

Zeitschrift:	Schweizerische Zeitschrift für Soziologie = Revue suisse de sociologie = Swiss journal of sociology
Herausgeber:	Schweizerische Gesellschaft für Soziologie
Band:	32 (2006)
Heft:	3
Artikel:	Well-being and frailty process in later life : an evaluation of the effectiveness of downward social comparison
Autor:	Keciour, Myriam Girardin / Spini, Dario
DOI:	https://doi.org/10.5169/seals-814439

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Well-Being and Frailty Process in Later Life: an Evaluation of the Effectiveness of Downward Social Comparison¹

Myriam Girardin Keciour* and Dario Spini**

1 Introduction

When one thinks of old age one thinks first of the deterioration of health – an inevitable process at that time of life – and all the contingencies associated with it – tiredness, aches and pains, illnesses, reduced mobility, difficulty in communicating with others, hospitalization, institutionalization, loss of autonomy and, finally, the imminence of death. Considered in a broader sense, this phase in life is characterized by frailty – which may be defined as a clearly visible weakening of health in various aspects (biophysical, motor-sensory, cognitive, energy, etc.) which renders the individual more vulnerable in that it affects one's capacity to adapt to the multiple stresses associated with old age. The latent frailty process, which is responsible for the state of frailty, intensifies and may at an advanced stage culminate in the loss of autonomy and death. In such a context is it permissible to speak of well-being in advanced age? In this article we move away from conventional thinking and consider the linkage between well-being and health and trends of both variables in late life. On the basis of the data emerging from the first five waves of a longitudinal study conducted with 295 octogenarians in Switzerland, we have observed trends in well-being, both on average and on individual bases.

* Myriam Girardin Keciour, University of Geneva, Center for Interdisciplinary Gerontology, Centre interfacultaire de gérontologie, Université de Genève, Route de Mon-Idée 59, CH-1226 Genève-Thônex, Tél.: (41) 22 305 66 01, Fax: (41) 22 348 90 77, E-mail: myriam.girardin@cig.unige.ch.

** Dario Spini, Faculty of Social and Political Sciences, University of Lausanne, Center for Life Course and Life Style Studies, Universities of Lausanne and Geneva, Centre PAVIE, Bâtiment Provence, Université de Lausanne, CH-1015 Lausanne, Tél.: (41) 21 692 38 44, Fax.: (41) 21 692 38 45, E-mail: Dario.Spini@unil.ch.

1 This study was conducted within the framework of the Swiss Interdisciplinary Longitudinal Study of the Oldest Old (SWILSO-O), directed by Professor Christian Lalive d'Epinay and financed by the Swiss National Science Foundation, with the support of the Departments of Health of the cantons of Geneva and Valais. We thank Hugh M. Bell for his editorial assistance.

2 The paradox of stability of well-being

What exactly is meant by well-being? In scientific literature well-being is generally made up of two dimensions: the affective dimension, which comprises the positive and negative affects of individuals, and the cognitive dimension, which deals with self-evaluation of the subject's own life or on more specific subjects (family, health, etc.) (Diener and Suh, 1997; Hilleras, 1998; Diener, Suh, Lucas and Smith, 1999). In a number of works in the field of gerontology the affective dimension is approached from the angle of the frequency of depressive symptoms and the cognitive dimension from that of the perception of one's state of health, which is defined as a self-assessment of the individual's state of health, at the centre of all the concerns of older persons (Radloff, 1997; Holahan, Holahan and Wonacott, 2001; Idler, 1993). What can be said of the evolution of these two dimensions for octogenarians? A number of researchers relate a decline of the affective dimension of well-being with advancing age, but are astonished at the low level of decline bearing in mind the deterioration in health which typifies the aging process (Rothermund and Brandstädter, 2003; Fiske, Gatz and Pedersen, 2003). The same can be observed in the cognitive dimension; objective and subjective health are both measurements of the same reality, but are not systematically correlated; even more surprisingly, the correlation between the two weakens still further with advancing age to a point where on average the perception of health detaches itself completely from the declining trend in objective health (Idler, 1993; Leinonen, Heikkinen and Jylhä, 1998; Rodin and McAvay, 1992; Pinquart, 2001; Hoeymans, Feskens, Kromhout and van den Bos, 1999). The divergent directions taken by well-being, which tends to remain stable, and health, which tends to decline, are perceived as a paradox in scientific literature (Kunzmann, Little and Smith, 2000), all the more so as health, measured over a given period of time, has a definite impact on well-being.

2.1 Health

From a synchronic standpoint health impairments of a chronic nature (chronic illnesses, cognitive and psychic problems or functional limitations) are associated with an increase in depressive symptoms (Haynie, Berg, Johansson, Gatz and Zarit, 2001; Mirowsky and Ross, 1992; Hilleras, 1998; Turner and Noh, 1988) and a negative perception of health (Hoeymans et al., 1999; Pinquart, 2001; Rodin and McAvay, 1992). In the same way as serious impairments to health, frailty, although less perceptible than functional disabilities, has an equally negative effect on well-being (Frieswijk, Buunk, Steverink and Slaets, 2004; Kirby, Coleman and Daley, 2004).

2.2 An effective adaptation mechanism: downward social comparison

This being said, if one turns to consider the effect of advancing age on well-being – dissociating it from the negative effect of a declining health – it will be observed,

from the diachronic standpoint, that the advancing age is associated with a lower risk of developing a depression and, in broader terms, with a higher level of well-being (George, 1992; Kunzmann et al., 2000). This positive influence of aging may be attributed to a recourse by very old people to certain strategies which facilitate adaptation² to the frailty process, thus contributing to the preservation of their well-being (Brandtstädter and Greve, 1994; Heckhausen and Schulz, 1995; Idler, 1993; Kunzmann et al., 2000; Rothermund and Brandtstädter, 2003).

Of these different mechanisms, downward social comparison³ seems particularly effective in very advanced age. Individuals generally have recourse to it when they are exposed to a negative and threatening event. This is the case with very old people who have to face up to the advancing frailty process and its consequences. This mechanism consists of comparing oneself with others whom one considers to have been more affected than oneself by a particular event; it enables an individual who feels relatively less affected by that situation to preserve or recover a positive image of the self (Frieswick et al., 2004; Heckhausen and Schulz, 1995; Taylor, 1983; Taylor and Lobel, 1989). By evaluating themselves in relation to others who are in worse health than themselves, very old people tend to redefine what is for them a satisfactory state of health for their age, distinguishing between the changes in health which they consider normal – because highly probable at their age – and those which are not (Hoeymans et al., 1999; Idler, 1993; Leinonen, Heikkinen and Jylhä, 2001; Leinonen et al., 1998; Suls, Marco and Tobin, 1991; Tornstam, 1975). By thus lowering their criteria for a “good health”, they minimize impairments of their own health which they consider normal to such a degree that some impairments – even of a disabling nature – have only a minor influence on their well-being (Brandtstädter and Greve, 1994). By envisaging their health condition in a positive manner – even if, objectively speaking, their state of health is poor (positive illusion) – very old people sustaining the frailty process are enabled to preserve their self-esteem in face of a declining health (Frieswick et al., 2004; Heckhausen and Schulz, 1995; Taylor, 1983; Taylor and Brown, 1988; Taylor and Lobel, 1989).

2.3 The frailty process, downward social comparison, and well-being

But to what extent can older persons – knowing that with advancing age their health is deteriorating and their resources are diminishing – still evaluate their health in a positive fashion in order to preserve their self-esteem by recourse, among other

2 Among the psychosociological theories advanced in the literature to explain this process of adjustment, particular mention may be made of the model of selective optimization with compensation (Baltes and Baltes, 1990), Carstensen's socioemotional theory (1991) and the mechanisms for the protection of self-esteem and identity (Brandtstädter and Greve, 1994).

3 Downward social comparison does not seem to be activated intentionally. Here we are in agreement with Brandtstädter and Greve (1994), who conceive of the different mechanisms, not as strategies consciously deployed, but rather as modes of adjustment which activate themselves, with varying degrees of success, in response to certain situations.

things, to downward social comparison? A number of authors consider that, as soon as the deterioration of the elderly's health exceeds their capacity to cope with it, their depressive symptoms increase and their perception of their health becomes negative (Rothermund and Brandstädter, 2003; Leinonen, et al., 2001; Pinquart, 2001; Rodin and McAvay, 1992). Thus, the capacity of the oldest old to adapt to the degradation of their health – on which their well-being is highly dependent – diminishes with the growing frailty process associated with the aging process. In these circumstances the effectiveness of downward social comparison, in face of the intensification of the frailty process, seems of extremely limited effectiveness since it fails to preserve their well-being.

3 Methods

3.1 Sample and procedure

The data come from the Swiss Interdisciplinary Longitudinal Study on the Oldest Old (SWILSO-O) (Guillet, Métral and Spini, 2003). SWILSO-O is a longitudinal and interdisciplinary study on the psychological, health, social, and sociological situations as well as trajectory of a sample of octogenarians. The panel was launched in 1994 and involves two cohorts (C1, persons born 1910–1914, n = 340, started in 1994; C2, persons born 1915–1919, n = 377, started in 1999). Each cohort was randomly selected among community-living persons aged 80–84 years at baseline, living at home in an urban area (canton of Geneva) and a semi-rural area (central Valais), and stratified with equal weights by region and gender. Participants were assessed on a rich battery of psychological, health, social, and sociological variables administered individually by trained interviewers during face-to-face interviews based on a standardised questionnaire. They answered the questionnaire, either in person or, if unable to take part in the interview, most of the information was provided by a proxy. We focus here on the first five waves of the first cohort which were assessed every 12 or 18 months between 1994 and 1999. In view of the type of information we needed, we retained only the individuals who answered our investigators personally. The sample was thus made up of 295 self-respondents at baseline (1994), 132 (44.7%) of whom were still able to participate personally in the fifth wave in 1999. Altogether, 1025 interviews constituted the raw material for our analysis.

3.2 Measures

Well-being : our analysis is based on nine questions designed to measure the frequency of positive and negative affects, using a scale ranging from "never" (coded 1) to "always" (coded 4) (scale adapted from Wang, Treul and Alverno's Self-Assessing Depression Scale (SADS) (1975)). In addition, "self-rated health", which is assessed

by asking "Overall, how do you evaluate your health?", has been taken into account; this is measured by means of a scale ranging from "poor" (coded 1) to "very good" (coded 5). Table 1 shows all these items and their mean frequency. A principal component analysis⁴ on these ten items produces at the first wave three factors. The first comprises the negative affects, the second the positive affects and the third, items relating to perception of health. A first series of analyses have revealed that the results concerning positive and negative affects are strictly equivalent – but of course diametrical opposites. Consequently, it was decided to include all the affects, both positive and negative, within a single index. On this basis two indices have been constructed⁵:

- affective well-being: this first indicator measures the mean frequency of all the positive affects (having pleasure in doing things, having self-confidence, being hopeful about the future) and the negative ones (feeling a little lonely, feeling sad, feeling anxious, finding time passes slowly, having crying spells or feeling like it). The negative affects scales have been inverted in order to obtain an overall positive index. Thus, a positive score indicates that the persons interviewed consider, on average, that their level of affective well-being is positive. The Cronbach alpha for all these items reaches 0.77 at baseline. This index measures the affective component of well-being. Its scale ranges from -2.85 (lowest affective well-being) to 0.64 at baseline.
- perception of health⁶: this index is a mean of two items, the self-rated health and the frequency of the individual's concern for one's health. This latter item comes from the scale adapted from Wang's SADS. These two questions are positively coded; thus the higher the score, the more positive the perception of health. The Cronbach alpha for these two items is 0.55⁷ at baseline. This index evaluates the cognitive component of well-being; the scale ranges from -2.22 (extremely negative perception of health) to 1.12 at baseline.

Frailty: we have approached frailty by considering impairments of five dimensions of health: mobility (going up and down stairs, moving around outside, walking at least 200 metres), physical ailments (10 items), sensorial capacities (reading a text in a newspaper, following a one-to-one conversation, following a conversation among several persons), memory (memory complaints), and loss of energy (tiredness, loss of appetite). A person is deemed to be frail if impaired in at least two

⁴ This analysis has been effected by use of the "maximum likelihood" as extraction method and "promax" as a rotation type in order to evaluate the correlations between the factors.

⁵ Prior to this, we took the step of standardizing all the ten variables (on account of their differing scales) in order to render them comparable and, to appreciate evolution over time, we standardized them at each wave of interviews on the basis of the first wave.

⁶ At the first wave there is a modest correlation (0.36; $p < 0.01$) between affective well-being and perception of health.

⁷ The small number of items (2) taken into account in this index explains to a considerable degree the weakness of this alpha.

of these five dimensions. On the basis of these dimensions and an indicator of functional dependence – defined as inability to perform alone one or more of the five basic activities of daily living⁸ (ADL: cf. Katz, Downs, Cash and Grotz, 1970) – we have constructed two other measures for health: robustness and dependence. Robust (non-frail) persons are not impaired in more than one dimension of health and are not suffering from any disability, whereas dependent persons report at least one ADL disability, regardless of the number of impairments in the five dimensions of health. While frail persons are not dependent, the great majority of dependent persons are frail (for a detailed description of frailty, its theoretical definition and operationalization, see Ghisletta, Girardin and Guilley, 2003 and Guilley, Armi, Ghisletta, Lalive d'Epinay and Michel, 2003).

Social comparison: to measure social comparison we asked octogenarians to compare their own state of health with that of other persons of the same age. They could estimate that their state of health was worse (code 1), equivalent (code 2) or better (code 3).

Socio-demographic characteristics: to ensure that the linkages between health, social comparison and well-being are not simply a reflection of certain socio-demographic characteristics, four of the latter – age, gender, socio-economic status⁹ and region – have been inserted in our analyses as control variables.

3.3 Statistical analysis

This study seeks to observe relations between well-being, health and downward social comparison in later life. The analyses consist of four parts:

- First, we consider the global evolution of health and well-being in later life. Therefore we proceed to a descriptive comparison of both health status and well-being at baseline (Wave 1) and at the end of the observed period (Wave 5) using a Wilcoxon signed-rank test (Siegel and Castellan, 1988).
- Second, hierarchical lineal models of two-level data have been run using HLM 6.0 (Raudenbush, Bryk and Congdon, 2004) to assess the contribution of health status and of downward social comparison in predicting the two dimensions of well-being (perception of health and affective well-being). Gender, age, socio-economic status, and region are considered as covariates. Fixed and random effects were estimated by the method of restricted maximum likelihood.
- Third, we focus on the evolution of well-being and its relation to social comparison according to the six more frequent sequences of individual health trajectories among our population. Therefore we use first the Wilcoxon signed-rank test to observe continuity and change in well-being in relation to

⁸ Washing, dressing and undressing, eating, rising from and going to bed, and moving around within the apartment.

⁹ Socio-economic status is measured taking into account the last socio-occupational activity, level of education and income.

the evolution of health status between two successive waves. Then the coefficient $\hat{\eta}$ and analyses of variance (one-way) have been calculated to measure the association between well-being and social comparison at each of the six sequences of individual health trajectories.

- Finally, we measure mean score of social comparison, perception of health and affective well-being at each of the sequences of individual health trajectories and we compare them by using analyses of variance (univariate) and Duncan's test for post hoc contrasts. Except for multilevel analyses, all these analyses are conducted with SPSS 14.0.

3.4 Characteristics of the sample at baseline and changes in well-being

The majority of the subjects are of relatively low socio-economic status (58.3%); their mean age is 81.8 years ($SD = 1.39$) at baseline. It should be recalled here that the data relate only to those persons able to participate personally in interviews (self-respondents). All the subjects who have replied personally to the first interview (initial sample) have on average a satisfactory level of well-being, both affective and cognitive (see table 1). When questioned on the frequency of their positive affects (having pleasure in doing things, having self-confidence and being hopeful about the future) their scores average between "often" and "always"; when evaluating the frequency of their negative affects (feeling a little lonely, sad, anxious, finding time passes slowly, having crying spells or feeling like it) their mean score is between "never" and "rarely". On average, they consider at baseline their state of health between "satisfactory" and "good" and they rarely express concern for their health. In addition to thinking themselves in good health, 61% of them consider that their state of health is better than that of their peers – even though, at the outset of the study, over half of them (59%) are showing signs of frailty.¹⁰

Over the five-year period¹¹, the overall state of health deteriorates: the number of dependent octogenarians almost quadruple, while the proportion of robust persons falls from 53% to 36%. However, while the health of our interviewees is deteriorating, during the same period no significant change has occurred in any of the well-being items save one affect (having pleasure in doing things), which declines significantly. In fact, neither the change in levels of affective well-being (indicator of

10 As some complementary analyses show, self-respondents are in better health than those who have not personally participated in the inquiry. Because of this selection, the frail and the dependent persons are here under-represented in relation to the entire population group.

11 The analyses relating to changes in health, well-being and social comparison take into account only those persons who have participated in the inquiry up to the fifth wave. Some complementary analyses (calculations of selectivity indices (Lindenberger, Singer and Baltes, 2002)) show that, save in respect of one affect (having pleasure in doing things), this sub-group of respondents does not differ significantly, at the outset of the study, from all the persons interviewed (initial sample) with regard to socio-demographic profile, well-being and health assessment by social comparison; this gives additional credence to our findings. Only their health is better than that of all the persons interviewed at baseline.

Table 1: Characteristics of initial sample and changes therein between the first and fifth wave for selected respondents

	Initial sample	Participants in wave 5		
		Wave 1 (1994)	Wave 1 (1994)	Wave 5 (1999)
Socio-demographic features				
Mean age (SD)	81.8 (1.39)	81.7 (1.31)		
Gender : female (%)	48.5	54.3		
Region : Geneva (%)	53.2	46.5		
Socio-economic status : middle/upper (%)	41.7	43.4		
State of health (%)				
Robust	41.2	52.7	36.4	***
Frail	51.7	42.6	48.1	
Dependent	7.1	4.7	15.5	
Social comparison (%)				
Better	60.6	67.3	68.3	ns
Equivalent	31.5	29.8	29.8	
Worse	7.9	2.9	1.9	
Affective well-being (mean [SD])				
I have pleasure in doing things ²⁾	3.75 (0.59)	3.89 (0.32)	3.72 (0.60)	*
I have self-confidence ²⁾	3.58 (0.70)	3.60 (0.76)	3.61 (0.68)	ns
I am hopeful about the future ²⁾	3.29 (0.95)	3.35 (0.89)	3.20 (0.97)	ns
I feel sad ²⁾	1.67 (0.81)	1.58 (0.76)	1.61 (0.83)	ns
I feel anxious ²⁾	1.65 (0.84)	1.55 (0.79)	1.50 (0.83)	ns
I feel a little lonely ²⁾	1.55 (0.83)	1.43 (0.76)	1.57 (0.88)	ns
I find time passes slowly ²⁾	1.47 (0.79)	1.43 (0.75)	1.50 (0.81)	ns
I have crying spells or feel like it ²⁾	1.40 (0.66)	1.35 (0.60)	1.38 (0.69)	ns
Perception of health (mean [SD])				
Self-rated health ³⁾	3.56 (0.94)	3.71 (0.81)	3.55 (0.81)	ns
I am worried about my health ⁴⁾	3.40 (0.87)	3.47 (0.85)	3.47 (0.77)	ns

Notes. Initial sample: self-respondents (N = 295). Participants in Wave 5: self-respondents (N = 129). ¹⁾ Wilcoxon test. *** = p. < 0.001 ; * = p. < 0.05 ; ns = not significant. ²⁾ For all these affects the scale varies from 1 ("never") to 4 ("always"). ³⁾ The scale ranges from 1 ("poor") to 5 ("very good"). ⁴⁾ The scale ranges from 1 ("always") to 4 ("never").

the affective dimension), which has fallen from 0.10 to 0.00, nor that for perception of health (indicator of the cognitive dimension), which over the five-year period has changed from 0.12 to 0.05, show any significant decline at $p < 0.05$. In other words, the overall mean level of well-being remains stable notwithstanding the decline in health. Thus, our data confirm the paradoxical stability of well-being which has been pointed out in a number of studies. Social comparison remains stable over time: after five years of study about two thirds of the interviewees still consider that their state of health is better than that of their peers, notwithstanding the significant decline which has taken place in their own state of health.

Table 2: Hierarchical linear analyses of indicators of well-being, affective well-being and perception of health

	Affective well-being ¹⁾	Perception of health ²⁾
Fixed effect		
Intercept	0.07	-0.07
Gender (female)	-0.13*	0.05
Socio-economic status (middle/upper)	0.05	0.04
Region (urban)	-0.10	-0.02
Age (years)	-0.01	-0.01
Robust	0.13***	0.27***
Dependent	-0.25**	-0.24**
Downward social comparison	0.13***	0.21***
Random effect		
Intercept	0.19***	0.19***
Age	0.01***	0.00**

Notes. These models articulate two-level data. Number of observations (first level) for affective well-being: N = 920; for perception of health: N = 922. Number of individuals (second level) for affective well-being: N = 288; for perception of health: N = 289. ¹⁾ The higher the coefficient, the higher the affective well-being. ²⁾ The higher the coefficient, the more positive the perception of health. * $p < .05$, ** $p < .01$, *** $p < .001$.

4 The determinants of well-being and of its evolution

Looking at this paradox – stability of well-being notwithstanding a deterioration in health – one may ask whether health is a factor determining well-being. Our findings confirm it; the state of health is closely associated with well-being. It can be seen from table 2 that the frail persons have levels of well-being (both affective

and cognitive) lower than those of the robust persons and higher than those of the dependent persons. This linkage between the state of health and well-being is just as strong and significant if all the items are considered separately¹². Well-being is, when measured at a given time – in other words, from a strictly synchronic standpoint – closely linked to the state of health. How then is one to explain that, from the diachronic standpoint, well-being does not decline in parallel with the decline in health? The paradox might be explained by reference to social comparison seen as an adjustment mechanism. Our results reveal that, the more the state of health is judged better than that of other people of the same age, the greater both the affective and cognitive sense of well-being, irrespective of the objective state of health. Is it possible that such a mechanism might neutralize the negative effects of a decline in health to such a degree as to stabilize well-being over the course of time? We shall return to this subject later. The only control variable which has an effect on well-being is that of gender: men show a higher level of affective well-being than women.

5 Well-being and health trajectories

In order to study downward social comparison as a mechanism regulating well-being, we leave the overall level of analysis and move to the individual level. By examining the evolution of well-being in comparison with that of the state of health between two successive interviews we can gauge the effectiveness and the limitations of downward social comparison as an adjustment mechanism. With the knowledge that on average health steadily deteriorates, one may ask to what extent this mechanism is effective. The six segments of health trajectories most frequently encountered within our population group have been examined (Guilley, Ghisletta, Armi, Berchtold, Lalive d'Epinay, Michel and de Ribaupierre, submitted). These six types of segments ($N=698$) represent 96% of the segments of health trajectories observed in total on two waves. Three of them relate to continuity in the same state of health: maintained robustness (R-R), maintained frailty (F-F) and chronic dependence (D-D). However continuity in status does not mean health stability: as some complementary analyses show, maintained frailty (F-F) comprises a significant increase in the number of health impairments. Two of these six segments feature a deterioration of health: the onset of frailty (R-F) and, finally, the onset of dependence (F-D). The remaining one concerns an improvement in health, namely a return to robustness after having experienced frailty (F-R). In order to assess the effectiveness of social comparison, we have calculated its correlation with the two dimensions of well-being by each of the six segments. On the basis of earlier findings showing the positive effect of social comparison on the cognitive dimension of well-being

12 In these complementary analyses (not presented here) we consider all the observations made from the first to the fifth wave of interviews ($n=1025$).

(Spini, Clémence and Ghisletta, manuscript submitted for publication) we start from the premise that the association between social comparison and well-being is positive. Consequently, to assess its impact more precisely, we have considered here unilateral statistics.

Table 3: Changes in indicators of well-being and associations with social comparison by segment of health trajectories

	Health trajectories					
	R-R	F-R	R-F	F-F	F-D	D-D
Affective well-being						
Direction of change	→	↗	→	→	↘	→
Unilateral association with social comparison ¹⁾	0.04	0.05	0.31**	0.26***	0.25	0.38*
Perception of health						
Direction of change	→	↗	→	→	↘	→
Unilateral association with social comparison ¹⁾	0.13*	0.14	0.33**	0.34***	0.26	0.35*

Notes. Reference population group: self-respondents (1025 observations). The arrows indicate respectively stability « → », an increase « ↗ » or a decline « ↘ » in the indicators of well-being at threshold $p < 0.05$ (Wilcoxon test). R = Robust; F = Frail; D = Dependent. ⁽¹⁾ To measure association we have selected the η coefficient (correlation between a nominal variable and a continuous variable) associated with an analysis of variance. Unilateral associations only are considered here (positive effect of social comparison on well-being). These measurements have been calculated at the point in time T+1. The coefficients thus obtained are almost identical to Pearson's correlation coefficients.
* $p < .05$, ** $p < .01$, *** $p < .001$.

In order to evaluate if there is a change in well-being associated to the different segments of health trajectories, we have computed Wilcoxon nonparametric statistics. Two of the six segments are linked to a significant change in both affective and cognitive well-being. The latter increases when health improves (F-R) and decreases with the onset of dependence (F-D). That health does affect well-being is thus confirmed. However, neither the onset of frailty (R-F), nor an increase in frailty (F-F), nor chronic dependence (D-D) are linked to any negative change in well-being. What explanation exists for the stability of well-being in those three segments? The observation of the correlations between social comparison and well-being can enlighten us on this question. They are significant - on both the affective and cognitive dimensions – on the three trajectory segments R-F, F-F and D-D, but only partially significant, or not significant at all, on the three others. We can therefore put forward the hypothesis that when the correlations are significant in both dimensions of well-being, downward social comparison moderates the effects of the decline in health on well-being. The stability of the well-being over the range of those three segments bears witness to this. When the correlations are partially or not significant,

it is probable that downward social comparison is partially or totally “inactivated” or ineffective as an adjustment mechanism. We observe indeed changes in well-being on two of the three segments namely F-R and F-D. This could indicate that an absence of regulation by social comparison is associated with possible variations of well-being. To verify this hypothesis we have conducted some complementary analyses (analyses of variance of social comparison and well-being).

Table 4: Analyses of variance of social comparison, affective well-being and perception of health according to the six segments of health trajectories

Trajectories		ANOVA ¹⁾		ANOVA ¹⁾			
		Social comparison		Affective well-being		Perception of health	
		M	SD	M	SD	M	SD
R-R	n = 219	0.49 (a) ²⁾	0.57	0.26 (a) ²⁾	0.52	0.45 (a) ²⁾	0.53
F-R	n = 69	0.42 (a)	0.64	0.19 (a, b)	0.54	0.25 (a, b)	0.53
R-F	n = 90	0.43 (a)	0.63	0.11 (a, b)	0.58	0.19 (b)	0.58
F-F	n = 231	0.07 (b)	0.90	-0.00 (b)	0.55	-0.07 (c)	0.68
F-D	n = 38	-0.87 (c)	1.14	-0.68 (c)	0.82	-0.69 (d)	0.85
D-D	n = 51	-0.55 (d)	1.17	-0.49 (d)	0.83	-0.44 (e)	0.78

Notes. Reference population group: self-respondents (1025 observations). R = Robust; F = Frail; D = Dependent.

¹⁾ Univariate analysis of variance at point in time T + 1: social comparison ($F[5,635] = 29.32$ at $p < .001$); affective well-being ($F[5,688] = 26.88$ at $p < .001$); perception of health ($F[5,691] = 37.70$ at $p < .001$).

²⁾ Duncan's test (post hoc) at $p < .05$. Different letters indicate that the means differ significantly from one segment of the trajectory to another.

The analysis of variance of social comparison reveals that, on average, the octogenarians who remain robust (R-R), fully recover their health (F-R) or become frail (R-F) consider in majority that they are in better health than other people. This is not surprising in the first two situations (R-R) and (F-R), since their objective health is excellent. Since self-esteem is not *a priori* threatened by a decline in health, there is no reason to resort to the compensatory intervention of downward social comparison. However, it is already operating on the cognitive dimension of very old persons who are still robust (significant correlation between social comparison and perception of health). Admittedly, the decline in health does not directly threaten the image they have of themselves, since they are in good health; but one might assume that the fear of their own decline might be at the origin of the activation of this mechanism at the cognitive level. This being said, its regulatory effect on this

segment is not only partial but also relatively weak. Consequently health – good health, moreover – seems to play an essential role here; it acts on both dimensions of well-being, contributing to the stabilization of well-being between two successive interviews. The influence of health on well-being seems to be equally important for the F-R segment. The recovery of robustness has a positive effect on both dimensions of well-being, particularly as an improvement in health is unlikely at that age. Therefore very old people who recover their health might feel privileged by being in a situation which is rare in old age and therefore may not need to resort to downward social comparison as an adjustment mechanism to improve their self-image. This appears to be in line with the absence of correlation between well-being and social comparison. Thus, their well-being, stimulated by the improvement in their health, improves to such an extent that on average they achieve scores very close to those of very old people remaining in robust health (R-R).

On average, persons becoming frail (R-F) consider their health to be better than that of their peers, although objectively it is becoming precarious. In fact, their assessments are so positive as to be similar to those of octogenarians whose state of health is actually good (see *post hoc* contrasts in table 4). These assessments may be considered illusory (Taylor and Brown, 1988), since they depict reality in an exaggeratedly positive manner. Here downward social comparison is clearly being exercised, as is illustrated by the significant correlation between social comparison and the two dimensions of well-being. Moreover, it is clearly effective in its regulatory function; this is demonstrated by the stability of well-being and its mean level, which is equivalent to that of those who recover their robustness (F-R), and even, as regards the affective dimension, that of very old people remaining in robust health (R-R).

When frailty increases (F-F) the mean social comparison score declines without, however, falling sharply. In these cases very old people, on average, consider their state of health equivalent to that of their peers, even though their health is declining, as if they were aware that that state is “normal” for their age. The chronically frail persons are certainly aware of their state of health since, on average, their perception of their health is significantly worse than those in the previous trajectories. But as they consider that their frailty is “normal” for their age they minimize it and thus moderate its negative effects on affective well-being, which remains, on average, close to that of those who are becoming frail (R-F) or who are recovering their robustness (F-R). In such cases downward social comparison again proves its effectiveness – as is shown by the significant association between well-being and social comparison, and the resulting stability of well-being for the F-F segment.

On entry into a state of dependence (F-D) the mean assessment of health by social comparison falls sharply, and may even show a lower score than that obtained by persons who are chronically dependent (D-D). The loss of autonomy highlights the limitations of the compensatory function of downward social comparison. The

significant fall in well-being reveals that very old people do not succeed, by resorting to, *inter alia*, downward social comparison, in adjusting to their entry into a state of dependence. Moreover, they have the lowest levels of well-being, both affective and cognitive. In such cases this mechanism is ineffective; this is illustrated by the absence of correlation between the two dimensions of well-being and social comparison, and the decline in well-being across this specific health transition. However, when dependence persists (D-D), downward social comparison again becomes operative (a significant correlation between the two dimensions of well-being and social comparison), since it helps to stabilize well-being at a mean level significantly higher than that of persons who have just lost their autonomy.

6 Well-being, frailty and downward social comparison: the effectiveness of an adjustment mechanism

The well-being of our population group remains stable over the five-year period notwithstanding an obvious decline in health. The paradox of stability of well-being (Kunzmann et al., 2000), observed in numerous studies (Idler, 1993; Leinonen et al., 1998, 2001; Rodin and McAvay, 1992; Rothermund and Brandtstädt, 2003, Fiske et al., 2003), is corroborated by our own data, well-being being marked by the absence of any change, on average, between the first and the fifth wave while health declines in the same time. As health and well-being evolve differently in very old age, it may be wondered if they are in fact associated at that time of life. The state of health and well-being, measured at a given point in time, are closely associated; frail persons have higher well-being scores than dependent persons, they have lower scores than robust persons. These findings parallel those of numerous studies showing the association between health and well-being in old age (for a synthesis see Hilleras, 1998; Pinquart, 2001). The strength of this relationship on the synchronic or cross-sectional level having been shown, how is one to explain their different evolutions on the diachronic or longitudinal level? Downward social comparison, which has been identified in our study as a determining factor¹³ in well-being – we have shown in our analyses that the better one's health is assessed compared to peers, the higher the level of well-being, irrespective of the objective state of health – may enlighten us on this question. Downward social comparison, as an adjustment mechanism, would appear to enable very old people – by embellishing their state of health – to maintain a positive image of themselves, which would help to maintain their well-being notwithstanding the decline in their health

13 In addition to health and social comparison, gender appears in our analyses as a determining factor in well-being, but only on the affective dimension: men manifest greater affective well-being than women. This finding confirms the greater propensity of women to display depressive symptoms and actual depression, as stressed in a number of studies (George, 1992; Pinquart and Sörensen, 2001; Smith and Baltes, 1998).

and thus to facilitate their adjustment to the frailty process (Frieswijk et al., 2004; Brandtstädtter and Greve, 1994; Heckhausen and Schulz, 1995; Taylor, 1983; Taylor and Brown, 1988; Taylor and Lobel, 1989). The compensatory effect of downward social comparison explains the stability of the mean evolution in well-being between 1994 and 1999.

But to what extent is this mechanism functional? The analysis of individual health trajectories reveals the emergence and significance of this mechanism – and also its limitations. It shows that downward social comparison is already in operation among octogenarians who remain robust (R-R). Although self-esteem is not directly threatened by a decline in health, the anxiety to which it gives rise among the very old, even when robust, might explain the activation of this mechanism at the cognitive dimension of well-being. This being said, the good health of those who remain robust also contributes to the maintenance of a good level of their well-being. Similarly, the improvement in the health of those who recover their robustness (F-R) has a direct positive impact on their well-being, which increases significantly to a level almost equivalent to that of persons who remain robust (R-R). Since they feel privileged on account of the improvement in their health – a rare occurrence at that age – they have no need to boost their self-esteem by such mechanisms as downward social comparison.

It is from their entry into frailty (R-F) that the very old resort fully to downward social comparison as an adjustment mechanism. They tend to evaluate their health in relation to that of their peers as positively as do persons in good or improving health. This socio-cognitive mechanism proves perfectly functional – as the stability of well-being on a time range varying from 12 to 18 months shows – since it helps the oldest old to adjust to their frailty, even when it is increasing (F-F). By comparing themselves positively with others they judge their frailty as normal for their age and thus, as certain authors have suggested (Brandtstädtter and Greve, 1994), they tend to minimize their own health impairments, even if those are serious. Contemplation – even illusory – of their frailty in this way helps them, by enabling them to maintain a positive self-image, to tame it and adjust to it and thus to maintain a positive feeling of well-being, particularly on the affective dimension. However downward social comparison becomes momentarily ineffective when frailty culminates in dependence. This mechanism cannot soften the harmful effects of entry into dependence, which strikes directly the octogenarians self-esteem. Evidence of this is to be found in the mean well-being score, which is the lowest for the six segments of health trajectories studied. These findings confirm that well-being declines sharply when a certain threshold of deterioration of health is faced (Frieswijk et al., 2004; Heckhausen and Schulz, 1995; Leinonen, et al., 2001; Pinquart, 2001; Rodin and McAvay, 1992; Rothermund and Brandtstädtter, 2003). But then, downward social comparison recovers its effectiveness when dependence becomes chronic. Although this mechanism does not enable dependent persons to

attain a level of well-being equal to that of frail or robust persons, it contributes to facilitating their adjustment to dependence and thus to stabilizing their well-being at a higher mean level than that obtained by individuals who have just lost their autonomy. This stabilization of well-being, even at lower levels, is an original result of this research which should be studied further. Some authors, for example, show indeed that levels and stabilization of well-being should be considered together in order to better understand how individuals cope with various types of stress (Kernis and Goldman, 2003; Greenier, Kernis, McNamara, Waschull, Berry, Herlocker and Abend, 1999). Moreover research is needed on the relevance of downward social comparison as a coping mechanism following disturbing life events (e.g. death of a partner) which affect temporarily or more durably well-being (Lalive d'Epinay, Cavalli and Spini, 2003). In conclusion, it may be recalled that very few longitudinal studies have examined downward social comparison as an adjustment mechanism among frail octogenarians. And yet, as this study clearly reveals, this mechanism is particularly functional as a means of coping with the frailty process characteristic of old age.

7 References

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