Effects on work interest, work ability and health by an ergonomic and health training in elderly public urban transport drivers

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1. INTRODUCTION

Finnish researchers at the FIOH defined an ”ergonomic triangle” of levels of health promoting interventions to achieve an age-related work environment and sustainable improvement of work ability and health (Ilmarinen et al.,) so as to increase the rate of healthy older workers at work. These three interactive levels of intervention are:

(a) human relations at the workplace (culture),

(b) work and work organisation,

(c) individual work capacity (physiological and psychological).

This triangle is the ergonomic essence of evaluating successful interventions in the work ability of older workers in the Finnish ”Respect for the Ageing” programme by means of the Work Ability Index (WAI). The WAI is an evaluation questionnaire which assesses the individual ability to cope with work demands (Tuomi et al.) and assigns work ability to classes ranging from good to poor. The index bears a high predictive potential for early retirement (Ilmarinen et al.) and death. One item of the WAI is based on a questionnaire by Aaron Antonovsky, the promoter of salutogenic methods in research (Antonovsky).

In our evaluation research of occupational health promotion we have focussed on a second dimension which we consider important for keeping older workers healthy at work, namely interest in work interest, i.e. interest in work content, in the working life

in general and in one's personal development at work. Staying in the work process must, consequently, be founded on both, on work ability and interest in work. This hypothetical model is based upon another theory with a salutogenic paradigm: the "Existence Analysis" of Viktor Frankl, an anthropological and psychotherapeutic method which is highly useful for "salutogenic" research in occupational health promotion and ergonomics.

Based upon Frankl's paradigm, we have developed a salutogenic paradigm and several evaluation instruments, one of them being the so-called "Effect Typology" of occupational health promotion. This ET has been developed in the course of four years when we evaluated a health promotion programme for drivers of the Munich Public Transportation Authority with more than 400 participants. In 1995 and 1996 we made a co-evaluation of the programme both, by means of the Work Ability Index and by the Effect Typology, so as to deepen our knowledge of these instruments, to validate the Effect Typology and to investigate processes of occupational health promotion in general.

2. THE ”EFFECT TYPOLOGY” OF OCCUPATIONAL HEALTH PROMOTION AND THE EVALUATION OF NOETIC DYNAMICS IN WORKING LIFE

2.1. Viktor Frankl’s ”Existence Analysis”

The ”Effect Typology” is based on the anthropology of Viktor Frankl’s ”Existence Analysis” (1987). He defined two salutogenic paradigms among others, which are of relevance for research work in the field of occupational health and ergonomics:

1. Meaning (interest, challenge) in life is the basis for psychobiological health and lack of meaning is the basis for psychical and somatic illness. Meaning is, therefore, essential for human existence, an existential prerequisite. Psychobiological health does not result from intra-individual factors, but is built on the axiologic structure of interest between a person and values in the world. Meaning or interest is defined as the ”realization” of one’s personal values. Values are defined as the best choice for oneself in a given situation and given the reality as it is.
2. The Existence Analysis postulates a three-dimensional concept of man. Frankl defined the following three dimensions as essential for human life:
    - the biological dimension (somatic health, physiology, tension),
    - the psychical dimension (well-being, emotions, affects, drive, hurt),
    - the noetic dimension.

   Frankl defines noetic dynamics as the specific human abilities to find meaning, take over responsibility, make decisions, adopt personal attitudes to reality, adopt an attitude in a given situation and the ability to cope with oneself, to change and develop oneself. These noetic abilities enable man to decide for the correct and best way under certain conditions and to follow this way. Therefore, the impact of work on somatic health and psychical well-being does not only depend on external working conditions (psychobiological impact), but also on internal attitudes like meaning or interest in work (noetic dynamics).

This differentiation between psychobiological and noetic dynamics is very important and relevant for occupational health research, because it dismisses the paradigm of the homoeostasis as the basis of health and rather declares evolutionary imbalance and value-orientated intentionality to be the salutogenic basis of life. Noetic dynamics that are lived can temporarily be accompanied by negative physical and psychical phenomena and can, ”nevertheless”, be beneficial for health, as it makes sense to bear these troubles. This temporary ”antagonism of psychobiological and noetic dynamics” can be found in nearly all acts of creation and work: in labour-pains, in personal development, in education, when learning how to solve new tasks, in adventures. Dissatisfaction, effort, exhaustion and many phenomena of imbalance can either be pathogenic signs or temporary signs of a salutogenic further development: this depends on the noetic content in the relation of a person towards a task. Does it mean only an effort to the person or is it enrichment, too? For example, a 50-year old cleaning lady felt healthy and fit for work till the day her daughter started to earn her own money. Two weeks later, the lady developed severe symptoms of low back pain which lasted till her early retirement 9 months later.

These noetic abilities can be lived, but need not be lived. They can be bogged down in neurotic confusion or by psychobiological exhaustion. Where they are not lived, the risk of illness rises. In working life the tendency to completely forget these noetic dynamics is high, for example, if you are exhausted by psychobiological overdemand, if you are not involved in decisions that concern you in an authoritative working culture, if you are limited by monotonous, repetitive work, or if your experience and knowledge as that of an older worker is not esteemed. You feel that your psychobiological capacity is reduced. Occupational health promotion, participation, stress audits, focus groups, health circles, job enrichment, training programmes, et cetera, are processes which induce noetic dynamics by supporting the development of interests and interpersonal relations at work. In our opinion these methods do not only promote health, but they also lead to ergonomic changes at the workplace and result in noetic dynamics, i.e. interest in the design of the workplace, in group processes, in colleagues, in the product, in oneself as a working person (not only as psychobiological machine).

2.2. Salutogenesis of Work and Occupational Health Promotion

Based on the ideas of Frankl, we have formulated an anthropological paradigm of work, health and work ability: work is always an psychobiological effort and can lead to exhaustion, chronic stress, severe illness and even death. But work itself can also promote psychobiological health, if there is a balance between psychobiological effort, personal evolution and enrichment (see fig.1). Therefore, *(personal)* productivity at work is the basis for health as well as work performance, and only impedance of productivity makes sick. Productivity may be hindered by an authoritative culture, inferior education, defective work organisation, badly adapted ergonomic design, stressing work environment, lack of communication and excessive stress. Stress also causes illness not only because of unsustainable psychobiological turnover, but also through loss of salutogenic meaning, interest, challenge, productivity, et cetera.

Based on this paradigm, occupational health promotion and ergonomic measures should not only apply to the workplace and individual work ability, because the workplace and the worker's psychobiology are interconnected only by the worker's noetic dynamics. The noetic dynamics of workers in working life will improve if the work ability corresponds to the work demands, ergonomically, and if the worker, his ability and possibilities are challenged to improve this ergonomic fit through his own knowledge, participation and communication. In order to increase the rate of older employees at work and decrease early retirement, absenteeism or illness, we have to improve their work ability and their interest in work by systemic and individual psychobiological measures and implementation of age-related values by way of occupational health promotion. The evaluation of noetic effects is, therefore, a key to effective, sustainable health promotion in the same way as psychobiological effects or skills. This is the deeper meaning of our ”Effect Typology”.

2.3. The ”Effect Typology”: Theory and Methods

Effects of occupational health promotion are subjectively experienced effects on health and wellness, and, accordingly, the quality of a health promotion programme

can be measured by evaluating the quality of its subjective effects on the workers and participants themselves. So the subjective approach of the Work Ability Index has made it possible to examine working life, health promotion, and the influences on both. With our ”Effect Typology” we have tried to define subjective effects of health promotion programmes on the basis of the bio-psycho-noetic model of human life, to measure the quality of occupational health promotion by its salutogenic effects and to predict whether its effects on somatic and psychic health are of short, medium or long term (1994).

First we have defined a qualitative hierarchy of the health effects of an occupational health promotion programme. We have defined the following three health effect qualities:

Tab. 1: The structure of the ”Effect Typology” of occupational health promotion

EFFECT QUALITY	Regeneration of psychobiological resources	Development of psychobiological resources & skills	Induction of noetic dynamics
Recovery	✔		
Relaxation	✔	✔	
Evolution	✔	✔	✔

This typology is a hierarchic typology, i.e. a ”lower” health effect quality is automatically included in the next ”higher” one, but no effect is inferior to the other, because an optimal occupational health promotion strives to achieve all three effects.

In the following the theoretical impacts of this Effect Typology will be discussed.

Tab. 2: The ”Effect Typology” of occupational health promotion

QUALITY	DYNAMICS	DURATION
Recovery	**Regeneration** of psychological and somatic resources till reaching the original level again after finishing work demands and work effort *(day off, vacation, absenteeism, sick leave, etc.).*	short term
Relaxation	**Relief** from stress, exhaustion and tension **by increasing** psychobiological resources and psychosocial skills beyond original level through training, exercise, redesign or change of habits *(stress management, physical strength, ergonomic exercises, stretching, diet counselling, deneuroticising)*.	medium term
Evolution	**Induction** of health potentials through development of meaningful and interesting work relations, responsibility, freedom of decision, and a salutogenic way of dealing with oneself.	long term

The Effect Typology evaluates the salutogenic dynamics of a person over the course of one year (period of observation). But, of course, also stagnation or an involutional dynamics followed by deterioration of health, work ability and well-being or loss of interest in private and working life could be observed in this year. Even an occupational health promotion programme could have pathogenic ”side-effects”, i.e. it could cause aversive emotions, stress, reluctance, social phobia, illness or accidents at the workplace. Therefore, a fourth class of effects, namely a category of deterioration, of ”negative” effects, must be defined when evaluating an occupational health promotion programme:

Involution	Stress, aversive emotions and somatic reactions caused by an incompatibility between the person concerned and the health promotion programme	?

Based on the Effect Typology, we have developed and investigated methods for evaluating salutogenic effects of occupational health promotion programmes and intervention measures. The main part of this research work was done during the four subsequent one-year health promotion programmes carried out by the Munich Urban Transportation Authority for their elderly drivers:

- After the first year of health programme (1993), we typologised the individual outcome for each of the 120 drivers. The evaluation was based on semi-structured interviews of one hour, before and after the programme and on a qualitative analysis of the interview. The results of the typology were validated by the health, illness and professional data of each driver, and these results supported our salutogenic hypothesis of the Effect Typology (Geissler et al., 1994).
- In the second year (1994), we typologised 96 drivers by means of a highly structured interview after the health programme and simultaneously tested a self-rating itemised version of the Effect Typology so as to get a shorter questionnaire for further evaluations. Statistical analysis of the reliability and validity of the typology led to a short self-rating questionnaire of 8 items used for classifying the individual effects of the programme (Karazman/Karazman-Morawetz, 1996).
- In 1995 and 1996, this questionnaire was used for the evaluation of a sample of 193 drivers, parallel to the Work Ability Index (Karazman et al., 1996).

We used the Effect Typology Questionnaire for further evaluation.

3. SUBJECTS AND METHODS

3.1. The Characteristics of the Driver Population

The health promotion programme was established by the Munich Urban Transportation Authority (MVB) for elderly drivers. Bus, tram and subway drivers of over 45 years of age and with seniority at MVB could participate; participation was optional. The sample showed the following social and occupational characteristics:

Tab. 3: Sample characteristics

Total number of participants	122
Age	50.0
Female	6% (6)
Male	94% (89)
Tram drivers	20%
Bus drivers	58%
Subway drivers	22%
Seniority at Munich PTA	20.3
Years of professional life	23.0

3.2. The Occupational Health Program at the Münchner Gesundheitspark (Munich Health Park)

Organisation. The health programme was run in the Münchner Gesundheitspark by professional trainers (physicians, psychotherapists, physiotherapists, diet counsellors, sport trainers) and was directed by Birgit Ertl (medical supervisor M. Schmid-Neuhaus). The programme was carried out annually from 1993 to 1997.

Reduction of working hours. This annual programme lasted from January to December and consisted of 20 full-paid health days, one 8-hour day every two weeks. The health days were performed during working hours, and participation in the programme thus meant a full-paid reduction in working hours of 10 percent. This reduction in working hours ended after one year.

Group process. The participation in the programme was organised in groups of 16 drivers and 1 permanent qualified psychological trainer. Various specialists were called in for the specific elements of the programme.

Programme elements.

- *Physical training*: special exercises designed to be done directly at the workplace to achieve healthier postures, general musculo-skeletal exercises like stretching and jogging, sports like football and swimming.
- *Psychological training*: special relaxation training to cope with stress by ”schedules”, general relaxation training.
- *Stress management & social skills*: participatory group process for the development of new attitudes to work-related problems and conflicts with troublesome passengers.
- *Diet counselling*: cooking course together with the partners.

3. 4. Evaluation through Work Ability Index and Effect Typology Questionnaire

The individual effects of the programme on work ability, work interest and health have been evaluated in a pre-post-comparison in January and December by means of the

- Work Ability Index (ed. FIOH)
- Effect Typology Questionnaire (ed. IBG Austria)

Work Ability Index. The WAI consists of 7 items with a total score of 49 and a 4-class classification of work ability. The WAI is a highly validated and excellently investigated evaluation instrument with a high predictive potential on early retirement or rate of elderly workers at work.

Effect Typology Questionnaire. The ETQ consists of 7 items with a total score and a 4-class typology of occupational health promotion. The ETQ is continuously being improved and is validated with data on health, stress and professional performance (Karazman/Karazman-Morawetz, 1996). The Effect Typology was evaluated in January one year before the Munich programme (placebo year) started and in December of the year when the programme was run (intervention year). This design

allows an intra-individual placebo-intervention comparison and helps to answer the question whether health, well-being and interest is affected by the Munich program more than by daily life.

3.5. Statistical analysis

For the statistical analysis different calculations were used: t-test, ANOVA, correlations (PMK, Chi-quadrate). In the analysis only those participants were included who completely filled in both questionnaires and correct total scores could be summed up.

4. RESULTS

122 out of 193 participants filled in both questionnaires completely. For technical reasons and independently of the evaluation methods applied, drop-out rate was high in 1995. So this is no indicator for a preference of an evaluation method.

4.1. Results of evaluation by Work Ability Index

With the WAI, the average total score of 50-year old drivers was 37; this is a higher score than the reference group of Helsinki drivers achieved (Tuomi et al.). After the health promotion programme a slight increase of 37.3 points, on the average, could be registered; but this is, statistically, not significant.

Tab. 4: Score of the Work Ability Index before and after the health programme

WORK ABILITY INDEX Total score	WAI score BEFORE	WAI score AFTER
Average of total scores (n = 122)	37.05	37.50

ANOVA: p=n.s. at 5% - reference score of Helsinki PUT drivers 50a/55a: 34/34

When assigning the drivers' work ability to 4 classes of work ability on basis of the WAI score, slightly more than average workers show a better work ability, but one third has only a moderate work ability and 7 percent a poor one; this means that for around 40 percent of the workers a health promotion or even a rehabilitation programmes was imperative. After the programme had been executed, work ability slightly improved: 3 percent of drivers shifted from the below-average classes to the good and high ones, but this improvement was not significant.

Tab. 5: The classes of work ability by Work Ability Index score

WORK ABILITY INDEX Classes of work ability	WAI score BEFORE	WAI score AFTER
high	8.8 %	9.8 %
good	49.6 %	51.6 %
moderate	35.2 %	32.8 %
poor	6.4 %	5.7 %

Chi-square test: p=n.s. at 5%

In the single-item analysis, too, no statistically significant change could be noticed.

WORK ABILITY INDEX Single-item analysis		
Items	**Item score BEFORE**	**Item score AFTER**
1. Current work ability compared to the lifetime best	7.2	7.1
2. Work ability in relation to the demands of the job	7.5	7.6
3. Estimated work impairment due to diseases	5.3	5.2
4. Sick leave during the past year (12 months)	3.5	3.7
5. Own prognosis of work ability two years from now on	6.5	6.3
6. Number of current diseases	4.1	4.1
7. Mental resources	3.0	3.0

4.2. Results of evaluation by Effect-Typology

The Effect Typology was evaluated in the year before the programme (placebo year) and in the year during the programme (intervention year). The placebo year saw a surprising result: more than 50 percent of drivers noticed a ”relaxation” effect in the year before the programme started, i.e. no impairment and even an improvement of two items of the ET. All in all, two thirds of the participants perceived no impairment of their health, well-being and interest in work one year before programme start.

In the ET evaluation in the year when the programme was carried out, the ET quality of 60 percent of the participants improved, and above all the group who perceived a ”(high) evolution” grew from 9 to 48 percent. The placebo-programme comparison by the Effect Typology shows a statistically significant difference between both ET years, so that we may conclude that the programme resulted in an improvement of the health, well-being and interest in work of a majority of participants: The ”health” programme works, and not only for psychobiological health.

Tab. 6: The ”Effect Typology” before (PLACEBO) and after the programme

EFFECT-QUALITY	Effect Typology BEFORE	**Effect Typology AFTER**
High evolution	1.8 %	**14.0 %**
Evolution	7.0 %	**33.4 %**
Relaxation	55.3 %	**37.7 %**
Recovery	30.7 %	**12.3 %**
Burden	5.3 %	**2.6 %**

Chi-square test : p=0.000

In a single-item analysis of the 7 items of the Effect Typology responses are distributed as follows:

Tab. 7: The single-item analysis of ”Effect Typology”

EFFECT TYPOLOGY (December) Single-item analysis		
Items	**Improvement %**	**Impairment %**
1. Physical health and fitness	36	10
2. Psychical health and well-being	44	9
3. Subjective work ability	30	8
4. Interest in working life	12	5
5. Interest in private life	34	2
6. Personalisation	47	4
7. Realisation	53	5

In the ”psychobiological dimensions 1 to 3” and for the ”noetic dimensions 5, 6 and 7” a vast majority of workers noted an improvement. In the noetic items 4 and 5 only a minority saw an improvement, while the majority saw no change at all. Interest in work rose by 16 percent, that means a re-entry into working life of drivers even over 50 and with more than 25 years of professional life.

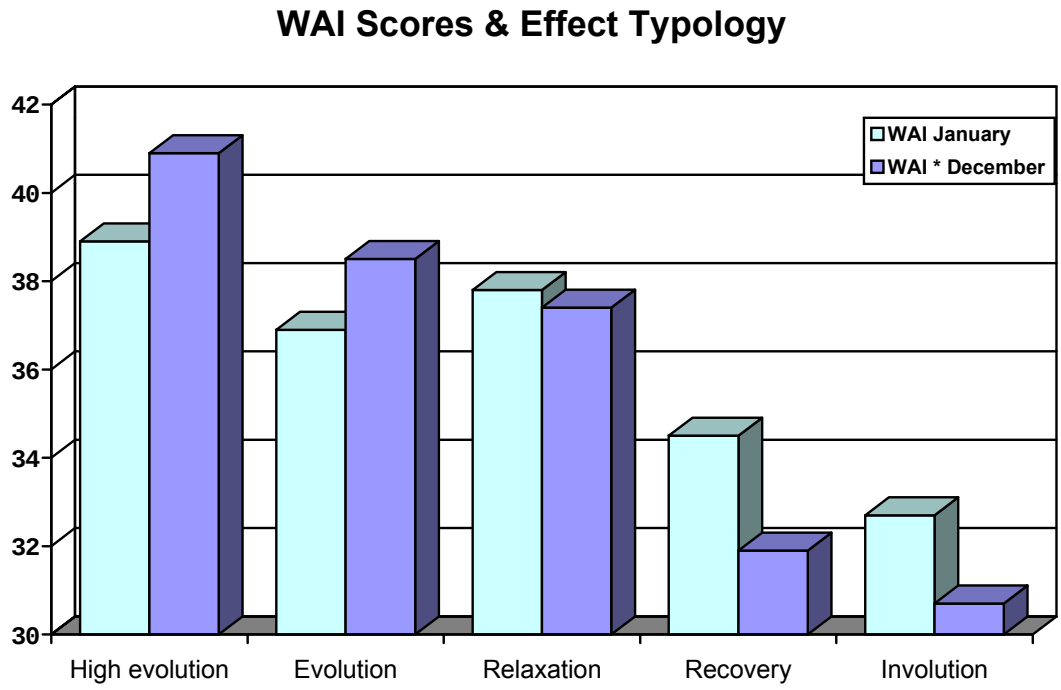
4.3. Results of co-evaluation by Work Ability Index and Effect Typology

The evaluation of the programme by means of the Work Ability Index showed no change in the WAI scores of all participants. In the next step, we, therefore, investigated whether the Effect Typology showed any significant deviations from the WAI scores. Results supported our hypothesis, as moderate and non-significant differences in January had increased and finally led to a marked polarisation by December: The participants in the ”evolution” group increased their WAI scores by 2 to 3 points, whereas the ”relaxation” group remained at the level of January and scores of the ”recovery” group dropped by 2 points and those of the very small ”involution” group even by 5 points. While the WAI differences between the

Effect qualities were not statistically significant in January, with 3 percent they had become significant by December – as measured by ANOVA.

Tab. 8: WAI-Scores according to the effect types of "Effect Typology"

QUALITY	WAI January	WAI * December	WAI Difference
Total WAI score	*37.0*	*37.5*	**+** *0.5*
High evolution	38.9	40.9	**+** 2.0
Evolution	36.9	38.5	**+** 1.6
Relaxation	37.8	37.4	– 0.4
Recovery	34.5	31.9	– 3.4
Involution	32.7	30.7	– 2.0
ANOVA	n.s.	p=0.0000	



Correlating the scores of Effect Typology and the scores of WAI, results show an interdependency between both parameters of r=0.41, which is statistically significant.

Tab. 9: Correlation between the scores of the Effect Typology and the WAI

EFFECT TYPOLOGY versus WAI	Correlation of scores
r	**0.4093**

Pearson's coefficient: p=0.000

In the single-item analysis of the WAI according to the effect qualities of the Effect Typology we want to investigate the differences in the correlation of the single items of the WAI with the Effect Typology. The single-item analysis shows that the screening potential of the Effect Typology for the WAI total score is mainly based on items 1, 4 and 7 and partly on items 2 and 4. Items 3 and 6 concerning the burden of diseases show equal scores for all effect qualities, and thus these items were not affected by the Munich occupational health promotion programme.

WORK ABILITY INDEX & EFFECT TYPOLOGY Scores of the single WAI items on basis of ET / December					
WAI items	**High**	**Evol**	**Relax**	**Rec**	**Invol**
TOTAL WAI-SCORE	***40.9***	***38.5***	***37.4***	***31.9***	***30.7***
1. Current work ability compared with the lifetime best	7.9	7.5	7.2	5.2	4.3
2. Work ability in relation to the demands of the job	8.6	7.8	7.5	6.8	5.8
3. Estimated work impairment due to diseases	5.3	5.3	5.3	4.9	5.0
4. Sick leave during the past year (12 months)	4.0	3.7	3.8	2.9	2.5
5. Own prognosis of work ability two years from now on	6.4	6.5	6.6	5.0	4.8
6. Number of current diseases	4.6	4.4	4.2	3.4	4.3
7. Mental ressources	3.3	3.1	3.0	2.7	1.5

The number of diseases (item 3) as well as the impairment of work due to diseases (item 6) seem to be invariant in spite of the salutogenic effects of the health promotion programme. Partly, this should be no surprise as the program offers neither therapy nor rehabilitation. An exclusion of these two items will lead to a higher correlation coefficient between the score of the 5 WAI items and the Effect Typology.

4.4. Thoughts on Early Retirement

Thoughts of early retirement proved to be an indicator of early retirement (Huutanen,). We assert that when thoughts of early retirement arise, this is already a sign of decreasing interest in work. And, therefore, early retirement becomes even more likely. Our hypothesis postulates that a good work ability and interest in work are essential for keeping older workers in the work process. In the following table the frequency of thoughts on early retirement was evaluated in relation to the Effect Typology. Results show that in those participants with an “evolution”-effect the thoughts on early retirement decreased strongest during the year of the programme. The less noetic dynamics had been induced during the programme, the stronger increased thoughts on early retirement. In short, the higher the interest in work, the less thoughts on early retirement, the less the risk of early retirement.

Tab. 10: Thoughts on early retirement according effects of ”Effect Typology”

EFFECT-QUALITY	Thoughts retirement DECREASED	Thoughts retirement INCREASED
High evolution	71	6
Evolution	41	7
Relaxation	20	22
Recovery	12	29
Involution	-	100
Chi-square	p=0.0000	

5. DISCUSSION

The Munich health promotion program proofed a high salutogenic potential. In the majority of participants not only the psychobiological dimensions health, well-being and work ability were promoted, but also work interest, personal development and noetic dynamics. This entity of psychobiological and noetic changes, evaluated by the Effect-Typology in the majority of particpants, were called “evolution”-effect. Participants with such an “evolution”-effect showed a significant increase of the WAI-score and an decrease of thoughts on early retirement during the program. Those participants with only psychobiological improvement (relaxation or recovery) showed a decrease of the WAI-score and an increase of thoughts on early retirement during the year of the program. This conincidence of evolution-effect, of WAI-increase and decrease of thoughts on early retirement support our hypothesis that maintainance at work is based on the synergy of work ability and work interest, on the synergy of psychobiological improvement and induction of noetic dynamics.

The Munich health promotion program was an individual training, nevertheless the WAI-score increased in the majority and so

This validation of the Effect-Typology by the WAI supports our hypothesis that maintainance of an increase in the WAI is based on an improvement of psychobiological resources and subjective work ability as well as on the , but also a result of the induction of noetic dynamics like interest in work or one’s own personal development. In the future, when designing occupational health promotion, we should, therefore, consider the importance and, s consequently, the induction of noetic dynamics and elements concerning personal and interpersonal relations.

In the general evaluation, WAI scores did not change after the programme. By the screening potential of the Effect Typology, however, relevant changes in the WAI scores of the majority of participants were made visible. A higher work ability index was achieved if the participant perceived noetic, intra-personal changes.

The increase in the WAI score of participants with an ”evolution effect” based on personal

ACHTERBERG J.: Gedanken heilen. rororo, 1993.

ANTONOVSKY Y.: The Salutogenic Perspective: Toward a New View of Health and Illness? Advances 1987; 4(1); 47-55.

FRANKL V.: Logotherapie und Existenzanalyse. Piper, 1987.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I., JOHANNING E., HÖRSCHINGER P.: Sinn-Erleben und Gesundheit - "Existenzanalyse" bei Fahrern eines öffentlichen Nahverkehrsunternehmens im Rahmen eines Gesundheitsförderungsprogrammes. In. JOHNEN R.: Salutogenese - Ein neues Konzept für die Psychosomatik. Karlsruhe, 1995a.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I.: Meaning in life and health in public urban transport drivers. Abstract-Band Congress "New Epidemics in Occupational Health“ Helsinki 1994d: 144.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I.: Lebensqualität, Sinn-Entwicklung und Belastungen bei NÖ. Hausärztinnen und Hausärzten 1994. Wien, 1994b.

KARAZMAN R.: "Stress in verschiedenen Arbeitsverhältnissen". In: KARAZMAN R., TEMML CH.: "Streß". WHO-Wien, Dokumentation 4, 1994c.

KARAZMAN R., GEISSLER H., PRIESTER K.: Sechs-Monate Katamnese der Effekte des Gesundheits-förderungsprogrammes von 1993. Forschungsbericht für Münchner Verkehrsbetriebe MVB, München 1995c.

LANGER G., GUTTMANN G.: Beußtsein. Fischer Verlag 1993.

LÄNGLE A. (Hg.): Wege zum Sinn. Logotherapie als Orientierungshilfe. Piper Verlag 1985.

ANTONOVSKY Y.: The Salutogenic Perspective: Toward a New View of Health and Illness? Advances 1987; 4(1); 47-55.

STOCK CH., BADURA B.: Fördern positive Gefühle die physische Gesundheit? - Eine Forschungsnotiz. 1995.

CARDOSO M.S.: Dissatisfaction in the workplace and prevalence of infectious diseases. In: RANTANEN et al: „New Epidemics in Occupational Health“. People and Work-Research reports 1995; 1:76-78.

FRANKL V.: Logotherapie und Existenzanalyse. Piper, 1987.

ILLMARINEN J, TUOMI K., ESKELINEN L., NYGARD C., HUUHTANEN P., KLOCKARSD M.: Summary and recommendations of a project involving cross-sectional and follow -up studies on the aging worker in Finnish municipal occupations (1981-1985). Scand J Work Environ Health 1991;17(suppl 1): 135-41.

KARASEK R.: Job demands, job decision latitude, and mental strain: implication for kjob redesign. Adm Sci Q 1979;24:285-307.

KARAZMAN R.: "Update über Psychoneuroimmunologie unter bes. Berücksichtigung der

Arbeitswelt". Bericht für BM für Gesundheit, Sport u.Konsumentenschutz: Wien, 1994a.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I., JOHANNING E., HÖRSCHINGER P.: Sinn-Erleben und Gesundheit - "Existenzanalyse" bei Fahrern eines öffentlichen Nahverkehrsunternehmens im Rahmen eines Gesundheitsförderungsprogrammes. In. JOHNEN R.: Salutogenese - Ein neues Konzept für die Psychosomatik. Karlsruhe, 1995a.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I.: Meaning in life and health in public urban transport drivers. Abstract-Band Congress "New Epidemics in Occupational Health“ Helsinki 1994d: 144.

KARAZMAN R., GEISSLER H., KARAZMAN-MORAWETZ I.: Lebensqualität, Sinn-Entwicklung und Belastungen bei NÖ. Hausärztinnen und Hausärzten 1994. Wien, 1994b.

KARAZMAN R., KOINIG G., LANGER G., SCHÖNBECK G., DITTRICH R.: Monitoring of withdrawal of antidepressants and neuroleptics by hormone pertubation-tests. Clinical Neuropharmacology; 13/1:197;1990.

KARAZMAN R.: "Stress in verschiedenen Arbeitsverhältnissen". In: KARAZMAN R., TEMML CH.: "Streß". WHO-Wien, Dokumentation 4, 1994c.

KARAZMAN R., GEISSLER H., KLOIMÜLLER I: Betriebliche Gesundheitsförderung für älterwerdende Arbeitnehmer. Zeitschrift des Hauptverbandes der Österreichischen Sozialversicherungen, 4/1995b.

KARAZMAN R., GEISSLER H., PRIESTER K.: Sechs-Monate Katamnese der Effekte des Gesundheitsförderungsprogrammes von 1993. Forschungsbericht für Münchner Verkehrsbetriebe MVB, München 1995c.