On testing plausible threats to construct validity
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CHAPTE RR  2.

THE MULTIDIMENSIONAL MODEL OF INTERNAL HEALTH LOCUS OF CONTROL BELIEFS: EXPLORING GENDER- AND AGE-RELATED DIFFERENCES

Abstract. - In a sample of elderly male patients Marshall (1991) found that internal health locus of control is multidimensional. In order to assess age- and gender-related differences Marshall's study was replicated using young students (N = 257) of both genders. Earlier inconsistent findings with internal health locus of control seem to some extent attributable to the one-dimensional approach and to the high level of generality. A clear distinction between different outcomes (management and prevention of illness) proved valid and useful. Furthermore, the distinction between beliefs about the behavior-outcome relationship, the attribution for outcomes and the perceived capacity to achieve an outcome also proved to be valid. Although no gender differences were found in dimensionality and association strength, several indications for age-related differences were found, all concerning the illness prevention beliefs and self-mastery beliefs. In order to understand the mechanism, through which at a young age health experiences shape internal locus of control beliefs and influence health behavior, more attention and research into the structure of illness prevention beliefs is required.

INTRODUCTION

To what extent do psychological variables determine health behavior and physical health? This question has incited many researchers and has given rise to extensive research during the past decades (i.e., Adler & Matthews, 1994; Rodin & Salovey, 1989). The broad attention for psychological variables (e.g. beliefs), that may contribute to health outcomes is due to the fact that these psychological variables are more easily changed than other health determining factors, such as biological and demographic variables. A psychological variable embraced as very promising for the prediction of health behavior and physical health is the concept of health locus of control, which stems from the Social Learning Theory. In Social Learning Theory the potential for a behavior to occur in a situation is a function of the expectancy that the behavior will lead to a particular reinforcement in that situation and the perceived value of that
reinforcement. Rotter (1966, 1975) introduced the concept locus of control to refine the prediction of how reinforcements change generalized expectancies, and thus change future behavior. An internal control belief is the belief that a reinforcement is contingent upon a person's own behavior or characteristics. An external control belief is the belief that a reinforcement is the result of luck, chance, fate or powerful others. In accordance with his theory, Rotter (1966) developed the Internal-External Locus of Control Scale to measure these generalized expectancies. But, if one is interested in predicting specific behaviors, better predictions will be obtained if one assesses the expectancies concerning those specific behaviors rather than generalized expectancies. Therefore, several health locus of control instruments have been developed (Lau & Ware, 1981; Wallston, Wallston, Kaplan, & Maides, 1976; Wallston, Wallston, & De Vellis, 1978), but the concept of health locus of control did not fulfill all high expectations (Wallston & Wallston, 1984; Wallston, 1992). Marshall (1991) proposes that the somewhat negative empirical findings may have been caused by the use of instruments lagging behind theoretical developments. According to Marshall internal locus of control, like external locus of control, might be multidimensional.

Recognition that control over health is possible (i.e. internal locus of control) is not a sufficient condition to render the appropriate behavior. In order to change or persevere in health behavior a belief in the capability to execute the necessary actions or to exert control is also necessary. Therefore Marshall proposes that self-mastery, which is defined as the perceived capacity to actually achieve desired outcomes, might constitute a separate dimension of internal locus of control. The relevance of self-mastery, or similar concepts as perceived competence (Smith, Dobbins, & Wallston, 1991), mastery (Pearlin & Schooler, 1978) and self-efficacy (Bandura, 1977, 1982) for the prediction of health behavior has received much endorsement (i.e., Wallston, 1992; O'Leary, 1992).

The distinction between self-mastery and other internal locus of control dimensions is commonly accepted and stressed by various authors (i.e., Bandura, 1992; Rotter, 1992; Wallston, 1992). But Marshall's second proposal is less commonly accepted. He suggests that the beliefs about illness management and beliefs about illness prevention constitute separate dimensions. His suggestion incorporates findings about the common sense representations of illness (Leventhal, Diefenbach, & Leventhal, 1992; Leventhal, Meyer, & Nerenz, 1980) and findings about the attributions regarding responsibility for illness
and for health (Brickman et al., 1982). Marshall tested in a sample of largely older male patients, whether internal health locus of control is, indeed, multidimensional, and, next, he assessed the association of the internal health locus of control dimensions with physical health and age.

In Marshall's results not only the proposed three dimensions, illness management, illness prevention and self-mastery emerged, but also a fourth dimension: self-blame, which reflects the attribution for negative health outcomes. Only self-mastery proved to be associated with physical health and age. Marshall administered the instrument to older help-seeking men only; therefore he makes a reservation about the generalizability of his findings. He states that future research is needed to explore gender- and age-related differences in the independence and relative importance of these dimensions.

A replication in a younger sample is warranted to assess the generalizability, but also for theoretical developments and for the development of intervention a replication is needed. Pasupathi (1996, p. 39) points out that "Age differences are not caused by age per se but by the actions of other mechanisms that covary with passing time. Identifying those mechanisms should be one of the primary objectives in research on age and health outcomes." The formation and change of control beliefs are viewed as important mechanisms that cause age-related differences in health outcomes. But hardly any age-related differences in internal locus of control beliefs have been found. Marshall suggests that those failures to find an association between internal locus of control and age might be due to the one-dimensional approach to the internal locus of control construct. He hypothesizes that age is associated with lower levels of self-mastery beliefs, but not necessarily with the recognition that both prevention and management of illness are contingent on certain actions.

Therefore, we investigated how these internal locus of control beliefs are structured and related to health at a younger age, and compared the found structure and relationships with Marshall's findings. In a young sample we tested the dimensionality of the internal locus of control scale by means of a confirmatory factor analysis. Second, we tested the association of self-mastery with perceived health.

Also, we investigated possible gender differences in the dimensionality of internal locus of control. Some authors suggest that for men and women different intervention programs are required. For example Mann (1996) claims that interventions to help people quit smoking will be most effective if tailored
specifically to either men or women, since the problems encountered when quitting smoking are different for men and women. Mann points out that, the kind of illnesses, the frequency of health problems, and the seriousness of the health problems is different for men and women. Also the relationships among risk factors and illnesses are quite different for men and women. Because such health experiences are believed to influence health locus of control beliefs, gender differences in the covariation between the internal locus of control beliefs might occur. Therefore, we also tested whether the multidimensional model was identical for female and male subjects.

**METHOD**

*Subjects and materials*

The Dutch version of the Internal Health Locus of Control Scale was administered to first year psychology students (91 men, 163 women and 3 unspecified). The mean age of the students was 21.96 ($SD = 4.76$).

The Internal Health Locus of Control Scale was identical to the one used by Marshall (all items are shown in Appendix A). Marshall used seven items of the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978) and one item of the Lau-Ware Health Locus of Control Instrument (Lau & Ware, 1981). These eight items were selected because they could be classified a priori as reflecting one of the hypothesized dimensions. Marshall added six new items to tap internal health locus of control. The 14 items were translated into Dutch.

The scale consisted of four dimensions: Illness Management, Illness Prevention, Self-Blame and Self-Mastery. Illness Management and Illness Prevention reflect a mere awareness of a conditional relationship between potential actions and health outcomes. Illness Management (assessed by 5 items) refers to the management of existing health problems and Illness Prevention (2 items) to the prevention of health problems. Self-Mastery (4 items), on the other hand, reflects the perceived capacity to actually obtain a desired health outcome (i.e., managing existing health problems). And finally Self-Blame (3 items) reflects the attribution of negative health outcomes to personal culpability. The items were presented in a random order and had to be answered on a 6-point scale ranging from strongly disagree (1) to strongly agree (6).
Moreover, we assessed perceived health\(^1\) by the same four, translated items (shown in the Appendix A) as used in Marshall’s study. Two items had to be answered on a 4-point scale ranging from poor (1) to excellent (4) and two items on a 4-point scale ranging from always (1) to never (4).

**Analyses**

First, the means of the factor-scores, found in our young sample, were compared to the means as found by Marshall in an elderly sample. Second, the covariance matrix was analyzed using LISREL 8W (Jöreskog & Sörbom, 1993). A confirmatory factor analysis was performed to test whether the same factor structure of internal health locus of control, as reported by Marshall, held in a young sample. A confirmatory factor analysis allows to specify at forehand, which items measure (load on) which factor. The confirmatory factor model specified was identical to the factor model Marshall specified. In Marshall’s model each item loaded on only one factor and three measurement errors were correlated within a factor. The four factors were allowed to correlate freely. To identify the model the first factor loading of each factor was fixed. The factor correlations, found in our young sample, were compared with the correlations as found by Marshall in an elderly sample.

Third, a structural model was fitted to test whether in our sample also only Self-Mastery was associated with perceived health. Furthermore, the association between age and each of the four proposed factors within our sample was assessed, as Marshall did. Partial correlations were calculated after controlling for the contribution of the other dimensions and for the contribution of perceived health.

Finally, a multi-group analysis was performed to test whether the same model fits the responses of both men and women. The advantage of using a multi-group analysis over the use of an exploratory factor analysis is the possibility to assess the significance of group differences. Moreover, one can test simultaneously whether the factor loadings, the factor correlations, the error variance and mean structure are identical in both groups (Sörbom, 1974). In the first multi-group analysis we tested whether the model had the same structure in both (sub-) samples. In the second multi-group analysis we tested whether the structural model was identical in both samples.

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\(^1\) Marshall referred to this construct as Physical Well-being.
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### Table 2.1 Descriptive Statistics of the Four Factors and Perceived Health in the Young and Elderly Samples

<table>
<thead>
<tr>
<th>Factor</th>
<th>Sample</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness Management</td>
<td>Young</td>
<td>4.31</td>
<td>0.75</td>
<td>0.84</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>4.23</td>
<td>1.12</td>
<td>0.72</td>
<td>181</td>
</tr>
<tr>
<td>Illness Prevention</td>
<td>Young</td>
<td>4.63</td>
<td>0.78</td>
<td>0.65</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>4.33</td>
<td>1.40</td>
<td>0.65</td>
<td>181</td>
</tr>
<tr>
<td>Self-Blame</td>
<td>Young</td>
<td>3.19</td>
<td>0.97</td>
<td>0.82</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>3.12</td>
<td>1.37</td>
<td>0.75</td>
<td>181</td>
</tr>
<tr>
<td>Self-Mastery</td>
<td>Young</td>
<td>4.37</td>
<td>0.75</td>
<td>0.77</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>2.91</td>
<td>1.27</td>
<td>0.77</td>
<td>181</td>
</tr>
<tr>
<td>Perceived Health</td>
<td>Young</td>
<td>3.36</td>
<td>0.46</td>
<td>0.77</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>2.50</td>
<td>0.71</td>
<td>0.85</td>
<td>181</td>
</tr>
</tbody>
</table>


The fit of the models was evaluated using the Scaled chi-square statistic, the normed and the nonnormed fit indices. A hypothesized model fits when the model can reproduce the covariance structure of the variables, in which case the chi-square statistic will be non-significant. The normed fit index (NFI) represents the increment in fit resulting from the use of the hypothesized model rather than the null model, in which all variables are uncorrelated (Stevens, 1996, p. 404). The non-normed fit (NNFI) can be interpreted as the increment of fit per degree of freedom obtained by using the hypothesized model. For both the NFI and the NNFI values greater than .90 are considered indicative of a good fit (Bentler, 1992).

### RESULTS

The reliability of both the internal locus of control factors and perceived health proved satisfactory. The Illness Prevention factor showed, as in Marshall's study, only moderate reliability (see Table 2.1) due to the fact that the factor consists of only two items. We expected a higher Perceived Health and a higher Self-Mastery than in Marshall's sample, because Marshall found Self-Mastery to be correlated with age. Indeed, we found that Illness Management and Self-Blame were equally high, respectively, $t(436) = 0.93, p = 0.35$ and $t(436) = 0.62, p = .53$, whereas Self-Mastery and Perceived Health were significantly higher in our young sample, respectively, $t(436) = 15.09$,
### Table 2.2 Latent Factor Correlations of Internal Health Locus of Control Factors in the Young Sample and the Elderly Sample

<table>
<thead>
<tr>
<th>Illness Management</th>
<th>Illness Prevention</th>
<th>Self-Blame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness Prevention</td>
<td>0.84 (0.59)</td>
<td></td>
</tr>
<tr>
<td>Self-Blame</td>
<td>0.66 (0.67)</td>
<td>0.48 (0.54)</td>
</tr>
<tr>
<td>Self-Mastery</td>
<td>0.89 (0.45)</td>
<td>0.91 (0.59)</td>
</tr>
</tbody>
</table>

*Note.* For all correlations $p < .001$


$p < .001$, and $t (436) = 15.38$, $p < .001$. But Illness Prevention was also slightly higher, $t (436) = 2.82$, $p < .005$, than reported by Marshall (see Table 2.1).

**Dimensions of internal locus of control**

Results of the confirmatory factor analysis showed that the model as specified by Marshall fitted our data, $\chi^2(68, N = 257) = 92.06$, $p = .03$; $NFI = 0.94$; $NNFI = 0.97^2$. Removing the three correlated measurement errors yields a significant decrease in model fit, $\chi^2_{\text{diff}}(3) = 18.83$, $p < .001$. Comparison of the factor correlations with the correlations reported by Marshall showed that in our sample Self-Mastery had significant higher correlations with the other three factors ($z = 9.59$, $p < .001$; $z = 8.69$, $p < .001$; $z = 2.85$, $p < .002$, respectively for the correlation with Illness Management, Illness Prevention and Self-Blame). The correlation between Illness Management and Illness Prevention was also significantly higher ($z = 5.56$, $p < .001$). Because in our sample the correlations were very high (see Table 2.2), we also fitted three-factor models$^3$. The three-factor model, in which the Self-Mastery and Illness Prevention items load on one factor, fitted our data as well. Furthermore, the difference with the four-factor model was not significant (see Table 2.3). Summarizing, the same four-dimensional structure was found in a young

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$^2$ In contrast to Marshall’s findings, the data were not multivariate normal distributed; the data had significant multivariate skewness and multivariate kurtosis (respectively, $z = 29.52$, $p < .001$ and $z = 12.67$, $p < .001$). Therefore, the Scaled chi-square statistic (Satorra & Bentler, 1994) was used.

$^3$ All two-factor models and the one-factor model did not fit and resulted in a significant decrease of fit.
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### Table 2.3 Chi-square Difference Test of the Four-factor Model and the Three-factor Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Factors combined</th>
<th>Scaled $\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>NFI</th>
<th>NNFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Four-factor model</td>
<td>--</td>
<td>92.06</td>
<td>68</td>
<td>0.03</td>
<td>0.94</td>
<td>0.97</td>
</tr>
<tr>
<td>1 Three-factor model</td>
<td>F1,F2</td>
<td>110.91</td>
<td>71</td>
<td>0.00</td>
<td>0.92</td>
<td>0.95</td>
</tr>
<tr>
<td>2 Three-factor model</td>
<td>F1,F3</td>
<td>228.37</td>
<td>71</td>
<td>0.00</td>
<td>0.85</td>
<td>0.86</td>
</tr>
<tr>
<td>3 Three-factor model</td>
<td>F1,F4</td>
<td>113.19</td>
<td>71</td>
<td>0.00</td>
<td>0.92</td>
<td>0.95</td>
</tr>
<tr>
<td>4 Three-factor model</td>
<td>F2,F3</td>
<td>243.19</td>
<td>71</td>
<td>0.00</td>
<td>0.85</td>
<td>0.86</td>
</tr>
<tr>
<td>5 Three-factor model</td>
<td>F2,F4</td>
<td>94.44</td>
<td>71</td>
<td>0.03</td>
<td>0.93</td>
<td>0.97</td>
</tr>
<tr>
<td>6 Three-factor model</td>
<td>F3,F4</td>
<td>260.10</td>
<td>71</td>
<td>0.00</td>
<td>0.84</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Chi-square difference test
- Model 0 and 1: 18.85, df = 3, p = 0.00
- Model 0 and 2: 136.31, df = 3, p = 0.00
- Model 0 and 3: 21.13, df = 3, p = 0.00
- Model 0 and 4: 151.13, df = 3, p = 0.00
- Model 0 and 5: 2.38, df = 3, p = 0.50
- Model 0 and 6: 168.04, df = 3, p = 0.00

Note. F1 = Illness Management; F2 = Illness Prevention; F3 = Self-Mastery; F4 = Self-Blame

sample, but the dimensions were less distinct. Especially, the distinction between Self-Mastery beliefs and Illness Prevention beliefs was not clear. Furthermore, the correlated measurement errors were confirmed, which implies that extra factors were embedded in the structure.

**Associations with Perceived Health**

Because both the four-factor model and a three-factor model fitted, two structural models were fitted next. In the first model Health Locus of Control consisted of four factors (see Figure 2.1). In the second structural model Internal Health Locus of Control consisted of three dimensions only: the Self-Mastery items and Illness Prevention items loaded on one single factor. We found both structural models to fit, respectively, Scaled $\chi^2(121, N = 257) = 154.06, p = .02; NFI = 0.92; NNFI = 0.97$ and Scaled $\chi^2(125, N = 257) = 158.41, p = .02; NFI = 0.91; NNFI = 0.97$, and they were not significantly different, $\chi^2_{df} (3, N = 257) = 4.35, p = .36$. In both models the explained variance of Perceived Health ($R^2 = .14$ and $R^2 = .09$) was lower than in Marshall's sample ($R^2 = .17$). We should note that in the first structural model none of the four factors had a significant association with Perceived Health. Stepwise exclusion of non-significant parameters yielded a fitting model in which only Illness Prevention was a causal indicator of Perceived Health,
Scaled $\chi^2(124, N = 257) = 157.01, p = .02$; $NFI = 0.91$; $NNFI = 0.97$; $R^2 = .08$. We can conclude that in a young sample either Self-Mastery or Illness Prevention was a causal indicator of Perceived Health. Illness Management and Self-Blame did not predict Perceived Health directly.

**Association with age within the young sample**

Within the young sample, Illness Prevention had a significant but low correlation with age ($pr = -.15, p < .01$), although Marshall found an association between Self-Mastery and age. But high correlations with age were very unlikely, because our sample, like Marshall’s sample, was rather homogenous with respect to age. All other correlations were not significant ($pr = .10, -.06, .00, .09$, respectively for Illness Management, Self-Blame, Self-Mastery and Perceived Health). The partial correlation between age and the combined factor (Self-Mastery and Illness Prevention) was also significant ($pr = -.11, p < .05$).

**Multi-group analysis**

We tested for group differences between men and women using the two structural models: the four-factor model and the three-factor model. Due to the small sample sizes, the Scaled chi-square statistic could not be estimated, therefore the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990) was used instead, to evaluate the model fit. Values of .05 indicate a close fit. The multi-group analyses showed that even the most stringent model, in which all model parameters were equal in both samples, had a good fit (see Table 2.4). This indicated that no significant gender differences occurred in the
The Multidimensional model of IHLOC

### Table 2.4 Multi-group analyses of the structural models

<table>
<thead>
<tr>
<th>Model</th>
<th>Hypothesis</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p</th>
<th>RMSEA</th>
<th>NFI</th>
<th>NNFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four factor model</td>
<td>Equal factor structure</td>
<td>303.88</td>
<td>242</td>
<td>0.004</td>
<td>0.045</td>
<td>0.86</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>Identical factor structure</td>
<td>357.07</td>
<td>292</td>
<td>0.006</td>
<td>0.042</td>
<td>0.83</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Identical factor and mean structure</td>
<td>395.11</td>
<td>310</td>
<td>0.001</td>
<td>0.046</td>
<td>0.82</td>
<td>0.95</td>
</tr>
<tr>
<td>Three factor model</td>
<td>Equal factor structure</td>
<td>311.80</td>
<td>250</td>
<td>0.005</td>
<td>0.044</td>
<td>0.85</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>Identical factor structure</td>
<td>360.53</td>
<td>296</td>
<td>0.006</td>
<td>0.041</td>
<td>0.83</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Identical factor and mean structure</td>
<td>399.42</td>
<td>314</td>
<td>0.001</td>
<td>0.046</td>
<td>0.81</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Note. Identical factor structure = factor loadings, factor correlations and error variance are equal in both groups. Identical factor and mean structure = factor loadings, factor correlations and error variance are equal in both groups and the difference between the groups in the mean structure is zero.

factor loadings, factor correlations, factor means or in the error variance of the four factors and of Perceived Health and no differences occurred in the associations of the four factors with Perceived Health.

**Discussion**

We set out to test age- and gender-related differences in the multidimensional approach of internal health locus of control, as proposed by Marshall (1991). Our main conclusion is that our study supports Marshall's multidimensional approach. The control beliefs of young and old are structured according to different outcomes (Illness Prevention and Illness Management). Furthermore, young people, like the elderly, have clearly distinct beliefs regarding the management of health problems through certain health actions (Illness Management), the perceived capacity to manage a health problem (Self-Mastery), and regarding the attribution for a negative outcome (Self-Blame).

Our findings support Marshall's hypothesis that earlier failures to find an association between age and internal health locus of control are due to the one-dimensional approach. We found that even between young adults age-related differences occur in one of the dimensions. Moreover, we found in our young sample as expected higher self-mastery beliefs and stronger associations.

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4 Under non-normality, as is the case in the present samples, the Normal Theory Weighted Least Square chi-square statistic is higher, and therefore more often significant, than the Scaled Chi-square statistic. Since the Chi-square statistic of the first model is significant, the Chi-square Difference Test could not be used.
between self-mastery and the other three dimensions. Elderly people are bound to have had health experiences showing them that they cannot always exert control, despite recognition of the fact that, in principle, control is possible. In young adults this kind of negative health experience will usually be absent, and, subsequently, their belief in their capacities will be more positive and more strongly based upon the belief that behavioral control over health is possible.

Different health experiences might also explain, why the illness prevention beliefs were more strongly related to the illness management beliefs. Direct experience is seen as the most important source of control beliefs (Bandura, 1997). Unhealthy lifestyles are often adopted in early adulthood, and thus some variation in (negative) health experiences with control over illness prevention will occur in young people. In contrast, young and predominantly healthy people have probably little or no experience with the management of serious health problems. When direct experience is absent, the control beliefs will be based upon similar experiences, experiences of similar others and verbal persuasion (Bandura, 1997). Therefore, the beliefs regarding the management of health problems of young adults might be strongly based upon their experience with preventing illness.

Our findings confirm age-related differences. However, they seem to contradict Marshall’s hypothesis, that age is associated with lower levels of self-mastery only. In our sample, we found age to be associated with illness prevention beliefs and not with self-mastery. This finding can be contributed to the absence of a separate factor assessing the perceived capacity to prevent illness. Whereas in case of illness management a distinction was made between beliefs about the behavior-outcome relationship and the perceived capacity to achieve an outcome, such a distinction was not made with illness prevention.

What’s more, the illness prevention items seem to assess the recognition of a conditional relationship between potential actions and the prevention of illness (e.g., stay healthy by taking actions), but they also seem to assess the perceived capacity to actually prevent illness (e.g., “I can pretty much stay healthy”). In other words, the item content does not completely match the definition of the construct, which was defined as the recognition of a conditional relationship between potential actions and the prevention of illness. This offers an explanation for the absence of a distinct difference between illness prevention beliefs and the perceived capacity to manage illness (self-mastery).
When dealing with ill people, as Marshall did, the lack of distinction between perceived capacity to prevent illness and the recognition of a relationship between actions and illness prevention will not constitute any problems. For ill people, differences in illness management beliefs, rather than differences in illness prevention beliefs will cause differences in their health behavior and differences in health. In contrast, young, healthy people will have had more experience with illness prevention, than with illness management. As a consequence, differences in the perceived capacity to prevent illness are to be expected, and not differences in the perceived capacity to manage illness. If we want to understand how internal control beliefs of healthy people are structured and related to health, a better assessment of illness prevention beliefs is required. The distinction between Illness Prevention beliefs and perceived capacity to achieve illness prevention should be studied more thoroughly in a young and healthy sample.

Two other aspects should be explored further in future research. First of all, the usefulness of the Self-Blame dimension needs to be explored, because both Marshall's and our study showed that self-blame does not contribute to perceived health. Moreover, self-blame had only a mediocre association with the other three dimensions. Possibly, the attribution regarding positive health outcomes, instead of self-blame, predicts perceived health. Second, the additional factors revealed by the correlated measurement errors should be explored further. Inspection of the item content yields the hypothesis that within the illness management beliefs a difference is made between coping with illness and curing from illness.

We found no difference between men and women in dimensional structure or in associations between the dimensions, perceived health, and age. Although at a young age no gender differences occur, possible gender differences at an older age need to be assessed. Gender differences might occur at a later age due to differential health experiences.

The differences we did find might possibly be caused by cultural differences between the United States and the Netherlands, rather than by age differences. As yet we can only speculate on the tenability of this assumption, because no evidence exists of such differences between the two countries. Furthermore, the differences found can be explained in terms of age-related differences in experience and cannot be explained in terms of culture-related differences in experience.
Summarizing, we found support for a multidimensional approach of internal health locus of control and for the existence of an association with age. The finding that both young and old have distinct beliefs with respect to different outcomes (Illness Prevention and Illness Management) throws light on the inconsistent findings with Internal Health Locus of Control mentioned by Marshall (1991) and Wallston (1984, 1992). These inconsistencies might have been caused by lack of differentiation between different outcomes. Although the Internal Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978) is intended to measure generalized expectancies regarding health, the level of generalization might still be too high and unrealistic. A multidimensional approach in which a distinction is made between different outcomes seems valid and useful. Furthermore, the distinction between the beliefs about a behavior-outcome relationship, the attribution for an outcome, and the perceived capacity to achieve a positive outcome appears important. This multidimensional approach seems promising for understanding the mechanism through which beliefs are structured and shape future behavior.