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Research report

How do life style factors relate to general health and overweight? ☆

Tatjana van Strien [a], Paul G. Koenders [b,*]

[a] Radboud University Nijmegen, Nijmegen, The Netherlands
[b] Beter, Occupational and Health Services, Hogehilweg 21, 1101 CB Amsterdam, The Netherlands

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ABSTRACT

In this study we examined the associations between on the one hand the life style factors: Sports, Alcohol, Nutrition, Overweight and Smoking (SANOS), the eating styles of dietary restraint, external- and emotional eating and on the other hand overweight, energy at work and perceived general health. Using a web-based life style questionnaire, responses were obtained from 3272 employees (1254 women and 2018 men) in a large banking corporation. These data were subjected to principal component factor analysis. In both sexes, the SANOS life style factors loaded on a factor that stood for good general health and energy at work, and that, in women, additionally comprised high dietary restraint. Overweight, in contrast, loaded in both sexes on a factor that comprised: restrained eating, emotional eating (highest loading) and external eating, and, in the women, additionally general health (negative loading) and energy at work (negative loading). It is concluded that the attempt made in life style programs to elevate general health perception and lower body weight may be more successful for the latter if the program is also targeted at improvement of eating behavior.

Introduction

Overweight and obesity are associated with increased health care costs, increased costs of absenteeism and loss of productivity (Jans, van den Heuvel, Hildebrandt, & Bongers, 2007; Neovius, Johansson, Kark, & Neovius, 2008; van Strien & Koenders, 2010). To decrease the direct and indirect costs, employers are increasingly interested in worksite interventions that improve both body weight and general health status of their employees. In the Netherlands so called SANOS interventions have been developed: SANOS stands for the stimulation of Sports (and physical activity), moderation of Alcohol consumption, Nutrition (stimulating consumption of fruit and vegetables), Overweight reduction (dieting) and stop Smoking programs. SANOS is Latin for health. Evaluation of these programs suggests that there is evidence that these programs contribute to increased health (lower blood pressure, plasma cholesterol), but that the programs lack efficacy in reducing employees body weight and weight associated health risk factors. This raises the question whether employers and occupational health and medical officers are betting on the right horse with the SANOS life style programs when it comes to reduction of overweight?

Increased physical activity, sporting and extra consumption of vegetables and fruit are generally considered to promote health and to protect against development of overweight (Avenell et al., 2004; Verweij, Coffeng, van Mechelen, & Proper, 2011; Vioque, Weinbrenner, Castelli, Asensio, & Garcia de la Hera, 2008).

The effects of the consumption of alcohol and smoking of tobacco are less clear cut. Both are related to serious diseases, such as (lung and breast) cancer and coronary heart diseases (Ebbert, Janney, Sellers, Folsom, & Cerhan, 2005; Terry et al., 2006). Nevertheless both are inversely related to body mass, at least in women (Coldiz et al., 1991), possibly due to their influence on eating habits: lower intake of carbohydrates (with increased alcohol intake) (Coldiz et al., 1991) or lower intake of food with increased smoking (Grunberg, Winders, & Popp, 1987). The latter was found to be especially true for women who were high restrained eaters (persons who eat less than desired to control their body weight)[1] (Goldfield & Lumb, 2008; Ogden, 1994). In fact, some women start smoking as a means of body weight control (Ogden & Fox, 1994).

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* Corresponding author.
E-mail address: Paul.Koenders@Beter.com (P.G. Koenders).

[1] Dietary restraint is defined as the attempted restriction of food intake in order to maintain or loose body weight. Although the term dietary restraint originally referred to the tendency to oscillate between periods of caloric restriction and overeating, we use the term dietary restraint as synonymous with 'dieting', avoiding any assumptions about whether it is associated with overeating. Although dietary restraint or 'dieting' is not the same as 'being on a diet, a dichotomous category that can be answered with a *yes* or a *no*, the question, 'Do you diet' was found to load on the same factor as dietary restraint (see further, van Strien, Herman, Engels, Larsen, & Van Leeuwe, 2007).

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So the clear health benefits of stopping smoking and drinking might be reduced by the introduction of health risks associated with increased body mass.

To complicate things further: dietary restraint is widely advocated as treatment of choice for obesity (Verweij, Coffeng, van Mechelen, and Proper, 2011). Yet, restrained eating was also found to be associated with excessive food intake, body dissatisfaction and finally weight gain (Polivy & Herman, 1985; Stice, Cameron, Killen, Hayward, & Taylor, 1999; van Strien, 1989). Also, dietary restraint (an inhibition factor) is associated with the overeating tendencies (disinhibition factors): external eating (overeating in response to food related cues such as sight and smell of food) (van Strien et al., 2007) and emotional eating (eating in response to negative emotions such as anxiety and irritability). Moreover emotional eating is considered a marker for abnormal and problematic behavior, because of its association with atypical depression (Levitan & Davis, 2010; van Strien, van der Zwaluw, & Engels, 2010) and problems with affect regulation (Spoor, Bekker, van Strien, & Van Heck, 2007).

The aim of the present study is to further research the relations between the SANOS life style factors and the eating styles of dietary restraint, external- and emotional eating with overweight and general health.

The main research questions are:

(a) Are the SANOS life style factors, compared to the eating styles, more indicative of general health?
(b) Are the eating styles, compared to the SANOS life style factors, more indicative of overweight?

Materials and methods

Participants

All participants in this study work at a large banking corporation in the Netherlands.

Once a year the company's occupational health service issues a web-based life style questionnaire. Based on their answers to the life style questions, employees are offered individual feedback and life style improvement advice. In 2008 a total of 5372 employees were invited to participate in the life style program. Of these employees 3272 (61%) completed the life style questionnaire, 1254 women and 2018 men. The mean age in 2008 was 43.9 (SD = 9.6). Educational levels broke down into 11.4% lower-level education, 35.8% medium-level education and 52.8% higher-level education. The mean BMI – body mass index: self-reported weight (kg) divided by self-reported height squared (m^2) – of survey respondents was 25.09 (SD = 3.7); a total of 1804 participants had a normal body weight ($\geqslant$17.5 BMI < 25) and 1468 subjects were overweight (BMI $\geqslant$ 25). Of the overweight group, a total of 275 subjects were obese (BMI $\geqslant$ 30).

Measures

Body Mass Index (BMI) was determined by dividing the self-reported body weight by the square of the self-reported body height in meters. Before the analyses, we converted BMI scores into overweight-level: a BMI < 25 was appointed not overweight, and overweight was defined as BMI $\geqslant$ 25.

General health was measured with the question: "How do you, generally speaking, estimate your health": (5) excellent, (4) very good, (3) good, (2) moderate, (1) poor (Aaronson et al., 1998; Ware & Sherbourne, 1992).

Energy during working time was measured with items that are highly similar to those of the vigor subscale of the Utrecht Work Engagement Scale (UWES) (Dorenbosch, 2009; Schaufeli, Salanova, González-Roma, & Bakker, 2002). The present measure has five items with four response categories ranging from 0 ("never") to 3 (always) e.g. "I am bursting with energy in my work". The reliability (Cronbach's α) for the present sample was $\alpha = 0.83$.

Eating behavior was measured with The Dutch Eating Behavior Questionnaire (DEBQ; original Dutch version (van Strien, Frijters, Bergers, & Defares, 1986) (the quotations used in this text are derived from the official English version (van Strien, 2011). The DEBQ has 33 items, forming three separate scales: emotional eating (13 items; e.g. "Do you have a desire to eat when you are irritated?"), external eating (10 items, e.g. "If food smells and looks good, do you eat more than usual?"), and restrained eating (10 items; e.g. "Do you try to eat less at mealtimes than you would like to eat?"). Response categories range from 1 ("never") to 5 ("very often"). Each of the scales displayed good internal consistency, factorial and predictive validity (van Strien, 2010; van Strien, Herman & Anschutz, in press). The reliabilities (Cronbach's α) for the present sample were $\alpha = 0.96$, $\alpha = 0.82$ and $\alpha = 0.91$ for emotional eating, external eating and restrained eating, respectively.

SANOS Life style elements

In single items we measured (see also Table 1):

(a) Time spent doing physical activity, in summer and winter, was translated to The Dutch Norm for Healthy Physical Activity. To fulfill the norm a person has to be active at least five days per week in summer and winter for more than 30 min, doing cycling, walking or other comparable moderately intensive activities (Haskell et al., 2007; Pollock et al., 1990). The resulting physical activity levels broke down into inactive (less than one physical activity in summer and winter), low-active (at least one physical activity in summer and winter, but less than five) or high-active (at least five physical activities in summer and winter).
(b) *Time spent doing sports:* more than 20 min of intensive physical activity three times per week in summer and winter (Haskell et al., 2007; Pollock et al., 1990). The resulting sporting levels broke down into no sporting (less than one

Table 1
Percentages, women and men in the SANOS life style categories.

	Women (n = 1254) (%)	Men (n = 2018) (%)
Physical activity		
Inactive	21.5	21.9
Semi-active	47.1	46.4
Norm-active	31.4	32.7
Doing sports		
Non-fit	27.5	24.2
Semi-fit	38.9	53.4
Norm-fit	33.6	22.4
Alcohol		
No	29	13.9
Moderate	66	81.3
Heavy	5	4.8
Fruit		
No	67	72.3
Semi-norm	9	9.8
Norm	24	17.9
Vegetables		
No	66	67.5
Semi-norm	14	16.3
Norm	20	16.2
Smoking		
No	85	85.4
Moderate	14	13.2
Heavy	1	1.4