Sports participation during the life course

Claudia Engel and Siegfried Nagel
University of Berne, Switzerland

Abstract: For many European nations, lifelong sports participation is an intrinsic aspect of sport policy. Nonetheless, very few differentiated studies have examined how participation in sport changes over the lifespan. Differences in individual life courses and in socio-historical framing conditions would suggest a great variety of different courses. It is necessary then to ask how participation can be described over the life course, and to what extent people’s previous experience of sport influences the decision to enter, return to or exit participation in sport. In a retrospective longitudinal study based on a life-course approach to research, a total of 1,739 over 50 year olds were asked about their participation in sport. Results indicate that individual courses of sports participation can be described by alternations between active sport episodes and episodes of inactivity. The longer a person remains in a specific episode, the lower the probability of either taking up or giving up a sport. Nonetheless, cohort effects indicate that effects of contemporary historical changes on sports participation overlay the effects of lifetime dependencies, and that in general, sport policy programmes have a relatively strong impact on sport careers in middle adulthood.

Keywords: life course research, sports participation, event history analysis

Introduction
Since the ratification of the EU Charter “Sport for All” in 1975, policymakers have striven to provide access to sport for as many social groups as possible. On the one hand, these programmes promoting sport and exercise have contributed to a general increase in quotas of sports participation, and to a broader understanding of sport, as well as a growing expansion of different sport facilities and sport providers. On the other hand, the persistent social inequalities in sports participation (Breuer & Wicker, 2008; Hartmann-Tews, 2006; Hovemann & Wicker, 2009; Moens & Scheerder, 2004; Scheerder, Vanreusel, Taks & Renson, 2002) indicate that these measures have been only moderately successful. Although lifelong sport is an important goal of both sport and health policy, due to its positive effects on health, fitness and social integration, participation quotas among older people – despite some increase in recent years – continue to be comparatively low. It is not only difficult to motivate people to engage in sports through appropriate sport policy programmes for example, it is also a challenge to encourage them to maintain their commitment and remain actively engaged in sport for as long as possible. Sports participation is characterised by drop-outs and re-starts (Pahmeier, 1994), particularly in adulthood. For example, high drop-out rates, of more than 50 per cent per year, could be found in health-related exercise and fitness clubs or sport clubs (Fuchs, 2003; Nagel, 2006; Pahmeier, 2008). In this context, it can be as-
sumed that sports participation does not proceed evenly across the life course but is characterised by the alternation between episodes of sport activity and inactivity. A further assumption is that current sport activity is influenced by prior experience, so studying the influence of prior sport history on current episodes of sport activity or inactivity would seem worthwhile. This article focuses on the following questions: How can the course of sports participation be described in relation to alternating episodes of sport activity and inactivity? To what extent does prior experience influence the decision to commence or recommence active sport, or to stop doing sport over the life course? And in view of the wide range of sport policies to encourage “Sport for All” and “Lifelong sport”, as mentioned above, to what extent do such campaigns and programmes influence the individual courses of sports participation?

To address these questions, this article begins by summarising current research on sports participation across the life course. Based on this summary, research goals and a theoretical framework are developed to support the explanation of sports participation across the life course by examining lifetime dependencies and changes over historical time. The methodology of the study is described, and the main findings are assessed against the research questions. The article concludes by discussing the results against a background of the life course approach.

The current state of research

The maintenance and course of sports participation can only be studied longitudinally. In recent years, there have been several such scientific studies in Europe, particularly in the Scandinavian and Benelux nations (Beunen et al., 2004; Kemper, de Vente, van Mechelen & Twisk, 2001; Kirjonen et al., 2006; Kjønniksen, Anderssen & Wold, 2009; Kristensen et al., 2008; Richards, Williams, Pouton & Reeder, 2007; Tammelin, Näyhä, Hills & Järvelin, 2003; Telama, Leskinen & Yang, 1996; Twisk, Kemper & van Mechelen, 2000; Vanreusel et al., 1997; Yang, Telama, Leino & Viikari, 1992). The majority of these studies have been mostly prospective longitudinal studies examining the lifetime dependencies of sports participation over a period of 7 to 27 years. De Bruyn and Bringé (2006) analysed the impact of the duration of membership in sports federations and sports clubs based on the occurrence of beginning or exiting membership. However, this research considers a relative short period of 5 years and focuses only on organisational membership. Therefore only few studies have addressed the course of sports participation over the entire lifespan (Klein, 2009; Frändin, Mellström, Sundh & Grimby, 1995). The focus of studies has instead been on how sport activity in childhood and adolescence relates to sport activity in middle adulthood. In contradiction to the frequently postulated lay assumption that this relation is positive, all longitudinal studies confirm only a weak positive correlation (Beunen et al., 2004; Kuh & Cooper, 1992; Malina, 2001; Taylor, Blair, Cummings, Wun & Malina, 1999; Telama, Yang, Laakso & Viikari, 1997; Trudeau, Laurencelle & Shephard, 2004; Twisk et al., 2000). In addition, the longer the period of observation, the weaker the relationship is found to be (Beunen et al., 2004; Malina, 2001; McMurray, Harrell, Bangdiwala & Hu, 2000; Pfeiffer et al., 2006). This unexpectedly weak
relationship is explained by methodological problems (Telama et al., 1997; Telama et al., 1996) when assessing sports participation (which is frequently based on self-reports that are considered to be less reliable and valid). These problems mean that insufficient attention is paid to variables and co-variables, and the failure to address the multivariate nature of the relationship (Malina, 2001).

The outcomes of these empirical studies are hard to compare because they not only address different time intervals (7 to 27 years) but also differ in the ways they define and conceptualise the central ideas of sports participation and sport activity. Although the available longitudinal studies assess sports participation at several timepoints, they neglect the course of sport activity between these, thus failing to address the perspective that sports participation over the life course is characterised by phases of activity and inactivity. They also do not distinguish between the two events marking the beginning and end of such an activity. Therefore the low correlations between sport activity at different measurement times may be due to a greater intraindividual variance in sports participation, a variance that cannot be depicted statistically due to insufficiently finely-graded assessment and the neglect of what happens between measurement times (Telama et al., 1996). Another conspicuous aspect of the current state of research is that although various birth cohorts have been examined singly, empirical findings have not been evaluated and presented in terms of a cohort analysis. Furthermore, findings have not been related to historical time and external social circumstances that vary over time, so that it is not known whether the impact of lifetime dependencies is confounded with changes over time. Indeed, increases in health awareness and body awareness along with the sport policy programmes to promote exercise and sport, which particularly gained momentum during the 1980s and 1990s, may have had such a positive impact on sports participation that the prior history of sport is of only secondary importance.

As there is a lack of theoretical basis to explain the assumption of lifetime dependence of sports participation and the expected relation between sports participation during adolescence and during adulthood, this article formulates a theoretical and methodological approach that analyses the entire lifespan, thereby making it possible to study the lifetime dependencies of sports participation as well as the influence of historical time on the lifetime course of sports participation.

**Theoretical framework**

The life course approach has been chosen as the theoretical framework (Elder, 1996; Mayer, 1990, 2009). Analysing the entire lifespan makes it possible to study the lifetime dependencies of sports participation while taking account of historical time. Individual life courses are defined as careers (like occupational careers, family careers, etc.) that are viewed as a sequence of activities and events both in various life domains and in the attendant institutions and organisations. Although the life course is shaped by society, individuals are perceived as autonomous actors who are able to exert an influence on social structures within the framework of given societal conditions.
The dynamic course of the sport career

The following study excludes the life course in the other life domains (family, work) and analyses the course of sports participation over the entire lifespan while relating this to historical changes in the general development of sport. The sport career has to be understood as a sequence of episodes of sport activity and sport inactivity that are introduced by the events of starting and stopping to play a sport (Figure 1). Hence, it is assumed that the course of sports participation over the lifespan has a dynamic character that is shaped by alternations between episodes of sport activity and inactivity, that is, by repeatedly entering and exiting sport.

The duration of a particular episode and the time assigned to it have “consequences for later decisions and courses” (Mayer, 1990, 11, translated). It can be assumed that a longer length of stay in a sport activity or in an episode of sport inactivity lowers the probability of leaving or entering this episode as the specific lifestyle consolidates. De Bruyn and Bringé (2006) identified for membership in sport federations and clubs: “the longer the duration of membership, the lower the proportion of members who leave” (p. 692).

The influence of the prior history of sport

“The life course is an endogenous causal relationship” (Mayer 1990, 11, translated). In other words, the individual careers in each life domain can be explained only through the conditions in prior life phases. In this sense, current sports participation relates to the prior history of sport, and can be understood only in light of past sport experiences. Presumably individual different prior experiences of sport have specific effects on future sports participation. For example, it can be assumed that the total duration of all sport episodes will have a positive effect on the further course of the sport career. The more sport years a person ‘collects’, the lower the probability of an exit and the higher the probability of a re-entry following a break.
Entry into the first sport activity is possible at any time during the life course, but the life phase in which sport activity commences may influence the later course of sports participation. As discussed in the analysis of current research, it is assumed that sport experience during adolescence has a particularly positive impact on any ensuing sports career and lays the foundation for life-long sport activity. Even though earlier studies have ascertained only a weak correlation between sports participation in childhood or adolescence and adulthood (Beunen et al., 2004; Kuh & Cooper, 1992; Malina, 2001; Taylor et al., 1999; Telama et al., 1997; Trudeau et al., 2004; Twisk et al., 2000), it seems likely that the probability of re-entering during adulthood after an episode of inactivity will be facilitated by participation in sport during adolescence. Moreover, attention should also be paid to the phase of the sports career following adolescence. The way in which these sport activities are practiced in the early years of life should provide various opportunities for acquiring experience that may, in turn, have specific effects on any ensuing sports career. For example, if a competitive sport is practiced over a longer period of time within a club or association, the experience gained in regular performance training could impact positively on the further course of sports participation. However, if this type of sport can no longer be performed for some reason or other (injuries, etc.), the concentration on this one type of sport and the performance orientation could impede another sport activity because alternative sports may seem unimportant. In contrast, trialling many different types of sport and sport activities could lead to the experience of a variety of exercises that would make it easier to adapt sports participation to any life situation. This could lead to life-long sports participation. Hence, one possibility is that competitively oriented sport activity in early life phases initially reduces the risk of exiting from sport, but also reduces the probability of re-entry after an exit. In contrast, if several changes are made in the type of sport, the probability of re-entry can be expected to increase.

The significance of changing framing conditions in society and developments in sport

Earlier research has revealed low correlations between lifetime dependencies and sport careers (Beunen et al., 2004; Kuh & Cooper, 1992; Malina, 2001; Taylor et al., 1999; Telama et al., 1997; Trudeau et al., 2004; Twisk et al., 2000). However, this could be due to the failure to relate the findings to their historical context. Sport careers are also subject to the influence of changing social framing conditions (Figure 1). Until the middle of the 20th century, the dominant understanding of sport was narrow in comparison to current perspectives, and was mostly a leisure pursuit for upper class males. In comparison, girls, young women and older people engaged in sport less frequently. Access to sport for these excluded groups has only come about through increased health awareness and changed body awareness combined with sport policy programmes to promote exercise. Increase in sports participation of women in recent decades (Breuer, 2003, 2004; Klein, 2009), for example, would seem to be determined by these historical trends. The changed societal framing conditions sketched here and developments in sport have probably influenced the sports participation of different birth
cohort in different ways. Those who experienced these developments in the 1980s and 1990s when they were middle-aged may well have been particularly motivated to play sports with the influence of changed health awareness and programmes to promote sport and exercise. Older cohorts, in contrast, experienced these trends at a later stage in their life course, and may well have felt these programmes had less personal relevance because of their advanced age and possibly a more passive old-aged self-image. Accordingly, it is conceivable that the age cohorts who were middle-aged in the 1980s and 1990s that have particularly been able to profit from the trends in sport sketched above. This means that, compared to older age cohorts, they will have a higher probability of (re-)entering sport after several years of inactivity. In summary, it can be assumed that when empirical findings are not classified against their historical contexts, the effects of prior sport experience may be confounded with historical changes over time.

These theoretical considerations lead to the following research questions or assumptions:

1. What influence does the duration of an episode of sport or an episode of sport inactivity have on the probability of exit or entry?
2. What specific effects do individual variations in prior sport experiences have on further sports participation? Further to this:
   2.1. To what extent is exiting or entering a sport episode influenced by the total number of prior years of sport?
   2.2. To what extent is the probability of re-entering sport in adulthood facilitated by participation in sport during adolescence?
   2.3. What influence does a competitive sport activity in earlier years have on the risk of exiting sport or the probability of re-entering sport in adulthood?
   2.4. To what extent does a varied sport career with several changes in the type of sport in earlier years influence the probability of sport exit or re-entry in adulthood?
3. To what extent do changing framing conditions in society and developments in sport exert different influences on the sport careers of different age cohorts?

Method

Sample

It is necessary to gather personal time series data in order to empirically investigate these assumptions. This data was collected in 2008 in the study ‘Sport in the Life Course’ via a telephone survey (CATI laboratory) of 1,739 over 50 year olds living in Braunschweig and Chemnitz, two cities in western and eastern Germany. The two cities have comparative populations, proportions of people aged over 50 years and unemployment rates (theoretical sample). On the basis of the telephone registers, a simple random sample of 2,000 respondents overall (1,000 in each town) was selected. After an examination of the internal consistency 261 incomplete data sets were removed. The sample is not completely representative because there are more women
than men, and compared to population statistics, the 60 to 69 year old population is over-represented (Table 1).

Table 1: Sample characteristics

<table>
<thead>
<tr>
<th>City</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braunschweig</td>
<td>858</td>
<td>49.3</td>
</tr>
<tr>
<td>Chemnitz</td>
<td>881</td>
<td>50.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1,063</td>
<td>61.1</td>
</tr>
<tr>
<td>Male</td>
<td>676</td>
<td>38.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age cohort</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-59</td>
<td>582</td>
<td>33.5</td>
</tr>
<tr>
<td>60-69</td>
<td>631</td>
<td>36.3</td>
</tr>
<tr>
<td>70-79</td>
<td>526</td>
<td>30.2</td>
</tr>
<tr>
<td>Total</td>
<td>1,739</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Measures

Sports participation over the lifespan is assessed through a specially developed questionnaire based on several existing retrospective questionnaires (Conzelmann & Nagel, 2003; Côté, Ericsson & Law, 2005; Nagel & Conzelmann, 2006). Retrospective data collections have their own specific methodological problems, in particular problems with memory. Based on the theoretical and methodological framework of life course research (Brückner, 1990) and other studies (Côté et al., 2005; Ropponen, Levälahti, Simonen, Videman & Battié, 2001), the survey is designed to access only facts on activities and events within the field of sports participation (e.g. sport activities, their frequency, participation in competitive sports) and not subjective interpretations and meanings of sport exercises that are difficult to remember. Prior sports activity is measured in decades from childhood to the present day. The survey firstly records all types of sport that were practiced regularly during each decade of life. The most frequent sport is then chosen and addressed with more specific questions (type of organisation, frequency, competitiveness). Finally, it is classified to a time axis through reports on when activity began and ended. This continuous path is chosen to facilitate recall. The following analyses are based only on the most frequently played types of sport. Sports participation is defined as practicing sport regularly at least once a week over a 6-months period during leisure time. This rather narrow definition delivers more reliable responses, as recall depends not only on how long the sport activity is maintained but also on the subjective significance of the event (see for example Schmidt, Peeck, Paas & van Breukelen, 2000).

Sport episodes are calculated in years from the start to the end of the sport activity. This means that only interruptions of more than one year are considered as episodes of sport inactivity. An assumed memory problem over a long time-span is the reasons for this approximate data collection in years. When the beginning and end of two types of sport follow on from each other without interruption or overlap, this is classified as one sport episode.

The competitive orientation is assessed dichotomously for the most frequent type of sport in each life decade (competitive: yes or no).
The variety of individual sport careers is assessed by the number of alterations in the most frequently played types of sport in the specific life decade.

An additional study was conducted to examine the reliability of the questionnaire used. On the basis of the test-retest-method a total of 38 persons (18 female, 20 male) aged 64 to 88 years were interrogated twice. The time-span between the two measurements amounted to approximately 5 months. The reliability was calculated by different correlation coefficients according to the scale level (Cramer’s Index, Pearson product-moment correlation coefficient, Spearman’s rank correlation coefficient). The data show predominantly high stability (CI=.823 to 1.00; r=.709 to .997).

Statistical analyses

Statistical analyses are performed with event history analysis procedures. These are particularly appropriate for analysing course data as they permit the prediction and explanation of events through the analysis of time until an event occurs. Like logistic regression, event history analysis aims to determine the entry probability for an empirically observed event. However, event history analysis has several advantages compared to (the frequently used) logistic regression analysis. For example, it offers various possibilities of modelling the distribution of lengths of stay until an event occurs. Furthermore, the survival analysis can take into account the problem of right-censoring data, that is, the problem that “in real data we often do not observe subjects long enough for all of them to fail” (Cleves, Gloud, Gutierrez & Marchenko, 2008, 2).

The Kaplan-Meier method has been chosen for a first explorative analysis of the transition probabilities from an active sport episode to an inactive episode and vice versa. This determines the entry probability of an event (sport entry or exit) on the basis of exact waiting times until the event occurs. Lifetime dependencies and variables influencing the further course of sports participation are studied with the exponential transition rate model. This model uses the exponential equation, \( f(t) = \alpha \exp(-\alpha t) \) to describe the duration until the occurrence of an event. It is based on the assumption that the risk of an event occurring is constant across all timepoints.

Results

The dynamic course of sport careers

About 59 per cent of respondents were sport active at the moment of the survey and a total of 86 per cent of all respondents had begun at least one sport episode in their life (46 per cent have one sport-active episode, 38 per cent have two sport-active episodes and 16 per cent have three or more sport-active episodes). However, three-quarters of the people who have started their first sport episode became sport-inactive again. That means that they finished their first sport-active episode (Table 2). Of these 1,143 persons, 71 per cent re-entered a second sport episode. Only about 44 per cent of them dropped out again.

It is remarkable that entry rates decrease less than exit rates. On the one hand, sport behaviour stabilises as the number of sport episodes increases. On the other
hand, a re-entry into sport episodes is more common. Overall, the data supports the assumption of a dynamic course of sports participation over the life course; that is, the sport career is characterised by the alternation between phases of sport activity and inactivity. Nonetheless, the data also indicates that after a first sport episode, the given behaviour pattern (either sport activity or inactivity) consolidates and the number of events (exit or entry) declines.

Table 2: Exits and durations of sport-active and sport-inactive episodes

<table>
<thead>
<tr>
<th>Episodes</th>
<th>Exits</th>
<th>Durations</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>%</td>
<td>Mean</td>
<td>Min.</td>
</tr>
<tr>
<td>1st sport-inactive</td>
<td>1,739</td>
<td>1,501</td>
<td>86.3</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>1st sport-active</td>
<td>1,501</td>
<td>1,143</td>
<td>76.1</td>
<td>17.3</td>
<td>1</td>
</tr>
<tr>
<td>2nd sport-inactive</td>
<td>1,143</td>
<td>808</td>
<td>70.7</td>
<td>20.9</td>
<td>1</td>
</tr>
<tr>
<td>2nd sport-active</td>
<td>808</td>
<td>352</td>
<td>43.6</td>
<td>14.1</td>
<td>1</td>
</tr>
<tr>
<td>3rd sport-inactive</td>
<td>352</td>
<td>235</td>
<td>66.8</td>
<td>14.0</td>
<td>1</td>
</tr>
<tr>
<td>3rd sport-active</td>
<td>235</td>
<td>70</td>
<td>29.8</td>
<td>10.5</td>
<td>1</td>
</tr>
<tr>
<td>4th sport-inactive</td>
<td>70</td>
<td>42</td>
<td>60.0</td>
<td>11.6</td>
<td>1</td>
</tr>
<tr>
<td>4th sport-active</td>
<td>42</td>
<td>5</td>
<td>11.9</td>
<td>8.0</td>
<td>2</td>
</tr>
<tr>
<td>5th sport-inactive</td>
<td>5</td>
<td>3</td>
<td>60.0</td>
<td>9.6</td>
<td>6</td>
</tr>
<tr>
<td>5th sport-active</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>8.7</td>
<td>3</td>
</tr>
</tbody>
</table>

* Because the beginning of the first sport episode was assessed from age 5 onwards (left-censored data), adequate reports on duration are not possible here.

The first episode of sport activity has a mean duration of 17 years. However, individual episodes vary greatly from 1 year to 72 years. The probability of maintaining the first sport activity (i.e. the survival probability) steeply drops in the first 10 years of a sport episode, particularly between 5 to 10 years (Figure 2). This means that a relatively high proportion of sport participants end their sport activity at this particular time. After approximately 6 years, the probability of continuing the sport episode drops to about 75 per cent; and after 10 years, to only 50 per cent. Whereas the decrease is slightly greater after 20 years of a first episode, the survival probability for the first sport episode drops below 25 per cent only after approximately 34 years. The longer the duration of the first sport episode, the lower the proportion of sport participants who leave.

The survival probability also declines in the second and third sport episodes, but less steeply than in the first. The first three sport episodes differ significantly from each other in terms of duration and exit probability (Tarone-Ware test: 75.04; p < .00005). In the second sport episode, the survival probability is also still about 75 per cent after 7 years, but drops to around 50 per cent after 21 years. In the third sport episode, it takes 24 years for the exit probability to rise above 50 per cent. After this, the probability of exit decreases with the continuing length of stay in the sport activity and with the increasing number of episodes (Figure 2).
Figure 2. Survival probability in the first three sport episodes

The second episode of sport inactivity following on from the first episode of sport activity lasts an average of 21 years. As for sport episodes, the probability of exiting sport inactivity and starting to play sport again is stronger in the first 10 years of the episode than in the years that follow (Figure 3). These episodes of sport inactivity also differ from each other significantly in terms of duration and exit probability (Tarone-Ware test: $=17.72; p( ) < .0005$). The probability of exiting an episode of sport inactivity and taking up a sport again does not reach 50 per cent until approximately 20 years in the second episode of sport inactivity, 14 years in the third, and 10 years in the fourth. In contrast to sport episodes, the survival function curve in the third and fourth sport inactivity episode decreases more steeply than in the second sport inactivity episode. In other words, in later episodes of sport inactivity, the probability of recommencing a sport is greater in former episodes.

Although the entry quotas to a sport activity are higher than the exit quotas from a sport episode, the durations of the episodes of sport inactivity are longer than those in active sport episodes. In general, results confirm the assumption that the entry probability for the event sport entry or sport exit declines with the increasing duration of the specific episode.

Proceeding from the assumption that the further course of sports participation is influenced by the life phase in which the sport episode commences, the first sport episode will now be analysed for each life decade.
Adolescence is particularly significant for a first entry into a sport activity. In almost three-quarters of respondents, the first sport episode commences in childhood or adolescence (up to the age of 20 years). However, the exit quota when a sport episode commences in the first two decades of life is also relatively high. Relatively few first sport episodes commence in subsequent life decades (Table 3). However, the exit quota from such sport activities that first commence in adulthood declines from decade to decade. When the first sport episode begins in either the second or the fifth life decade, its mean duration is shorter. However, when a first sport episode begins in the fifth life decade, it has to be considered that the lower mean length of stay is due to the fact that
some of the respondents are only 50 years old at the time of the survey, and these sport episodes have simply not ended yet (right-censored database).

The durations of the first sport episode differ significantly between specific life decades (Tarone-Ware test: \(=51.15; p( ) < .00005\)). The survival probability drops very strongly in the first 10 years of the first sport episode when this commences between the ages of 10 and 19 years. If the first sport episode commences in the first three life decades, the survival probability in the first 10 to 15 years is lower than when the first sport episode is commenced later (Figure 4). In general, the further course of each sport episode is influenced by the life decade in which the first sport episode commences.

![Kaplan-Meier survival estimates of the 1st sport episode](image)

**Figure 4:** Survival probability in the first sport-active episode split according to life decade of entry

Parameters of the sport career after age 40 (survival analysis; exponential transition rate model)

To analyse lifetime dependencies of the sport career and to explain in more detail the effects on (re-)entry in comparison to exit in middle adulthood, the sample is divided into two groups: sport-actives and sport-inactives at age 40. This makes it possible to analyse the duration of the sport inactivity episode until the next (re-)entry after age 40, as well as the duration of the sport activity episode until the next exit. 40 years old is chosen as the cut-off because the oldest age cohorts of 70 to 79 years old attained approximately this age in the 1970s. This ensures that all age cohorts in the study ex-
experienced the ongoing development of popular sport (which first commenced in the 1970s) during their own young to middle adulthood. It is then possible to detect not only age effects through the differentiation of age cohorts but also period and cohort effects.

Table 4: Estimated $\alpha$ coefficients for the exponential model of (re-)entry and exit rates in sport careers after age 40

<table>
<thead>
<tr>
<th>Parameters of previous sport career</th>
<th>Sport-inactive episode at age 40: (re-)entries</th>
<th>Sport-active episode at age 40: exits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years of sport before age 40</td>
<td>$0.01 &lt; 0.1$</td>
<td>$0.00$ n. s.</td>
</tr>
<tr>
<td>Number of years of sport in adolescence</td>
<td>$-0.01$ n. s.</td>
<td>$-0.01$ n. s.</td>
</tr>
<tr>
<td>Competitive sport (1 or more decades)</td>
<td>$0.18 &lt; 0.1$</td>
<td>$-0.04$ n. s.</td>
</tr>
<tr>
<td>Variety of sport (2 or more different sports)</td>
<td>$0.07$ n. s.</td>
<td>$0.05$ n. s.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socio-demographic parameters</th>
<th>Sport-inactive episode at age 40: (re-)entries</th>
<th>Sport-active episode at age 40: exits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth cohort 1949-58 Reference group</td>
<td></td>
<td>$0.01 &lt; 0.1$</td>
</tr>
<tr>
<td>Birth cohort 1939-48</td>
<td>$-0.14$ n. s.</td>
<td>$-0.09$ n. s.</td>
</tr>
<tr>
<td>Birth cohort 1929-38</td>
<td>$-0.53 &lt; 0.0005$</td>
<td>$0.08$ n. s.</td>
</tr>
<tr>
<td>Female Reference group</td>
<td></td>
<td>$-0.19 &lt; 0.05$</td>
</tr>
<tr>
<td>Male</td>
<td>$0.18$ n. s.</td>
<td>$-0.05$</td>
</tr>
<tr>
<td>No vocational qualification Reference group</td>
<td></td>
<td>$0.44 &lt; 0.05$</td>
</tr>
<tr>
<td>Vocational training</td>
<td>$0.44 &lt; 0.05$</td>
<td>$0.11$ n. s.</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>$0.65 &lt; 0.05$</td>
<td>$0.02$ n. s.</td>
</tr>
<tr>
<td>Constant episodes</td>
<td>$-3.75 &lt; 0.0005$</td>
<td>$-3.75 &lt; 0.0005$</td>
</tr>
<tr>
<td>Exits</td>
<td>1,101</td>
<td>638</td>
</tr>
<tr>
<td>% of exits</td>
<td>51.3</td>
<td>40.9</td>
</tr>
</tbody>
</table>

In line with these theoretical considerations and assumptions, socio-demographic variables (age cohorts, gender, and educational level) and various parameters of the previous history of sport are entered into the exponential model. Due to the different lengths of the observation periods for the three age cohorts after age 40, sport episodes or episodes of sport inactivity from age 40 to 60 are observed as the dependent variable. Sports participation during adolescence is entered into the model as the number of years of sport between the ages of 5 and 19. The total duration of sports participation and the time assigned to this across all sport episodes is represented by the metric variable number of years of sport up to age 40. Respondents are taken to have competitive experience if they have participated for a minimum of one decade in competitions in their main sport up to age 40. The variety of sport careers is represented by at least two different main types of sport up to age 40 (Table 4).
In the period after age 40, a sport exit or entry event occurs only a maximum of two times. Among those who are sport inactive at age 40, one half (re-)enter a sport activity in the following years. Among those who engage in sport at age 40, approximately 41 per cent end this sport episode (Table 4).

The parameters of prior history of sport have only a minor influence on the sport career after age 40. They have no significant influence on either the exit from or the (re-)entry into a sport episode. This confirms previous research findings indicating a low correlation between sports participation in adolescence and sport activity in adulthood. Nonetheless the probability of a (re-)entry into sport among those who are inactive at age 40 seems to be influenced positively as a nonsignificant trend by several years of competitive experience and by the total length of stay in sport activity across all sport episodes. The probability of taking up sport again tends to be higher among those who have actively engaged in sport for a longer time before age 40 and have engaged in competitive sport for at least one decade of their lives (Table 4).

The results of the event history analysis also indicate that changing framing conditions in society and developments in sport are significant for the sport career. All, gender, educational level and birth cohort impact significantly on (re-)entry after age 40 in the sport-inactives. Among men, the probability of commencing a sport episode after age 40 is 17 per cent lower. The probability to (re-)commence a sport activity is higher among people with vocational qualifications, especially among people with a graduate degree (92 per cent). The probability of a (re-)entry to sport is 41 per cent lower in the oldest birth cohort (born 1929-38) compared to the two younger birth cohorts (born 1949-58 and born 1939-1948) (Table 4). This applies particularly to the Chemnitz subsample. These respondents have experienced far-reaching changes as a result of the transformation processes in social and sport policy following German reunification in 1990.

Exit from a sport episode among the sport-actives at age 40 is not influenced by either the parameters of the prior history of sport or by socio-demographic parameters (Table 4). The maintenance of sport activity seems to depend on other variables than those studied here. It may be influenced by, for example, conditions in sport groups or events in other domains of life such as childbirth or a change of employment.

**Summary and Discussion**

The present study was designed to examine sports participation over the life course and analyse variables influencing the entry into a sport activity or the exit from sport. Results show that although individual sport careers were shaped by alternations between episodes of sport activity and sport inactivity, very frequent changes tend to be rare. Approximately three-quarters of the respondents reported that they had commenced a sport activity only once or twice up to the present. As assumed, the probability of sport entry or exit declined with increasing length of stay in a particular episode (see also De Bruyn & Bringé, 2006). What does seem to be significant is the life decade in which this sport episode commenced. If the first sport episode commenced in the first three life decades, the exit probability in the first 10 to 15 years was higher
than if it started later. Although the majority (about 75 per cent) commenced their first sport episode in childhood or adolescence, commitment to sport in the sense of an active sport lifestyle had not yet consolidated in this period of life, and sport was dropped rapidly – particularly in adolescence and young adulthood. On the one hand, these findings do not support the results of De Bruyn and Bringé (2006), who observe that “starting a sports activity in childhood increase the likelihood of a continuous sporting career” (p. 697), yet they only investigated the duration of membership in swimming and horse-riding federations. On the other hand these findings are in line with previous research which confirms only a weak correlation between a sport activity in adolescence and in adulthood (Beunen et al., 2004; Kuh & Cooper, 1992; Malina, 2001; Taylor et al., 1999; Telama et al., 1997; Trudeau et al., 2004; Twisk et al., 2000). The influence of prior history of sport has to be rated as being low in general. The total duration across all sport episodes, the specific experiences of engaging in competitive sport, and a varied sport career with several changes in the main sport did not exert significant influence on the further course of sports participation in middle adulthood. However, among those not active in sport at age 40, the probability of returning to sport after age 40 tends to be higher the more sport they had previously engaged in and if they had engaged in this sport competitively for at least one decade of their lives.

When compared to the parameters of prior history of sport, the socio-demographic variables studied here seemed to be more significant for the sport career in middle adulthood. Women who had not engaged actively in sport at age 40 revealed a significantly higher sport entry probability than men. As assumed and in line with previous research (Breuer, 2003, 2004; Klein, 2009), it seems that greater numbers of women had found access to sport through the historical changes on the macro level (e.g. the broadening understanding of sport, the increasing differentiation of sport, growing health and body awareness).

The significant differences between birth cohorts regarding the probability of entering a sport episode when they did not actively engage in sport at age 40 should be interpreted as indications for cohort effects. The probability of entering a sport after age 40 was significantly lower in the oldest birth cohort (born 1929-38) compared to the youngest birth cohort (born 1949-58). Members of the oldest cohort were in middle adulthood in the 1970s and 1980s when sport associations initiated the first sport policy programmes to promote exercise and sport in Germany. However, these first ‘bore fruit’ in the 1980s and 1990s when they were joined by the changing health and body awareness that enhanced the status of sport in society. The oldest birth cohort had already reached retirement age at this time, and could not profit from this change on the macro level to the same extent as the younger cohorts. It can be concluded that sport policy programmes seem to have had a strong effect on sport careers in middle adulthood and perhaps even a stronger effect than an individual’s prior history of sport.

The present study does not just provide a description of sports participation over the life course. On the basis of the theoretical and methodological approach of life course research, it also offers approaches to explain individual sport careers. Analyses
of the empirical data clarify not only the impact of macro level changes over time on the individual courses of sport careers but also the different effects of parameters on the two events identified as sport entry and sport exit. These observations could be used to focus more attention on this aspect of historical framing conditions or on different types of sport policy programmes – particularly in international comparisons of sports participation. This study has focused on the description and explanation of sport careers, but analysis of sport-inactivity careers could also give a more detailed insight into specific determinants. An important issue could be, for example, to research to what extent the duration of sportive inactivity determines further sportive inactivity and what influence socio-demographic parameters have on the course of sport inactivity. Further research, both quantitative and qualitative, could also study the impact of sections of the courses on other life domains (e.g. family and occupational careers), to deepen the understanding of these relationships. A retrospective assessment of sport careers could pay more attention to other sports aside from the main sport engaged in, and also consider different competition levels (regional, national, international). An orientation toward life decades proved to be a useful aid to memory for the present study. However, recall may be improved further through the link with significant events in other life domains (e.g. school transitions, or moving home). Further research could deliver valuable findings that could contribute to the development of more efficient sport promotion programmes to bring Europe closer towards the two sport policy goals of “Sport for All” and “Life-long sport”.

References


**Claudia Engel** is assistant at the University of Bern. Her main interests lie in life course research, particularly in sports participation during the life span and event history analysis.
Institute of Sport Science, Sport Science Bremgartenstrasse 145, 3012 Berne, Switzerland
E-mail: claudia.engel@ispw.unibe.ch

**Siegfried Nagel** is Professor of Sport Science (Sociology of Sport/Sports Management) at the University of Bern since 2008. His main fields of interest are sport association research, particularly sports club development, sports participation, socialisation and life course research as well as management of sport organisations.
Institute of Sport Science, Sport Science Bremgartenstrasse 145, 3012 Berne, Switzerland
E-mail: siegfried.nagel@ispw.unibe.ch