

Do “Young-Old” Exercisers Feel Better Than Sedentary Persons? A Cohort Study in Switzerland*

Christian J. Lalive d’Epinay and Jean-François Bickel
University of Geneva, Switzerland

RÉSUMÉ

Selon le paradigme du « vieillissement réussi », le sentiment de bien-être est aussi important que la santé « objective ». L’exercice physique est considéré comme un facteur important de la santé ; cependant, son lien avec le bien-être au sein de la population vieillissante n’a été que peu exploré. Sur la base de deux enquêtes sur échantillons aléatoires de la population âgée menées l’une en 1979 et l’autre en 1994, qui comprenaient des questions biographiques, deux cohortes de personnes de 65 à 74 ans ont été sélectionnées (cohorte 1, née en 1905–1914, $N = 949$; cohorte 2, née en 1920–1929, $N = 602$) et réparties en quatre groupes selon leur trajectoire sportive (sportifs constants LE ; nouveaux sportifs NE ; anciens sportifs Q ; sédentaires S). Le lien entre ces trajectoires et deux indicateurs de bien-être (santé auto-évaluée et échelle de dépression auto-évaluée) a été examiné au moyen d’analyses de régression. Dans les deux cohortes, LE présente un niveau de bien-être supérieur à Q et S. Cette étude attire également l’attention sur les anciens sportifs (Q), qui ont le plus faible niveau de bien-être ; l’abandon de l’exercice physique et ses causes étant jusqu’à ce jour négligés par la recherche.

ABSTRACT

From a “successful aging” perspective, the subjective feeling of well-being is as important as “objective” health. Physical exercise is seen as being an effective way of staying healthy, but its link with well-being in a normal aging population remains largely unexplored. Based on two randomized surveys of the aging population, conducted in 1979 and 1994, respectively, with questionnaires including retrospective questions on activities and health, two cohorts of *young-old* (aged 64–74) were selected (cohort 1, born 1905–1914, $N = 949$; cohort 2, born 1920–1929, $N = 602$) and split into four groups, corresponding to their exercising trajectories (long-term exercisers LE, new exercisers NE, quitters Q, sedentary S). The link between the four trajectories and two indicators of well-being (self-rated health, self-assessed depression scale) was examined by means of regression analyses. In both cohorts, the LE group had a higher level of well-being than the Q and the S. The study also throws light on the case of the quitters (Q), who showed the lowest level of well-being. Scant research has hitherto been done on the causes and repercussions of abandoning exercise.

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Christian J. Lalive d’Epinay
Centre for Interdisciplinary Gerontology (CIG)
University of Geneva
59, route de Mon Idée
CH-1226 Geneva (Thônex)
Switzerland
(christian.lalive@socio.unige.ch)

Physical Activity, Health, and Well-Being

The relationship among exercising, fitness, and health has long been a topic of scientific interest, as the voluminous publications on the subject attest. Recent overviews are to be found in Bouchard, Shephard, and Stephens (1994), Shephard (1997), and American College of Sports Medicine [ACSM] (1998, 2001). Robust research results have been obtained. Sedentary life has been shown to be significantly related to higher mortality, at all ages, and to a wide range of diseases: hypertension, coronary heart disease, stroke, cancer, osteoporosis, and metabolic disorders (see Bokovoy & Blair, 1994; Heikkinen, 1998; Keysor & Jette, 2001). Exercise has a beneficial effect on maintaining and/or enhancing cardiovascular health, endurance, muscular strength, flexibility, and coordination (see Spirduso, 1994).

However, the more the focus of attention moves away from physical health and physiological measures toward mental health, cognitive functioning, and subjective well-being, the more meagre the research findings become and the less conclusive the current results. For example, that exercising, mental health, cognitive functioning, and depression are linked is well established in terms of correlation, but the causal direction and the way it works remain at issue. Cross-sectional studies are unable to establish the causal link, and the findings of training studies on exercising and cognition are said to be "equivocal at best" (ACSM, 1998, p. 999). Physically inactive elders show a higher level of depressive symptoms than those who are active, but there is no proof that exercising by itself reduces depression (O'Connor, Aenchenbacher, & Dishman, 1993; Keysor & Jette, 2001) or that it enhances the feeling of well-being. A higher level of well-being may be a pre-condition for exercising, suggest Spirduso and Leilani Cronin (2001).

The "successful aging" paradigm (Baltes & Baltes, 1990; Rowe & Kahn, 1997, 1998) encompasses the subjective as well as the objective dimensions of health. Successful aging requires not only that aging individuals remain healthy and function better but also that they feel better than "normal aging" persons. This paradigm has been criticized for its underlying elitism and voluntarism (Höpflinger, 1995; Scheidt, Humpherys, & Yorgason, 1999). However, it is widely accepted that the subjective feeling of well-being is an important aspect of self-fulfilment, during old age and throughout the process of human development (Spirduso & Leilani Cronin, 2001).

A survey among the population at large to determine whether elders whose lifestyle includes exercising feel better would thus seem to be a worthwhile task, but little research has been done on that aspect (Sheppard,

1997, pp. 314–316). The few available studies carried out on samples of the old-age population show a convincing correlation between exercising and indicators of well-being, but being cross-sectional, they cannot establish the causal direction of the link (Lalive d'Épinay, Bickel, Maystre, & Vollenwyder, 2000, pp. 284–297; Parkatti, Deeg, Bosscher, & Launer, 1998; Pohjolainen, 1997; Ragheb & Griffith, 1982; Ruuskanen & Ruoppila, 1995).

Objectives of the Study

In this article we investigate the relationship, among the *young-old* population, between regular participation in physical exercise and sport as a component of lifestyle and well-being. More specifically, we test the hypothesis of a causal incidence of participation in sport and physical exercise on the feeling of well-being. In short, we deal here with the following three questions:

1. Do those elders whose lifestyle involves physical exercising feel better than their more sedentary contemporaries?
2. If so, is this a consequence of their involvement in sport and physical exercise?
3. Are our results stable over time or do we observe a cohort effect?

Methods

Design

The first research question can be examined on the basis of cross-sectional data with bivariate analysis, and research has already yielded a convincingly positive answer. The second, concerning the causal link and its direction, remains unknown. A lifestyle is a stable pattern of individual behaviour that reflects personal choices within a framework of biological, environmental, sociological, and cultural influences (Wankel & Sefton, 1994, p. 530). Thus behavioural stability (here, involvement in physical exercise) must be shown over a long timespan, which calls for long-term panel data. Not surprisingly, none of the few available longitudinal databases, to our knowledge, offers the information needed for such an analysis.

One alternative is offered by the use of reminiscence in cross-sectional questionnaires, with the aim of gathering biographical information that can be used to reconstruct specific trajectories (family, professional, health, leisure pattern, etc.) (Blossfeld & Götz, 1995; for a discussion, see below). This is the path we have chosen in this article. Revisiting the data obtained from two surveys of the old-age population carried out in Switzerland in 1979 and 1994, we selected the young-old (aged 65 to 74), for whom the questionnaires included retrospective measures of activity and of self-rated health.

We then split them into four groups according to their exercising trajectory from mid-life to young-old age (long-term exercisers, new exercisers, quitters, and sedentary elders). The resulting design is quasi-experimental: We compare the score of the four groups on two measures of well-being (self-rated health and a scale of depressive symptoms).

Samples

The data we revisited are taken from two cross-sectional surveys of the old-age population, the first having been carried out in 1979 and the second, 15 years later, in 1994. The main goal of the 1979 project was to obtain, for the first time in Switzerland, a comprehensive description of the aging population in various domains of life: health, income and housing, household, family, social networks, activities, and attitudes and beliefs (Lalivé d'Épinay et al., 1983). The 1994 survey reproduced the general pattern of the first, the aim being to provide for a comparison with the 1979 study and to make a systematic study of the changes that had occurred in the elderly population during a space of 15 years (Lalivé d'Épinay et al., 2000). Both studies were carried under the leadership of the first author of this paper, had a similar design, and followed the same methodological and practical rules. Both were based on random samples of the population aged 65 and over (1979, $n = 1,608$), then 60 and over (1994, $n = 1,898$), drawn from the *cantonal* registers of population. The samples were stratified by gender and 5-year age groups, and by the two regions covered by the study, namely, the Canton of Geneva and the central part of the alpine Canton of Valais. The choice of these two regions was made in 1979, the aim being to compare the situation in an urban-metropolitan area with that in a semi-rural one (according to the classification of the Federal Office of Statistics, which is based on the degree and structure of urbanization and on economic activity). The fieldwork for the two studies entailed face-to-face interviews (lasting from 1½ to 2½ hours), conducted by a team of specially trained investigators from the University of Geneva. The refusal rate in 1979 was 24 per cent, and in 1994, 34 per cent. Note that representativity is not an issue here, due to the quasi-experimental design, but randomized samples ensure their heterogeneity. The two regions of the study are located in the western, French-speaking part of Switzerland, so French was the language of the questionnaire and the interviews.

One feature of the questionnaire was that, in addition to the usual biographical questions (date and place of birth, family, education, career, etc.), it included a set of questions about free-time activities and health, referring not only to the current period but also to the time when the subject was "close to fifty years old". Specific trajectories from mid-life to young-old age

could thus be reconstructed. The goal was to study continuities and changes following retirement, so these questions were addressed only to persons in the 65-to-74 age group.

This feature of the questionnaire was of special interest for the purpose of this article. The authors were thus able to select the members of two cohorts, aged 65 to 74 when interviewed – the members of the first cohort (C1) having been born before World War I, between 1905 and 1914, and having been interviewed in 1979 ($N_{C1} = 949$); and those of the second (C2) having been born between the two wars, from 1920 to 1929, and having been interviewed in 1994 ($N_{C2} = 602$).

Measures

To examine the link between participation in sports and physical exercise, on the one hand, and well-being, on the other, we used

1. as independent variable, the individual trajectory of participation between mid-life and young-old age;
2. as dependent variables, two measures of well-being at the time of the interview – self-rated health and the Wang self-assessing depression scale; and
3. as control variables, gender, region, SES, and self-rated health at mid-life.

Independent Variable: Trajectories of Participation in Physical Exercise and Sports

In French, *faire du sport* or *pratiquer un sport* ("participate in sports or other athletic activities") clearly excludes such activities as strolling, gardening, or any kind of physically demanding hobby but may include physical or fitness exercise, such as gymnastics, fast walking, jogging, or cycling. Thus, to avoid any misunderstanding, two questions were asked in the following sequence:

Faites-vous

1. des exercices physiques (gymnastique de toute sorte, aérobic, etc.; promenade non comprise)
2. un sport (exercices physiques et promenade non compris)

[Currently, do you

1. engage in physical exercise – gymnastics of all kinds, aerobics, etc. (not strolling)?
2. participate in sports or other athletic activities (not physical exercise or strolling)?]

[Answers: *no / yes, at least once a year / yes, at least once a month / yes, at least once a week / yes, almost every day*]

These questions were asked retrospectively during a second round:

Quand vous approchiez la cinquantaine, disons entre 45 et 50 ans, faisiez-vous

1. des exercices physiques (gymnastique de toute sorte, aérobic, etc.; promenade non comprise)
2. un sport (exercices physiques et promenade non compris)

[When you were close to 50 years old – say, between 45 and 50 – did you

1. engage in physical exercise ... ?
2. participate in sports ... ?]

[The set answers were as before, with an additional control: *more than no w/ the same as no w/ less than now*].

An *exerciser* was defined as “a person who either engages in physical exercise or plays a sport once a week or more”. Those who exercised less often or not at all were termed *sedentary persons*. According to the sociology of leisure, engaging in such an activity on at least a weekly basis means that it is part of the agenda, that time in the week has been set aside for it, and that going to exercise has become part of the weekly routine. In other words, exercising is a component of the lifestyle (Lamprecht & Stamm, 1994; Paillat, Delbès, Gaymu, & Sammartino, 1993; Pronovost, 1993).

Exercising once a week per se is seen as an insufficient minimum to expect health benefits (U.S. Department of Health and Human Services, 1996). But the goal of our study is to determine not whether exercisers are (objectively) in better health than their more sedentary contemporaries but whether they feel better. The former would require adopting the norms defined by the ACSM, whereas the latter deals with exercising as a regular practice.

Four groups were defined according to each person's trajectory of involvement in physical exercise and sports, and the members of the two cohorts were each assigned to one:

1. *long-term exercisers (LE)*: exercisers at mid-life who continue when young-old
2. *new exercisers (NE)*: persons sedentary at mid-life who have become exercisers when young-old
3. *quitters (Q)*: exercisers at mid-life who no longer exercise when young-old
4. *sedentary elders (S)*: persons sedentary both at mid-life and when young-old

Dependent Variables

Well-being refers to “the way people feel about their lives”. Two indicators are available here: self-rated health (SRH) and the Wang self-assessed depression scale (SADS).

Self-rated health (SRH) is one of the possible indicators of well-being and quality of life (Spirduso & Leilani Cronin, 2001, p. S599). Current self-rated health (CSRH) was assessed by the question, “Altogether,

how do you rate your health?” on a 5-point scale, from *very good* to *very bad*.

The second indicator assessed a negative component of psychological health, namely, depressive symptoms (a similar approach was adopted by Ruuskanen & Ruoppila [1995]). The Swiss 1979 questionnaire used the SADS, which is a simplified version (with 10 items) of Zung's 20-item self-rating depression scale (Zung, 1965) that Wang and associates validated by comparing results with the Zung scale (Wang, Treub, & Alverno, 1975). For comparative purposes, the SADS was again used for the 1994 questionnaire, although meanwhile the CES-D had gained acceptance. Answers were dichotomized, with “*always / often*” coded 1 and “*never / seldom*” coded 0.

Control Variables

Gender and *region* are dummy variables. *Socio-economic status* is a three-level construct, based on last occupation, education, and current income. *Past self-rated health (PSRH)* is introduced as a control variable in the multivariate analyses, in an attempt to neutralize health as a cause of higher or lower participation in sports and exercise at mid-life.

Cohort is also used as a control variable: In the same way that the comparison between regions revealed the spatial consistency of the results, the cohort comparison tested their consistency over time (see Pohjolainen, 1997, who also used a two-cohort design).

SRH was also assessed retrospectively for the mid-life period, with the same 5-point scale (“When you were close to 50 years old – say, between 45 and 50 – would you say that your health was ...?”).

Reminiscence

Recourse to reminiscence provides measures of participation in sports and physical exercise and of self-rated health at mid-life. Compared to panels, cross-sectional surveys using reminiscence offer huge savings in terms of financing and time. The critical issue is the reliability of the data gathered. The basic rules derived from a knowledge of the memory's functioning must be respected (Blossfeld & Götz 1995; Campbell, 1992):

1. The mnemonic functioning of the population under study must be normal.
2. Questions on past opinions and beliefs must be avoided because they could result from “autobiographical reconstruction” (Plumer, 1983).
3. Reminiscence about facts or events may be subject to confusion with regard to their place in time or space (“time/space telescoping”, Menard, 1991, p. 42).

Within these constraints the use of reminiscence is widely accepted (e.g., Baltes & Mayer, 1999; Bruckner & Mayer, 1998). In connection with this study, (1) the

recollective (biographical) memory of persons aged 65 is not significantly different from that of younger age groups (Rubin, 1996); (2) questions should deal with facts, not beliefs; and (3) these facts should be indexed not by place (space), but only by a very specific and memorable time of life – for example, the age of 50 years. Furthermore, the comparative framework of current and past situations makes answering easier.

Analytical Strategy

For the presentation of the basic data, bivariate analyses were used and cohort differences tested with the Pearson χ^2 test (percentage comparisons) or a *t*-test (means comparisons). The latter was also used for the co-variations between exercising and well-being in young-old age (question 1). In order to estimate the causal impact of the exercising-related trajectories on well-being (question 2), ordinary least-square multiple regressions were carried out separately for each cohort.

Results

Cohort Characteristics and Trajectories Regarding Exercising

Table 1 presents the basic descriptive information. The mean ages of the members of each cohort are very close, which makes the cohorts fairly comparable. Due to the stratification of the overall samples, both genders and regions are almost equally represented. Socio-economic status shows a shrinkage of the low-

est-status position, reflecting the structural transformation of Swiss society in past decades: development of post-compulsory education, decline of the working classes, and the increase in the number of white-collar workers. Compared to cohort 1, the young-old members of cohort 2 rated their health higher and showed significantly fewer depressive symptoms.

The proportion of exercisers jumped from 33 per cent among cohort 1 to 45 per cent among cohort 2, with no decline in (aggregate) participation from mid-life onward to young-old age, either in C1 or in C2.

Figure 1 displays the four trajectories related to the physical exercising of the members of the two cohorts. The cohort comparison shows a decline in the proportion of sedentary persons (S) and an increase in that of long-term exercisers (LE) from the earlier to the more recent cohort. The longitudinal comparison indicates that the apparent aggregate stability of participation between mid-life and young-old age shown in Table 1 hides huge discontinuities. About 1 person in 4 in C1 quit (12%) or began (15%) exercising between mid-life and young-old age; in C2 the proportion was more than 1 in 3, with 18 per cent quitters (Q) and 18 per cent newcomers (NE). As a matter of fact, in each cohort roughly 40 per cent of those who were exercising in mid-life quit doing so, while among those who were exercising when young-old, roughly the same proportion were new exercisers.

Table 1: Cohort characteristics: Age, status variables, well-being, exercisers from both cohorts

Characteristics	Cohort 1 (1905–1914) N = 949	Cohort 2 (1920–1929) N = 602	Cohort Difference (C2–C1)
Mean Age (SD)	69.25 (2.77)	68.98 (2.80)	-0.27
Status Variables			
% Semi-Rural Area	53.2	51.3	-1.9
% Women	56.7	56.0	-0.7
SES (% col.)			
Low	63.1	49.5	-13.6***
Middle	28.2	35.8	+7.6***
Upper-Middle, Upper	8.7	14.7	+6.0***
Well-Being			
Self-Rated Health (1–5)			
Current Mean	2.57	2.24	-0.33***
Past (Mid-Life) Mean	1.72	1.67	-0.05
Depressive Symptoms (0–10)	2.02	1.20	-0.82***
Current Mean			
Exercisers			
% Current	33.0	44.8	+11.8***
% Past (At Mid-Life)	30.3	44.6	+14.3***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Both samples are weighted.

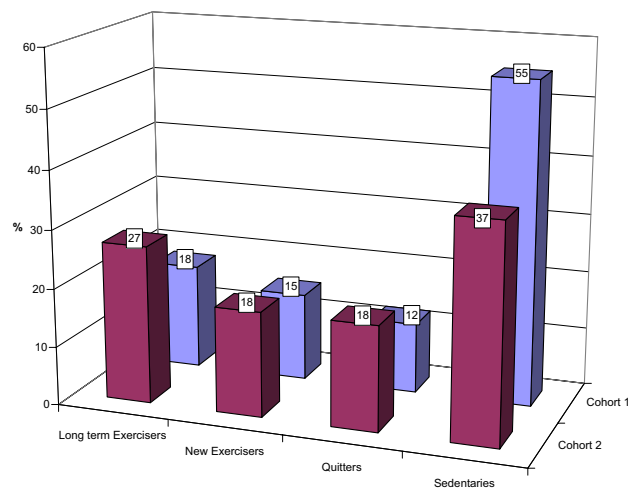


Figure 1

Co-Variation between Exercising and Well-Being during Young-Old Age

Before making any attempt to establish the direction of the link between exercising and well-being, we must check whether our results confirm its existence (question 1). As Table 2 shows, they do: at young-old age, among both cohorts, non-exercisers rated their health lower and had a higher score for depressive symptoms than exercisers. The question now is whether inferences about causality can be drawn from these cross-sectional co-variations.

Trajectories of Scores on the Exercising, Self-Rated Health, and Self-Assessing Depression Scales

In response to question 2, we checked the link between the four exercising trajectory categories and the two indicators of well-being. Tables 3 and 4 display the results of ordinary least-square regression analyses with, CSRH and SADS as dependent variables, respectively. The model includes three socio-demographic variables and past self-rated health as control variables. Long-term exercisers (LE) serve as reference category for the exercising trajectories and the results of the other possible paired comparisons are added at the bottom of the tables.

Table 2: Mean score on self-rated health and self-assessed depression scale by young-old exercisers and non-exercisers, for each cohort

	Self-Rated Health		Self-Assessing Depression Scale	
	Cohort 1*** N = 949	Cohort 2** N = 602	Cohort 1** N = 949	Cohort 2** N = 602
Exercisers	2.31 (0.06)	2.13 (0.05)	1.72 (0.12)	0.97 (0.09)
Non-Exercisers	2.69 (0.04)	2.32 (0.05)	2.17 (0.09)	1.39 (0.09)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed test)

Both samples are weighted.

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Self-Rated Health

Table 3 refers to CSRH. Among the status variables, the only impact is that of SES, with the lower-status

members rating their health worse than did the other two categories in cohort 1 and than the upper status in cohort 2. In both cohorts self-rated health at mid-life (PSRH) is a strong predictor of self-rated health in young-old age.

Among the members of C1 the two exercising groups (LE and NE) rated their health significantly better than did the quitters (Q) and the sedentary persons (S), with no difference between the former two or the between latter two. C2 displays another pattern, with the Q group having the lowest CSRH score and no significant difference among the other three groups, S included.

Table 3: Self-rated health in young-old age regressed on exercising trajectories (controlled by gender, region, socio-economic status and self-rated health at mid-life)

	Cohort 1 N = 949	Cohort 2 N = 602
Control Variables		
Gender ^a	-0.01 (0.07)	-0.04 (0.06)
Region ^b	-0.08 (0.07)	-0.05 (0.06)
Socio-Economic Status – Middle ^c	-0.27*** (0.07)	-0.09 (0.07)
Socio-Economic Status – Upper ^c	-0.26* (0.12)	-0.27** (0.10)
Self-Rated Health at Mid-Life	0.35*** (0.04)	0.38*** (0.04)
Test Variable – Exercising Trajectories		
Long-Term Exercisers (LE) versus		
New exercisers (NE)	-0.01 (0.12)	0.12 (0.10)
Quitters (Q)	0.35** (0.11)	0.35*** (0.10)
Sedentaries (S)	0.28** (0.09)	0.08 (0.08)
Constant	1.90	1.61
R ²	0.16	0.20
Exercising Trajectories – Other Paired Comparisons		
New Exercisers (NE) versus Quitters (Q)	0.34** (0.13)	0.23* (0.11)
New Exercisers (NE) versus Sedentaries (S)	0.27** (0.10)	-0.04 (0.09)
Quitters (Q) versus Sedentaries (S)	-0.07 (0.10)	-0.27** (0.09)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests)

a 1 = women, 0 = men;

b 1 = urban, 0 = semi-rural;

c compared to low socio-economic status.

Ordinary least-square multiple regression. Unstandardized regression coefficients with standard errors in parentheses.

Self-Assessing Depression Scale

Table 4 reports on the SADS. This time gender (with women reporting symptoms at a higher rate) and not SES adds its effect on depressive symptoms to that of PSRH. In cohort 1 the only significant difference in SADS lies between the NE and S groups. In the more recent cohort (C2) the LE group has a lower score for depressive symptoms than Q and S.

Discussion and Conclusions

A comparison of cohorts points to an improvement in well-being in the more recent one, according to both indicators (Table 1). Previous time-lag studies have shown a cohort improvement in health (mainly functional; see Manton, Corder, & Stallard, 1997; Mor-miche, 1997) but have not focused on well-being. Our

data also confirm the trend toward wider participation in sports and physical training, which is congruent with the results of studies carried out in various countries, based on longitudinal data (Pohjolainen, 1997; Hirvensalo, Lampinen, & Rantanen, 1998; Verbrugge, Grubber-Baldini, & Fozard, 1996) or on series of cross-sectional surveys (Elkeles, 1997; Garrigues, 1989; Paillat et al., 1993; Pronovost, 1993). In a recent paper based on the same data, we analysed the cohort changes in participation in sports and physical training and in the socio-demographic composition of the exercisers, showing that the increase in the proportion of exercisers was related to a change in the pattern of participation, from one in which sports and physical exercise were a mostly male, urban, and upper- (middle-) class activity, to a more generalized, democratic pattern (Lalive d'Epinay, Maystre, & Bickel, 2001).

Table 4: Self-assessed depression scale (SADS) in young-old age regressed on exercising trajectories (controlled by gender, region, socio-economic status, and self-rated health at mid-life)

	Cohort 1 N = 949	Cohort 2 N = 602
Control Variables		
Gender ^a	0.63*** (0.14)	-0.41** (0.12)
Region ^b	-0.19 (0.14)	-0.13 (0.12)
Socio-Economic Status – Middle ^c	-0.26 (0.15)	-0.12 (0.13)
Socio-Economic Status – Upper ^c	-0.37 (0.24)	-0.28 (0.18)
Self-Rated Health At Mid-Life	0.60*** (0.07)	0.38*** (0.07)
Test Variable – Exercising Trajectories		
Long-term Exercisers (LE) versus		
New exercisers (NE)	-0.22 (0.24)	0.09 (0.18)
Quitters (Q)	0.08 (0.23)	0.43* (0.18)
Sedentaries (S)	0.22 (0.18)	0.32* (0.15)
Constant	0.71	0.15
R ²	0.13	0.10
Exercising Trajectories – Other Paired Comparisons		
New Exercisers (NE) versus Quitters (Q)	0.30 (0.26)	0.34 (0.20)
New Exercisers (NE) versus Sedentaries (S)	0.44* (0.20)	0.23 (0.17)
Quitters (Q) versus Sedentaries (S)	0.14 (0.21)	-0.11 (0.17)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests)

a 1 = women, 0 = men;

b 1 = urban, 0 = semi-rural;

c compared to low socio-economic status.

Ordinary least-square multiple regression. Unstandardized regression coefficients with standard errors in parentheses.

Let us now consider the first two objectives of this study. With regard to question 1, our results confirm the existence of a synchronic link, among young-old persons, between participating in a sport and/or exercising and well-being (Table 2).

With regard to question 2, once exercising trajectories are taken into account, our results (Tables 3 and 4) prompt three observations:

1. Long-term exercisers (LE) show a higher level of well-being than both the S and the Q groups, according to CSRH among cohort 1, and according to SADS among cohort 2. The lower level of well-being among S (compared to LE) is attested on one of the two indicators in each cohort. These results support the hypothesis of a positive causal relationship between a long-term exercising lifestyle and well-being.
2. New exercisers (NE) rate their health better than S and Q in the earlier cohort, and than Q in the later cohort (where differences between NE and S are not significant). When compared with long-term exercisers, NE always rank very close; no significant difference was found between these two groups on any of the two measures. The data suggest that new exercisers derive some benefit from taking up exercise (although the direction of the causal link remains unclear in the later cohort). Spirduso (1994) has argued that, with an adequate level of exercise, "late exercisers" (those becoming active after their mid-forties) could improve their general health status and almost close the gap with the group of people having a long-term "exercise lifestyle". Her argument was based on evidence drawn from training studies, with measures at the beginning and at the end of the training period. Our study deals with the young-old at large and we focus on subjective

well-being. However, it is interesting to transfer the hypothesis from health to well-being and to note that, while our results do not validate it, they do not contradict it either.

3. The Q group shows the lowest level of well-being, a result that raises serious practical and theoretical questions. The quitters form a large part (about 40%) of the mid-life exercisers in each of the two cohorts. They are an important and worrisome group for research as well as for social medicine and practical gerontology. Why they quit we do not know. The cause might lie in an injury brought about by exercising, in an unrelated health problem or in some non-health-related circumstance. In the absence of information on the path leading from past health and health problems to quitting and current health, the causal link between quitting exercise on the one hand, and health and well-being on the other, remains a mystery. Specialists have drawn attention to the barriers, both physical and psychological, that deter people from exercising as they grow older (McPherson & Yamaguchi, 1997, Lehr & Jüchtern, 1997). The risks involved in sports and training are also the subject of numerous studies (Pate & Macera, 1994; Thomson & Fahrenbach, 1994). But we are not aware of any studies dealing with quitters. The main reason for this omission seems to lie in the difficulty of tracking quitters, but the magnitude of this group, and the evidence that there is a connection here with the quitters' low level of well-being, should spur more research on the subject.

Turning now to the third question we raised at the outset, namely that of a possible cohort effect, we find that the link between exercising and well-being follows the same basic pattern among the two cohorts: In both cases, long-term exercisers felt better than sedentaries and quitters, with the latter scoring lowest in well-being. But a striking result is the difference in the sensitivity of the cohorts to the two available indicators of well-being. Cohort 1 relates exercising mostly to SRH, with 4 significant paired differences out of a total of 6 and only 1 for SADS, while cohort 2 shows 3 significant differences on SRH and 2 on SADS. One explanation could be that a substantial change in the socio-occupational structure took place from the first to the second cohort. About half of the members of C1 were manual workers (farmers or blue-collar), compared with only 19 per cent of C2. Manual workers might consider physical health first, while white-collar workers and professionals might be more sensitive to psychological well-being and depressive symptoms (Thorslund & Lundberg, 1994; Mossey & Shapiro, 1982).

Our study is a secondary analysis and thus depends on the available indicators. Three remarks apply. First, future research would benefit from being based on a more complete conceptualization of subjective well-being (McAuley & Rudolph, 1995, Spirduso & Leilani

Cronin, 2001). Second, measures of physical activity are given for only two periods of the life course: close to the age of 50 and when interviewed in young-old age. We postulated continuity among the LE and S groups, but in the case of the new exercisers and the quitters, the change (starting or stopping the activity) may have happened either recently or decades ago. Lastly, the use of PSRH to control health at baseline (mid-life) is a rudimentary solution, but more reliable data could be obtained by means of a long-term, longitudinal panel or through access to past medical information.

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