

Health effects on leaders and co-workers of an art-based leadership development program

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Health effects on leaders and co-workers of an art-based leadership development program

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Abstract

Background: There are very few evaluations of the effectiveness of leadership development programs. The purpose of the study was to examine whether an art-based leadership program may have a more beneficial effect than a conventional one on leaders' and their corresponding subordinates' mental and biological stress.

Methods: Participating leaders were randomised to two, yearlong, leadership programs, one art-based and one conventional, with follow-up at 12 and 18 months of the leaders and their subordinates. The art-based program built on an experimental theatre form, a collage of literary text and music, followed by writing and discussions focussed on existential and ethical problems.

Results: After 18 months a pattern was clearly visible with advantage for the art-based group. In the art group (leaders and their subordinates together as well as for subordinates only) compared to the conventional group, there was a significant improvement of mental health, covert coping and performance based self-esteem as well as significantly less winter /fall deterioration in the serum concentration of the regenerative/anabolic hormone dehydroepiandrosterone-sulfate (DHEA-s).

Conclusions: Our findings indicate a more beneficial long-term health effect of the art-based intervention compared to a conventional approach. Positive findings for both standardised questionnaires and biological parameters strengthened the findings. The study provides a rationale for further evaluation of the effectiveness of this alternative educational approach.

Key words: Leadership education, Management, Psychosocial stress, Cortisol, DHEA-s, Leadership and culture, Workplace, Randomized controlled study

Introduction

Leaders and managers have a serious responsibility for the wellbeing of organisations and people. Accordingly there are high demands on leaders' competence and, consequently, on leadership development programs. But despite a yearly expenditure of between 36 and 60 billion dollars on leadership programs worldwide there are very few evaluations of these programs (1). The different methods are claimed to be effective, but little research has been done to support these claims (2). According to Jackson and Parry (3) there is a blind faith in the effectiveness of today's leadership programs. It is of great importance that leadership education has a beneficial impact on leaders' competence, as well as on employee health.

Most leadership development programs, irrespective of theoretical basis, focus mainly on cognitive, analytic abilities and standardized measurable skills (3). Emphasis on instrumental knowledge and cookbook methods can give leaders a false sense of self-confidence and a dangerous feeling of being able to manipulate and control reality and human beings within standard procedures; the human qualities of compassion and empathy may disappear when such models are applied. In essence, human aspects and ethical considerations are reduced to technical ones – adiaphorism according to Bauman (4). Reduction of complexity of real life and alienation of employees may result in "laissez-faire" leadership and bureaucratic workplaces in which phenomena such as impersonality/formalism, avoidance/passivity, control and relativism could develop. Diamond maintains that bureaucratic workplace leads to "an often dramatic avoidance" of the assumption of personal responsibility (5). Such laissez-faire leadership has strong negative effects on workplaces and is clearly the worst leadership-style with regard to poor mental health among employees (6, 7, 8).

A modern leader has to make decisions and deal with a highly complex reality; unpredictable, multifaceted, often fragmentary and contradictory. This increasing complexity requires emotional responsibility to contain uncertainty, ambivalence or anxiety. It also requires ethical responsibility to make moral judgments and furthermore an aesthetic sensitivity (empathetic imagination/ intuition) to interpret the multitude of impressions and create meaning. According to Kant decision-making is deeply rooted in aesthetic sensitivity (9).

An alternative vision of leadership education is needed because established leadership training could, if it is not balanced by efforts to strengthen ethical, aesthetic and emotional abilities, encourage an unproductive and unhealthy organisational climate. As Pearce argues, leadership programs should emphasize the importance of identity, multi-level approaches, creativity, emotions, and spirituality (10). According to Eisner, a new conception of education is needed, that has a greater focus on valuing than measuring, on surprise than on control, on distinctions than on standard and on the imaginative/metaphorical than on the factual/literal. He speaks about art experience as a source in improving educational practise (11).

The duty of art is to handle human problems that are not possible to tackle with cognitive and rational methods (12). Ricoeur believes that art shows unexpected sides of existence without "explaining it into pieces" through theoretical systems. It is with fantasy we receive and create new pictures for a deeper human existence, a new way to understand the world (13). Martha Nussbaum states that art represents a way to resist each reductive conception about human beings. Literature aids us to cultivate feelings as compassion and make us experience the world in a realistic way. Nussbaum emphasizes the fundamental role of feelings and fantasy in moral judgment (14). As Eisner argues, art teaches us to judge in absence of rules (11).

In the present study a new, art-based approach to leadership education has been evaluated. To our knowledge no research has evaluated possible health effects of art-based leadership education.

The following main research question was formulated: Will an art-based leadership program have a stronger beneficial effect than a conventional one on leaders' and their corresponding subordinates' mental and biological stress? Our question was examined by means of a yearlong controlled intervention study with follow-up at 12 and at 18 months after the baseline. The general hypothesis was that after some delay, the leaders would improve their ability to take responsibility, which should improve the total psychosocial climate in the workgroups both for the leaders themselves and for the subordinates. Our main research question therefore

concerns leaders and subordinates together and was formulated for long-term comparisons (18 months after the baseline) because we expected secondary influences from education program effects on leaders to subordinates to be delayed.

Materials and Methods

Participants

Inclusion criteria for participating were a formal managerial position with at least four subordinates. To recruit participants we turned to voluntary organizations at the Swedish Armed Forces, Reserve Officers Union, and the Swedish Criminal Investigation Department – 13 persons, The Swedish National Trade Union for Leaders – 15, advertisement in a daily newspaper – 20. The participants represent the following professional areas: education – 7 persons, medical care – 6, police – 4, culture – 3, religious service – 3, business – 8, IT – 9, and other – 8. There was no accumulation of subjects within one organization. The vast majority was managers with a small number of subordinates (median 5, range 4-10). The number of subjects was based upon previous studies, which have shown that 25 subjects in each group may give sufficient statistical power for the evaluation of a psychosocial intervention program of this kind (15).

Procedure

Subjects were informed that they would be randomly allocated to two different leadership programs, however they were not informed of the contents of these programs. All participants received exactly the same information about the purpose of the leadership. The gender, occupation and age distributions were matched in 25 pairs of participants. After this procedure the members in each pair were randomized into either art-based or conventional intervention. The researchers who performed the randomization were blinded in this process. Before the interventions had started and before the contents were known, two subjects in the art group dropped out. At this stage it was not possible to perform a new randomization.

Each participating leader was asked to select four of their subordinates. Leaders and their subordinates had to fill out a questionnaire concerning mental health and to leave a blood sample before the study started, after the end of the interventions (at 12 months) and finally 6 months later. Time for blood sampling was in the morning between 8 and 10 o'clock. Subjects were asked to eat a normal breakfast. Licensed nurses drew blood samples in the supine position from an antecubital vein. The specimens were centrifuged after half an hour and the samples were sent to the laboratory at the Karolinska Hospital.

In the beginning all participants attended the same conventional leadership training (16) lasting for three days. After this the two groups (art and conventional) started their respective intervention. Both groups had twelve intervention sessions during approximately one year. Each session lasted for three hours.

Schibbolet – the art based intervention

This intervention is described more in detail than the conventional one because it is new approach. The main author has developed this concept. The elements of this method have been applied previously as a pilot project in conventional programs. An interview study showed that the Schibbolet method had benefited the participants' ability to make active choices, which could change their own and their surrounding situation (17).

Prior to the start of the intervention the participants did not receive any information about the program or about the other participants; nor did they get an opportunity to present themselves to the others. Each intervention session comprised writing (3-5 min), witnessing a performance (60 min), writing (5-7 min), guided group reflection (40 min), reflection in smaller groups (20 min), guided group reflection (30 min), and finally writing (5-10 min). Time estimations are approximate.

The Performance: The participants witnessed a performance, a collage of fragments of literary texts and recorded music. An actor with assistance of the main author read the texts. Universal themes were raised such as love, abuse of power, humiliation, multiple personality, sexual assault, belief in God, genocide

(Holocaust, Gulag, Rwanda). In an intensive ensemble of contradiction, music and texts flow in a polyphonic stream with continuous changes between the different art genres. According to Sklovskij, the duty of art is to prevent the usual, “automatic” perception and liberate our perception and sensations through making things consciously more difficult (18). The form of performance, fragmented and without a continuous and logical context, is intended to induce a strong element of tension and surprise and to pose demands on different types of perception: to interpret and understand the combination of context and to merge the fragments into a meaningful whole (associative, analogue and creative/gestalt thinking). New cognitive and emotional contexts can be created between the feeling and the thought, between the ethic and the aesthetic. **Writing:** Beyond the sentence “write down what is on your mind”, no other instructions were conveyed to the participants. Participants came to the meeting directly after a workday and needed to switch focus and concentrate on upcoming topics. They were asked to write in the beginning, to raise the level of attention; after the performance, to prepare for and facilitate further group reflection (the group size of about 20 people was not optimally suited for reflection); and at the end, to close the meeting to return to the initial mode. **Group reflection:** The participants were given the possibility to express their reactions and to search for the meaning of the performance. The aim was to achieve a meta-level: the level of ethical reflection. A moderator guided the group but the participants decided what subjects to raise: good and evil, meaningfulness, free will and personal responsibility, the courage to stand up for one’s belief and to intervene when somebody gets humiliated etc.

A few days after the session the participants received the moderator’s own reflections about the performance and the main author’s summary of the discussion.

Conventional intervention

Two professional leadership teachers at The Swedish Armed Forces designed this leadership-training program. They also lead the whole program themselves. The program was based upon practical experiences in Scandinavian leadership training, which means that the emphasis was on democracy, employee participation, group functioning, communication, feedback etc. The theoretical approach was transformational leadership (16, 19), which is related to good employee health (20-22). Among other things, the following subjects were introduced: group psychology (23), organization and leadership theories (24, 25).

To give the participants confidence and a feeling of safety, they received detailed information about the whole program in advance and a list of each others’ email addresses. The participants also had an opportunity to present themselves to the group (15 min) in the first meeting of the education program. Each intervention session was executed according to the following model: a lecture concerning modern leadership, group and organisation theories and different leader toolbox (60 min); an “after talk” with the whole group (20-30 min); group process exercises and discussions in smaller groups, where the participants could exchange their own professional experiences (60 min); summing-up with the whole group (20-30 min); finally, new individual assignments were given (and discussed in the following group discussion). During the dialog in smaller groups the main principle was to focus on the participants’ professional problems and the feedback they received from the other participants in the group. Time estimations are approximate.

Measures

Biological variables

- Cortisol excretion has been established as an important indicator of energy mobilisation. In particular, the morning serum or plasma concentration of cortisol has been shown to be sensitive to adverse work environments. A previous evaluation showed that employees whose managers attended a psychosocial education program lasting for one year had significantly decreased serum cortisol levels in the morning after this year whereas no change was found in the comparison group (26).
 - Dehydroepiandrosterone-sulfate (DHEA-s) is a steroid with anabolic/regenerative effects. It belongs to a group of steroids with increasing excretion/concentration during improving life conditions and vice versa. Decreasing concentrations are strongly correlated with aging and premature aging (27).
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Cortisol and DHEA-s were analysed by means of Electro Chemical Luminescence Immuno Assay using Modular 170 from Roche. For cortisol the within assay coefficient of variation was between 1.0 and 1.7%, and the total coefficient of variation between 1.4 and 2.2 %. For DHEA-s the within assay coefficient of variation was between 1.5 and 3.2% and the total coefficient of variation between 2.2 and 2.7%.

Mental outcome variables

Questionnaire measures:

- Emotional exhaustion has been established as a valuable measure of mental effects of long-term stress. It is the main and most important dimension of the Maslach Burnout Inventory, standardised for use in Sweden (28, 29). Emotional exhaustion has 5 items, each scored from 1 to 6 with higher scores signifying less emotional exhaustion. Cronbach's alpha was 0,88.
- Sleep disturbance was chosen because sleep is easily disturbed when subjects are exposed to long-term stress. It is the summary measure of sleep disturbance from the Karolinska Sleep Questionnaire. The questionnaire has been established in extensive research (30). Sleep disturbance has 4 items, each scored from 1 to 6 with higher scores signifying more disturbed sleep. Cronbach's alpha was 0.87.
- Depressive symptoms are regarded as a serious mental consequence of problematic psychosocial work environments particularly when there are disturbed social relationships. It was taken from the Hopkins Symptom Checklist, SCL-90 (31). The subscales focus on six items corresponding to the six item Hamilton Depression subscale (HAM-D6), using clinical validity as the primary selection criterion (32, 33). Depressive symptoms has 6 items, each scored from 1 to 5 with higher scores signifying more depressive symptoms. Cronbach's alpha was 0.89.
- Poor mental health. For the test of the main mental health hypothesis the three above-mentioned dimension (Emotional exhaustion, Sleep disturbance and Depressive symptoms) scores were regarded as items in a new summary score based upon 15 items. Exploratory factor analysis indicated that they formed one dimension and a summary mean (mean of averages of 15 items) was calculated. Cronbach's alpha for the total score was 0.88. In order to avoid risk of mass significance we started by evaluating the statistical effect of this summary score and regarded this as the main test of our hypothesis. Subsequently we also tested the three sub dimensions separately.
- Covert coping is an indicator of patterns of avoidance in the work environment. This pattern is associated with poor employee health (34). The index has been established in previous research (35). Covert coping has 8 items, each scored from 1 to 4 with higher scores signifying more covert coping. Cronbach's alpha was 0.76.
- Performance based self-esteem has been established as an important correlate of burnout among employees (36). A short index was used which comprised four items. However, factor analysis (with rotation) showed that only two items had acceptable loadings (>0.5). These were both typical of performance-based self-esteem. The two remaining items did not load strongly and were not formulated in such a way that it was clear that they related to the performance based self-esteem. Therefore only the first two items ("I think that I sometimes try to prove my worth through my work" and "My self-esteem is far too dependent on my work achievements") were used. Performance based self-esteem two items scored from 1 to 5 with higher scores signifying more performance-based self-esteem. Cronbach's alpha was 0.79.

An average was calculated from the items included in each dimension. For each score, if more than 20% of the items were missing the whole score was regarded as missing e.g. for dimensions which contain 2 - 4 items no missing response was accepted.

Statistics

The group differences in development were analysed by ANCOVA for repeated measures, using initial value as covariate. Since in particular DHEA-s has a highly significant negative correlation with age, age was added as a covariate in the hormone analyses (the mean age in the Schibbolet group was four years higher than in the conventional group). Greenhouse Geisser corrections were used in the calculation of significance levels. Since there were no baseline differences between the groups, only two-way interactions will be presented in the table although significant main effects will be mentioned in the text below the table (see table 2). Adjustment for gender had no effect on the group effects and will accordingly not be presented.

The following four analysis versions will be presented (see table 2). Options 1 to 3 (main analysis and two sub-versions of the main analysis) concern subjects who are filling our criteria (see below) for having participated in “the whole study evaluation”. Option 4 is based upon a larger number, which also included subjects who did not fulfil all the criteria.

1. Main analysis. This analysis is in accordance with the main research question and includes assessments at baseline and 18 months after start, with the leaders and their corresponding subordinates together.
2. Only subordinates, with assessments at baseline and 18 months. It was considered to be of importance to separate the subordinates from their managers since they had not themselves participated in the intervention program. There were too few leaders for an analysis of leaders only.
3. Leaders and their subordinates, all three assessments (baseline, 12 and 18 months) in one analysis
4. All subjects who participated in the biological or questionnaire evaluation regardless of whether they fill our criteria for participating in the whole study evaluation. Leaders and their subordinates were analysed together with assessments at baseline and 18 months. This analysis is closer than the other ones to the “intention to treat principle”.

Our criteria for including subjects in “the whole study evaluation” (main analysis and two sub-versions)

1. Leaders who pursued the intervention program and all the three assessments (the whole study period)
2. Subordinates who: a) stayed at work during the whole study period and did not have long work absence; b) participated in all three assessments; c) had the same leader during the whole study period; d) had a leader who pursued the intervention program, but did not necessarily participate in all three assessments.

In addition seasonal effects are well known particularly for the biological variables (37, 38). Such effects were unlikely in the one the one-year follow-up. In the second follow-up, however, this could be important since the first and second assessments took place during the spring (April and May) whereas the third assessment was performed during October and November when cortisol could be expected to be higher and DHEA-s lower than at start. Also mental health during the early winter-late fall period was expected to deteriorate.

Results

Participation Rate

For biological data and self-rated health the numbers at baseline were 108 (23 leaders, 85 subordinates) in the art group and 123 (25 leaders, 98 subordinates) in the conventional group. It should be pointed out that the number of participants in the questionnaire study deviates from the biological study due to differences in internal loss of responses: If more than 20% of the items were missing in a scale the sum score was regarded as missing. Two leaders in the Conventional group became pregnant during the study and were excluded from the blood sample study (since pregnancy as such has a strong effect on endocrine status) but not from the questionnaire evaluation. The subordinates of the pregnant leaders participated in the whole study because both these managers remained working in their positions and participated in their intervention program. In addition three subordinated women became pregnant and were also excluded from hormone analyses but not from questionnaire evaluation. In the evaluation of biological changes (regardless of our criteria for participating in the whole study evaluation) there were 59/108 (55%) subjects in the Schibbolet and 77/123 (63%) subjects in the conventional group. (see alt. 4 above)

However, when participating leaders changed jobs and left program for any reason (N=5 in the Schibbolet and N= 9 in the conventional group), their subordinates were excluded from “the whole study evaluation” since the leader effect then disappeared from the workgroup when the group became exposed to a new leader. One leader in the Schibbolet group and three in the Conventional group were lost because they were unwilling to continue and consequently also their corresponding subordinates were lost. Some of the subordinates were also unwilling to continue. Part of the total attrition was due to the fact that some of the subordinates also changed jobs, went on leave of absence or parental leave or became sick. There were subjects who did not participate in all three assessments. In the evaluation of biological changes according to our cri-

teria for participating in the whole study evaluation (see alt. 1 to 3 above), there were 49/108 (45%) subjects in the Schibbolet and 74/123 (60%) subjects in the conventional group.

Comparisons were made between non-participants (loss) and final participants in the main analysis. The gender distribution was similar among non-participants and participants (hormone analysis) in both groups. The mean age was 44 among non-participants and 51 among participants in the Schibbolet and 42 among non-participants and 47 among participants in the Conventional group. Accordingly the non-participants were younger than the participants but this age difference was the same in both groups. There were no significant differences between the non-participants in the Schibbolet and conventional group neither with regard to hormone concentration nor with regard to mean questionnaire scores at baseline. Comparisons were also made between non-participants and participants within the two intervention groups respectively and no significant differences were found. DHEA-s had a higher mean concentration in the non-participation groups than among participants but this difference was the same in both intervention groups.

Biological and mental outcomes

Serum cortisol: There were no significant interaction effects for serum cortisol.

Serum DHEA-s: Regardless of analysis version (1-4) there was a significant interaction (period*group). In both groups there was a decrease in DHEA-s concentration after 18 months but there was significantly smaller winter /fall deterioration in the Schibbolet group. (See Table 1 and 2).

Self-rated mental health; Regardless of analysis version (1-4) there was a significant interaction (period*group); after 18 months the Schibbolet group showed a decrease and the conventional an increase in the total poor mental health, covert coping and performance based self-esteem scores. (See Table 1 and 2).

Discussion

The purpose of the study was to examine whether an art-based leadership training may have a more beneficial effect on stress-related mental health and endocrine status in leaders and their subordinates than conventional training. The findings support a positive response to our research question; the Schibbolet group showed significantly better changes than the conventional group with regard to DHEA-s, total poor mental health, covert coping and performance-based self-esteem. This indicates a general long-term health promoting effect of the art-based approach compared to a conventional approach.

Limitations and strengths

The study was designed as far as possible in a symmetrical way. For both groups the same education purpose and pedagogical philosophy was applied, equal time for the sessions was allocated and the structure of each session was similar (after the main presentation reflections in groups followed). The crucial difference between these two programs was the content itself. In the conventional group it was about leadership theories, tools, participants' professional experiences, group processes and personal feedback. Although there were an emotional component of group and feedback exercises, the participants were mostly exposed to a cognitive and factual impact within a limited leadership area. Participants in the Schibbolet group experienced a performance touching universal human situations and moral choices, which was reflected in the subsequent reflection in writing and group discussions. Impact on Schibbolet group was holistic and integrated aesthetic, emotional, intellectual and even physical aspects (strong music and sound effects).

It is a major strength that the two groups of leaders were randomized. Our method of recruiting participants does not guarantee representativeness. The subjects who were willing to undergo a leadership education without specification and were willing to participate in the extensive follow-up for one year and a half may have been more interested and more tolerating than the average leader may be. The fact that leaders themselves selected their subordinates may be regarded as a weakness compared to a random allocation. On the other hand the same conditions applied to both intervention groups.

Attrition due to unwillingness and openly stated negative attitudes to the project were infrequent. On the other hand the total attrition was very high. The study design was complex and multi-level; It was based on the assumption that leaders and their corresponding subordinates kept the same work position for almost two years. However in the Swedish longitudinal study of employees (www.stressforskning.su.se/slosh) 38.5% of the participants who described themselves as managers reported that they had changed job during the past two years. Some of the total attrition was due to the fact that some of the subordinates also changed jobs or went on leave of absence. These should be added to the attrition rate that was due to manager turnover with resulting loss of corresponding subordinates. Accordingly, the total attrition was on a level that could have been expected in the Swedish working life. To do the analysis according to the “intention to treat principle” would have introduced powerful sources of error since our aim was to analyse total effects on managers and subordinates together. When the leader changed group, possible effects on the group could not be assessed, and hence subordinates of leaders who did not stay in the work group had to be excluded. However, re-inclusion of some subjects who had been excluded in the main analysis because they did not fulfil all the criteria (column 4 in table 2) did not change the results.

The fact that the first follow-up took place after a whole year whereas the second one after one year and a half could potentially be a problem since there are pronounced seasonal variations in several of the studied outcome variables (37, 38). Accordingly increased cortisol excretion, reduced DHEA-s excretion and worsening mental health could be predicted during the dark part of the late fall and early winter – when the 18-month follow-up was performed. This was counter-balanced by the design (identical follow-up periods in the two groups) as well as in the statistical analysis (two separate analyses for each period). So our findings indicate that the Schibbolet intervention has prevented some of the worsening in DHEA-s excretion as well as in self-reported mental health symptoms that could have been expected on the basis of the seasonal effect.

A further weakness in the present study is that there was only one teacher team for each intervention. This means that the intervention principles that were tested could not be generalised to teacher teams in general. The main author has constructed the art-based concept and two discussion leaders who were also potentially favouring this administered it. This could create a bias in favour of the Schibbolet program. However, two teachers who were both anxious to show that their program was the best one represented the “conventional” program, and the second author is one of the constructors of that. Similarly, the teachers themselves have participated in the construction of the conventional program. Accordingly, the design of the evaluation was constructed in such a way that the programs would compete with one another in a symmetrical way. Therefore, while the general principles have to be tested with a larger number of teacher teams, our conclusion is that none of the programs has been systematically favoured in the design of this study.

It should also be emphasized that the subordinates have not been involved in the interventions themselves. Therefore, any observed effect on them is unlikely to be biased by such favouritism. It is also a strength in the design that the findings on DHEA-s changes which are less likely to be biased than the questionnaire findings point in the same direction as the findings on self-reported health changes.

General aspects

It has been argued that the most effective leader is a leader who is able to perceive obstacles and difficulties that they and their subordinates face in the work situation (39). Our findings indicate that the Schibbolet intervention increased leaders’ openness to complex, difficult human situations (conflicts, injustice or unfairness) which had impact on their ability to make judgments and to intervene when something went wrong or when somebody was humiliated – consequently less laissez faire leadership. These possible changes in the leaders’ attitudes and behaviour in turn influences the subordinates’ own attitudes against the colleagues and their leaders. Trevino et al found that ethical leaders influence others to act ethically (40, 41). Such reciprocal action improved the total psychosocial climate in workgroups both for the leaders and their subordinates: less bureaucratic, more tolerant/empathic to emotional expressions, dissident opinions and ethical questions. Improved leadership and psychosocial climate in the workgroup should have resulted in improved mental and biological stress. Our considerations are consistent with previous research.

The Schibbolet group showed a decrease and the conventional group an increase in the total poor mental health (emotional exhaustion, sleep disturbance, depressive symptoms), covert coping and performance-based self-esteem. New findings suggest that perceived injustice or unfairness at workplace causes feelings of embitterment and burn-out characterised by intrusive thoughts, memories and negative mood (42). Covert coping (when employees avoid telling about unfair treatment in work and dare not express their emotions) decreased. This indicates increased emotional intelligence and psychological acceptance (willingness to experience unwanted thoughts and feelings), which in turn is associated with improvement of mental health and depressive symptoms (43-50). Studies of work environment have shown that sleep disorder is associated with emotional coping strategies and high arousal levels (51). Furthermore emotional exhaustion is strongly associated with *laissez faire* behaviour (52). Moreover, a correlation between low self-esteem and bureaucracy has been shown by Diamond (53).

The concentration of DHEA-s developed in a significantly more favourable way in the Schibbolet group than in the other group. DHEA-s is related to cell regeneration and is therefore associated with bodily protection against harmful effects of stress. The concentration of this hormone shows strong seasonal variation (38). The Schibbolet intervention seems to have protected from winter deterioration of DHEA-s concentration. There are studies that illustrate that the DHEA-s increases during psychosocially supportive and decreases during psychosocially stressful periods (27, 54). In another study it was shown that higher DHEA-s was associated with healthier psychological profiles among managers (55).

Conclusion

The present study represents a new cross-disciplinary approach. It should be seen as a pilot study in the field. It suffers from attrition problems. Positive findings for both standardised questionnaires and biological parameters strengthened the results. Compared with an established manager education, the art-based approach was more beneficial to leaders' and employees' mental and biological stress, at least when the two programs are administered as in the present study. The study provides a rationale for further evaluation of the effectiveness of this alternative educational approach.

Acknowledgment

The first author has developed the Shibboleth method specifically for this research project. The fully developed manager education program has never been used before and never been used for commercial purpose. The second author and the two teachers designed the conventional program. They normally use the same educational model and some aspects of this program in its regular work as professional leadership teachers.

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Tables

Table 1 Mean concentrations and mean scores with standard errors of means in subjects who participated in “the whole study evaluation” (leaders and subordinates who pursued the whole intervention program and all the three assessments: at baseline, after 12 months and after 18 months).

	Baseline	12 months	18 months
Cortisol (nmol/l)			
Schibbolet	331+/-16.8	366+/-18.0	371+/-15.2
Conventional	347+/-13.6	331+/-14.6	361+/-12.4
DHEA-s (micromol/l)			
Schibbolet	4.93+/-0.39	4.88+/-0.37	4.55+/-0.35
Conventional	4.90+/-0.32	4.62+/-0.30	4.21+/-0.28
Emotional exhaustion (score 1 - 6)			
Schibbolet	2.25+/-0.14	2.02+/-0.13	2.23+/-0.15
Conventional	2.10+/-0.12	2.20+/-0.11	2.43+/-0.13
Sleep disturbances (score 1 - 6)			
Schibbolet	2.46+/-0.13	2.40+/-0.13	2.38+/-0.14
Conventional	2.31+/-0.10	2.48+/-0.10	2.56+/-0.11
Depressive symptoms (score 1 - 5)			
Schibbolet	1.88+/-0.10	1.83+/-0.10	1.80+/-0.10
Conventional	1.78+/-0.08	1.88+/-0.09	1.97+/-0.09
Total poor mental health * (score 1 - 5,6)			
Schibbolet	2.45+/-0.09	2.37+/-0.09	2.36+/-0.10
Conventional	2.34+/-0.08	2.44+/-0.08	2.55+/-0.08
Covert coping (score 1 - 4)			
Schibbolet	2.04+/-0.06	1.95+/-0.06	1.90+/-0.05
Conventional	1.98+/-0.05	1.99+/-0.05	2.07+/-0.05
Performance based self esteem (score 1 - 5)			
Schibbolet	3.02+/-0.14	2.76+/-0.14	2.71+/-0.15
Conventional	3.18+/-0.11	3.03+/-0.11	3.22+/-0.12

* Average score from Emotional exhaustion , Sleep disturbances and Depressive symptoms

Table 2 Results of ANCOVA interaction analyses (group*period). Covariates: initial value (all analyses) and age (hormones only). Degrees of freedom.

	Main analysis, only full participation, leaders and subordinates together, at start and 18 months later	Full participation, subordinates only, at start and 18 months later	Full participation, leaders and subordinates, at start and 12 and 18 months later	All subjects, at start and 18 months later, including those who did not fill criteria for full participation
Cortisol	N=49/74 F=0.29 df=1,119 p=0.586	N=31/58 F=0.12 df=1,85 p=0.723	N=49/74 F=2.69 df=2,118 p=0.074	N=59/77 F=0.44 df=1,132 p=0.510
DHEA-s	N=49/74 F=9.44 df=1,119 p=0.003	N=31/58 F=3.28 df=1,85 p=0.027	N=49/73 F=4.80 df=1,117 p=0.010	N=59/77 F=9.44 df=1,132 p=0.007
Emotional exhaustion	N=52/74 F=3.38 df=1,123 p=0.068	N=41/57 F=2.89 df=1,95 p=0.092	N=52/74 F=2.41 df=2,122 p=0.094	N=53/78 F=2.30 df=1,123 p=0.132
Sleep disturbances	N=48/74 F=3.80 df=1,119 p=0.053	N=37/56 F=3.91 df=1,90 p=0.051	N=48/71 F=2.48 df=2,115 p=0.086	N=49/78 F=3.82 df=1,124 p=0.053
Depressive symptoms	N=52/76 F=2.66 df=1,125 p=0.105	N=41/58 F=1.48 df=1,96 p=0.233	N=52/71 F=1.25 df=2,119 p=0.288	N=53/80 F=3.36 df=1,130 p=0.069
Total poor mental health *	N=51/74 F=6.23 df=1,122 p=0.014	N=40/57 F=5.01 df=1,94 p=0.028	N=51/68 F=3.51 df=2,115 p=0.032	N=52/78 F=6.08 df=1,127 p=0.015
Covert coping	N=47/66 F=7.66 df=1,110 p=0.007	N=36/53 F=5.51 df=1,86 p=0.022	N=45/62 F=4.27 df=2,103 p=0.016	N=48/69 F=8.15 df=1,114 p=0.005
Performance based self esteem	N=51/74 F=8.09 df=1,122 p=0.005	N=41/57 F=5.57 df=1,95 p=0.020	N=50/73 F=3.78 df=2,119 p=0.024	N=52/78 F=8.28 df=1,127 p=0.005

*sum of emotional exhaustion, sleep disturbance and depressive symptoms

Main effects in the main analysis:

DHEA-s time p=0.001 group p=0.003
 Emotional exhaustion time p=0.000 group p=0.041
 Sleep disturbance time p=0.000 group p=0.053
 Depressive symptoms time p=0.000 group p=0.105
 Poor mental health time time p=0.001 group p=0.014
 Covert Coping time p=0.001 group p=0.007
 Performance based self esteem time p=0.000 group p=0.005

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