Self-Perceptions of Health: A Prospective Analysis of Mortality, Control, and Health

Verena H. Menec, Judith G. Chipperfield, and Raymond P. Perry

A growing number of studies show that self-perceptions of health are an important predictor of mortality. The present study was designed to extend this research by examining the relation between health perceptions and a range of other outcome measures besides mortality, including control beliefs and morbidity. The results show that older adults who rated their health as “bad/poor” and “fair” were more than twice as likely to die within three to three-and-a-half years following the initial survey than those who perceived their health as “excellent.” However, although health perceptions assessed in 1991/92 were related to health perceptions four years later, they did not predict morbidity. Health perceptions also predicted perceived control and use of control-enhancing strategies in dealing with age-related challenges, as assessed in 1995. These findings contribute to our understanding of the benefits of positive health perceptions by showing that they are connected to an adaptive psychological profile including perceptions of control and use of control-enhancing strategies that are linked to health and well-being.

A growing body of research shows that self-perceptions of health are linked to mortality, even when more “objective” health measures are controlled (see Idler & Benyamini, 1997, for a review). The unique contribution of health perceptions to mortality is substantial for both older adults and general population samples, with people rating their health as “poor” being between 1.5 and 3 times more likely to die than individuals who perceive their health as “excellent.” The relation between health perceptions and mortality is a robust one and persists when statistically controlling not only for self-reported health measures, but also for numerous other variables, such as health-related behavior like alcohol use, exercise, smoking (e.g., Borawski, Kinney, & Kahana, 1996), social support (McCullum, Shadbolt, & Wang, 1994; Wolinsky & Johnson, 1992), worries about health (Wolinsky & Johnson, 1992), and so forth.

A variety of explanations have been put forth to explain the relation between health perceptions and mortality (see e.g., Idler & Benyamini, 1997; Mossey & Shapiro, 1982; Rakowski, Mor, & Hiris, 1991). One possibility is that health perceptions reflect insights into people’s health that are not captured by more objective health measures. Another possibility is that individuals who rate their health as poor may miss certain “critical points” in initiating health-promoting actions, thereby precipitating health problems (Rakowski et al., 1991). Alternatively, positive self-perceptions of health may be beneficial because optimistic feelings in themselves are protective (Mossey & Shapiro, 1982). Although all these explanations appear plausible, there is, to date, little known about the mechanisms that link health perceptions to mortality, highlighting the need for more research on the relation between health perceptions and a variety of variables.

The purpose of the present study was twofold. First, we wanted to replicate the health perception-mortality connection by statistically controlling not only for self-reported measures of health status (morbidity and functional disability), but also for objective health measures, defined here in terms of physician visits and hospitalization. Few previous studies have included health care use variables when examining the unique effects of health perceptions, although one would expect that a variable like hospitalization, for example, would be related to mortality. Moreover, these studies have either relied on self-report measures (Idler & Kasl, 1991; Schoenfeld, Malmrose, Blazer, Gold, & Seeman, 1994) or have combined several measures into a summary index of “objective health” (Mossey & Shapiro, 1982), which precludes an examination of the independent effect of each variable.

In the present study, information regarding physician visits and hospitalization was obtained from administrative records. These data were then linked to survey responses. Obtaining information from an external source adds greater validity to the assessment of health care use than relying on self-report measures, as potential inaccuracies in reports due to recall bias or poor memory are avoided (see e.g., Carsjö, Thorslund, & Wärneryd, 1994). Moreover, because Canada has a universal health care system, potential biases in health care use resulting from lack of access are minimized.

A second purpose of the study was to extend previous research on health perceptions by going beyond mortality as an outcome measure. We did so in two ways. First, we investigated the relation between health perceptions and later health, given the possibility that health perceptions may be related to mortality because of their impact on health status (Idler & Kasl, 1991). Second, we examined the association between health perceptions and control beliefs, which have been found to be an important predictor of health and well-being in older and younger adults (see Rodin, Timko, & Harris, 1985 for a review). We approached the concept of control from two different angles: by prospectively investi-
gating the contribution of health perceptions to older adults’ perceived control, and by examining the relation between health perceptions and the use of control-enhancing strategies in dealing with age-related challenges.

Perceived Control

The physical and psychological benefits of feeling in control have been documented extensively over the past three decades (Rodin et al., 1985). For example, perceived control has been found to predict physical and mental health (Langer & Rodin, 1976; Roberts, Dunkle, & Haug, 1994; Rodin & Langer, 1977; Schulz, 1976; Zautra, Reich, & Newsom, 1995), health care use (Krause, 1988), and mortality in older adults (Chipperfield, 1997b; Menec & Chipperfield, 1997b; Rodin & Langer, 1977). Perceived control has also been shown to correlate with older adults’ health-related behavior, such as exercise and proper nutrition (e.g., Menec & Chipperfield, 1997a; Speake, Cowart, & Pellet, 1989).

Although much of the research on perceived control is correlational in nature, researchers typically assume (implicitly or explicitly) that control beliefs are causal antecedents of physical and psychological well-being. Experimental studies indeed suggest that this is the case. Well-controlled animal studies, for example, show that loss of control causes specific physiological reactions, such as suppression of immune system responses (Monjan & Collector, 1977), and failure to reject tumors (Visintainer, Volpicelli, & Seligman, 1982). Moreover, studies have shown that introducing a control-enhancing intervention to nursing home residents improved health and well-being, and decreased mortality rates relative to a control group that received no intervention (Langer & Rodin, 1976; Rodin & Langer, 1977). It is equally plausible, however, that health outcomes also predict perceived control, with the relation between these variables most accurately described as being reciprocal in nature. Thus, being in good health may lead to feeling in control, with a sense of control, in turn, contributing to health and well-being. In the present study we focused specifically on the former relation, namely whether health perceptions predict perceived control.

Control-Enhancing Strategies

Aging is associated with a variety of challenges. Older adults face a progressive decline in health and may no longer be able to carry out the activities they engaged in when they were younger. Researchers increasingly recognize that the way people deal with these obstacles is critical to successful aging (Baltes, 1993; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). Coping with difficulties can be described in terms of the concept of perceived control or, more specifically, the notion of primary versus secondary control (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996).

The distinction between primary and secondary control, first introduced by Rothbaum, Weisz, and Snyder (1982), captures two approaches to coping. Whereas primary control derives from actively dealing with challenges to effect changes in the environment, secondary control relates to changing the self in order to accommodate to the environ-

ment, such as by downgrading expectations, accepting the situation, or finding meaning in it. The notion of primary control fits with the more widely used definition of perceived control, the benefits of which were described above. In contrast, the idea that individuals can maintain a sense of control, albeit secondary control, by trying to adjust to a changing environment has been gaining attention only recently (e.g., Thompson, Collins, Newcomb, & Hunt, 1996; Thompson, Nanni, & Levine, 1994; Weisz, McCabe, & Dennig, 1994). This research indicates that secondary control strategies, such as acceptance, can be thought of as a second line of defense when primary control is not possible. These strategies appear to be particularly effective in low-control situations, as when people must undergo invasive medical procedures (Helgeson, 1992; Weisz et al., 1994).

In the present study, we investigated the connection between health perceptions and control-enhancing strategies in dealing with an age-related challenge over which exertion of control is likely possible. More specifically, we focused on how older adults deal with difficulties with leisure activities. The pursuit of leisure activities takes on a particularly important role in later life. In this respect, Heckhausen (1997) showed that while goals related to work, family, and finances were rated as important by young adults, leisure, health, and community-related goals predominated in older adults. We hypothesized that health perceptions would be positively related to primary control strategies, that is, actively trying to deal with such difficulties. Conversely, health perceptions might be negatively related to secondary control strategies, such that the better the individuals rate their health, the less likely they will be to downgrade expectations and accept their situation. These hypotheses were based on the assumption that individuals who rate their health as good both want to and are able to deal with difficulties with leisure activities in an active way—active coping presumably being an adaptive response under these circumstances.

In sum, the purpose of the present study was to examine: first, the connection between health perceptions and mortality, and second, the relation between health perceptions and other outcome measures, including control and health. As the study involved a longitudinal design, we were able to investigate whether health perceptions assessed in 1991/92 would predict perceived control and control-enhancing strategies measured 4 years later, in 1995. Furthermore, we prospectively examined the relation between health perceptions and health. Lastly, the association between perceived control, control-enhancing strategies, health perceptions, and morbidity assessed in 1995 was also analyzed cross-sectionally.

Method

Data Source

The present research was based on a longitudinal study conducted by the Canadian Aging Research Network in the Province of Manitoba, Canada. Participants were interviewed on two occasions, once between September 1991 and April 1992, the second time in the spring of 1995. The
sample consisted of 1,406 older adults drawn from Manitoba Health’s provincial registry. As residents of the province need to be registered with this governmental agency to receive medical service coverage, this is one of the most complete listings of residents. In order to obtain a representative sample, participants were randomly selected within strata defined by age group (65–74, 75–84, and 85+) and gender, proportional to the Manitoba population. In addition, an equal proportion of individuals was randomly drawn from urban and rural communities. The study focused only on individuals living in the community.

The first interview conducted in 1991/92 was specifically designed to identify the kinds of products and services needed by older Canadians; the survey included questions regarding household products, clothing, recreation, and so forth. The survey also included measures regarding health status that were used in the present study, such as health perceptions and functional status. Interviews were conducted on a one-to-one basis in participants’ homes. After completing the survey, participants were provided with a consent form requesting them to release information regarding their health care use from the provincial health care registry. For individuals who agreed to release this information, it was possible to obtain records regarding physician visits and hospitalization for the 12 months prior to and the 12 months following the interview. The second interview, conducted in 1995, again included health-related measures, as well as questions regarding perceived control and control-enhancing strategies.

**Overview of Data Analyses**

Two sets of analyses were computed to address the two aims of the study. First, we examined the relation between health perceptions and mortality. In order to be included in these analyses, participants had to have complete data on all relevant measures (see Table 1 and below for details). Of the total sample, 1,178 individuals met this criterion. This reduced sample size was primarily due to participants’ refusing to release their health care usage information (N = 210). Moreover, several participants had missing values on some of the measures, and seven individuals could not be located at the time of follow-up. As it could not be determined whether these participants were still alive, they were also excluded from all analyses. A comparison between the sample used in the mortality analyses and individuals not included revealed no statistically significant differences in terms of age, gender, education, living arrangements, health perceptions, morbidity, or functional status.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Time of Measurement</th>
<th>Code or Range</th>
<th>Mean (SD) or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality Analyses (N = 1,178)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health perceptions-91/92</td>
<td>1991/92</td>
<td>1–5</td>
<td>3.78 (0.82)</td>
</tr>
<tr>
<td>Age</td>
<td>1991/92</td>
<td>65–104 years</td>
<td>75.73 (6.92)</td>
</tr>
<tr>
<td>Gender</td>
<td>1991/92</td>
<td>0 = male</td>
<td>43.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = female</td>
<td>56.9%</td>
</tr>
<tr>
<td>Education</td>
<td>1991/92</td>
<td>0–24 years</td>
<td>9.33 (3.28)</td>
</tr>
<tr>
<td>Living arrangements</td>
<td>1991/92</td>
<td>0 = lives alone</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = lives with somebody</td>
<td></td>
</tr>
<tr>
<td>Morbidity</td>
<td>1991/92</td>
<td>0–13 health problems</td>
<td>3.33 (2.45)</td>
</tr>
<tr>
<td>Functional disability</td>
<td>1991/92</td>
<td>0–2.71</td>
<td>0.21 (0.36)</td>
</tr>
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<td>Preinterview physician visits</td>
<td>12 months prior to 1991/92 interview</td>
<td>0–24 visits</td>
<td>9.83 (7.11)</td>
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<tr>
<td>Preinterview hospitalization</td>
<td>12 months prior to 1991/92 interview</td>
<td>0 = not hospitalized</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = hospitalized</td>
<td>12%</td>
</tr>
<tr>
<td>Postinterview physician visits</td>
<td>12 months after 1991/92 interview</td>
<td>0–24 visits</td>
<td>10.33 (7.38)</td>
</tr>
<tr>
<td>Postinterview hospitalization</td>
<td>12 months after 1991/92 interview</td>
<td>0 = not hospitalized</td>
<td>83.3%</td>
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<td></td>
<td></td>
<td>1 = hospitalized</td>
<td>16.7%</td>
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<tr>
<td>Mortality</td>
<td>3–3.5 years after 1991/92 interview</td>
<td>0 = alive</td>
<td>87.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = deceased</td>
<td>13.0%</td>
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<td>Interview 2 Analyses (N = 495)</td>
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<tr>
<td>Health perceptions-95</td>
<td>1995</td>
<td>1–5</td>
<td>3.73 (0.79)</td>
</tr>
<tr>
<td>Morbidity-95</td>
<td>1995</td>
<td>0–14 health problems</td>
<td>5.07 (2.68)</td>
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<td>Perceived control</td>
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<td>7.41 (1.80)</td>
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<td>Primary control strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Continue as always</td>
<td>1995</td>
<td>1–5</td>
<td>3.30 (1.11)</td>
</tr>
<tr>
<td>Exert more effort</td>
<td>1995</td>
<td>1–5</td>
<td>3.03 (1.12)</td>
</tr>
<tr>
<td>Tell myself I still can</td>
<td>1995</td>
<td>1–5</td>
<td>3.27 (1.18)</td>
</tr>
<tr>
<td>Secondary control strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expect less</td>
<td>1995</td>
<td>1–5</td>
<td>3.33 (1.06)</td>
</tr>
<tr>
<td>See as less important</td>
<td>1995</td>
<td>1–5</td>
<td>3.11 (1.11)</td>
</tr>
<tr>
<td>Accept</td>
<td>1995</td>
<td>1–5</td>
<td>4.06 (0.69)</td>
</tr>
</tbody>
</table>

*This measure was truncated at 24.

*Analyses for perceived control, control-enhancing strategies, health perceptions-95, and morbidity-95.
The second set of analyses was based on 495 older adults and focused on outcome measures assessed in 1995, including perceived control, control-enhancing strategies, health perceptions, and morbidity. These 495 individuals represent a subsample of participants responding to the second interview who indicated specifically that they had difficulties with leisure activities. Only older adults who indicated having such difficulties were subsequently asked questions regarding the strategies they used to deal with these problems (see Control-enhancing strategies section for details). To be consistent in terms of the sample used, the analyses involving perceived control, health perceptions, and morbidity assessed in 1995 were also based on this subset of participants.

Given that only individuals who reported having difficulties with leisure activities were included, our sample differed systematically from persons who responded to the second survey but were not used in the analyses. Compared to those excluded, the sample included more women (63.1% vs 54.3%). Moreover, the individuals included were older ($M_s = 74.9$ vs 73.8), more educated ($M_s = 9.9$ vs 9.3 years), perceived themselves as less healthy ($M_s = 3.8$ vs 4.1), displayed greater morbidity ($M_s = 3.5$ vs 2.4), were more functionally impaired ($M_s = .18$ vs .09), and incurred more physician visits both prior to and following the 1991/92 interview ($M_s = 10.1$ vs 8.5 and 10.5 vs 8.7, respectively). No differences between those included in the analyses versus those excluded emerged for living arrangements and hospitalization.

**Measures**

**Health perceptions.**—Health perceptions were assessed with the question typically used in the literature (e.g., Chipperfield, 1993a; Idler & Kasl, 1991; Wolinsky & Johnson, 1992), namely: “For your age, would you say in general your health is ...?” ($1 = $bad, $2 = $poor, $3 = $fair, $4 = $good, $5 = $excellent). Health perceptions were again measured in 1995. Ratings were made on the same 5-point scale as in 1991/92. See Table 1 for descriptive statistics. The two measures are respectively referred to as health perceptions-91/92 and health perceptions-95.

**Demographic information.**—Gender, age, education, and living arrangements, all assessed in 1991/92, were included in all the analyses. See Table 1 for details.

**Health status.**—Four indices of health status were used: two self-report measures (morbidity and functional disability) and two more objective measures (physician visits and hospitalization).

Morbidity was assessed twice, once in 1991/92 and again in 1995. In order to differentiate between the two measures, they will be referred to as morbidity-91/92 and morbidity-95 (see Table 1). In 1991/92, participants were provided with a checklist asking them whether they had any of the following 22 health problems: heart trouble (heart attack, angina), stroke, high blood pressure, other circulation problems, kidney trouble, cancer, diabetes, breathing problems, palsy, thyroid trouble, stomach trouble, dental problems, emotional/mental problems, foot/limb problems, skin trouble, arthritis or rheumatism, eye trouble, ear trouble, incontinence, other bladder problems, back problems, and osteoporosis. A total morbidity index was created by adding affirmative responses. A virtually identical morbidity index was used in the 1995 survey, except that the presence or absence of one additional health problem was assessed, namely memory loss.

Functional disability was measured in 1991/92 with 19 items taken from ADL/IADL scales routinely used in the gerontological literature. Questions pertaining to ADLs included, for example, dressing, eating, and using the toilet (Branch, Katz, Kneipmann, & Papsidero, 1984; Katz, Ford, Moskowitz, Jackson, & Jaffee, 1963). Examples of IADL items were shopping for groceries, doing housework, preparing meals, and so forth (Branch & Meyers, 1987; Rosow & Breslau, 1966). For each item, participants indicated whether they had difficulty engaging in the activity, with ratings being made on 4-point scales (0 = no difficulty; 3 cannot perform the task). For the present purposes, we created a summary score of all 19 items (Cronbach's alpha = .89; see Table 1 for overall mean).

Information regarding physician visits and hospitalization was obtained from administrative records. As all physician visits and hospital admissions are recorded for all Manitoba residents, this provides a valid and objective measure of health care use. Records were obtained for the 12 months prior to the 1991/92 interview and the 12 months following the 1991/92 interview. Because a few individuals made a large number of physician visits, pre- and post-interview scores were truncated, and those above 24 were treated as 24. Such truncation has been shown to be a useful procedure to deal with skewed health care use data (Wolinsky & Coe, 1984). Moreover, individuals were classified as either having been hospitalized during the time period or as not being hospitalized (see Table 1).

**Mortality.**—The mortality measure was based on whether participants were alive or deceased 3 to 3.5 years after the initial interview, that is, at follow-up in 1995. Information as to whether 1991/92 participants had died was obtained from family members or friends when attempts were made to contact them for the follow-up survey. In some instances, participants' deaths were verified or revealed when Manitoba Health use data were received, and a hospitalization had been terminated due to death. Of all 1,406 individuals who were interviewed in 1991/92, only seven could not be located at the time of follow-up, attesting to the success of the tracking system. These seven older adults were excluded from the mortality analyses, as we could not determine whether they were still alive.

**Perceived control.**—Perceived control was measured in 1995 with the following question: “Thinking about life in general, some people generally feel out of control and helpless, while others feel in control and able to cope. How do you generally feel?” (0 = out of control; 10 = totally in control). Similar questions have been used in previous research and have been found to predict adjustment to illness (e.g., Affleck, Tennen, Pfeiffer, & Fifield, 1987; Helgeson, 1992) and mortality (Menec & Chipperfield, 1997b).
Control-enhancing strategies.—After responding to a host of questions regarding leisure activities, participants were asked if they experienced problems with any leisure activities. If they responded yes, they were then asked questions about the strategies used to deal with these difficulties.

The control-enhancing strategy questions were developed for the present study and were derived from the literature on primary versus secondary control (Rothbaum et al., 1982). Primary control strategies are defined as actively dealing with difficulties. Three questions were developed to assess this approach, including “I try to continue as I always have,” “I try to exert more effort in order to perform the activities,” and “I tell myself I can still do these activities if I try” (1 = strongly disagree; 5 = strongly agree).

Secondary control strategies relate to a variety of responses designed to adjust oneself to a given situation, such as modifying one’s goals, expectations, and so forth (Rothbaum et al., 1982). Three questions were included to sample these varying strategies: expecting less of oneself, seeing the activity as less important, and accepting that the activity cannot be done as well as before. These measures were also rated on 5-point scales (1 = strongly disagree; 5 = strongly agree).

A factor analysis of the six control strategy questions revealed the expected two factor solution. The three items pertaining to primary control strategies correlated relatively highly with each other (range of rs = .37 to .51). These items were therefore combined into a primary control strategy measure (Cronbach’s alpha = .69). The items for secondary control strategies were only weakly correlated (range of rs = .07 to .25). Because the low intercorrelations revealed the expected two factor solution. The three items as modifying one’s goals, expectations, and so forth (Rothbaum et al., 1982). Three questions were included to sample these varying strategies: expecting less of oneself, seeing the activity as less important, and accepting that the activity cannot be done as well as before. These measures were also rated on 5-point scales (1 = strongly disagree; 5 = strongly agree).

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Results

Mortality

The mortality data were analyzed using logistic regressions. We computed two models in order to examine the unique contributions of preinterview and postinterview physician visits and hospitalization on mortality. Model 1 included health perceptions-91/92, age, gender, education, living arrangements, morbidity-91/92, functional disability, and preinterview physician visits and hospitalization as predictors. Health perceptions-91/92 were entered as contrasts, with the “excellent” category serving as the reference group. The “bad” and “poor” categories were combined, as few participants reported being in bad health. Adjusted odds ratios (AOR) larger than one indicate an increased mortality risk. See Table 2 for results.

As Table 2 shows (Model 1), older adults who perceived their health as bad/poor were 3.4 times more likely to die than those who perceived their health as excellent. Similarly, endorsing the “fair” category represented a risk for mortality (AOR = 3.46). Being older, being male, and having greater morbidity and functional impairment also significantly increased the risk of mortality.

In a second analysis (see Table 2, Model 2), we added postinterview physician visits and hospitalization to the model. This did not change the results substantially, although the odds ratio for health perceptions-91/92 decreased considerably. However, individuals who rated their health as bad/poor or fair were still more than twice as likely to die than participants who perceived their health as excellent. Postinterview hospitalization also emerged as a significant predictor of mortality (AOR = 2.11).

Perceived Control

We tested the hypothesis that health perceptions measured in 1991/92 would predict perceived control four years later with an ordinary least squares (OLS) regression analysis, with perceived control being regressed on health perceptions-91/92, demographic variables, and health status. Results are shown in Table 3 (Columns 1). Three significant relations emerged: health perceptions-91/92 were positively related, and morbidity-91/92 and functional disability were negatively related to perceived control. Thus, the healthier older adults perceived themselves to be and the fewer health problems and functional impairment they experienced, the more in control they felt later on.

Control-Enhancing Strategies

OLS regressions were also conducted for the control-enhancing strategies. In the first analysis, the primary control strategy measure was regressed on health perceptions-91/92, demographic variables, and health status (see Table 3). The results indicated that health perceptions-91/92 were positively related to the use of primary control strategies. As expected, therefore, the better people rated their health, the more likely they were to actively deal with age-related challenges. Moreover, age was negatively related to use of primary control strategies. Analyses for the three secondary control strategy measures indicated that health perceptions-91/92 were negatively related to downgrading expectations and acceptance...
Health Perceptions-95 were positively related to health perceptions-95 (P = .18, .01). We next examined the cross-sectional relation between perceived control and health perceptions-95, by adding perceived control to the model. The results indicated that perceived control was positively related to health perceptions-95 (B = .18, p < .001), controlling for health perceptions-91/92, demographics, and health status. Analogous regressions for the control-enhancing strategies revealed a positive association between the use of primary control strategies and health perceptions-95 (B = .18, p < .001), and a negative relation between downgrading expectations and health perceptions-95 (B = -.12, p < .01). Acceptance and seeing the situation as less important were not related to health perceptions-95.

In sum, the longitudinal results indicated that the healthier older adults perceived themselves to be in 1991/92, the more educated they were, and the less morbidity they experienced, the better they rated their health four years later. Cross-sectionally, perceived control, primary control strategies, and downgrading expectations were all associated with health perceptions-95, similar to the results from the longitudinal analyses.

### Morbidity-95

We first regressed morbidity-95 on health perceptions-91/92, demographics, and health status, with the results showing that morbidity-91/92, preinterview physician visits, and postinterview physician visits predicted morbidity-95 (see Table 4). However, health perceptions-91/92 were not related to later morbidity. We next examined the relation between perceived control and morbidity-95 by including perceived control as a predictor in the regression model. As in the case of the longitudinal analysis, this cross-sectional analysis showed that perceived control was negatively related to morbidity-95 (B = -.09, p < .05). Lastly, regressions indicated that none of the control-enhancing strategies was significantly associated with morbidity-95. These results are therefore identical to those obtained previously (see Table 3), in that morbidity was related only to perceived control, but none of the control-enhancing strategies.

### DISCUSSION

The present results contribute to the growing literature on health perceptions by showing that a simple, global measure that asked older adults to rate their health on a scale from “bad” to “excellent” was substantially related to mortality, independent of more “objective” health measures. The results also provided evidence that positive health perceptions were linked to control beliefs. That is, health perceptions assessed in 1991/92 predicted perceived control and control-enhancing strategies measured four years later.

Similar to previous research with older adults (e.g., Idler & Kasl, 1991; Mossey & Shapiro, 1982), health perceptions were an important predictor of mortality in the present study.

#### Table 3. Regression Results (β) for Perceived Control and Control-Enhancing Strategies Assessed in 1995 (N = 495)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Perceived Control</th>
<th>Primary Control</th>
<th>Downgrade Expectations</th>
<th>Accept</th>
<th>See as Less Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Perceptions-91/92</td>
<td>.22***</td>
<td>.14*</td>
<td>-.13*</td>
<td>-.12*</td>
<td>-.08</td>
</tr>
<tr>
<td>Age</td>
<td>.05</td>
<td>-.17***</td>
<td>.04</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td>Morbidity-91/92</td>
<td>-.11*</td>
<td>.04</td>
<td>-.02</td>
<td>.04</td>
<td>.00</td>
</tr>
<tr>
<td>Functional Disability</td>
<td>-.16**</td>
<td>.05</td>
<td>-.10*</td>
<td>-.02</td>
<td>-.13*</td>
</tr>
</tbody>
</table>

Note: All demographics and health status measures were included in the analyses, but only predictors significantly related to at least one of the outcome variables are listed.

*Primary control strategies.

*Secondary control strategies.

*p < .05; **p < .01; ***p < .001.

#### Table 4. Regression Results (β) for Health Perceptions-95 and Morbidity-95 (N = 495)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Health Perceptions-95</th>
<th>Morbidity-95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Perceptions-91/92</td>
<td>.40***</td>
<td>-.08</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.05</td>
<td>.03</td>
</tr>
<tr>
<td>Gender</td>
<td>.04</td>
<td>-.04</td>
</tr>
<tr>
<td>Education</td>
<td>.08*</td>
<td>.04</td>
</tr>
<tr>
<td>Living arrangements</td>
<td>.01</td>
<td>-.06</td>
</tr>
<tr>
<td>Health Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity-91/92</td>
<td>-.15**</td>
<td>.50***</td>
</tr>
<tr>
<td>Functional disability</td>
<td>-.08</td>
<td>.03</td>
</tr>
<tr>
<td>Preinterview physician visits</td>
<td>.03</td>
<td>.11*</td>
</tr>
<tr>
<td>Preinterview hospitalization</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>Postinterview physician visits</td>
<td>.02</td>
<td>.13**</td>
</tr>
<tr>
<td>Postinterview hospitalization</td>
<td>-.07</td>
<td>-.02</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.30</td>
<td>.44</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001.
study. Individuals who rated their health as bad or poor were more than twice as likely to die than those who perceived their health as excellent. Similarly, older adults who endorsed the “fair” category were at an increased risk of dying. It is noteworthy that these effects were obtained when controlling for self-report measures of health status (morbidity and functional disability), as well as physician visits and hospitalization obtained from administrative records. The finding that low health perceptions remained a substantial risk factor is particularly impressive given that functional disability and postinterview hospitalization were also uniquely and strongly related to mortality. Older adults who experienced some functional impairment were three times as likely to die than those who were unimpaired. Being hospitalized during the year following the initial survey doubled the risk of dying.

Few studies on the health perceptions-mortality connection have controlled for health care use. Two previous studies that have done so included self-report measures of whether participants had been hospitalized during the past year (Idler & Kasl, 1991; Schoenfeld et al., 1994). In neither of these studies did hospitalization predict mortality. This is consistent with our findings, which showed that preinterview hospitalization was also not related to mortality. In contrast, postinterview hospitalization was indeed related to mortality in the present study. This discrepancy in findings for preinterview and postinterview hospitalization makes sense, given that preinterview hospitalization likely occurred for relatively less serious health problems that neither culminated in death nor left individuals too debilitated to participate in the study. Moreover, postinterview hospitalization occurred closer in time to the recorded mortality.

The finding that health perceptions-91/92 failed to predict morbidity warrants consideration. Idler and Kasl (1991) suggested that health perceptions might relate to mortality because they impact on later health status. Although few studies have examined this possibility, one previous study with elderly Dutch men showed no relation between health perceptions and chronic illnesses, including cardiovascular disease, cancer, and diabetes/chronic nonspecific lung diseases (Phijls, Feskens, & Kromhout, 1993). Thus, the connection between health perceptions and later illness is not as straightforward as one might expect.

However, health perceptions did predict perceived control measured four years later. Only two other variables besides health perceptions predicted perceived control, namely morbidity and functional disability. That none of the other measures were related to perceived control is quite striking. For example, one might have expected that being hospitalized would reduce perceptions of control, given that it has long been assumed that being hospitalized creates loss of control (Raps, Peterson, Jonas, & Seligman, 1982). One explanation for our finding is that the time span between the assessment of hospitalization and perceived control may have been too great. While being hospitalized may reduce perceptions of control temporarily, control may increase again once a person is discharged. Alternatively, hospitalization may not necessarily induce loss of control (cf. Baltes & Skinner, 1983), and may even provide a sense of comfort that health problems are being dealt with.

The findings for control-enhancing strategies were similar to those for perceived control. Health perceptions measured in 1991/92 predicted use of primary control strategies in dealing with difficulties with leisure activities four years later. Thus, older adults who perceived themselves as healthy dealt with these challenges in a more active way by trying harder or exerting more effort. Evidence was also found for a negative relation between health perceptions and use of secondary control strategies four years later, namely downgrading expectations and acceptance. This makes sense, as older adults who perceived themselves as healthy were able to invoke primary control strategies, and would therefore have little need for secondary control strategies. These findings were replicated cross-sectionally, with perceived control, primary control strategies, and downgrading expectation being associated with health perceptions. Perceived control was also related to morbidity.

Our results further show that the use of primary control strategies declined with age. This fits with the assumption that in older age, declining mental and physical health may make it increasingly difficult to have a direct impact on one’s environment. Primary control strategies may therefore be less important in old age, with people increasingly relying on secondary control strategies (Schulz & Heckhausen, 1996). A study by Heckhausen (1997) indeed shows that, compared to middle-aged and young individuals, older adults display more flexible goal adjustment, such as by trying to find meaning in negative events.

Functional disability was also related to secondary control strategies; the more impaired older adults were, the less they downgraded expectations and downplayed the importance of their leisure difficulties. No relation was found, however, between functional disability and use of primary control strategies, suggesting that primary and secondary control strategies continually have to be teased apart.

Previous research has shown that perceived control predicts health and mortality (e.g., Langer & Rodin, 1976; Menec & Chipperfield, 1997b). Research on control-enhancing strategies also showed that use of primary and secondary control strategies prospectively predicted psychological distress in HIV-positive men (Thompson et al., 1996), and adjustment to chronic illness in a general population sample (Helgeson, 1992). In combination with the present findings, this therefore lends support to the assumption that the relation between these variables is reciprocal in nature: people who perceive themselves as healthy feel more in control, and feeling in control contributes to health and well-being. Thus, a person may be caught in a downward spiral of increasingly deteriorating health and loss of control, which ultimately culminates in death.

Similarly, actively coping with age-related challenges should be adaptive, at least under certain circumstances. In the case of leisure-related challenges, exertion of effort may well be useful and appropriate. For example, an individual who experiences some discomfort playing golf because of physical problems may nevertheless continue playing, thereby maintaining a sense of well-being. The situation would be quite different when difficulties are experienced over which individuals have no control, such as when people undergo intrusive medical procedures (Helgeson, 1992;
Weisz et al., 1994). Under these circumstances, accepting the situation or downgrading expectations might be the more adaptive response. In a recent study in which we examined the relation between control-enhancing strategies for difficulties with tasks of daily living, we indeed found that the use of secondary control strategies was positively related to health, although only among the oldest-old individuals (Chipperfield, Perry, & Menec, 1998).

Limitations
The present study has several strengths. Most importantly, it involved a longitudinal design and was based on a relatively large sample of older adults. The inclusion of health care use information obtained from administrative records also constitutes a contribution to the literature on health perceptions. Several limitations warrant highlighting, however. First, although it was possible to examine the relation between health perceptions and perceived control and control-enhancing strategies prospectively, this was not the case for the connection between perceived control, control-enhancing strategies and health perceptions and morbidity assessed in 1995. Thus, it was not possible to examine whether health perceptions predict perceived control and control-enhancing strategies, and whether these variables, in turn, predict subsequent health.

A second limitation relates to the sample used in the analyses for perceived control, control-enhancing strategies, health perceptions-95, and morbidity-95. The sample constituted a subset of individuals' completing the 1995 survey who indicated having difficulties with leisure activities and, consequently, were asked how they coped with these difficulties. Our analyses were therefore based on a subset of relatively less healthy individuals, with the results potentially not generalizing to healthier populations. For example, the lack of a relation between health perceptions and morbidity may be due to the restricted range in these variables, given our relatively less healthy subsample.

Furthermore, the present study included only a few secondary control strategies. It would be useful in future research to include a more thorough assessment of a wide range of strategies related to adaptation across the life span, such as changes in the self-system (e.g., Ryff, 1991), and social comparison processes (Taylor & Lobel, 1989). As well, no distinction was made between the kinds of difficulties people experienced with leisure activities. For example, difficulties related to financial factors might elicit quite different coping responses than difficulties due to health-related problems. A more fine-grained analysis of the kinds of problems individuals were faced with would contribute to a better understanding of the adaptiveness of various control-enhancing strategies.

Conclusion
That health perceptions are a strong predictor of mortality has now been repeatedly demonstrated, a finding that was again confirmed in the present study. However, 15 years after Mossey and Shapiro's (1982) seminal study on this topic, we are still no closer to understanding what mechanisms account for this relation. The answer to this question is clearly not a simple one, but likely involves a complex interaction between physiological, psychological, social, and behavioral factors. A first step in gaining an understanding of the processes involved is to broaden the range of outcome measures beyond mortality. Although researchers have started to do that, focusing on the relation between health perceptions and functional disability for example (Idler & Kasl, 1995; Wilcox, Kasl, & Idler, 1996), a great deal more research is needed in this respect. This research could well benefit from drawing on factors that are known to contribute to health, well-being, and mortality. This is the approach we took in our study by examining the link between health perceptions and control, the effects of which are well-established in the research literature. The present study indeed shows that health perceptions are related to an adaptive psychological profile including high perceptions of control and the use of active coping strategies in dealing with age-related difficulties.

REFERENCES
HEALTH PERCEPTIONS


