Health-Specific Self-Efficacy Scales

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Introduction ***2***

Nutrition Self-Efficacy **4**

Physical Exercise Self-Efficacy **4**

Alcohol Resistance Self-Efficacy **5**

Social-Cognitive Modeling of Health Behaviors **6**

Data Base **6**

Scale Description ***7***

Dimensionality ***8***

Item Analyses ***9***

Composite Score Statistics ***10***

Nutrition Self-Efficacy **11**

Physical Exercise Self-Efficacy **11**

Alcohol Resistance Self-Efficacy **12**

Validity ***13***

Correlations With Behavioral Intentions **13**

Correlations With Behavior **14**

Conclusions ***14***

References ***14***

Author Notes ***21***

HEALTH-SPECIFIC SELF-EFFICACY SCALES

The present chapter describes brief health-specific self-efficacy scales that were developed to examine the relationship between self-efficacy, intentions, and behaviors in the context of large-scale field studies designed to screen diverse populations. The idea was to construct parsimonious measures that can be integrated into more comprehensive questionnaires. The scales were not developed for clinical settings, although it would be worthwhile to study them there. The measures to assess perceived self-efficacy for preventive nutrition, physical exercise, and alcohol resistance were tested in the German versions. Adaptations to other languages have not yet been evaluated.

After an introduction that includes theory and review of studies, we proceed to a detailed scale description with psychometric properties, based on a large longitudinal study in Germany.

Introduction

The construct of perceived self-efficacy represents one core aspect of social-cognitive theory (Bandura, 1992, 1997). While outcome expectancies refer to the perception of the possible consequences of one's action, perceived self-efficacy refers to personal action control or agency. A person who believes in being able to produce a desired effect can conduct a more active and self-determined life course. Health-specific self-efficacy is a person's optimistic self-belief about being capable to resist temptations and to adopt a healthy lifestyle.

As an introduction, the relationship between self-efficacy and specific health behaviors is reviewed. A number of studies on adoption of health practices have measured self-efficacy to assess its potential influences in initiating behavior change. As people proceed from considering precautions in general to shaping a behavioral

intention, contemplating detailed action plans, and actually performing a health behavior on a regular basis, they begin to believe in their capability to initiate change. In an early study, Beck and Lund (1981) subjected dental patients to a persuasive communication designed to alter their beliefs about periodontal disease. Neither perceived disease severity nor outcome expectancy were predictive of adoptive behavior when perceived self-efficacy was controlled. Perceived self-efficacy emerged as the best predictor of the intention to floss ($\underline{r}$ = .69) and of the actual behavior, frequency of flossing ($\underline{r}$ = .44). Seydel, Taal, and Wiegman (1990) report that outcome expectancies as well as perceived self-efficacy are good predictors of intention to engage in behaviors to detect breast cancer (such as breast self-examination) (see also Meyerowitz & Chaiken, 1987; Rippetoe & Rogers, 1987). Perceived self-efficacy was found to predict outcomes of a controlled-drinking program (Sitharthan & Kavanagh, 1990). Perceived self-efficacy has also proven to be a powerful personal resource in coping with stress (Lazarus & Folkman, 1987). There is also evidence that perceived self-efficacy in coping with stressors affects immune function (Wiedenfeld et al., 1990). Persons who have high efficacy beliefs are better able to control pain than those who have low self-efficacy (Altmaier, Russell, Kao, Lehmann, & Weinstein, 1993; Litt, 1988; Manning & Wright, 1983). Self-efficacy has been shown to affect blood pressure, heart rate and serum catecholamine levels in coping with challenging or threatening situations (Bandura, Cioffi, Taylor, & Brouillard, 1988; Bandura, Reese, & Adams, 1982; Bandura, Taylor, Williams, Mefford, & Barchas, 1985). Recovery of cardiovascular function in postcoronary patients is similarly enhanced by beliefs in one's physical and cardiac efficacy (Taylor, Bandura, Ewart, Miller, & DeBusk, 1985). Cognitive-behavioral treatment of patients with rheumatoid arthritis enhanced their efficacy beliefs, reduced pain and joint inflammation, and improved psychosocial functioning

(O'Leary, Shoor, Lorig, & Holman, 1988). Obviously, perceived self-efficacy predicts degree of therapeutic change in a variety of settings (Bandura, 1997).

Nutrition Self-Efficacy

Dieting, weight control, and preventive nutrition can be governed by self-efficacy beliefs within such a self-regulatory cycle. It has been found that self-efficacy operates best in concert with general changes in lifestyle, including physical exercise and provision of social support. Self-confident clients of intervention programs were less likely to relapse into their previous unhealthy diet (Bagozzi & Edwards, 1998; Brug, Hospers, & Kok, 1997; Fuhrmann & Kuhl, 1998; Gollwitzer & Oettingen, 1998). Chambliss and Murray (1979) found that people who were overweight were most responsive to behavioral treatment when they had a high sense of self-efficacy.

Physical Exercise Self-Efficacy

Motivating people to do regular physical exercise depends on several factors, among them optimistic self-beliefs of being able to perform appropriately. Perceived self-efficacy has been found to be a major instigating force in forming intentions to exercise and in maintaining the practice for an extended time (Dzewaltowski, Noble, & Shaw, 1990; Feltz & Riessinger, 1990; McAuley, 1992, 1993; Shaw, Dzewaltowski, & McElroy, 1992; Weinberg, Grove, & Jackson, 1992; Weiss, Wiese, & Klint, 1989).

The role of efficacy beliefs in initiating and maintaining a regular program of physical exercise has also been studied by Desharnais, Bouillon, and Godin (1986), Long and Haney (1988), Sallis et al. (1986), Sallis, Hovell, Hofstetter, and Barrington (1992), and Wurtele and Maddux (1987). Endurance in physical performance was found to depend on efficacy beliefs that were created in a series of experiments on competitive efficacy by Weinberg, Gould, and Jackson (1979), Weinberg, Gould, Yukelson, and Jackson (1981), and Weinberg, Yukelson, and Jackson (1980). In terms of competitive

performance, tests of the role of efficacy beliefs in tennis performance revealed that perceived efficacy was related to 12 rated performance criteria (Barling & Abel, 1983).

Patients with rheumatoid arthritis were motivated to engage in regular physical exercise by enhancing their perceived efficacy in a self-management program (Holman & Lorig, 1992). In applying self-efficacy theory to recovery from heart disease, patients who had suffered a myocardial infarction were prescribed a moderate exercise regimen (Ewart, 1992). Ewart found that efficacy beliefs predicted both underexercise and overexertion during programmed exercise. Patients with chronic obstructive pulmonary diseases tend to avoid physical exertion due to discomfort, but rehabilitation programs insist on compliance with an exercise regimen (Toshima, Kaplan, & Ries, 1992). Compliance with medical regimens improved after patients with chronic obstructive pulmonary disease received a cognitive-behavioral treatment that raised their confidence in their own capabilities. Efficacy beliefs predicted moderate exercise ($\underline{r}$ = .47), whereas perceived control did not (Kaplan, Atkins, & Reinsch, 1984).

Alcohol Resistance Self-Efficacy

Overcoming addictive behaviors such as substance use, alcohol consumption, and smoking poses a major challenge for those who are dependent on these substances as well as for professional helpers. For *alcohol* consumption, instruments were presented by Rychtarik, Prue, Rapp, and King (1992), Sitharthan and Kavanagh (1990), and Young, Oei, and Crook (1991). An assessment of self-efficacy has been published by Haaga and Stewart (1992), who developed an "articulated thoughts technique" to measure recovery self-efficacy after a setback from quitting smoking. Other studies were conducted by Annis (1982), Annis and Davis (1988), DiClemente at al. (1985), and Miller, Ross, Emmerson, and Todt (1989).

Social-Cognitive Modeling of Health Behaviors

The data reported below are based upon the "Berlin Risk Appraisal and Health Motivation Study" (BRAHMS). Its theoretical background has been described elsewhere, but a brief summary is appropriate here (e. g., Renner, Knoll, & Schwarzer, 2000; Schwarzer & Fuchs, 1995, 1996; Schwarzer & Renner, 2000). Based on social-cognitive theory (Bandura, 1997), a new health behavior model, the Health Action Process Approach (HAPA; Schwarzer, 1992, 1999, 2001), was developed. The Health Action Process Approach assumes that two distinct phases need to be studied longitudinally, one phase leading to a behavioral intention and another leading to an actual health behavior. Within both stages, different patterns of social-cognitive predictors may emerge, with perceived self-efficacy as the only predictor that seems to be equally important in both phases. First, an intention to change is developed on the basis of self-beliefs, among others. Second, self-regulation is at stake when it comes to planning, initiating, maintaining, and relapse management. Identifying individuals at particular points within the change process has considerable implications for treatment.

Data Base

The "Berlin Risk Appraisal and Health Motivation Study" (BRAHMS) was designed to examine the social-cognitive determinants of health behaviors , such as physical exercise, alcohol consumption, and preventive nutrition. A total of 2,549 inhabitants of Berlin came to four different locations (two universities and two city halls) to participate in the study. Average age of the participants was 39 years, with a range from 14 to 90 (SD = 16 years). There were 1,024 men and 1,373 women. The analyses below differ in sample size due to missing values on some variables. Details are described elsewhere (e.g., Renner et al., 2000; Schwarzer & Renner, 2000).

Scale Description

In the following section, the item wording is provided for the three measures. Response format is (1) very uncertain, (2) rather uncertain, (3) rather certain, and (4) very certain.

Table 1 *The Nutrition Self-Efficacy Scale*

"How certain are you that you could overcome the following barriers?"

I can manage to stick to healthful foods, ...

Item	
1	...even if I need a long time to develop the necessary routines.
2	...even if I have to try several times until it works.
3	...even if I have to rethink my entire way of nutrition.
4	...even if I do not receive a great deal of support from others when making my first attempts.
5	...even if I have to make a detailed plan.

Table 2 *The Physical Exercise Self-Efficacy Scale*

"How certain are you that you could overcome the following barriers?"

I can manage to carry out my exercise intentions, ...

Item	
1	...even when I have worries and problems.
2	...even if I feel depressed.
3	...even when I feel tense.
4	...even when I am tired.
5	...even when I am busy.

Table 3 *The Alcohol Resistance Self-Efficacy Scale*

I am certain that I can control myself to...

Item	
1	...reduce my alcohol consumption.
2	...not to drink any alcohol at all.
3	...drink only at special occasions.

Dimensionality

Each scale should represent a unique dimension that is statistically distinct from the other scales. To examine the dimensionality of the three measures, a principal component analysis was performed on the basis of the 13 items. According to eigenvalues and scree test, a three-component solution was extracted. It accounted for 68% of the total variance. Table 4 displays the VARIMAX-rotated solution. All loadings below .25 were omitted for ease of communication. As can be seen, there is a perfect structure for the self-efficacy inventory.

Table 4 *Principal Components Analysis*

Rotated Component Matrix

	Component		
	1	2	3
Exercise: Worries	,843		
Exercise: Depressed	,857		
Exercise: Tense	,814		
Exercise: Tired	,800		
Exercise: Busy	,753		
Nutrition: Routines		,831	
Nutrition: Try		,771	
Nutrition: Rethink		,808	
Nutrition: Support		,780	
Nutrition: Planning		,813	
Alcohol: Reduce			,815
Alcohol: not at all			,861
Alcohol: Occasions			,838

Item Analyses

The purpose of the following section is to report the basic psychometric properties for the three scales by providing item means, item-total correlations, and reliability. Item analyses were carried out separately for each scale. Each item had a response range from 1 to 4. Item means and corrected item-total correlations are given in Table 5. All of these coefficients turned out to be satisfactory. No overall improvement was possible by eliminating any particular item.

Table 5 *Item Analyses*

Item	Mean	Correlation r(it)
	Nutrition Self-Efficacy	
1	2,634	,740
2	2,652	,665

3	2,912	,706
4	2,709	,682
5	2,846	,718
	Exercise Self-Efficacy	
1	2,600	,752
2	2,367	,764
3	2,616	,702
4	2,117	,694
5	2,159	,643
	Alcohol Self-Efficacy	
1	3,164	,599
2	2,355	,672
3	3,046	,625

Moreover, the reliability of the scales turned out to be excellent, given the small number of items. The internal consistency (Cronbach's alpha)for the nutrition self-efficacy scale was alpha = .87 (n = 1,722 respondents). The internal consistency for the exercise self-efficacy scale (n = 1,726 respondents) was alpha = .88, and the internal consistency for the alcohol self-efficacy scale (n = 1,567 respondents) was alpha = .79.

Composite Score Statistics

In this section, some statistics are provided at the sum score level, such as means, standard deviations, skewness, kurtosis, as well as the frequency distributions with the normal curve as the backdrop.

Nutrition Self-Efficacy

The frequency distribution of the nutrition self-efficacy sum scores comes close to a normal distribution (Mean = 13.729, SD = 3.376, kurtosis = -.141, skewness = -.108, n = 1,743). The response range at each item was 1 to 4; correspondingly, the theoretical range of sum scores was from 5 to 20. Figure 1 displays the frequency distribution.

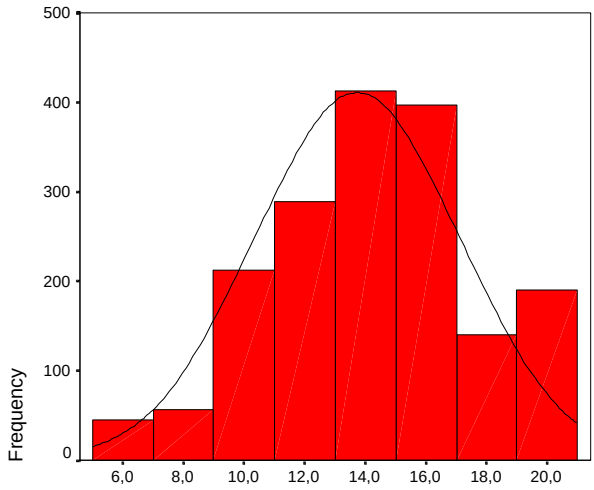

Figure 1 *Frequency distribution Nutrition Self-Efficacy*

Nutrition self-efficacy was the only scale that was used longitudinally. It was applied again six months later, which allows to assess its stability. The test-retest correlation was r(tt) = .59, based on 982 persons.

Physical Exercise Self-Efficacy

The frequency distribution of the physical exercise self-efficacy sum scores comes close to a normal distribution (Mean = 11.836, SD = 3.779, kurtosis = -.525, skewness = .132, n = 1,745). The response range at each item was 1 to 4; correspondingly, the theoretical range of sum scores was from 5 to 20. Figure 2 displays the frequency distribution.

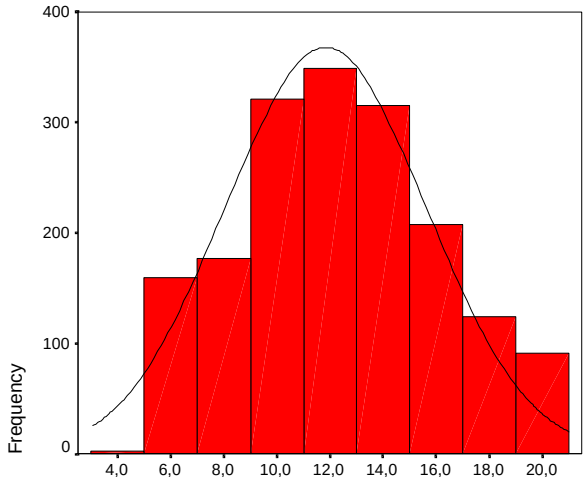

Figure 2 *Frequency distribution Exercise Self-Efficacy*

Alcohol Resistance Self-Efficacy

The frequency distribution of the alcohol resistance self-efficacy sum scores comes close to a normal distribution (Mean = 8.549, SD = 2.594, kurtosis = -.836, skewness = -.262, n = 1,582). The response range at each item was 1 to 4; correspondingly, the theoretical range of sum scores was from 3 to 12. Figure 3 displays the frequency distribution.

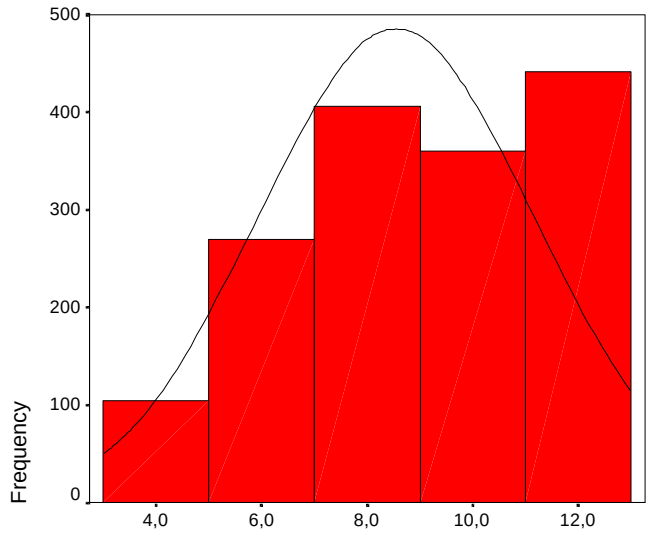

Figure 3 *Frequency distribution Alcohol Self-Efficacy*

Validity

Evidence for the validity of the scales has been published in previous articles (e.g., Renner et al., 2000; Schwarzer & Fuchs, 1995, 1996; Schwarzer & Renner, 2000). Further evidence is presented here. Behavioral intentions and reported health behaviors are chosen as criteria for construct validity. According to social-cognitive theory (Bandura, 1997) and the Health Action Process Approach (HAPA; Schwarzer, 1992, 1999, 2001) perceived self-efficacy is regarded as a suitable predictor of behavioral intentions and reported health behaviors. In the following two sections, thus, each of the three scales is examined in terms of these outcome variables.

Correlations of the three scales with age and sex range only between $\underline{r}$ = .08 and $\underline{r}$ = -.13 and can thus be regarded as negligible.

Correlations With Behavioral Intentions

Health-specific self-efficacy is significantly related to the motivation to adopt or maintain corresponding health behaviors, as Table 6 shows.

Table 6 *Correlation of Self-Efficacy With Behavioral Intentions*

		Intention Healthy Diet	Intention Physical Exercise	Intention Healthy Lifestyle
Nutrition Self-Efficacy		,216**	,108**	,209**
	N	1714	1701	1701
Exercise Self-Efficacy		,001	,327**	-,044
	N	1713	1704	1700
Alcohol Self-Efficacy		,086**	,100**	,097**
	N	1561	1554	1552

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations With Behavior

Table 7 shows that health-specific self-efficacy is significantly related to corresponding health behaviors. These are self-reported behaviors, assessed six months later than self-efficacy.

Table 7 *Correlations of Self-Efficacy With Health Behaviors Six Months Later*

		Time 2 Nutrition Behavior	Time 2 Exercise Behavior	Time 2 Alcohol Drinking
Nutrition Self-Efficacy		,338**	,149**	-,049
	N	972	995	891
Exercise Self-Efficacy		,166**	,388**	,006
	N	969	994	889
Alcohol Self-Efficacy		,056	,109**	-,284**
	N	888	906	810

**. Correlation is significant at the 0.01 level (2-tailed).

Conclusions

Based on social-cognitive theory, psychometric tools were developed to assess three health-specific self-efficacy variables, namely preventive nutrition, physical exercise, and alcohol resistance self-efficacy. The scales are brief and parsimonious and serve the purpose to assess these facets within the context of large-scale health behavior screening studies. The psychometric properties are satisfactory. The measures are clearly distinct from each other, as demonstrated by principal components analysis, and they are homogeneous, as indicated by their internal consistencies. First attempts at exploring construct validity were made by relating the scales to behavioral intentions and reported behaviors at a later point in time. The results are promising and suggest to apply these measures in future studies.

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