, p. 151). Furthermore, when some new potential partner comes into our lives, as they often do, we are reluctant simply to "trade up", even if the new prospective mate scores higher on, or better instantiates, those valuable qualities. Love can also endure change: a partner may lose the qualities to which we were initially attracted, but we stay in love regardless. Despite the changes, there is a constant nucleus that remains the object of our love. In much the same way, I don't change my team with each new defeat. Although the two types of love are qualitatively different, we feel an enduring loyalty to the object of our devotion.

Dixon goes even further when specifically discussing the ethics of supporting sports teams, suggesting that the partisan displays a side to her character lacking in supporters willing to change teams – the tendency to form bonds with others, especially with those we are familiar. Drawing an analogy with the ability to form friendships and lasting romantic attachments, the purist "displays a character flaw that would be condemned from a standpoint of virtue ethics" (Dixon, 2001, p. 155). Why is the purist normally regarded, as Dixon suggests, as lacking commitment, as barely qualifying as a fan at all?

The purist, we might say, is prepared to "trade up" at any given opportunity. Her support is based purely on her love of the game, and she is prepared to follow whichever team best exemplifies the virtues and admirable qualities most prized: fairness, excitement, skill and style. In a sense, as Dixon points out, the purist seems to have the moral high ground here, as her choice is based on purely sporting excellence, rather than the arbitrariness of place of birth. If we want to teach our children the value of fairness, at least partly through the games that they play with each other, why should we also give them the strong impression that they should stick with their team even when it cheats and connives, and

otherwise privileges a win-at-all-costs mentality? "Rather than being a genuine fan, the purist approaches each game as a neutral, hoping that his team will continue its excellent play, so that he will be able to continue supporting it" (Dixon, 2001, p. 152).

Of course, the loyal support of the partisan can itself be dangerous, or just plain stupid. Why would I continue to love a partner who continues to abuse and betray me? To give our love and support unconditionally to another becomes masochistic if the significant other is genuinely not worthy of it. Therefore, something that could be called "moderate partisanship" might be the best option: I'll give my whole and undivided support to my team, but there is a limit.

A more robust defence of the purist can be made, however. Stephen Mumford (2012), in his book *Watching Sport: Aesthetics, Ethics and Emotion*, actively privileges and praises the virtues of the true purist, arguing that the issue turns to a large extent on the respective aesthetic experiences enjoyed by our two different types of supporter. But how and why do different types of supporter have different aesthetic experiences? Obviously, a partisan may enjoy the game less if her team loses, trudging home disconsolately and awaiting the barbs of colleagues on Monday morning, while the purist enjoys the spectacle even if her adopted team loses, because she enjoys primarily the aesthetic experience offered up. In fact, the purist may even find the very idea of supporting one particular team rather disagreeable. What matters is the quality of the play and of the game, not who wins. But the differences, according to Mumford, go even deeper than that, as we'll see after a brief consideration of the ideas of Arthur Schopenhauer.

Schopenhauer, the famously pessimistic German philosopher, placed great importance on the enjoyment of aesthetic experiences. In *The World as Will and Representation*, Schopenhauer argues that the world is indifferent to human suffering – and suffer we do. Human existence, Schopenhauer says, has no intrinsic meaning or value, and is characterised by suffering, pain, and misery. This is because humans are animals who have will and desire: we have desires (and needs) that we seek to satisfy, and our will drives us on to do so. Unfortunately, as soon as one desire or need is satisfied, another arises, making our lives a continual succession of new desires in need of satisfaction that ends only in death. In fact, happiness may be defined in purely negative terms, as the temporary absence of pain.

Fortunately, we have three choices open to us. Firstly, we can commit suicide. Those of us unwilling or unable to end our own lives can consider the second option, that of pursuing an ascetic lifestyle – the denial of the will-to-live – by which we renounce our desires. Finally, we can temporarily remove ourselves from the constant striving and misery of everyday life through art, and through the aesthetic experiences that attend our genuine appreciation of it.

Some types of art, however, are superior to others, or at least lend themselves to a superior aesthetic experience. Schopenhauer mentions architecture, sculpture, painting, and poetry as examples of art that allow for meaningful aesthetic experiences in different ways – but music is by far the most important. The reason for this hierarchical ordering is that Schopenhauer believes that the different types of art allow us better access to the Platonic Forms, or Ideas, the "in-itself" of the world. Schopenhauer seems to be saying that when, for example, one experiences and genuinely contemplates a piece of sad classical music, then one is not experiencing some particular *example* of sadness, but that one has access to sadness *itself*, to the Form or essence of sadness. Music and art are perceptual

representations of universal ideas that cannot be accessed through our normal perceptions of the world around us.

The problem with art, excepting music, is that it is still connected to the will and to the striving of everyday life. We cannot experience art (again, excepting music) without understanding it through the prism of our needs and interests, thus distorting it and lending it a subjective bias. But music is different: music releases us from the endless striving and suffering and desiring of life. Schopenhauer describes it as follows:

"When an external cause or inward disposition suddenly raises us out of the endless stream of willing, and snatches knowledge from the thralldom of the will, the attention is now no longer directed to the motives of willing, but comprehends things free from their relation to the will. Thus it considers things without interest, without subjectivity, purely objectively ... Then all at once the peace, always sought but always escaping us on that first path of willing, comes to us of its own accord, and all is well with us ... For that moment we are delivered from the miserable pressure of the will." (Schopenhauer, 1969, p. 196)

In this sense, the having of a genuine aesthetic experience demands a kind of disinterestedness, a denial of the will and all it strives for. Usually, we see the world around us in the self-interested context of how specific aspects of it might be utilised or manipulated to help us satisfy our desires. But through the aesthetic experience of music, we become detached from ourselves and from the pressures placed on us by our desires and needs, and can enjoy it objectively, for its own sake.

It seems that what Schopenhauer says here about music and art can be applied to the aesthetic enjoyment of watching sport. Mumford argues that the "purist" sports spectator enjoys a heightened aesthetic experience because she has no special desire to see one particular team win. A partisan supporter may see an exciting game of football, for example, but still be disappointed because their team lost. Just as the quality of our aesthetic experience of art depends on our ability to become detached from our desires, so too does our aesthetic experience of sport. So, whereas Dixon sees the purist's flexible and conditional support as a drawback, to the extent that he suggests that purists are not genuine supporters, Mumford sees it as a positive benefit, allowing her to enjoy a heightened and more authentic aesthetic experience.

The purist, Mumford argues, perceives the game differently from the partisan, the latter having what he refers to as a "competitive perception" (Mumford, 2012, p. 12). Reporting on a match he saw between Hearts and Celtic in 1996, Mumford suggests that our desire to see our team win at all costs distorts our perception of the game. Sitting with the Hearts fans, he observes them calling vociferously for corners, free kicks, and even throw-ins for their team when it was clear that the ball was Celtic's: "In their perception, the ball really did seem to have come off a Celtic player last before leaving the field … Were they being disingenuous? Or could this really be two different and honest perceptions? I decided it could be" (Mumford, 2012, p. 13).

This leads Mumford to suggest that purists and partisans simply perceive the game differently from each other. Drawing on the thesis of the theory-dependence of observation, he says that "one's beliefs and desires can determine what one actually sees" (Mumford, 2012, p. 13). Again, this reminds us of Schopenhauer's idea that it is possible to avoid the distorting effects of the will in our aesthetic experience of art. (This, for example, is a good reason to demand that referees are neutral.)

But if the purist and the partisan just "see" the game differently, then on what basis are we allowed to suppose that one interpretation is better than the other? The implication must be that the purist sees the game more objectively, for the simple reason that she lacks the unconditional loyalty and passion that might otherwise distort perception, blinding her to the objective reality of what is in front of her.

This takes us back to a point mentioned earlier in passing. If Dixon supposes that the purist is someone who supports a team for the qualities they embody, then Mumford supposes that the more genuine purist is one who supports no team at all. For the most authentic aesthetic experience, to see the game for all its beauty and drama, the purist must not have any investment in any one particular team. Thus, she has no interest in where the beauty and the drama come from, only that she can experience it, and without experiencing it through the distorting prism of partisanship. In this way, the true purist does not switch allegiance from one game to the next, depending on which team is the fairest or who plays the most attractive and exciting football, for she has no allegiance in the first place (although it might be said that some teams display certain virtues on a more continual basis, which possibly allows Mumford's purist to develop *some* degree of allegiance).

If this is indeed the case (and I do not think that it is), then the analogy drawn earlier, between supporting a football team and one's love for a partner, is misplaced – or, at least, the wrong inference is drawn. Mumford agrees, and develops the following analogy: "The purist is more in the position of a parent with a number of children … The parent wants to see all their children do well in life and realise their full potential. They do not choose a favourite among their children and hope for them to do better than their siblings" (Mumford, 2012, p. 16).

In that case, it would be a mistake to think that the partisan is more passionate about the game – it's simply more likely that the passion of the purist is less conspicuous. Invoking John Stuart Mill's distinction between higher and lower pleasures, Mumford says that the purist enjoys the game in a deeper and more satisfying way. She can, for instance, focus more on "the style of play, the tactics, the movement of the ball, rapidity, grace, economy, incisiveness, and so on." To be concerned with the identity of the winner or the final score is "a crude measure of the worth of a game" (Mumford, 2012, p. 17).

A number of objections could be raised at this point. Firstly, why the sharp distinction between partisans and purists? Isn't the dividing line drawn by both Dixon and Mumford artificial and arbitrary? I think so, for the reason that the distinction fails to capture the actual lived experience of many football fans. My evidence here might be considered anecdotal and personal, but I think valid generalisations can be made.

There seems to be no reason, *prima facie*, to discount the possibility of supporters being both partisan and purist. One can appreciate an excellent performance from an opposing team without thereby denying one's commitments to one's own team. For example, and speaking from personal experience, I once saw a game involving the team I have passionately supported all my life, in which an opposition player scored a spectacular goal, which won the game. The supporters, including myself, spontaneously broke into an appreciative round of applause. Of course, this may not generally be the case, as Mumford points out in his experience of the Hearts-Celtic match. But why exclude the possibility?

Mumford also suggests that one of the virtues of purism is to study and appreciate tactics. Again, there is no reason why partisan supporters cannot do the same. In fact,

having an appreciation of the finer tactical points of any sport can help one to understand the strengths and failings of one's own team. If even partisan supporters are capable of appreciating tactics, the skill and grace of opposition players and teams, and so on, then the distinction between the purist and the partisan begins to break down. As ever, the truth lies somewhere in between.

Furthermore, and here's the second objection, the main part of Mumford's argument is based on the theory that the purist actually has a superior or more genuine aesthetic experience, which obviously begs the question: can we enjoy meaningful aesthetic experiences from watching sport at all? Can sport be said to be an "art"? We can obviously say that sport can be the *object* of art, as Lowry's wonderful "Going to the Match" demonstrates on its own. Douglas Gordon and Phillipe Parreno's film/art installation, *Zidane: A 21st Century Portrait*, is also, ostensibly, a work of art, and yet it blurs the line: can Zidane's performance against Villarreal, upon which the well-known film remorselessly focuses, itself be considered art? My temptation is to say yes, as it embodies the grace, elegance, poise, and balance that Mumford thinks are key aesthetic sporting qualities. It also embodies the striving, determination, and occasional brutality of football (Zidane is sent off for violent conduct towards the end of the match).

Linguistically speaking, at the pragmatic everyday level of language-use, we naturally attribute aesthetic qualities to sport – "that was a beautiful goal", "XavI's pass was a work of art", or that "Barcelona played beautiful football today". We use such language to describe both individual and collective examples of aesthetically pleasing play. Certainly many football players and managers have been obsessed by the supposed superiority of the aesthetic approach, privileging "attractive" football over the win-at-all-costs mentality – a feature of football brought out nicely by the famous and oft-mentioned enmity between César Luis Menotti and Carlos Bilardo, the aesthete and philosopher versus the arch pragmatist.

Menotti once famously said that, "I maintain that a team is above all an idea, and more than an idea it is a commitment, and more than a commitment it is the clear convictions that a coach must transmit to his players to defend that idea. So my concern is that we coaches don't arrogate to ourselves the right to remove from the spectacle the synonym of festival, in favour of a philosophical reading that cannot be sustained, which is to avoid taking risks. And in football there are risks because the only way you can avoid taking risks in any game is by not playing … I believe that efficacy is not divorced from beauty" (Wilson, 2011).

Intuitively, most football supporters understand this, even if they don't necessarily go along with it. We may, for instance, disagree on the exact source of aesthetic enjoyment. After all, we might get just as much enjoyment from watching a valiant backs-against-the-wall 0–0 game, especially if one of the teams is demonstrably inferior to the other, as we do from a 4–3 thriller characterised by awful and comical defending. Of course, these are not necessarily *aesthetic* qualities. Bad play may lead to an exciting game, but the sources of aesthetic pleasure are many and varied. For instance, the gradual increase in the number of goals per game in the English Premier League over the last few years might be cause for celebration for some, but bad news for fans of sophisticated defenders and defending. It depends where we find the beauty of football, and that might be at least partly subjective.

But is the aesthetic dimension of football an essential aspect of the game? Again, it depends where you stand. David Best makes a distinction between purposive and aesthetic sports. Best says that in purposive sports, such as football, "it is the independently specifiable purpose which at least largely defines the character of the activity, and the aesthetic is largely incidental" (Best, 1978, p. 104). Therefore, there's no requirement, legally or morally, to bring aesthetic qualities to the performance. Aesthetic sports, on the other hand, are obviously based, to a large degree, on the aesthetic aspects of the performance: there is a concern for the manner in which such games are performed. In such sports, the "purpose cannot be considered apart from the manner of achieving it. There is an intrinsic end which cannot be identified apart from the means" (Best, 1978, p. 104). And Jim Parry (1989, p. 17) agrees on this point, saying that: "In football I can distinguish the means of scoring a goal from the end, but in gymnastics the means are part of the end." The awarding of points in sports such as gymnastics focuses on relevant qualitative aesthetic qualities. Here is an excerpt from an expert's summary of Ludmilla Tourischeva's gold medal-winning floor exercise at the 1972 Munich Olympics:

"Of qualities of form, she displayed poise, controlled balance, cleanness of line, and each in turn – an arched, curled, twisted and extended torso; her long supple limbs described sinuous and circular movements and her shapely flexible fingers made florid gestures in space. Her footwork had a precision at times forceful and firm and yet again dainty with impeccably shaped and patterned placings." (Arnold, 1990, p. 166)

On this theme, Mumford (2012, p. 29) acknowledges the "aesthetic pluralism" of sport, meaning that different aesthetic categories apply to different sports: speed, strength, grace, and so on. Furthermore, what Mumford refers to as competitive sports, which involve primarily the overcoming of opposition, and football is a perfect example, provide spectators with a further aesthetic dimension – the unfolding of a drama as the teams battle for a limited resource, namely victory. Sports that depend more on measurement, such as long jump, and sports that depend on the judging of aesthetic criteria, such as figure skating, do not quite generate the same excitement and tension. According to Mumford (2012, p. 22), the drama of such sports "tends to be less regular and is not what the nature of these sports is all about."

Nonetheless, the main point is that, despite the enjoyment of observing the unfolding drama of a football match, aesthetic qualities are not necessarily inherent to football, even though they may be highly desirable. Footballers can succeed if they are slow, weak, fat, graceless, and so on, although they are clearly more likely to be more successful if they possess none of those qualities. But I think that we can say that some players and teams are better than others in different ways relating to technical and aesthetic criteria. Some athletes are more graceful, even though they might not be more successful, while others might lack grace but be physically bigger and stronger than their opponents – does this make one "better" than the other? If not, then this suggests that the principle of aesthetic pluralism holds *within* football as well as without. The question is whether any specific criteria are objectively more significant than others, in this case because they add to the aesthetic experience of spectators – technique, flair, vision, and so on. Football supporters are likely to be familiar with a debate that suggests that the Barcelona teams that played under the management of Johan Cruijff (the so-called "Dream Team") and, later, Pep Guardiola, are two of the greatest club sides ever seen, *because* of the aesthetic qualities

they embodied. At the same time, the Greece side that won Euro 2004 is often derided for the poor quality of their football during that tournament. (Greece scored only eight goals in seven matches during Euro 2004, and on only one occasion did they score more than one goal in a game.) It is perhaps worth noting that aesthetically pleasing football teams, whether successful or not, tend to endure in the popular consciousness more than those renowned for achieving success cynically or by playing in a "boring" manner. For example, any football fan well versed in the history of the game remembers the Dutch side of 1978, even though they lost the World Cup final of that year.

Such assertions, of course, prove nothing, but the implication is clear – that there are standards of taste, as David Hume would put it, that go beyond the subjective. But how can we decide whether something offered up for our aesthetic appreciation is worthy of being objectively superior? In terms of works of art, Hume suggested that endurance over time as an object of aesthetic appreciation is one criterion. Another standard is given by paying attention to the opinions of those with refined and delicate sensibilities, such as critics and experts. Of the current crop of the best football teams in the world, which will be remembered, and which will be *fondly* remembered?

Many will resist Hume's conclusion that there are standards of taste that go beyond subjective preferences. The discussion so far has drawn on examples from football, a purposive sport. Since aesthetic qualities are incidental to purposive sports such as football, as Best says, then issues of taste might be considered irrelevant. But this rather begs the question – is winning all that really counts, even in purposive sports? Can we possibly find a reason to say that the aesthetic dimension is more than just desirable, even for those sports in which the end in question can be distinguished from the means? In purposive sports, achieving some desirable state of affairs, i.e. victory, in any way not proscribed by the rules counts as success. Does doing so in a way that violates relevant but not required standards of taste somehow devalue that success?

To help us here, we can use a distinction noted by Parry (2006, p. 206), namely the distinction between athletics and game-sports. In athletic sports, such as the 100 m sprint, the purpose of the sport cannot be separated from the manner of achieving it. For the 100 m sprinter, "He wins *by* running. Just by the running" (Parry, 2006, p. 206). In game-sports such as football, it's more complicated: "in game-sports it is quite possible to execute a task to the highest standard and still not be successful" (Parry, 2006, p. 207). This means that the demonstration of excellence in the performance may not lead to victory, so the result is "supervenient" on the performance of the player or players. In other words, the best team might lose on the day, whilst it cannot be said that the fastest runner in the 100 m sprint will not win. Parry (2006, p. 207) goes on to say: "The fact that the aim of the activity can be specified independently of the manner of achieving it means that claims to excellence are ambiguous. They could refer either to success in terms of victory or to quality of style or to both."

It seems obvious to say that a team cannot be considered the best if they consistently demonstrate qualities that many spectators consider to be aesthetically pleasing while losing games. At the same time, a team that wins by utilising an effective but dull and ugly style of play would be maligned by neutral observers (purists), although perhaps not by their own supporters (partisans). Both winning and playing well are important factors in

determining, for example, which football teams deserve to be lauded in the present and fondly remembered in the future.

Although aesthetic criteria are not absolutely decisive in such considerations, they're still hugely important in the minds of both purists *and* partisans. Argentina's World Cup winning side of 1986 will be remembered not only for the individual brilliance of Maradona, but also, and perhaps primarily, for the cynicism of manager Carlos Bilardo, while MenottI's exhilarating 1978 side – World Cup winners also – will be more fondly remembered. Of course, there are no trophies handed out to teams who lose in style, and the lists of champions in the history books make no note of the winners' aesthetic qualities. Nonetheless, to view victory as everything is, to paraphrase Mumford, a crude measure of the worth of a team.

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PURISTÉ, PARTYZÁNI A ESTETICKÁ DIMENZE SPORTU

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SOUHRN

Ve své knize *Watching Sport* Stephen Mumford identifikuje dva typy sportovních diváků – partyzány a puristy. Partyzáni se zajímají spíše o výhru svého týmu, ať už je jejich hra estetická, nebo ne, zatímco puristé nemají tento iracionální zájem a zajímá je vyšší estetický sportovní zážitek. Mumford považuje puristy za nadřazenější, protože sledují sport z estetických a intelektuálních důvodů, a zdá se, že vidí hru objektivněji, zatímco partyzáni jsou emocionální a sledují hru skrze touhu po vítězství. Moje argumenty ukazují, že toto pojetí adekvátně nepopisuje zážitek diváků. Zatímco Mumford vhodně uvádí, že estetická dimenze sportu je důležitá pro naše potěšení ze sportu, není důvod předpokládat, že partyzáni nemohou oceňovat sport esteticky. Navíc zatímco je výhra očividně velmi důležitá při hodnocení kvality sportovních týmů, budeme je hodnotit lépe, dosáhnou-li ji prokázáním estetických hodnot. I ten nejhlučnější partyzán je schopen takové týmy ocenit.

Klíčová slova: sport, estetika, partyzáni, puritáni

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SELECTED PROBLEMS WITH DIAGNOSTICS OF SARCOPENIA IN LONG-TERM-CARE FACILITIES FOR THE ELDERLY

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SUMMARY

As the current population gets older, we are learning that some of the diseases and conditions which were formerly perceived as a natural part of the ageing process are actually preventable and curable. Sarcopenia is one of these; it is currently one of the most challenging problems of clinical gerontology. Sarcopenia is a geriatric syndrome that presents as gradual muscle mass loss and decreases in physical performance. It is one of the important factors of frailty. Its treatment is as any other treatment highly dependent on the correct diagnostics. Nevertheless, it seems that latest guidelines for sarcopenia diagnostics considerably neglect real conditions in a number of medical facilities for the elderly, despite the vast increase in the number of studies on its prevalence and the options of sarcopenia treatment carried out in recent years. In this mini review, we shall discuss various diagnostic methods and the possibilities of their real use in clinical practice for the institutionalized elderly.

Keywords: aging, muscular atrophy, diagnostic techniques, sarcopenia, institutionalized elderly

INTRODUCTION

Ageing is accompanied by multiple changes in the human body and the loss of muscle mass is one of them. During ageing, muscle mass is partially replaced by adipose tissue. Muscle functions decrease together with the loss of muscle mass and physical functioning declines, too. At the end of the twentieth century Rosenberg (1989) proposed the term sarcopenia to describe the age-related decline of muscle mass and muscle functions. Although more than twenty years have passed since that time, a lot of the questions associated with this phenomenon are yet to be resolved. Sarcopenia is a very complex process

influenced by a lot of factors which contribute to skeletal muscle mass loss and muscle function disorders (Muscaritoli et al., 2010). A wide range of diagnostic methods have been recommended for diagnosing sarcopenia but few of them are actually useful in real practice for the elderly over 80. Currently, there are three basic areas, which can be used in the diagnosing sarcopenia; these are a measurement of muscle mass, muscle strength and physical performance (Cruz-Jentoft et al., 2010). In this mini review, we shall discuss the possibilities of using non-invasive measurement techniques for sarcopenia diagnostics in nursing homes, in homes for the elderly or facilities with special care.

MEASUREMENT OF MUSCLE MASS

The European Working Group on Sarcopenia in Older People (EWGSOP) proposes the dual energy X-ray absorptiometry (DXA) for measurement of body composition (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). DXA is the most preferred method and gold standard (Bouchard et al., 2009; Bunout et al., 2011; Di Monaco et al., 2011; Fielding et al., 2011; Hairi et al., 2010; Chen et al., 2007; Kim et al., 2009; Lee et al., 2007). This method is very exact to assess appendicular muscle mass (Burton and Sumukadas, 2010). Acquisition and operation of the whole body DXA with special software are comparable with the computed tomography (CT) and magnetic resonance imaging (MRI) and definitely less expensive than them but still greatly exceed the budgets in many facilities. Moreover, DXA has a lot of limitations and contraindications that prevent its use for the elderly e.g., changes in body hydration incurred as a result of kidney damage or heart failure can affect the accuracy of the estimate (Bunout, de la Maza, Barrera, Leiva and Hirsch, 2011), DXA accuracy decreases with increasing patient weight (Evans et al., 2010), DXA is unsuitable for examining patients unable to lie calmly during the twenty-minute examination; this may be a problem for patients with Parkinson's and Alzheimer's diseases (Bauer et al., 2008). Areas with implanted metallic material cannot be assessed by DXA either (Lee, Auyeung, Kwok, Lau, Leung and Woo, 2007). In addition, DXA does not provide any information about the quality of muscles, patients are exposed to low doses of radiation and the limited resolution between water, bone tissue and lean tissue mass can also lead to poor results of measurement (Pahor et al., 2009).

The bioelectrical impedance analysis (BIA) is another method of measuring body composition which is recommended by EWGSOP for clinical measurement as an alternative method (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). But the use of BIA has also a lot of limitations, e.g. a measurement is inaccurate at patients with an acute disease, liver disease, cardiac or renal dysfunction, endocrine disorders (diabetes mellitus, hypo- or hyper-thyreoidism), at patients who take certain medication affecting a body composition (steroids, diphenylhydantoin and heparin), patients with implanted metallic material and patients with diseases which can disturb the balance of electrolytes, e.g. due to edema (Chumlea and Baumgartner, 1989; Janssen et al., 2000; Landi et al., 2012). Patients with cardiac pacemakers and limb amputations have completely contraindicated BIA measurement (Hedayati and Dittmar, 2010; Chien et al., 2008). The principle of BIA is to measure

body impedance against alternating electrical flow because electrical impedance of body is inversely proportional to the amount of body water. For this reason, the measurement results are strongly influenced by a hydration state of the tested patients, which may be a source of inaccuracy at the elderly (Janssen, Heymsfield, Baumgartner and Ross, 2000). BIA also cannot provide any information about the quality of muscles and in comparison with CT, MRI and DXA is much less accurate (Jelen et al., 2008; Pahor, Manini and Cesari, 2009). Most patients living in nursing homes and facilities with special care suffer from some of the above mentioned diseases so the use of DXA and BIA is very limited in practice (Bauer, Kaiser and Sieber, 2008; Gallagher and DeLegge, 2011; Landi, Liperoti, Fusco, Mastropaolo, Quattrociocchi, Proia, Russo, Bernabei and Onder, 2012).

The third of the recommended EWGSOP resources is anthropometry. This is a whole range of methods that are inexpensive and widely used in practice. Waist or calf circumference can be used as an alternative diagnostic tool (Chien et al., 2010; Rolland et al., 2003; Sanada et al., 2010), because they are positively related to the muscle mass for both sexes Hedayati and Dittmar (2010). Midarm muscle circumference (MAMC = midarm circumference − 3.14 × triceps skinfold thickness) also seems to be a useful tool for assessing sarcopenia in the elderly as a simple, fast, inexpensive and non-invasive method (Landi et al., 2010). The triceps and subscapular skinfold thicknesses could be useful indicators of subcutaneous adipose tissue but their use is highly controversial for the elderly (Chumlea and Baumgartner, 1989) because there occurs the age-related fat redistribution in a human body (Hughes et al., 2004). Height and weight body measurement could also be the useful indicator of sarcopenia e.g. body mass index (BMI) values below 22 are prognostically unfavourable for the elderly (Allison et al., 1997) and malnutrition (BMI < 21 kg/m^2) is associated with an increased risk of sarcopenia (Landi, Liperoti, Fusco, Mastropaolo, Quattrociocchi, Proia, Russo, Bernabei and Onder, 2012).

Unfortunately, anthropometric measurements cannot give any information about the quality of muscle and nutritional status with co-morbid diseases can easily distort their results (Pahor, Manini and Cesari, 2009). In addition, measurements for the elderly are a special problem. Standard anthropometric measurements are done standing but a lot of elderly people have a problem to maintain the upright body posture and some of them depend on a wheelchair or are bedridden due to an injury or disease. Moreover, to diagnose sarcopenia depending on the physical composition, the norms for a given population group are required. Variability and average value found within the reference population may fundamentally influence evaluation of a patient. Reference populations can vary ethnically. Even within the U.S. reference population is usually expressed as Caucasian and African American or Hispanic, which differ substantially (Miller et al., 2009; Steffen et al., 2002). The reference values between the U.S., Asian, European or Japanese populations are different. They may differ also within Europe; e.g. northern European and southern European populations (Janssen, Heymsfield, Baumgartner and Ross, 2000). The reference values have not been established in many countries because large epidemiological studies needed for their calculation have not been conducted yet. The survey data are usually compared with reference values from adjacent states (Hedayati and Dittmar, 2010) which may also affect the evaluation of the patients measured. Precisely for the reasons mentioned above, also the algorithm suggested by EWGSOP for identifying subjects with sarcopenia (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin,

Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010) does not have to be useful for treatment of sarcopenia because it is very dependent on subjects' body composition.

MEASUREMENT OF MUSCLE STRENGTH

As muscle strength has been proved an important indicator of sarcopenia at the elderly (Berger and Doherty, 2010) and muscle strength measurement can be a very effective indicator of changes in the muscle for the use in clinical practice (Hairi, Cumming, Naganathan, Handelsman, Le Couteur, Creasey, Waite, Seibel and Sambrook, 2010) muscle strength measuring is another area on which diagnosing sarcopenia is focused. EWGSOP recommends a diagnostic tool to detect sarcopenia for the use in clinical practice, handgrip strength < 30 kg for men and < 20 kg for women, which is classified as decreased muscle strength (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). Nevertheless, the use of this may also be limited for the elderly. Reasons for excluding handgrip strength are recent or current wrist or hand pain/surgery to the upper extremity within the three months prior to the measurement (Hairi, Cumming, Naganathan, Handelsman, Le Couteur, Creasey, Waite, Seibel and Sambrook, 2010). Moreover, the strength of upper extremities is not the main limitation for sarcopenic patients.The reduced force of lower extremities is much greater problem for mobility and self-sufficiency of the elderly than the upper extremities strength.

MEASURING PHYSICAL PERFORMANCE

The last area is measuring physical performance. To measure physical performance, EWGSOP recommends the Short Physical Performance Battery (SPPB) or similar tests, the gait speed res. the geriatric get-up-and-go test (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). Recommended methods for measuring physical performance focus largely on the function of the lower extremities. The lower extremities are crucial to execute daily physical activities (Buford et al., 2010) and functional limitations of a lower extremity may predict development of disability reflecting the symptoms of a chronic disease, injury and overall decline in physical performance (Guralnik et al., 1995). SPPB consists of three sub items, the balance test, usual gait speed and chair stand test (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). According to SPPB, elderly people with poor results have significantly less muscle mass than their contemporaries without functional limitations (Buford et al., 2012; Castillo et al., 2003; Clark et al., 2011; Marzetti et al., 2012). Moreover, only some sub items of the SPPB may be used as a sufficiently effective tool to detect sarcopenia. Landi, Liperoti, Fusco, Mastropaolo, Quattrociocchi, Proia, Russo, Bernabei and Onder (2012) used the four-meter walking test to evaluate physical performance; participants with sarcopenia were significantly slower comparing

to residents without sarcopenia. Assessing usual walking speed over 4 meters long may be a fast, safe, inexpensive and highly reliable diagnostic tool for practical use (Abellan van Kan et al., 2009). Some other tests measuring levels of physical performance have also been used in sarcopenia research e.g. the Berg balance scale (Berg et al., 1992) or timed up & go test (TUG) (Podsiadlo and Richardson, 1991). These are mostly modifications of one of the above mentioned tests and their accuracy is comparable.

The use of speed walking or getting up from a chair, however accurate this measurement may seem, has also a lot of limitations for the elderly. Patient's cooperation is essential for these measurements. Therefore, acquiring clinically useful results may be hard with patients suffering from multimorbidity, functional impairment, cognitive impairment or depression due to unwillingness to cooperate. For example, Landi, Liperoti, Fusco, Mastropaolo, Quattrociocchi, Proia, Russo, Bernabei and Onder (2012) stated in their study that only 2.5% of participants were able to perform the walking test by speed > 0.8 m/s recommended by EWGSOP (Cruz-Jentoft, Baeyens, Bauer, Boirie, Cederholm, Landi, Martin, Michel, Rolland, Schneider, Topinkova, Vandewoude and Zamboni, 2010). However, the walking speed and chair stands did not demonstrate any association with muscle mass in the study on numbers of community-dwelling older Chinese men and women (Lee, Auyeung, Kwok, Lau, Leung and Woo, 2007).

OTHER DIAGNOSTIC POSSIBILITIES

Diagnosing sarcopenia in nursing homes and facilities with special care has many drawbacks and although a number of studies have been carried out in recent years, there is no universally applicable diagnostic method recommended yet. Besides, methods used in research are usually very expensive and they have a number of limitations and thus are not particularly useful in practice. Practical use needs a method suitable for the given conditions. With regard to the fact that funding for these facilities is usually limited, the result should be, if possible, a compromise between the price of the diagnostic tool and its accuracy. Taking this fact into account, the following equations seem to be a viable option for body composition analysis as they are independent on expensive measurement technology.

With regard to the limitations mentioned above Woods et al. (2011) made an interesting finding in their study. They evaluated muscle strength on the basis of objective methods to determine the maximum isometric strength of the ankle dorsiflexers, knee extensors, and hip abductors and on both legs using a hand held dynamometer. Using the results of their study the authors consider hip strength as a more important indicator of sarcopenia than body composition. Their study included participants with a history of cancer, diabetes, high blood pressure, heart disease, rheumatic fever, lung disease, kidney disease, thyroid disease, stroke, arthritis, and back pain. Spink et al. (2010) confirmed that the hand-held dynamometer is a reliable tool for measuring foot and ankle strength at the elderly. In addition, hand-held dynamometry is considered justified for investigating limitations in mobility for the elderly (Bohannon, 2009; Bohannon, 2012; Schaubert and Bohannon, 2005). It thus seems that muscle testing by hand held dynamometer is an interesting method of diagnosing sarcopenia in nursing homes and facilities with special

care. However, its use in diagnosing sarcopenia has to be verified by further research. Surprisingly, manual muscle testing is completely neglected in the research of sarcopenia, although the use of this measuring method offers a wide range of possibilities for the research into applied kinesiology (Conable and Rosner, 2011). Although their work was done by a lot of experienced physiotherapists using these diagnostic methods to diagnose neuromusculosceletal dysfunction (Schmitt and Cuthbert, 2008), we can only speculate about the use of manual muscle testing in diagnosing sarcopenia because these measurement techniques have not been documented yet.

CONCLUSION

Sarcopenia is currently a growing health problem that needs to be resolved as soon as possible. However, although this topic has recently been the subject of great attention, it seems that the issues regarding diagnostic methods applicable in real practice have not been investigated enough so far. A large part of the diagnostic methods cannot be used in specialized medical facilities such as a nursing home. Therefore the lack of reliable diagnostic methods for sarcopenia identification may complicate effective treatment of this disease in facilities where patients are endangered with sarcopenia is on daily basis. Future research should thus focus primarily on creating and verifying methods that can be realistically used for sarcopenia diagnostics in facilities such as nursing homes, facilities with special care and similar specialized geriatric workplaces.

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VYBRANÉ PROBLÉMY S DIAGNOSTIKOU SARCOPENIA V ÚSTAVECH DLOUHODOBÉ PÉČE PRO SENIORY

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SOUHRN

Protože současná populace stárne, stávají se některé nemocí, které byly dříve vnímány jako přirozená součást procesu stárnutí, významnou výzvou pro vědeckou společnost. Sarcopenia je jednou z těchto nemocí. V současné době je sarkopenie jedním z nejnáročnějších problémů klinické gerontologie. Sarcopenia je geriatrický syndrom, který se projevuje postupnou ztrátou svalové hmoty, silové schopnosti a snížením fyzické výkonnosti. Je to jeden z důležitých faktorů stařecké křehkosti. Její léčba je tak jako jakákoliv jiná léčba vysoce závislá na správné diagnostice. Přesto se zdá, že poslední pokyny pro diagnostiku sarkopenie výrazně zanedbávají skutečné podmínky v řadě zdravotnických zařízení pro seniory a to navzdory obrovskému zvýšení počtu studií zabývajících se prevalencí a možnostmi léčby sarcopenie, které byly provedené v posledních letech. V této mini recenzi budeme diskutovat o různých diagnostických metodách a možnostech jejich skutečného použití v klinické praxi při léčbě sarkopenií ohrožených institucionalizovaných seniorů.

Klíčová slova: stárnutí, svalová atrofie, diagnostické metody, sarcopenie, institucionalizovaní senioři

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ARE OLYMPIANS REAL IDOLS OF YOUNG PEOPLE FOR THEIR MOTIVATION AND PARTICIPATION IN SPORT?

ANTONÍN RYCHTECKÝ

SUMMARY

The aim of this study was to determine: "if Olympic champions are real models and idols for today's young people" and whether they would wish or not to become Olympic champions, and which reasons they associate with their positive or negative answers. 440, 12 and 15 year old respondents participated in surveys carried out in the year 1998 (12 and 15 year old respondents only) and consequently in the period 2010–2011 in which 1274 boys and 1090 girls, 12–19 years, old were respondents in this project. The quota samples were used in the selection of respondents in Prague' and the Central region in the Czech Republic. The parts of the "Olympic Questionnaire", created and verified in the 1998 survey were focused on the analysis of the respondents' answers. The open answers of the respondents were subsequently divided into several general and common categories. The desire to become an Olympic Champion was felt more intensely in respondents of the surveys carried out in the year 1998 than in the project carried out in period 2010–2011. Young people more involved in sports express their wishes to become Olympic winners significantly clearer than those who practice sports seldom or not at all. Over 16 year old respondents are more aware of the difficulties associated with the process of becoming Olympic champions than 12–14 year old pubescent. The evaluation of the differences and identical opinions between the respondents' answers in the observed groups were made by the MANOVA and t-tests for independent samples. The hypothesis about the importance of sports models and idols in current youth was confirmed. The role of Olympic champions is very important; namely in the internalization of the Olympic values in the process of the Olympic education of youth; both at schools and out of schools. Olympians should be aware of the fact that even their behavior which is not related to sport events is noticed by young people. The Olympians should be informed about their influence on young generations. Mass-media play a very important role in their mediation. For these reasons, the collaboration between the Club of Czech Olympians and the Olympic Academy should be innovated.

Keywords: Olympic education, elite sport, identification of model and idols, desire to be an Olympic winner

INTRODUCTION

Models and idols in pedagogical and kinanthropological researches are frequently studied and monitored. They belong to the basic factors of the socialization process. They are particularly important in the education of youth, in shaping of their value orientation, belief, attitudes, etc. Some of them are stable and consolidated in the course of socialization, and individuals can identify with them. Other models and idols are in the ontogenesis gradually abandoned and lose their former significance.

Models and idols are functional and operate in the different spheres of human activities: in the arts, sports, science, commerce, etc., and form part of the contemporary world. The terminology and content of the models and idols are differing from each other. In particular, they are differing in the depth of emotional experiencing.

Models are those persons whom other individuals imitate. In contrast, idols are admired, loved and honored by the others (Biskup & Pfister, 1999; Scheepers, 2013). The idol, unlike the model has a significantly greater depth and level of influence on society, social groups or on individuals. The individual, who identifies himself/herself with the idol or model, increases his/her value by imitating people who have a high prestige, performance, values, opinions, beliefs, etc.

The role of models and idols in ontogenesis

Young people are under the informal influences of parents, friends, cultural production, athletic performance, mass-media presentations, etc. as well as formal an intentional stimuli at schools, sports clubs, etc. and through the own activity create their personal celebrities, models, idols, etc., But what is most important, in order that models and idols reflect such values they be should be indoctrinated to young people, especially in the early stages of ontogenesis. Value orientation and attitudes should be previously created. Without the models and idols the development of an individual may be somewhat limited (Bromnick & Swallow, 1999). It should be highlighted that the transition from childhood to adolescence is not only a biologically conditioned process, but it also implies a change in the attitudes of subjects towards their models or idols.

Children, more often than the other age groups in society, identify them through sportsmen, stars, idols and heroes. Persons who are admired for their qualities and achievements are considered to be Olympic heroes (Biskup & Pfister, 1999; Carr & Weigand, 2002; Lines, 2001; Vescia, Wilde & Crosswhite, 2005).

On the other hand Scheepers (2013) pointed out that it would be wrong to form a model only by his/her success and not according to the values that he or she represents. The position and successful individuals are often considered as the reference standards in the assessment of the overall model or idol. The tendency to overestimate the status and popularity of models and idols, can suppress values such as honesty, trust, compassion, truth, responsibility, kindness, etc., which should be included in the values of an effective and satisfied society (Andrews & Jackson, 2001).

The perception of models and idols associated with the gender of individuals. For example, Bishop & Pfister (1999) found that athletes of both genders in the role of models and idols are significantly less assessed by women, while Ewens and Lashuk

(1989) found that male athletes are significantly more selected as a models than female athletes. The girls found their source of identification rather in models presented on television screens and pages of magazines than in other areas, including the sports environment (Lines, 2001). The importance and impact of models and idols are amplified, especially through media coverage. This may concern all or certain social groups and individuals.

Models and idols may not always have a positive effect. They may also present negative attitudes, values and behavioral patterns. Motivation of young people to participate in sport, is often associated to their sports models, which can sometimes be more effective than the emotional pattern of acceptance by parents or friends and optimizes their interest in the practice of sports. Athletes may play a negative role of models because of an improper or illegal behavior, which however, despite their inadequacies are often presented in mass-media. The media play an important role in how the sport and sports personalities in particular influence children and youth (Andrews and Jackson, 2001). Of course there are many excellent sports personalities who the positive behaviors directly personify (Scheepers, 2013; Femiak & Rymarczyk, 2010). Idols and models which symbolize and reinforce the standards and ideals in society or in specific groups are predominately considered as desirable (Biskup & Pfister, 1999).

Athletes, Olympic champions – as the models for youth

On the occasion of the 150 anniversary of the birth of the founder of modern Olympism Pierre de Coubertin, it is good to remember some of his thoughts, ideals and his efforts in his mission to create a modern and global Olympic Movement. Pierre de Coubertin viewed the athletes – Olympians as the ambassadors of peace and disseminators of the Olympic ideals. Indeed, the athletes were and are important models and idols that young people and not only they ones, who imitate, identify and admire them. For example John DeFrancisco, state senator in New York, Syracuse, on the background of the OG 2012 made two remarks: a) In OG there are more inspiring things than their results. It is wonderful that there still are those who are willing to spend countless hours to become successful. b) It is truly refreshing to see and hear the interviews of the successful Olympians. They are reflective, humble, thankful and articulate, in contrast to many of our current sports and entertainment idols who all too often simply try to push the envelope for notoriety, not caring about the effect they may have on our youth. He closes these comments with the following challenge: "we desperately need role models and thankfully, we now have them".

Aims of the study

The aims of the current empirical and comparative study were to identify:
- Who are the models and idols among Czech youth?
- Are the Olympic champions the real models, idols and heroes, with whom today's young people can identify?
- What changes in the identification of the sport models and idols of youth, were noticed in the surveys carried out in the period between 1998 and 2011?

– What are the most frequent motives which young people associate with their positive and with their negative responses to the question: "Would you like to become an Olympic champion or not?"

Method and respondents

The default research method was an Olympic questionnaire, standardized in the framework of the European project: "Physical Fitness, Sporting Lifestyle and Olympic Ideals: Cross-Cultural Studies on Youth Sport in Europe" carried out in the period 1996–1998 (Telama, Naul, Nupponen, Rychtecký & Vuole, 2002).

The first survey was carried out in the year 1998 and 440 boys and girls, 12 and 15 years old participated in it.

In the second survey, carried out in the years 2010 and 2011, 1274 boys and 1090 girls in the age 12–18 years, selected by the quota samples were respondents.

In both studies the students were asked to reply to the questions and fulfill the tasks:

– Who, among the Olympians are most admired by the respondents and which are the main reasons for it?
– Would you want to be an Olympic champion or not?
– To record the reasons or motives why do you want to become, or don't want to become an Olympic champion.
– Open answers of respondents were subsequently divided into several general and common categories.

RESULTS

The models and idols in Czech youth

Interesting results have been found in the survey of the Sofres-Factum Agency carried out in 2002 in the Czech Republic. Young 18–25 year old people were asked: "Who is a model or idols for them?" The most frequent responses to this question were – the athletes. Olympic champions especially reached the highest position in this survey (see Figure 1)

It is a positive fact that the athletes, particularly Olympic champions belong to the most frequent models and idols among youth. On the other hand, the findings that 34% of young people do not, or cannot determine their models or idols and identify themselves with them are not too positive. These individuals and groups of youth are not usually involved in some socially desirable leisure-time activities and therefore cannot satisfy their needs and cannot find their models or idols. In response to the question of what actually the models and idols are in general, the answer should be that models of virtue and success were always an integral part in childhood. Their imitation and identification should be one of the basic methods not only in cultural, but also in Olympic education.

According to Čáp (2010) it is the ancient civilization pattern in which some heroes or heroines may affect the youth just by the mere fact of their existence.

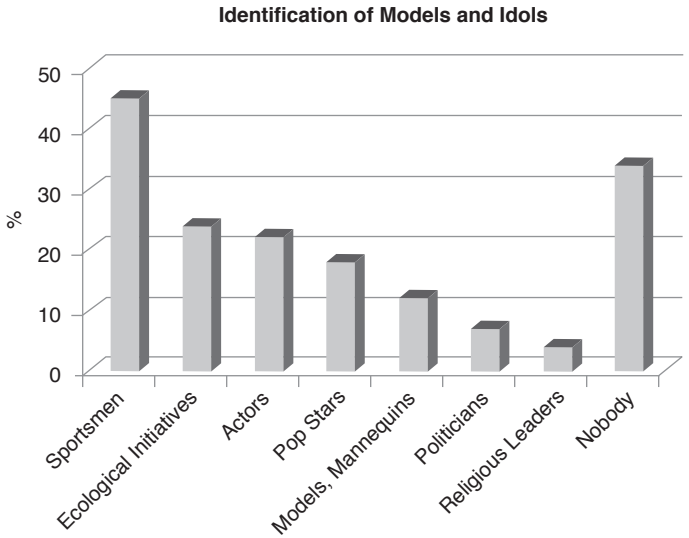

Figure 1. The models and idols in Czech youth (Sofres-factum Agency, 2002)

Sport Models and Idols in Czech youth

Assessments of the Olympic Champions as models and idols were carried as an integral part in the two above mentioned survey, carried out in the years 1998 and 2011.

In these surveys the respondents were asked to list their three favorite Olympic champions and shortly explain the reasons for choosing of them. The respondents should answer the question: "Which male and female Olympic champions do you admire?"

The results in both studies showed that boys and girls previously admired the national sport models, idols and heroes of high repute. The respondents very seldom selected the so-called "megastars", internationally famous persons (Lewis, Agassi, etc.) who were well known in mass media, namely in TV reports of the Olympic Games.

The respondents in 1998 selected the first three of admired sport males: Železný, Zátopek, Změlík. In the 2011 study the order in the answers was as follows: Šebrle, Železný and the Czech hockey team. 49.7% and 46.9% of the respondents in 1998, respectively in 2011 did not replay or were not able answer this question. With respect to the international female "megastars", they were selected also in summer and winter sports (Bonaly, Ottey, Sally Gunnel etc).

In Czech Olympians females, in the 1998 project the order was: Čáslavská, Ottey and Kratochvílová. In the second study in 2011 the sport females were selected in the following order: Neumanová, Sáblíkova and Hilgertová. 65% and 52.8% of respondents did not fulfill this task.

It is a remarkable and nice finding that young boys and girls were and are familiar with former Olympic champions. For example Zátopek and Časlavská are still popular. Časlavská is still involved in sport and helps in the promotion of the Olympic Movement.

With respect to the reasons why the respondents specified their choice of concrete Olympic champions some common and some specific motives were ascertained.

In the selection of the indicators: "Good Athlete", "Top Performer" and "Fair Player" dominated. However, the students also had a few, very personal reasons for their choices such as "nice and attractive person", "I like his sports" or "I like his appearance in public life", which was more likely to be connected with the athlete's appearance reported by the mass media (TV, newspaper).

A few and slight differences were apparent in selecting male or female Olympic champions. The most important reasons given for selecting Olympic champions in 1998 were: "Good Athlete", "Skillful/Fast" and "Fair Player". In the 2011 project in both genders the order: was as follows "Good athlete", "Personal reasons" and "National pride" which were found as coincident with the respective reasons for selecting male and female Olympic champions. Fewer students reported also the "National Pride". 2.7% of girls and 14% of boys reported it as an important factor in their choices.

Self-assessment of becoming an Olympic Champions or not

The students were asked whether it was important for them to become an Olympic champion. The question, to which the respondents should to reply, was: "Would you like to become an Olympic champion?" In addition, the students were asked to record reasons either for wanting to become, or not wanting to become an Olympic champion. According to the free responses of the examined persons have been according to its frequency, content compliance, etc., were generalized into several categories. Differences in responses, in terms of gender, age, participation in sports, and membership in clubs and participation in sports competitions were substantively and statistically processed and evaluated.

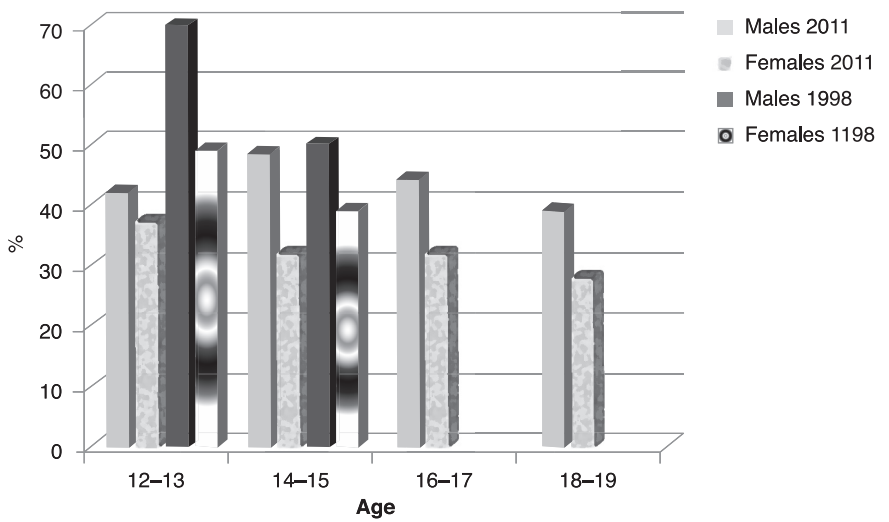

Figure 2. Would you like to become an Olympic champion? The affirmative responses only (2011; in %).

Participation of respondents in physical and sports activities was administered by the questionnaire COMPASS (Mussino, 1997; Rosi-Mori, 1998; Rychtecký, 2006), which combines three essential criteria: organization in sport clubs, participation in competitions and frequency of participation in sport and physical activities in the annual overview. It sets out eight basic categories from 1: competitive, organized, intense activity to 8: no physical activity and sports.

Data about the self-assessment of the importance of becoming or not becoming an Olympic champion give further explanations regarding assessments of the other items about the Olympic Idols and some lifestyle criteria about the intensity of physical activities, participation in competitions and reasons for exercising and their application in the concepts of Olympic education.

The results in Figure 2 document compliance of data from the research in 2011 with the data identified in the list of Sofres-Factum Agency (2002) and a survey of 1998. They show that the most significant models and idols for 40–50% of boys and 32% of girls aged 14–15 years are the athletes. Approximately the same number of respondents, according to our surveys of 1998 and 2011, would like to become Olympic champions (Telama, Naul, Nupponen, Rychtecký & Vuole, 2002). The significant differences between the data in those projects were identified in the 1998 and 2011 studies by t-test for independent samples in groups of twelve year old respondents only. Twelve year old boys in

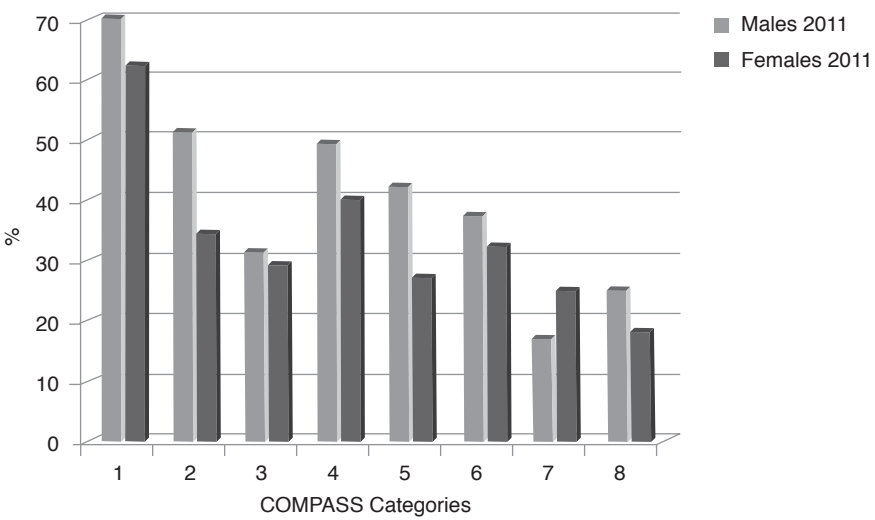

Figure 3. The relationship between the frequency of physical and sports activities and preferences in wish to become Olympic champions (study in 2011; %)

Legend: 1. Competitive, organized, intensive. Annual frequency (AF) more than 120, competitions in one sport at least, member of sports club. **2. Intensive, competitive and/or organized.** AF more than 120, competitions at least in one sport or membership at a sports club. **3. Intensive.** AF more than 120, no competition in sports, no membership at a sports club. **4. Regular, competitive and/or organized**. AF 60–120, competitions in one sport at least, member of sports club. **5. Regular, recreational**. AF 60–120, no competitions in sports, no membership in sport club. **6. Irregular.** AF 12–60. **7. Occasional.** AF 1–12. **8. No participation in sports and physical activities.**

a 1998 study declared a higher frequency in the desire to become an Olympic champion ($t = 4.456$, $p \leq 0.000$) than their counterparts in 2011 study.

Differences between the boys and the girls in the 2011 study documented a higher wish in boys to become Olympic champions. That is, depending on the age of the tested persons it was always higher than in the girls. As the age of the respondents increases, the differences between the age groups increase as well. Most notably it was observed at the age group 14–15 years. In this period, the affirmative declaration of respondents' wish to become Olympic champions attained its peak. In girls a downward trend can be observed in all age ranges, completely coming down and decreases about 10%. For boys, the peak is in 14–15 year old respondents and also decreases to 10%. The differences between the average values of affirmative answers were in addition to the age group 12–13 years statistically and substantively significant (ANOVA, $F = 33.648$, $p \leq 0.000$).

Association between the participation in physical activity and sports competitions, membership in a sports club and desire to become an Olympic champion

The results in Figure 3 confirmed the assumption that active and organized sporting boys and girls, more clearly than recreational, not organized, lower sporting, or no sporting respondents would like to become Olympic champions in a statistically significant level.

Reasons why the respondents wish to become Olympic champions

Open answers of respondents', as it was previously mentioned, were according to the identical contents or related characters divided into eight categories in the case of an affirmative answer to the question of whether they would like to become Olympic

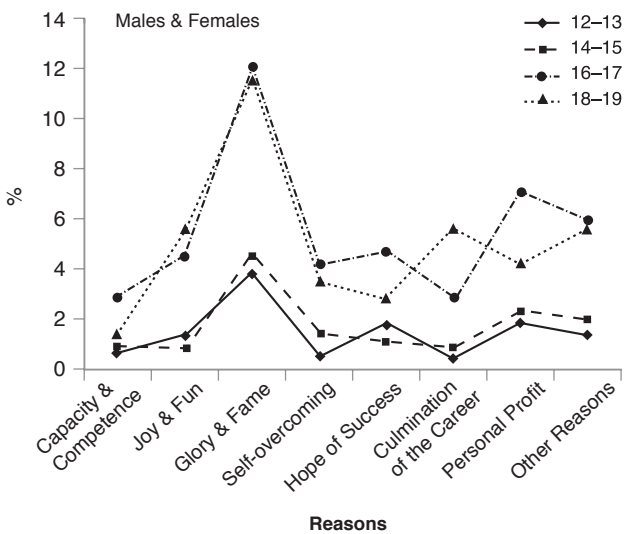

Figure 4. Reasons why the respondents want to become Olympic champions (2011)

champions?; and to seven categories in the case of negative answer to this question. This approach allows compare the differences between the respondents which correspond to the age, gender and participation in sport of the examined individuals.

Significant consensus in preferences depending on the age of respondents is presented in Figure 4. The age of respondents is a more important factor than gender in the selection of answers why the respondents want to become Olympic champions. With the increasing age of respondents the preferences of some reasons also increase. These findings can be explained by the fact that increases in age autonomy and independence and decreases in the need for someone to look up to. At the same time, however, it may be said that the increasing demands of individuals and problems in finding personalities with whom he/she would like to identify. Older young people are more focused on lifestyles or young people's movements. For example it would be a certain type of music and its collective listening.

The selected reasons, for example: "glory and fame", "personal profit", "joy and fun", "hope for success" or "culmination of the career," "self-overcoming" documented this trend. The profile of these motives is in older respondents aged 16–19 years more dynamic than in younger individuals and stress rather hedonistic characters and not so much the focus on the development of efforts and overcoming obstacles. Themes like "glory and fame", "joy and fun" as the hedonistic categories were identified as the most attractive reasons why respondents would like to become Olympic champions. In contrast, in younger students aged 12–15 years there are differences in preferences of selected reasons which are insignificant with exception "glory and fame". The "Joy and Fun" category is associated with training and participation in competitions, and also with other aspects of lifestyle and sports career of their admired athletes. Statistical evaluation of the difference in averages confirmed significant differences between the respondents' age differences among the age groups in the motive: to become an Olympic champion (MANOVA, $F = 33.648$, $p \leq 0.000$ in age and reasons as an independent variables).

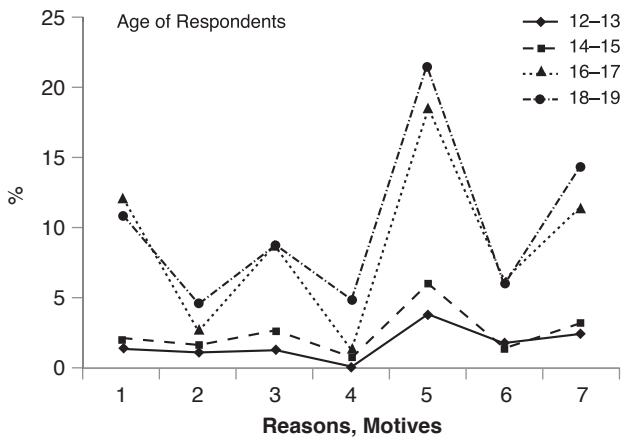

Figure 5. Reasons why respondents don't' want to become Olympic champions
Legend: 1. Too much effort; 2. Capacity and competences; 3. The consequences of fame and glory; 4. Fear of failure. 5. Focus on other activities; 6. I do not like sport; 7. Other reasons.

Reasons why the respondents not to become an Olympic champion

The results, in the case of negative answers why the respondents don't want to become Olympic champions are presented in Figure 5. As in the previous case a significant relationship between the age of the respondents and the growing preference were revealed in some reasons. "Another orientation than to sport", "Consequences of fame and glory", "Underdeveloped skills" (capacity and competences) were the main reasons why the respondents do not want to become Olympic champions. Older respondents (16–19 year old) in a greater extent than younger individuals (12–15 years) understand and are aware of the fact that the wish to become an Olympic champion is associated with a high mobilization of voluntary effort, masterfully mastered skills, supply mental and physical forces and low levels of fear of eventual failure.

CONCLUSION

The role of Olympic champions is very important; namely in the internalization of the Olympic values, in the process of the Olympic education of youth.

The assumption about the importance of sports models and idols in the current conception of Olympic education in youth was confirmed in our studies. Sport models and idols belong to those who are frequently selected as the role of important models and idols in youth. Sport models and idols also play an important role in the personal development of young people. Especially during the pubescence and adolescence the preference of sport idols is very important and has positive impact especially for these target groups.

On the other hand Olympians should be aware of the fact that their behavior which is not related to the sport events is noticed and assessed by young people. The Olympians should be informed about how they influence on young generations. Mass-media can play a very important role in their correct presentation (mediation).

To support of sport brings a double benefit. The first one gives an opportunity to self-realization in competitive sport, especially in gifted person. The second benefit offered to youth an opportunity in order to select a sport environment with real models and idols, which young people may imitate and identify themselves with. The promotion of top sport contributes and helps to the development of Olympic and sport movements as well.

We assume that sport models and idols may play an important role in encouraging youth participation in sport as a part of the motivation process, in the enhancement of their own self-identification. For sporting individuals they may play a positive role in their identification, namely in grow of their own sports performance.

With respect to the reasons which young people associate with their desire to become or not an Olympic champion, in our investigations it was found that the age of young people more significantly than their gender influences the choice of the values which youngsters attribute to them.

Older respondents (16–19 year old) in a greater extent than younger individuals (12–15 years) understand and are aware of the fact that the desire to become an Olympic champion is associated with a high mobilization of voluntary effort, masterfully mastered skills, supply mental and physical forces and low levels of fear of eventual failure. We

therefore suggest that sports models and idols should really encourage young people to take part in physical activities and positively influence their personal development.

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JSOU OLYMPIONICI SKUTEČNÝMI IDOLY MLÁDEŽE V JEJÍ MOTIVACI A ÚČASTI VE SPORTU?

ANTONÍN RYCHTECKÝ

SOUHRN

Cílem této studie bylo zjistit: „zda olympijští vítězové jsou reálnými vzory a idoly pro dnešní mladé lidi" a zdali by se chtěli, nebo nechtěli stát olympijskými vítězi, a s jakými důvody jsou asociovány jejich pozitivní či negativní odpovědí.

Respondenty a etapy výzkumů. V průzkumu, provedeném v letech 1998 bylo testováno 440 osob ve věku 12 a 15 let. Druhého šetření, v letech 2010–2011, se účastnilo 2364 jedinců, 1274 chlapců a 1090 dívek, ve věku 12 až 19 let dle principů kvótního výběru v Praze a Středočeském kraji, České republiky. Použit byl

„Olympijský dotazník“ vytvořený a standardizovaný v prvním šetření z roku 1998. Otevřené, volné odpovědi respondentů byly následně rozděleny do několika obecných a společných kategorií.

Bylo předpokládáno, že touhu či přání stát se olympijským šampiónem pociťují intenzivněji respondenti z průzkumu provedeného v roce 1998 než v šetření realizovaném v období let 2010–2011. Mladí lidé, kteří se intenzivněji zapojují do sportu, vyjadřuji své přání stát se olympijskými vítězi výrazněji, než osoby méně či vůbec nesportující.

Testované osoby starší než 16 let si více uvědomují obtíže spojené s procesem stát se olympijskými vítězi než dospívající ve věku 12–14 let.

K statistickému vyhodnocení rozdílů a shodných názorů mezi odpověďmi respondentů ve sledovaných skupinách dle věku a pohlaví respondentů byly použity metody ANOVA, MANOVA a T-testy pro nezávislé vzorky.

Výsledky a závěry: hypotéza o významu sportovních vzorů a idolů současné mládeže byla potvrzena. Role olympijských šampionů jsou velmi důležité, zejména v internalizaci olympijských hodnot v procesu olympijské výchovy mládeže. Jak na školách, tak mimo školy. Olympionici by si měli být vědomi skutečnosti, že i jejich chování, které se přímo netýká sportovních událostí, je objektem pozornosti mladých lidí. Olympionici by proto měli být informováni o jejich vlivu na mladou generaci. Masmédia mají velmi důležitou roli v jejich zprostředkování. Z těchto důvodů by měla být spolupráce mezi Klubem českých olympioniků a Olympijskou akademií inovována.

Klíčová slova: olympijská výchova, elitní sport, identifikace vzorů a idolů, touha stát se olympijským vítězem

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PROGRESSIVITY OF BASIC ELEMENTS OF THE SLOVENIAN NATIONAL ALPINE SKI SCHOOL

BLAŽ LEŠNIK, MILAN ŽVAN, BOJAN LESKOŠEK, MATEJ SUPEJ

SUMMARY

Ski school programmes in different countries are adapted to the local conditions and skiing trends. The aim of the study was to establish the progressivity of the three basic elements of the Slovenian ski school in terms of the duration of individual turns and their phases. Eight participants were recorded as they performed three basic elements of the Slovenian national ski school: wedge curves – E1, turns with a wedge push-off – E2 and basic swinging – E3. According to the ski school, the elements were divided into phases. The results of the computer-aided video analysis showed that in the beginning types of skiing in the same conditions on the same length of terrain, the average durations of turns and the times of comparable initiation and steering phases of the elements shortened on the methodical upward scale (from E1 to E3). The number of turns executed on the same length of terrain from E1 to E3 increased. A larger step in motor task complexity was indicated when a pole plant was included in skiing elements. Further, relatively large differences were observed in time durations among subjects executing the same elements. In conclusion, it can be assessed that the basic elements of the ski school are placed gradually in terms of progressivity in time durations.

Keywords: Alpine skiing, basic swinging, kinematics, turn phases, wedge curves

INTRODUCTION

The development of the Alpine skiing technique has always followed the novelties introduced by competitors. Therefore, the bulk of studies have been conducted in the field of competitive Alpine skiing and have involved an investigation of the skiing technique (Jentschura & Fahrbach, 2004; Federolf et al., 2008; Supej, Kugovnik & Nemec, 2002; Vaverka & Vodičkova, 2012), physical conditioning (Garret & Kirkendal, 2000; Mildner et al., 2012; Müller et al., 2000), equipment (Colbeck, 1994; Coupe, 2008; Ettlinger, Johnson & Shealy, 2006; Federolf et al., 2010; Gustyn, 2012), psychological preparation

(Dosil, 2006; Weinberg & Gould, 2011) and other factors affecting competitive performances to a greater or lesser extent (Heikkinen, 2003; Neumayr et al., 2003). Because the skiing technique of competitive athletes has always affected the skiing technique of the broader population (Petrovič, Šmitek & Žvan, 1984), ski schools have had to adapt to this development with their ski learning techniques and methods (Lešnik & Žvan, 2010).

With the development of the equipment and method for executing turns on the ski edge, Alpine skiing has become ever faster (Shealy, Ettlinger & Johnson, 2005). The new skis, featuring a more pronounced side-cut, facilitate the execution of simple turns on the edge of the skis. However, the development of ski schools has failed to follow this trend (Hildebrandt et al., 2011), which has also been reflected in the number and type of injuries in competitive (Bere et al., 2011) and recreational skiing (Hunter, 1999; Johnson et al., 1997). According to the studies conducted so far, the majority of injuries result from high speed (Veselko & Polajnar, 2008) and other factors (Aschauer et al., 2007; Burtscher et al., 2008; Noé & Paillard, 2005), one of them including skiing knowledge resulting from the national ski school programme (Lešnik & Žvan, 2010).

Ski school programmes in different countries are adapted to the conditions and skiing trends. Nevertheless, there are no substantive differences between ski schools in the most developed skiing countries (Austria, Switzerland, France, Italy etc.) in terms of imparting fundamental skiing knowledge. All of them provide the most important basic instructions about the selection of ski equipment and about the first steps on the snow, whereas later on the complexity of the skiing knowledge and skills increases by adding new contents, which depends on the selection of the terrain and other skiing conditions (e.g. Campell et al., 2000; FISI, 2010; Gamma, 1985; Lešnik & Žvan, 2010; Wörndle, 2007).

There is a paucity of scientific studies related to ski schools and the execution of individual elements. Therefore, with ever higher speeds in skiing (Ruedl et al., 2010) such studies could improve the quality of the learning and consequently raise the level of skiing knowledge in both recreational and competitive sport (Blitzer et al., 1984). This could then enhance the enjoyment derived from skiing, while better knowledge would contribute to greater skiing safety and fewer injuries (Bailey, Boon & Watson, 2009; Goulet et al., 1999; Meyers et al., 2007).

The patterns of motor behaviour in Alpine skiing contain some elements of basic human locomotor movements, although it is a specific motor skill that an individual acquires through the process of directed motor learning (Summers & Anson, 2009). Moreover, the skiing movement occurs in an environment that is at least to some extent unpredictable and the sequences of motor structures are markedly interdependent. The neuromuscular coordination of movement during skiing follows the combined principle of open and closed loop control (Schmidt & Lee, 2005). The latter is specifically important for beginners who learn new elements and for those skiing elements that are executed at a lower relative speed (i.e. the speed of the sequence of motor sub-elements and not necessarily the absolute speed of movement of a skier on the terrain).

To achieve optimal results – this means the rapid learning of motor skills at a minimum risk of injury or other negative side effects in Alpine skiing – the process has to be appropriately structured (Molteni et al., 2012). The principle of progressivity in speed and complexity of movement is an important didactic principle according to which the

individual is guided until they carry out a skiing element optimally (Winter, 2009). What is meant by progressivity in the speed of learning of Alpine skiing is the time frame in which a motor task(s) must be implemented. The number of motor tasks that are performed can be high or low (Kawato & Gomi, 1992; Shumway-Cook & Woollacott, 2000) and the skier must execute them within a specific time period. Alpine skiing involves the linking of different ski turns in given conditions. Every ski turn consists of individual inter-related phases (Müller, 1994). Namely, it is a series of necessary motor tasks that can be kinematically defined (Brodie, Walmsley & Page, 2008; Nachbauer et al., 1996). Practical experience shows that ski turns cannot be learnt in one step, but that different methodological approaches and paths to learning to ski are required and/or an Alpine ski school. They are based on the gradual and progressive development of the elements of skiing motor skills.

PURPOSE

Therefore, the basic aim of the study is to establish the progressivity of the three basic elements of the Slovenian ski school in terms of the duration of individual turns and their phases. Based on the established time parameters of complete execution (synthetically) and its individual phases (analytically), we will try to establish whether the elements of the Slovenian ski school are structured gradually in terms of their time parameters and complexity.

PROCEDURES

Eight elite Alpine skiing demonstrators, members of the national Slovenian Demo Team (mean age = 27.14 years, SD = 1.35 years; mean height = 176.28 cm, SD = 7.45 cm; mean body weight = 71.57 kg, SD = 9.16 kg), participated in the study and gave their written informed consent. The study was conducted in accordance with the Helsinki Declaration and was approved by the regional Ethics Committee at the Faculty of Sport, University of Ljubljana, Slovenia.

Each participant performed three basic elements of the Slovenian national ski school: wedge curves – E1 (Figure 1), turns with a wedge push-off – E2 (Figure 2) and basic swinging – E3 (Figure 3) and was measured using a 25-Hz high-definition camcorder (Sony HC-7, Sony Corp., Japan) from the start to finish of each element. In order to increase the frequency of the measurement, the interlaced high-definition video recordings were first transformed to a 50-Hz format by a field-to-frame procedure involving two open-source video-editing software packages (Avi Synth 2.5.8, Virtualdub 1.9.11).

The measured ski school elements were divided into turn phases according to the motor tasks needed as described earlier. According to the official Slovenian ski school (Lešnik & Žvan, 2010), the elements E1, E2 and E3 can be divided into several individual development phases:

Four phases of element E1:
- the gentle traversing (GT) phase in a high body position with a parallel ski position (preparatory phase);
- the initiation phase (IP) with wedge positioning and the transition from the parallel ski position to snowploughing (wedging) and body movement from a higher to a lower position;
- the steering phase (SP) with the performance of a wedge curve;
- the transition to gentle traversing (TGT) with body movement from a lower to a higher position (preparatory phase).

Two phases of element E2:
- the initiation phase (IP) with a push-off in the direction of a new turn and wedging (snowploughing); body movement from a lower to a higher position;
- the steering phase (SP) with the performance of a parallel turn with lowering of the body.

Two phases of element E3:
- the initiation phase (IP) with a push-off and pole planting in a parallel ski position and the transition to a higher body position;
- the steering phase (SP) with the performance of a parallel turn with lowering of the body.

For each skier and each element at least eight turns were recorded on a gentle and wide course as required for basic ski school teaching (Lešnik & Žvan, 2010). The snow conditions were close to ideal with natural and groomed snow. The weather was sunny which enabled impeccable visibility and the air temperature was around −6 °C.

The durations of the turns and the turn phases were derived from the computer-aided video analysis performed by an expert panel consisting of two Alpine skiing researchers and two professional ski instructors, members of the elite Demo team group. First, the

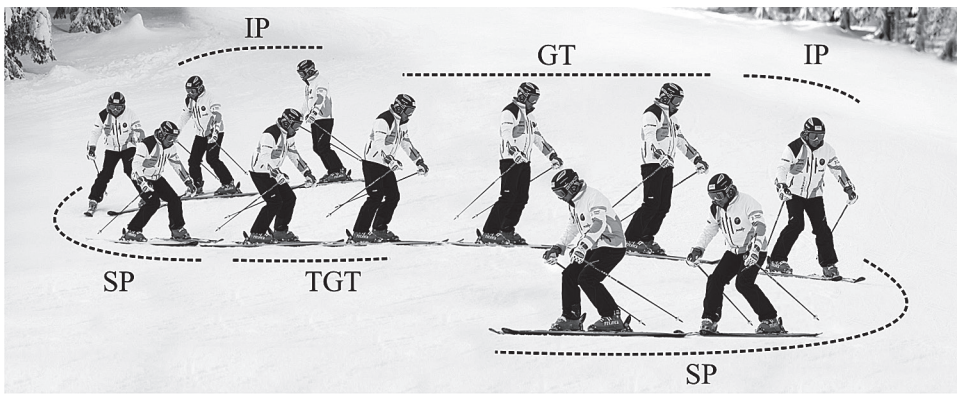

Figure 1. E1 – Wedge curves with four turn phases

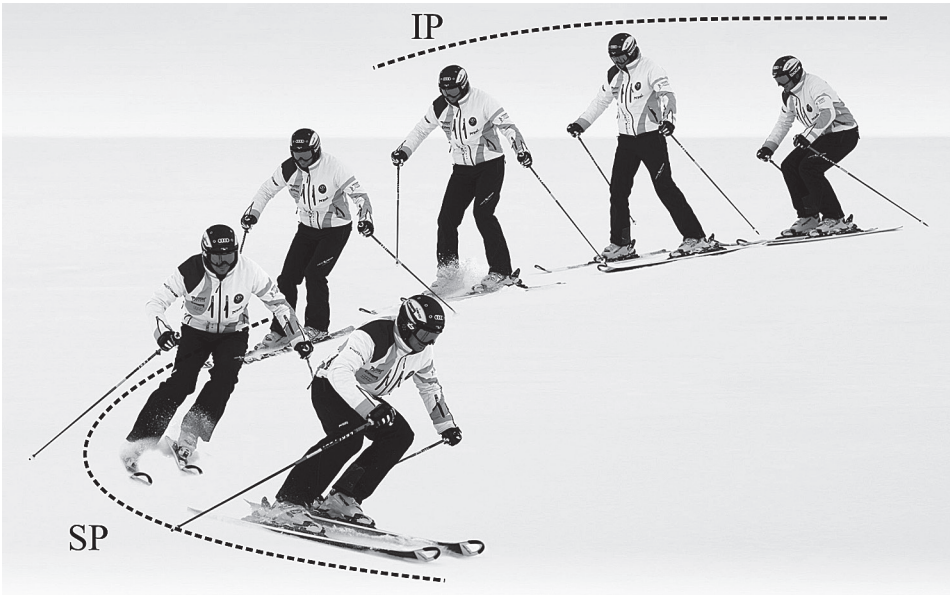

Figure 2. E2 – Turns with a wedge push-off with two turn phases

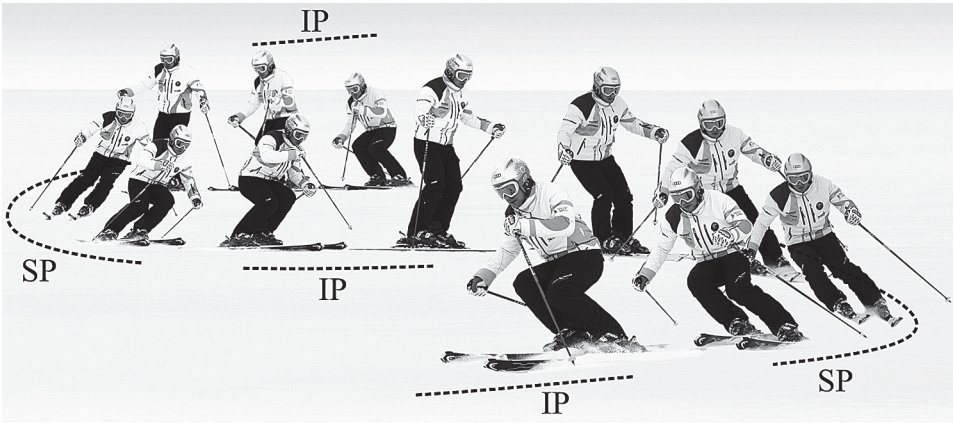

Figure 3. E3 – Basic swinging with two turn phases

panel together approved the characterisation of the turn phases for each element described above. Thereafter, they independently analysed the durations of the phases for each skier and each element. After that analysis, the four evaluators reviewed the video together and agreed on their judgements. Their initial judgements before the agreement differed by a maximum of two video frames (0.04 s).

Data analysis

Basic distributional parameters (mean, standard deviation) were computed for each element, turn phase and subject. Differences in the mean duration of elements and their phases were tested using the linear mixed-effect model in the R 2.14 (http://r-project .org) programming environment with the *nlme* library and *REML* (restricted maximum-likelihood) method used to construct the model. Differences between subjects as fixed effects were tested with the *lm* library.

RESULTS

Figure 4 shows the average times (mean) and standard deviations in the durations of complete turns executed by all study subjects by turns (1 to 10) of individual skiing elements (E1, E2 and E3). The presented average times (mean) and standard deviations (SD) show that the turns from 1 to 10 in elements E1, E2 and E3 were on average executed by study subjects over different periods of time ($p < 0.001$). The average duration of the turns of the E1 element (mean = 5.61 s; SD = 0.69 s) was almost twice the average duration of the turns of the E2 element (mean = 2.93 s; SD = 0.46 s), whereas the average duration of the turns of the E3 element was the shortest (mean = 1.96 s; SD = 0.26 s). The variation coefficient (KV) in the E1 element was the smallest (KV = 12%), in the E2 element the largest (KV = 16%), whereas in the E3 element it was KV = 13%.

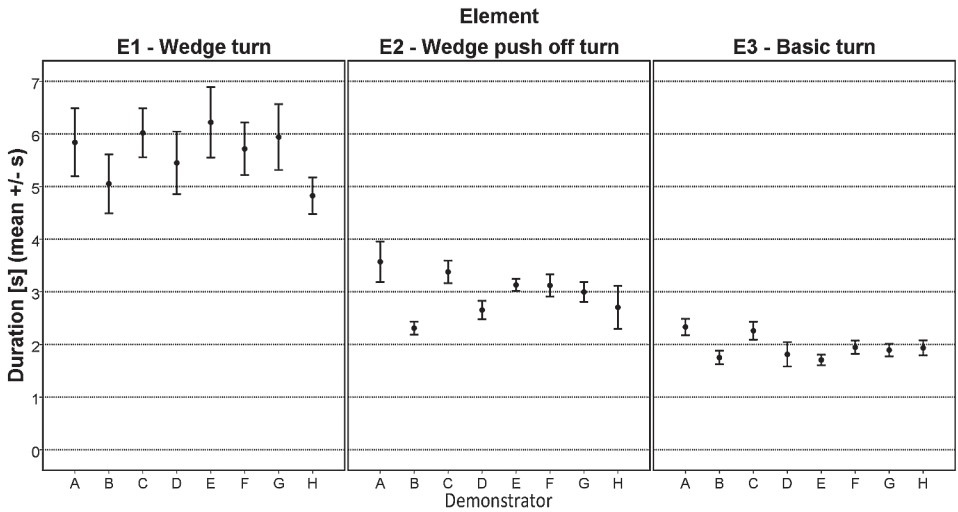

Figure 4. The average times (mean) and standard deviations in the duration of complete turns of all study subjects, by turns of selected elements of the ski school

Figure 5 shows the averages (mean) and standard deviations (SD) in the duration of all captured turns of individual elements of ski school, by study subjects (A to H). The differences between the study subjects are statistically significant ($p < 0.001$) but smaller than the differences between the turns (elements), as the former explain only 3.5% and the latter 91% of the variance of the duration of turns. The average values of the duration of all performed turns (mean) by study subjects (A to H) differ the most in the E1 element (range: 4.83–6.22 s). E1 also revealed the highest standard deviations (from 0.35 to 0.65 s). The element E1 was executed the fastest by study subject H (mean = 4.83 s; SD = 0.35 s), and the slowest by study subject E (mean = 6.22 s; SD = 0.67 s).

The means of the duration of all turns performed by the study subjects (A to H) were half of that in the E2 element (range: 2.30–3.52 s) compared to the E1 element. This element also shows smaller standard deviations (from 0.11 s to 0.44 s). It is evident from the results that element E2 was executed the fastest by study subject B (mean = 2.30 s; SD = 0.12 s), and the slowest by study subject A (mean = 3.52 s; SD = 0.38 s).

The study subjects executed the E3 turns in an even shorter average time (from 1.72 s to 2.36 s), and the standard deviations were the smallest for this element (from 0.08 to 0.24 s). It is evident from the results that element E3 was executed the fastest by study subject E (mean = 1.72 s; SD = 0.08 s) and the slowest by study subject A (mean = 2.36 s; SD = 0.14 s).

From the elements E1 to E3, by study subject, the average values of all executed turns and also the standard deviations decrease. The coefficient of variation decreases from the E1 element (KV = 9.7%), through E2 (KV = 7.9%) to E3 (KV = 6.9%).

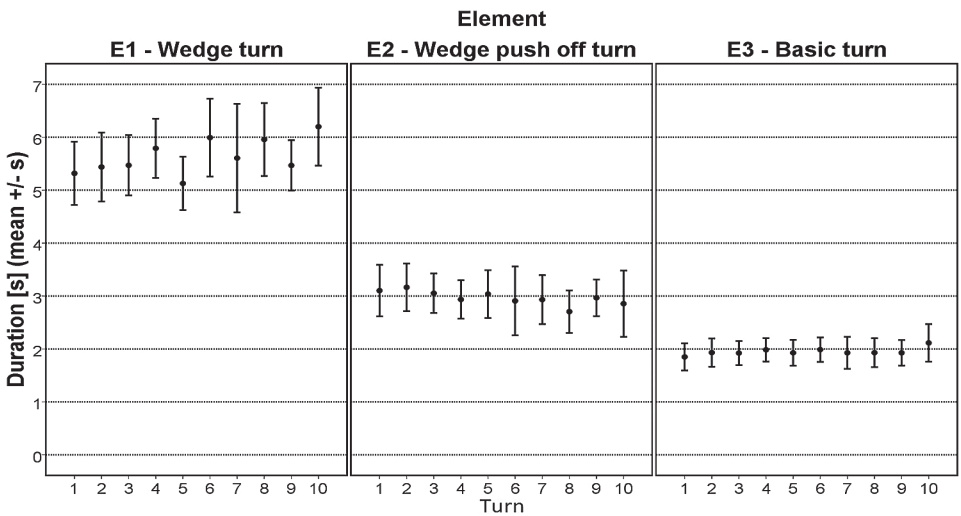

Figure 5. The means and standard deviations in the duration of all captured turns of individual elements of ski school, by study subjects

Table 1. Basic statistical parameters of the duration of each individual turn by phase of elements E1, E2 and E3

Task	Turn Phase		Turn										
			1	2	3	4	5	6	7	8	9	10	all
E1	GT1	mean (SD)	1.07 (.61)	1.17 (.49)	1.00 (.43)	1.15 (.44)	.91 (.35)	1.21 (.56)	1.18 (.49)	1.32 (.45)	1.12 (.39)	1.28 (.47)	1.13 (.46)
		KV %	57%	42%	43%	39%	39%	47%	41%	34%	34%	37%	41%
	IP1	mean (SD)	.76 (.32)	.96 (.27)	1.02 (.54)	1.17 (.24)	.96 (.30)	1.22 (.19)	.89 (.50)	1.10 (.33)	1.04 (.33)	1.28 (.17)	1.03 (.35)
		KV %	42%	28%	53%	20%	31%	16%	56%	30%	32%	14%	34%
	SP1	mean (SD)	2.41 (.32)	2.49 (.36)	2.45 (.42)	2.65 (.39)	2.25 (.30)	2.69 (.46)	2.41 (.34)	2.54 (.59)	2.11 (.41)	2.64 (.21)	2.47 (.40)
		KV %	13%	14%	17%	15%	13%	17%	14%	23%	20%	8%	16%
	TGT1	mean (SD)	1.08 (.30)	.82 (.18)	1.00 (.16)	.82 (.19)	1.01 (.20)	.88 (.12)	1.12 (.35)	1.00 (.25)	1.20 (.31)	1.01 (.15)	0.98 (.25)
		KV %	28%	22%	17%	23%	20%	14%	31%	25%	26%	15%	25%
E2	IP2	mean (SD)	.79 (.25)	.85 (.31)	.80 (.09)	.78 (.10)	.85 (.17)	.87 (.38)	.84 (.13)	.79 (.08)	.86 (.11)	.78 (.10)	0.82 (.20)
		KV %	31%	37%	11%	13%	20%	44%	15%	11%	13%	12%	24%
	SP2	mean (SD)	2.32 (.35)	2.32 (.39)	2.26 (.40)	2.16 (.32)	2.19 (.38)	2.04 (.36)	2.10 (.38)	1.92 (.33)	2.11 (.27)	2.08 (.55)	2.16 (.37)
		KV %	15%	17%	18%	15%	17%	18%	18%	17%	13%	26%	17%
E3	IP3	mean (SD)	.59 (.11)	.59 (.08)	.58 (.05)	.59 (.10)	.58 (.04)	.64 (.06)	.59 (.07)	.60 (.06)	.57 (.06)	.66 (.10)	0.60 (.08)
		KV %	19%	14%	8%	16%	7%	9%	11%	10%	11%	15%	13%
	SP3	mean (SD)	1.26 (.19)	1.35 (.20)	1.34 (.20)	1.40 (.18)	1.35 (.22)	1.35 (.18)	1.34 (.26)	1.33 (.24)	1.36 (.21)	1.46 (.31)	1.35 (.21)
		KV %	15%	15%	15%	13%	16%	14%	19%	18%	15%	21%	16%

Legend: E1 – Wedge curves with four turn phases; E2 – Turns with a wedge push-off with two turn phases; E3 – Basic swinging with two turn phases; GT – gentle traversing phase; IP – Initiation phase; SP – Steering phase; mean – Mean of results; SD – Standard deviation; KV – Coefficient of variation

Table 1 shows basic statistical parameters of the duration of each turn by individual phases (GT, IP, SP and TGT) of the E1, E2 and E3 elements. In contrast to the other two elements, the E1 element also has the GT1 and TGT1 phases. The average duration of the GT1 phase was approximately 1 second. On average, the subjects executed the GT1 phase the fastest in the 5th turn (mean = 0.91 s; SD = 0.35 s), and the slowest in the 8th turn (mean = 1.32 s; SD = 0.45 s). In this phase, the coefficient of variation (KV) was the largest in the first turn (57%) and the smallest in the 10th turn (37%). In the IP1 phase, the duration was shorter on average than in the GT1 phase. The latter is the shortest in the first turn (mean = 0.76 s) and the longest in the last turn (mean = 1.28 s). The highest coefficient of variation (KV) of the IP1 phase was in the 7th turn (KV = 56%) and 3rd turn (KV = 53%), whereas the smallest was in the 10th turn (KV = 14%) and 6th turn (KV = 16%). The average duration of the SP1 phase was quite a lot longer than the other three phases in E1. On average, the results revolve around 2.5 s; however, the subjects executed the SP1 phase for the longest time in the 6th turn (mean = 2.69 s; SD = 0.46 s) and for the shortest time in the 9th turn (mean = 2.11 s; SD = 0.41 s). The coefficients of variation (KV) in the SP1 phase were relatively low in all turns (from 13 to 23%). The subjects executed the last phase on average for about one second (mean from 0.82 to 1.20 s; SD = 0.18 to 0.31 s).

In the E2 element, the average duration of the IP2 phase was less than a second. The subjects executed the IP2 phase the fastest in the 4th and 10th turns (mean = 0.78 s; SD = 0.10 s), whereas in all other turns the average duration of the phase was longer, with the longest being the 6th turn (mean = 0.87 s; SD = 0.38 s). The highest KV (44%) was calculated in the 6th turn. The average duration of the SP2 phase was more than twice as long as the IP2 phase. On average, the results exceed 2 s. The subjects executed the SP2 phase for the longest time in the 1st turn (mean = 2.32 s; SD = 0.35 s), while the shortest average time for the SP2 phase of this element was recorded in the 8th turn (mean = 1.92 s; SD = 0.33 s).

In the E3 element, the average duration of the IP3 phase was the shortest, ranging from 0.58 to 0.66 s. The calculated coefficients of variation (KV) in the IP3 phase ranged from 4 to 11%. The average duration of the SP3 phase was longer than the IP3 phase. On average, the results revolve around 1.3 s. The subjects executed the SP3 phase for the longest time in the 10th turn (mean = 1.46 s; SD = 0.31 s), with the shortest average time for the SP phase of this element being recorded in the 1st turn (mean = 1.26 s; SD = 0.19 s).

Differences in the duration of analogue phases of different elements (IP1, IP2 and IP3; SP1, SP2 and SP3) were tested using linear mixed-effects models with phases and turns as fixed factors and subjects as a random factor. In both cases (IP and SP), the differences between the phases were found to be highly significant ($p < 0.001$).

Table 2. Basic statistical parameters of the duration of the phases of turns in all three elements, by study subjects (A to H)

Task	Turn Phase		Study subjects (A–H)							
			A	B	C	D	E	F	G	H
E1		N1	8	9	10	8	6	11	10	10
	GT1	mean (SD)	1.23 (.31)	1.19 (.27)	1.25 (.39)	0.62 (.16)	0.99 (.38)	1.49 (.32)	1.56 (.43)	0.59 (.19)
		KV%	25%	23%	31%	26%	39%	22%	28%	32%
	IP1	mean (SD)	1.31 (.25)	0.79 (.17)	1.28 (.32)	1.11 (.32)	1.02 (.21)	1.03 (.40)	1.00 (.29)	0.72 (.35)
		KV%	19%	22%	25%	29%	21%	39%	29%	49%
	SP1	mean (SD)	2.31 (.17)	2.16 (.20)	2.55 (.30)	2.59 (.59)	3.23 (.38)	2.29 (.30)	2.37 (.23)	2.51 (.22)
		KV%	7%	9%	12%	23%	12%	13%	10%	9%
	TGT1	mean (SD)	0.99 (.33)	0.91 (.33)	0.95 (.11)	1.13 (.19)	0.98 (.24)	0.91 (.21)	1.02 (.28)	1.00 (.23)
		KV%	33%	36%	12%	17%	24%	23%	28%	23%
E2		N2	9	13	9	10	7	10	10	8
	IP2	mean (SD)	1.14 (.37)	0.73 (.07)	0.86 (.17)	0.80 (.08)	0.67 (.05)	0.78 (.07)	0.80 (.06)	0.75 (.08)
		KV%	32%	9%	20%	10%	7%	9%	8%	11%
	SP2	mean (SD)	2.43 (.11)	1.58 (.12)	2.52 (.17)	1.85 (.16)	2.46 (.14)	2.34 (.21)	2.20 (.17)	1.96 (.40)
		KV%	5%	7%	7%	8%	6%	9%	8%	20%
E3		N3	13	16	11	13	10	13	12	10
	IP3	mean (SD)	0.67 (.09)	0.56 (.08)	0.66 (.05)	0.56 (.05)	0.57 (.04)	0.61 (.08)	0.62 (.07)	0.60 (.09)
		KV%	13%	15%	8%	9%	8%	13%	12%	15%
	SP3	mean (SD)	1.66 (.09)	1.19 (.12)	1.60 (.15)	1.26 (.23)	1.14 (.08)	1.34 (.11)	1.28 (.08)	1.34 (.09)
		KV%	6%	10%	10%	18%	7%	9%	6%	7%

Legend: E1 – Wedge curves with four turn phases; E2 – Turns with a wedge push-off with two turn phases; E3 – Basic swinging with two turn phases; GT – gentle traversing phase; IP – Initiation phase; SP – Steering phase; mean – Mean of results; SD – Standard deviation; KV – Coefficient of variation; N – number of turns

Table 2 shows the number of executed turns and the average duration (mean), standard deviations and coefficients of variation of all executed phases of all captured turns of elements E1, E2 and E3, by study subjects from A to H. The subjects executed a different number of turns on the same length of the terrain (with element E1 from 6 to 11 turns, E2 from 7 to 13 turns and E3 from 10 to 16 turns). In terms of executed turns within an individual element, subject E stands out from the other subjects with a low number of turns: 6 (in E1), 7 (E2) and 10 (E3). The highest number of turns in all three elements was executed by subject B: 9 (in E1), 13 (in E2) and 16 (in E3).

In element E1 the subjects executed the GT1 phase for about 1.3 s on average. The most outstanding examples included subject G who executed this phase for the longest time (mean = 1.56 s, SD = 0.43 s) and subject H who needed the least time to execute this phase (mean = 0.59 s, SD = 0.19 s). The highest coefficient of variation (KV) in the GT1 phase was that of subject E (KV = 39%) and the smallest of subject F (KV = 22%). The average time of execution of the IP1 phase was about 1 second, whereas the phase was executed the fastest by subjects H (mean = 0.72 s, SD = 0.35 s) and B (mean = 0.79 s, SD = 0.17 s). Subjects A (mean = 1.31 s, SD = 0.25 s) and C (mean = 1.28 s, SD = 0.32 s) needed the most time to execute the IP1 phase in this element. The coefficients of variation (KV) of this phase range in most subjects from 19 to 29%; subjects H (KV = 49%) and F (KV = 39%) stand out. Compared to other phases of the E1 element, the SP1 phase was at least 1 second longer for all subjects. On average, the subjects executed it for 2.3 seconds; the highest value was that of subject E (mean = 3.23 s; SD = 0.38 s) and the lowest of subject A (mean = 2.16 s; SD = 0.20 s). The coefficients of variation (KV) of this phase were below 13% for most subjects, except for subject D (KV = 23%). For most subjects, last phase of element E1 (TGT1) lasted on average about 1 second (from 0.91 to 1.13 s) and the standard deviations ranged from 0.22 to 0.19 s. The lowest coefficient of variation (KV) in the TGT1 phase was that of subject C (KV = 12%) and the highest of subject B (KV = 36%).

In the E2 element most subjects executed the IP2 phase in less than a second. The most outstanding examples included subject A who took the longest time to execute this phase (mean = 1.14 s, SD = 0.37 s) and subject E who needed the least time to complete this phase (mean = 0.67 s, SD = 0.05 s). The coefficients of variation (KV) in execution of the E2 phase by the subjects were mostly below 11%; the lowest KV was that of subject E (KV = 5%) and the highest of subject A (KV = 32%). Compared to the IP2 phase, the SP2 phase was at least 1 second longer for all subjects. On average, the subjects executed it for about 2 seconds; the time range was from (mean = 1.58 s; SD = 0.12 s) for subject B to (mean = 2.52 s; SD = 0.17 s) for subject C. The calculated coefficients of variation (KV) of this phase were below 9% for most subjects, except for subject H (KV = 20%).

The E3 element, compared to the E1 and E2 elements, lasted on average for the least time with all study subjects. This applies to the IP3 and SP3 phases. The average time of execution of the IP3 phase was slightly more than 0.5 second, whereas the phase was executed the fastest by subjects B (mean = 0.56 s, SD = 0.08 s) and D (mean = 0.56 s, SD = 0.05 s) and the slowest by subject A (mean = 0.67 s, SD = 0.09 s). The coefficients of variation of the IP3 phase were low for the study subjects, ranging from 8 to 15%. The subjects executed the SP3 phase a little longer, namely in about 1.3 seconds. Subject E (mean = 1.14 s, SD = 0.08 s) needed the least time to execute the SP3 phase, and subject

A the most (mean = 1.66 s, SD = 0.09 s). The calculated coefficients of variation (KV) of the SP3 phase were below 10%, except for subject D (KV = 18%).

DISCUSSION

The main results of the study showed that in the beginning types of skiing in the same conditions on the same length of terrain, the average durations of turns and the times of comparable phases (IP and SP) of the elements of the ski school shortened on the methodical upward scale (from E1 to E3). On the other hand, the number of turns executed on the same length of terrain from E1 to E3 increased. Therefore, we can assess that the elements of the ski school are, in terms of progressivity in speed, gradually placed as a consequence of the hierarchically set initial elements of the ski school (Lešnik & Žvan, 2010). The reasons lie in the basic characteristics of Alpine skiing that are defined by speed, timeliness, accuracy, rhythmic and softness of skiing (Petrovič, Šmitek & Žvan, 1984). Of all the above skiing characteristics, the timeliness and rhythmic ones are time-limited in each individual turn, whereas the speed of sliding is by all means a basic condition for carrying out an individual element in the hierarchy of elements of each ski school.

If the results are discussed using the methodical scale of the ski school in an upward direction, it can be established that all phases of the turn (GT, IP, SP, TGT) in E1 are executed slower than in comparable phases (IP, SP) of hierarchically more demanding elements (E2 and E3). The reason for this lies in the speed which has to be adjusted to skiers with a lower level of knowledge. This can be achieved with the appropriate completion/closing of turns. Due to the longer or shorter phase of gentle traversing (GT) in the E1 element, one cannot speak about the rhythm of skiing (the turns are unrelated in terms of movement). To implement movement in E1, accuracy, timeliness and softness are less important. It has been shown that in the GT phase the differences between the subjects in terms of duration are the largest as a consequence of longer or shorter traversing. Practically speaking, skiing teachers – the subjects of this study are all skiing teachers – must adjust the time of traversing and preparation for the execution to the abilities of the learners, whereas the level of knowledge of the learners that the subjects should teach was not prescribed. It is also interesting that the time of traversing (GT) was longer especially in the first turns when the speed of skiing was probably lower.

The E2 element involves upgrading of the learnt motor information where, compared to the E1 element, the speed of skiing is slightly higher (Žvan, Lešnik & Supej, 2012), whereas the motor tasks in subsequent phases pass from one to another more directly. Due to a faster skiing rhythm (shorter times) the mutually comparable phases (IP and SP) in E2 are shorter than in E1 and the movement is more complex. This involves the simultaneous execution of several necessary movements in the same or even a shorter time period with their known consequences (Christina & Rose, 1985; Danthir et al., 2005; Deary, Der, & Ford, 2001, Endsley, 2006; Memmert, Simons, & Grimme, 2009); in the case of our study these were push-off, wedge push-off of the upper ski, pole planting etc. The complexity of the movement has been discussed on the basis of studies of special psychological abilities (Knudson, 2013), conductivity of the nervous system (Hertensein & Weiss, 2011) and intelligence (Agrawal & Kumar, 1993; Jensen & Munro, 1979). These are all

interconnected sets of activities that, given the desired way of movement and external stimuli, can appear in a more simple or complex form (Favilla, 2002).

Likewise, the E3 element involves upgrading of the acquired motor knowledge from E2. The speed of skiing increases (Žvan, Lešnik & Supej, 2012), while at the same time our study ascertained that the rhythm of skiing or duration of turns and their phases increases too. It should also be emphasised that the skiers in E3 execute the entire turn with a parallel ski position which increases the need for knowledge to manage the skis in the IP phase when the skis must turn in the direction towards the fall line (Lešnik & Žvan, 2010). Due to the above, there is a need for a slightly higher speed of skiing and coordinated pole planting that increases the need for timeliness and accuracy (Petrovič, Šmitek & Žvan, 1984).

The need for coordinated pole planting with a parallel ski position is so great that in the methodology of learning to ski the E2 element can be executed – as an interim exercise from E2 to E3 – with the planting of the pole (Figure 6). This one belongs to the IP phase which increases the complexity of movement, nevertheless the exercise is helpful in ensuring a smoother transition to E3 which represents the most basic way of skiing in a parallel ski position through all phases of the turn.

The speed of executing simple and complex movements in skiing increases on the methodical scale, yet reactions to a large number of (un)expected stimuli during skiing also occur. In this context, we are not only referring to a series of specific reflex reactions but, in such situations, the reaction depends on the development of cognitive functions, the age of the subject and other factors (Light & Spirduso, 1990). During skiing there is an uninterrupted flow of different external stimuli and/or an appropriate selection of reactions to the environment which depends on the already acquired skiing knowledge as well as the general intelligence of the subject. This is related to a person's ability to solve problems and is also an indicator of the successfulness of that person when faced with a new situation. The success of introducing the desired movement is not only influenced by the selection of appropriate motor programmes but also by the degree of control and

Figure 6. Turns with a wedge push-off with a pole plant as a pre-exercise for basic turning

level of concentration and, consequently, also the number of incorrect movements. Studies confirm the fact that, by increasing the number of concurrent movements, the time of reacting to a stimulus grows. This is particularly true for subjects who are still learning a complex movement (Henry & Rogers, 1960).

The main limitation of the study is that the measurements were performed with a computer aided video-analysis where the accuracy of the definition of phases and the beginnings and ends of the turns is limited by the frequency of capturing and defined through visual perception. For the purpose of ensuring the greatest measurement accuracy, the expert panel was composed of people with different skiing and scientific knowledge. Each member of the expert panel conducted the analysis of the phases individually, and then the members harmonised their findings. Nevertheless, the assessed accuracy of the determination of the times of the turns and phases is better than ±0.04 s, yet lower than could be achieved with the use of determination of phases through measurements of 3D kinematics (Müller et al., 1998; Supej, Kugovnik & Nemec, 2003) or through measurements of the ground reaction forces (Vaverka & Vodičkova, 2012).

In conclusion, to our knowledge this study is the first to deal with the complexity of movement of the elements of the Alpine ski school and their methodical progressivity. The study focused on the initial elements of skiing that represent the pillar of the Slovenian national skiing school. Nevertheless, the methodological progression of these core elements of other national alpine ski schools are similar, therefore the findings of this study might be possible to generalize. We are aware that in the future it would be reasonable to verify whether the complexity of movement also intensifies in a similar way in the continuous elements of the ski school or whether this only involves aggravating circumstances that manifest themselves in higher ground reaction forces and the related need for better balance, higher speed and additional time limitation. Since skiing speed, as indicated by the measurement, is an important factor in the methodological scale, it would be reasonable to conduct measurements that can verify accurately how the speed changes with the elements of the ski school as well as how the selection of the terrain, the snow and other conditions in which the skier learns to ski affect the execution of elements of the ski school. It would be worth studying more accurately the complexity of movement during skiing and the differences between individual movements in the same phases of various elements of the ski school.

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PROGRESIVITA ZÁKLADNÍCH ELEMENTŮ SLOVINSKÉ NÁRODNÍ ŠKOLY ALPSKÉHO LYŽOVÁNÍ

BLAŽ LEŠNIK, MILAN ŽVAN, BOJAN LESKOŠEK, MATEJ SUPEJ

SOUHRN

Programy lyžařských škol v různých zemích jsou přizpůsobeny místním podmínkám a lyžařským trendům. Cílem této studie bylo stanovit progresivitu tří základních prvků slovinské lyžařské školy, pokud jde o dobu trvání jednotlivých zatočení a jejich fází. U osmi účastníků bylo zaznamenáno, jak provádějí tři základní prvky ze slovinské národní lyžařské školy: E1 – oblouk z pluhu; E2 – oblouk z přívratu vyšší lyží E3 – paralelní oblouk. Podle lyžařské školy byly prvky rozděleny do fází. Výsledky počítačové video- analýzy ukázaly, že na začátku lyžování za stejných podmínek a stejné délky terénu, je průměrná doba zatáčení a časů srovnatelného zahájení a řízení fází, jsou tyto prvky dle metodické vzestupné škály zkráceny (od E1 po E3). Počet zatočení provedených na stejné délce terénu se zvýšil; od E1 po E3. Delší pokrok byl v motorické komplexnosti úlohy, indikován při jejich začleněného do lyžařských prvků. Poměrně velké rozdíly mezi subjekty, které prováděli stejné prvky, byly zaznamenány v době jejich trvání. Na závěr lze usuzovat, že základní prvky lyžařské školy jsou postupně z hlediska progresivity podle času jejich trvání, implementovány.

Klíčová slova: Alpské lyžování, kinematika, otočné fáze, klínové křivky

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