

Leisure Sickness: A Biopsychosocial Perspective

Guus L. Van Heck & Ad J. J. M. Vingerhoets

Tilburg University

Department of Psychology and Health

Abstract

Leisure and vacation are generally associated with feelings of relaxation and well-being. However, there is also evidence suggesting that some people feel particularly ill and develop symptoms especially during weekends and vacations. The focal points of this article are the exploration of the antecedents and consequences of this phenomenon, pointing out the need of systematic research on its prevalence, phenomenology, background, and the putative mechanisms involved. The paper concludes with a discussion of some possible effective interventions.

Keywords: leisure sickness, biopsychosocial perspective, interventions

A change of troubles is as good as a vacation
David Lloyd George (1863 – 1945)

Introduction

When work is over, rest is sweet. Generally, people feel relatively better during rest and vacations compared with periods full of work activities. As the proverb says: a bow long bent at last waxes weak. Or another saying, revealing insight and wisdom: you can't burn the candle at both ends. Therefore, people strongly believe that leisure time has a beneficial influence on their functioning and health. It seems that this notion is valid for most people: they feel good and relax during leisure time (Baum, 1991; Strauss-Blasche, Ekmekcioglu & Marktl, 2000, 2002; Strauss-Blasche et al., 2004; Westman & Eden, 1997). This is also reflected in psychobiological measures. For example, decreases in blood pressure and heart rate have been reported during leisure time. In addition, there is a sizeable decrease in the production of stress hormones like adrenaline (Frankenhaeuser et al., 1989).

✉ Ad Vingerhoets, Department of Psychology and Health, Tilburg University, P.O. Box 90.153, 5000 LE Tilburg, The Netherlands. E-mail: Vingerhoets@uvt.nl

This explains why rest is an important prescription of medical doctors in case of illness, overload and other, physical as well as mental, health problems.

However, there is also a group of persons who just when they take breaks from work, at the weekend or while on vacation, develop health complaints, a condition that contrasts sharply with the virtual absence of symptoms during periods of work. It mainly concerns headaches, migraine, vague muscular aches and pains, excessive fatigue, nausea, and, especially in the first days of a vacation period, viral infections causing colds, fever and flu-like symptoms (Vingerhoets, Van Huijgevoort & Van Heck, 2001, 2002). We have coined this phenomenon “leisure sickness”. For the sake of clarity, with this term we do not lay claim to describe a new disease. The term solely refers to the *moment* of onset of health complaints, not to the very nature of these ailments, which can vary considerably.

This rather remarkable phenomenon is generally known, as is apparent from the many articles on this topic in popular, non-scientific journals and magazines. Especially “weekend migraine” has been often described (e.g., Couturier, Hering & Steiner, 1992; Torelli, Cologno & Manzoni, 1999a, 1999b). With a few exceptions, such as the study by Ray (1990) which showed that employees with high levels of stress had more colds and other ailments within the first days of being off work, the scientific literature contains virtually nothing on the manifestation of weekend or vacation malady. Taking into account the fact that such incidents are very well known, it is quite astonishing that there is such a limited amount of systematic research. In view of the fact that approximately 3% of the Dutch population indicate that they suffer, some lightly, others very severely, from leisure/related health problems (Vingerhoets et al., 2002), it is important to increase our understanding of possible antecedents and determinants. Such insights are badly needed in order to be able to design effective prevention strategies and successful interventions, making possible that people suffering from this condition in the near future can also enjoy their leisure time and vacations.

Several researchers have mentioned the existence of leisure sickness, be it mostly without further explanation and seldom supported by empirical evidence (see, e.g., McEwen & Stellar, 1993; Van Luitelaar, 1997). For instance, Van Luitelaar discovered growing number of deaths during vacation, by simply counting obituaries in newspapers. He could demonstrate a sizeable increment of such death announcements during vacation periods, especially during the first free days. Kop, Vingerhoets, Kruithof and Gottdiener (2003) found a similar pattern when analysing the prevalence of myocardial infarctions during vacation travels. Also in this study, a small peak was seen during the first two days. It is tempting to draw a parallel with the outcomes of some well-known animal studies. For instance, Mason et al. (1961) found that monkeys who were exposed to stressful tasks developed ulcers and gastric complaints in the rest period *after* the exposure to stressors and not during the period of exposure itself.

A number of authors have provided empirical support for the phenomenon "becoming ill during leisure time". However, it should be noted that their research efforts often had a rather narrow focus on specific health problems like ischemic stroke in young women (Haapaniemi, Hillbom & Juvela, 1996), and migraine (Couturier, 1993; Couturier et al., 1992; Davies, Peatfield, Steiner, Bond & Clifford Rose, 1991; Morrison, 1990; Natterro et al., 1989). For instance, Davies et al. (1992) found that attacks of migraine occurred significantly more frequently during weekends, while Natterro et al. demonstrated that attempts to relax after stress exposure could elicit attacks of migraine. However, in contrast to these findings, Alstadhaug, Salvesen and Bekkelund (2007) reported that migraine occurrence was almost equally distributed during the week, except on Sundays, when there were significantly fewer attacks. These authors consequently concluded that days off protect against migraine rather than promoting this condition. In an earlier study, Morrison (1990) could also not provide firm evidence for the existence of some form of weekend migraine.

Possible explanations

A number of possible explanations can be formulated that need to be tested in future research. However, it should be noted beforehand that these explanations do not necessarily exclude each other. In addition, different symptoms may each have their own specific etiological factors. On the basis of the relevant literature, we come to the following possible hypotheses for leisure sickness. Globally, it boils down to explanations that emphasize the role of factors in the home or non-work situation which are conducive to complaints, problems with switching off from work to non-work, or some sort of illness "according to plan".

Exposure to sickness inducing environmental factors

It speaks for itself that, first of all, it should be checked whether in the non-work situation, factors can be identified that can be conceived of as pathogenic. For example, exposure to pesticides which are used in gardening, or solvents in paint, thinner and glue employed in repair work around the house, painting or other hobbies may be responsible for the onset of health problems. It is quite conceivable that people suffering from "leisure sickness", especially when being involved in such specific free time activities as sketched above, are exposed to chemicals that have harmful consequences for their health. It is also perfectly possible that they live in a house that is poorly ventilated or that they live in a polluted environment, or have pets to which they are allergic (Dumont, 1989; Roueche, 1988; Weiss, 1992). Interesting in this context is a case study by Lipton, Mazer, Newman and Solomon (1997). It concerns a 58 years old woman, who had only migraine during

weekends spend in a particular holiday home. In the end, it turned out that the severe attacks of migraine were the effect of a broken-down kitchen-cooker that produced a high concentration of carbon monoxide. After replacement of the stove, the headaches disappeared immediately. A similar case has been described by Roueche (1988); here, the wrongdoer was a chemical that was present in the weekend cottage to keep it free from vermin. It is not very likely, however, that all persons who suffer from leisure sickness are exposed to hazardous chemicals during their days off. Nevertheless, such possible causes cannot be excluded beforehand, especially not in a clinical setting and also not when one wants to design a systematic study.

Life style

Another possibility is that in persons with ailments during weekends and vacations there are huge discrepancies between their leisure time lifestyle and their style of life at work periods. For instance, they may sleep much longer or much shorter, or drink other amounts of alcohol or coffee. Some research findings suggest that both more and less than usual coffee intake or consumption of the first cup of coffee at an unusual later time can cause headache attacks (Couturier et al., 1992; Couturier, Laman, Van Duijn & Van Duijn, 1997).

Baars and Tjia (1990) have introduced the term “holiday-heart-syndrome” in their article on the relationship between vacation, on the one hand, and heart problems due to excessive alcohol consumption, on the other hand. Also occasionally excessive indulgence in nicotine, caffeine or recreational drugs may play a significant role in the development of somatic problems.

The following two explanations reflect the possibility that people suffering from the leisure sickness syndrome do not enjoy the activities they generally have to undertake during their vacations and weekends. Maybe they consider these activities as rather stressful.

Low appreciation of leisure activities and secondary gain

“Relaxing can be very stressful for a lot of people ... because it means the day is unstructured, people have to re-establish relationships and spend time with their families” (Cooper, 2007). It is thinkable that some people don’t like visiting family, travelling, household chores, keeping in repair the car and the house, attending children’s sport activities, or shopping. The fact that these obligations tie them down too much can cause stress that in turn can lead to experiencing health complaints. It could also be that these persons cannot stand to be not actively engaged in their work, thinking business all day. It is conceivable that they have

guilt feelings, as a consequence of taking a break from work, which, as a source of stress, in the end form the basis of health complaints. This kind of stress experiences associated with the obligatory character of typical recreation activities can be identified most clearly in people with a high degree of commitment to their work (Burwell & Chen, 2002).

Additionally, persons with leisure sickness may be rewarded for their illness behavior. When displaying illness behavior, it is no longer expected that one should be involved in typical weekend and vacation activities. Thus, the experience and report of symptoms can not only lead to avoidance of negative experiences and obligations, but also to all sorts of positive consequences, such as receiving more attention. Through such environmental reinforcement, it becomes more likely that such behavior will occur more frequently in the future. See for a more extensive discussion of the role of operant conditioning by the social environment the review by Fishbain, Rosomoff, Cutter and Rosomoff (1995).

Symptom perception

According to the symptom perception model of Pennebaker (1994; 2000), there is a continuous competition between, on the one hand, internal bodily signals and, on the other hand, external environmental stimulation. Presumably, internal bodily signals will be consciously perceived more likely when they have a higher intensity and/or when the competing environmental input is rather limited. This could explain why people with very busy jobs are much more aware of their bodily sensations during leisure time compared to normal working days. Outside the work environment it is easier for their internal signals to compete with the external informational input and, consequently, to receive attention. On the other hand, symptoms and negative feelings seem to disappear at the very moment that these persons are exposed again to the worries and pressure of work. In this case, it is not a matter of actually more frequently getting sick during leisure time, but rather of becoming aware of and experiencing symptoms. Heart of the matter is the difference in attentional focus. This Pennebaker model is especially suitable for bodily sensations that are, relatively, less intense, like fatigue or rather vague pains and aches. Obviously, with respect to complaints like flu symptoms, fever, or severe attacks of migraine, this model does not provide an adequate explanation.

Physiological problems of adaptation

A fifth possibility is that physiological processes play a key role in the development of these health problems. A study by Elgerot, cited in Frankenhaeuser (1980), demonstrated that, in workers with a high workload, the production of adrenaline was not only increased during working hours, but also just in the

evening hours and the rest periods after finishing work. The results of Vingerhoets et al. (1996) also point into the same direction. People with many vague complaints differed in terms of adrenaline production from healthy controls, not during watching stressful films, but, on the contrary, during night time, when the body has to take rest and recovery processes should prevail. This can be caused by too slow unwinding of physical activation. Stated more simply: the engine is kept running and new energy is constantly produced, while from a physiological point of view there is no necessity for doing so.

In addition, it has been frequently demonstrated that acute stress has a beneficial effect on particular immune functions (Dhabhar & McEwen, 1996, 1997; Spencer, Kalman & Dhabhar, 2000). An implication could be that, in this way, acute immune-related health problems are suppressed until after the exposure to the stressor.

Another possibility concerns the phenomenon of a too fast changeover from work to leisure time. A badly coordinated change from activation to rest can also have a negative impact on health conditions. After all, a high workload implies a heavy burden for those bodily functions that are responsible for the maintenance of the internal physical balance (allostasis; McEwen & Stellar, 1993; Sterling & Eyer, 1988). When the external load suddenly stops, which is the case when people stop working and try to relax, and subsequently the body fails to inhibit the counterpressure in time, then this might result in a situation of being physiologically off balance, accompanied by an increased susceptibility to illness. It is tempting to draw an analogy with a balance that initially shows equilibrium due to a force and counterforce, but tips at the moment that a heavy weight is taken away from one of the scales.

In research with monkeys, a similar effect was observed: not *during*, but especially *after* a stressful episode the animals were suffering from ulcers and other gastric problems (Mason et al., 1961). Moreover, studies with rats also reveal that there are considerable individual differences with respect to recovery after stress and stress hormone reactions, like cortisol production (Dhabhar, McEwen & Spencer, 1993).

Dehabituation to stress and anticipated harm

Strauss-Blasche et al. (2002) tested the expectation that vacation may act as a stress buffer, reducing the adverse impact of job stress. Their study, however, did not support this hypothesis. Contrary to expectation, workload did not have an effect on health status and well-being *before* vacation, but did so significantly *after* vacation. After vacation, employees with high workload reported a relatively poor quality of sleep, few positive social activities, few positive affect, and considerable negative mood, whereas there was a clear pre- to post-vacation increase of health

status and well-being for employees with a relatively low workload. The authors hypothesize that the reduction in job stress during vacation might promote a process of *dehabituating* to stress. Consequently, when returning to work, the renewed confrontation with job stress will induce stronger stress reactions, due to the fact that the job stressors are experienced as relatively novel stimuli compared to pre-vacation time. One can speculate that individuals who have experienced this process several times will be confronted with a lot of anticipated harm, which in turn also might affect their well-being during vacations.

(Un)conscious postponement of sickness

Finally, one may wonder whether people are able to postpone becoming ill to a period that suits them better. Anecdotes as well as the scientific literature contain indications that terminally ill persons can delay their death until, for instance, the birth of a grandchild or the return of a family member from abroad. For example, Phillips and Feldman (1973) as well as Idler and Kasl (1992) reported a decrease in the number of deaths immediately before and during religious holidays that were important for terminally ill patients (e.g., Yom Kippur, Easter). Patients who felt more commitment for the feast day had a lower chance of dying in the period immediately preceding the holiday. Phillips and King (1988) found in a Jewish population also strong indications for the existence of a pattern of peaks and drops in mortality figures linked to religious holidays. A similar pattern has been reported for elderly Chinese women (> 75 years) around the Harvest Moon Festival (Phillips & Smith, 1990). Marriott and Harshbarger (1973) found an increase in the number of people who died *after* Christmas and Easter (see also Harrison & Kroll, 1985-1986). More recently, Anson and Anson (2001) observed a very significant decrease in mortality on the Sabbath (Saturday), but only in the Jewish population of Israel, not for the non-Jewish part of the population. This decrease in mortality was followed by an increase of the number of deaths during the following days (Sunday, Monday). These findings suggest that people are able to postpone death until a, for them, more appropriate moment, that fits them or their family better. If terminally ill patients have a certain degree of control over their dying, it may not seem unlikely that healthy individuals also may have the capacity to time the development of health problems. In line with the findings of the study by Phillips and Feldman (1973), this might be expected to occur primarily in individuals who consider their work as very important and/or are convinced that they are irreplaceable at work.

The role of personality

There is a strong association between work commitment and well-being (Riipinen, 1997). The question whether work commitment is also related to leisure sickness still has to be resolved in future research. However, it seems rather plausible that such a link indeed exists. Especially perfectionists with high workloads, a strong commitment, and an over-developed sense of responsibility to their work seem to form a high-risk group (Vingerhoets et al., 2002). In case of very frequent or long-lasting stress episodes, it takes more time to return to a relaxed state without stress (Sluiter, 1999). In the long run, this may imply that leisure time will not suffice to recover completely. Moreover, as can be predicted from Pennebaker's (1994, 2000) symptom perception model, a higher level of arousal than, from a physiological point of view, is required, can very easily lead to bodily sensations that will be labelled as health complaints.

Difficulties with switching from work to non-work can be (partly) due to personality characteristics. It is quite conceivable that there is a direct effect like, for instance, when rigidity and inflexibility cause problems in switching over from work to leisure activities; with the result that after working hours one still is involved in performing various work tasks. This is a situation that very likely can lead to an excess of stress.

Personality can also have an indirect effect on a problematic re-adaptation after work. For example, perfectionists have high standards and consequently experience a high eagerness to achieve. This may make them, especially during a non-work period, rather vulnerable for health problems, when earlier mentioned high allostatic counterforce suddenly disappears. A couple of studies indeed have demonstrated the negative aspects of perfectionism and have found that perfectionism is associated with, amongst others, exhaustion at work (Mitchelson & Burns, 1998).

Individuals differ also with respect to their competencies to cope with non-work situations. Well-known in this respect are Type A persons and "workaholics" (Burke, 2000; Friedman & Rosenman, 1974; Sanders & Malkis, 1982; Spence & Robbins, 1992). It is also quite conceivable that especially individuals with a strong need of control, who likely have a clearly structured job that offers the desired possibilities for control, experience the changeover from work to leisure time as problematic, because the latter is generally less structured and offers less opportunities for control (see Suls & Rittenhouse, 1990). Such persons might feel restless especially during weekends and vacation. They experience strain instead of relaxation; a state of affairs that has negative consequences for their well-being.

Besides personality, temperament may also play a moderating role. Temperamental traits co-determine style of action, preferences for particular situations and activities of given stimulative value, as well as the psychophysiological costs inherent in performing activity under highly stimulating

demands (Strelau, 1996). Especially temperamental variables which reflect characteristics of the central nervous system, like the Pavlovian concepts 'strength of excitation' and 'strength of inhibition' (Pavlov, 1951-1952; see Strelau, 1998), are good candidates for promising future research. Also the concept 'mobility', as introduced by Pavlov, might have high relevancy in this context. Besides strength of excitation, reflecting the functional capacity of the nervous system, and strength of inhibition, a concept reflecting the ability to sustain a state of conditioned inhibition such as extinction or delay, Pavlov pointed at individual differences in the *mobility* of nervous processes reflecting the ability of the central nervous system to respond adequately to changes in the surroundings. In addition to the latter East-European, Pavlovian temperamental traits, there are several corresponding Western arousal-oriented variables, like extraversion and neuroticism, that may have relevance in this context. For instance, the difference between introverts and extraverts lies in their arousability. In situations with a low stimulation level, in particular extraverts might be expected to be relatively underaroused and most likely feel very bored. In high arousal situations, however, extraverts would perform better, due to the tendency in introverts toward overarousal (Eysenck & Eysenck, 1985). A lack of stimulation at leisure time, when stimulation and challenges are markedly reduced, can have negative effects for some persons, in particularly for high-scorers on extraversion tests. The term 'underload syndrome' is used to refer to this pattern characterized by a decrease in the production of vital hormones such as endorphins, a subsequent drop in metabolic rate, lower energy, a sluggish immune system, and, consequently, a higher susceptibility to infection. "Boredom has exactly the same effect on the body as stress. People who are normally busy can become ill when they don't have enough to do, because it sends their levels of stress hormones shooting up" (Dyer-Smith, cited in Elkins, 2003).

The above makes clear that it would be interesting to examine the mediating and moderating role of personality and temperament in future research on leisure sickness. The same applies for scrutinizing the role of coping styles, since there are indications that ways of coping are related to the degree of perceived stress (Mariage, 2001).

Regarding all these factors, which possibly predispose people to difficulties switching off when they take breaks from work, it is a matter of *actual* or *perceived* high workload. Therefore, future investigations should also pay adequate attention to the appraisal of work as well as non-work.

CONCLUSION

The term 'leisure sickness' refers to the phenomenon that health complaints manifest themselves just during weekends and vacation. The complaints appear to be very diverse: not only rather vague pains and aches, excessive fatigue and nausea, but also flu-like symptoms, including fever.

There are several explanations for this phenomenon that do not exclude each other necessarily. Globally speaking, leisure sickness can be associated with (i) factors in the non-work environment that elicit and promote the experience of symptoms, (ii) specific physiological problems inherent in the changeover from work to non-work, or (iii) the ability to postpone health problems. It is not unlikely that certain personality characteristics function as predisposing factors. Maybe the different kinds of complaints, and perhaps also the role of personality traits, can be explained by distinct mechanisms. Results of a pilot study (Vingerhoets et al., 2002) suggest that especially people with high workload and high commitment, who feel very responsible for their work, are more apt to suffer from leisure sickness.

Regarding the question "What can be done?", at this moment we can only speculate and provide a set of tentative answers. Possibly, physical exercise after work evening will facilitate substantially the physiological transition from work activities to rest. It speaks for itself that research efforts should also be focussed on evaluating the possible beneficial effects of adaptation of the life pattern, changes in the sleep pattern, and sizeable reduction of the intake of caffeine and alcohol. It is conceivable that particular interventions will be very effective for particular subgroups of persons. For instance, particular forms of cognitive behavioural therapy aimed at restoring balance in life with more attention and appreciation for the social environment in general and the family in particular (see Burwell & Chen, 2002). The view that leisure sickness is a clear signal from the body to go somewhat easier on work and to strive for more balance in one's life between working and non-working activities, should also be taken seriously. Be it as it is, leisure sickness concerns an extremely interesting phenomenon that elicit an abundance of intriguing research questions for psychologists, at the level of fundamental research as well as applied studies.

REFERENCES

- Alstadhaug, K.B., Salvesen, R., & Bekkelund, S. (2007). Weekend migraine. *Cephalalgia*, 27, 343-346.
- Anson, J., & Anson, O. (2001). Death rests a while: Holy day and Sabbath effects on Jewish mortality in Israel. *Social Science & Medicine*, 52, 83-97.
- Baars, M.W., & Tjia, M.W. (1990). Alcohol en hartritmestoornissen [Alcohol and heart rhythm disturbances]. *Tijdschrift voor Alcohol, Drugs en andere Psychotrope Stoffen*, 16, 105-109.
- Baum, A. (1991). A psychophysiological perspective, with emphasis on relationships between leisure, stress, and well-being. In B.L. Driver, P.J. Brown, & G.L. Peterson (Eds.), *Benefits of leisure* (pp. 407-410). State College, PA: Venture Publishing Inc.
- Burke, R.J. (2000). Workaholism in organizations: Psychological and physical well-being consequences. *Stress Medicine*, 16, 11-16.
- Burwell, R., & Chen, C.P. (2002). Applying REBT to workaholic clients. *Counselling Psychology Quarterly*, 15, 219-228.
- Cooper, C. (2007). In: Why we get ill at weekends. Read March 5, 2007 at <http://news.bbc.co.uk/1/hi/health/2503603.stm>
- Couturier, E.G. (1993). Wie uitgeslapen is, slaapt nooit meer uit: Weekendhoofdpijn door te late en te geringe inname van cafeïne [People who are wide-awake never ever have a long lie-in: Weekend headache due to caffeine intake that is too late and too small] . *Nederlands Tijdschrift voor Geneeskunde*, 137, 1953-1955.
- Couturier, E.G., Hering, R., & Steiner, T.J. (1992). Weekend attacks in migraine patients: Caused by caffeine withdrawal? *Cephalalgia*, 12, 99-100.
- Couturier, E.G., Laman, D.M., Van Duijn, M.A., & Van Duijn, H. (1997). Influence of caffeine and caffeine withdrawal on headache and cerebral blood flow velocities. *Cephalalgia*, 17, 188-190.
- Davies, P.T., Peatfield, R.C., Steiner, T.J., Bond, R.A., & Clifford Rose, F. (1991). Some clinical comparisons between common and classical migraine. *Cephalalgia*, 11, 223-227.
- Dhabhar, F.S., & McEwen, B.S. (1996). Stress-induced enhancement of antigen-specific cell-mediated immunity. *Journal of Immunology*, 156, 2608-2615.
- Dhabhar, F.S., & McEwen, B.S. (1997). Acute stress enhances while chronic stress suppresses cell-mediated immunity in vivo: A potential role for leukocyte traffic. *Brain, Behavior and Immunity*, 11, 286-306.
- Dhabhar, F.S., McEwen, B.S., & Spencer, R.L. (1993). Stress response, adrenal steroid receptor levels and corticosteroid-binding globulin levels: A comparison between Sprague-Dawley, Fischer 344 and Lewis rats. *Brain Research*, 616, 89-98.

- Dumont, M.P. (1989). Psychotoxicology: The return of the mad matter. *Social Science & Medicine*, 29, 1077-1082.
- Elkins, L. (2003). Bored sick. *Sunday Times of London*, February 2.
- Eysenck, H.J., & Eysenck, M.W. (1985). *Personality and individual differences: A natural science approach*. New York: Plenum.
- Fishbain, D.A., Rosomoff, H.L., Cutter, R.B., & Rosomoff, R.S. (1995). Secondary gain concept: A review of the scientific evidence. *Clinical Journal of Pain*, 11, 6-22.
- Frankenhaeuser, M. (1980). Psychobiological aspects of life stress. In S. Levine & H. Ursin (Eds.), *Coping and health* (pp. 203-223). New York: Plenum.
- Frankenhaeuser, M., Lundberg, U., Fredrikson, M., Melin, B., Tuomisto, M., Myrsten, A.L., Hedman, M., Bergman-Losman, B., & Wallin, L. (1989). Stress on and off the job as related to sex and occupational-status in white-collar workers. *Journal of Organizational Behavior*, 10, 321-346.
- Friedman, M., & Rosenman, R.H. (1974). *Type A behavior and your heart*. New York, NY: Knopf.
- Haapaniemi, H., Hillbom, M., & Juvela, S. (1996). Weekend and holiday increase in the onset of ischemic stroke in young women. *Stroke*, 27, 1023-1027.
- Harrison, A.A., & Kroll, N.E.A. (1985-86). Variations in death rates in the proximity of Christmas: An opponent process interpretation. *Omega*, 16, 181-192.
- Idler, E.L., & Kasl, S.V. (1992). Religion, disability, depression, and the timing of death. *American Journal of Sociology*, 97, 1052-1079.
- Kop, W.J., Vingerhoets, A.J.J.M., Kruithof, G.J., & Gottdiener, J.S. (2003). Predictors of myocardial infarction during vacation travel. *Psychosomatic Medicine*, 65, 396-401.
- Lipton, R.B., Mazer, C., Newman, L.C., & Solomon, S. (1997). Sumatriptan relieves migrainelike headaches associated with carbon monoxide exposure. *Headache*, 37, 392-395.
- Mariage, A. (2001). Strategies de coping et dimensions de la personnalité: Étude dans un atelier de couture [Coping strategies and personality dimensions: A study in a clothing firm]. *Travail Humain*, 64, 45-59.
- Marriot, C., & Harshbarger, D. (1973). The hollow holiday: Christmas, a time of death in Appalachia. *Omega*, 4, 259-266.
- Mason, J.W., Brady, J.V., Polish, E., Bauer, J.A., Robinson, J.A., Rose, R.M., & Taylor, E.D. (1961). Patterns of corticosteroid and pepsinogen change related to emotional stress in the monkey. *American Association for the Advancement of Science*, 133, 1596-1598.
- McEwen, B.S., & Stellar, E. (1993). Stress and the individual: Mechanisms leading to disease. *Archives of Internal Medicine*, 153, 2093-2101.
- Mitchelson, J.K., & Burns, L.R. (1998). Career mothers and perfectionism: Stress at work and at home. *Personality and Individual Differences*, 25, 477-485.

- Morrison, D.P. (1990). Occupational stress in migraine: Is weekend headache a myth or reality? *Cephalalgia*, *10*, 189-193.
- Nattero, G., De Lorenzo, C., Biale, L., Allais, G., Torre, E., & Ancona, M. (1989). Psychological aspects of weekend sufferers in comparison with migraine patients. *Headache*, *29*, 93-99.
- Pavlov, I.P. (1951-1952). *Complete works* (2nd ed.). Moscow & Leningrad: SSSR Academy of Sciences.
- Pennebaker, J.W. (1994). Psychological bases of symptom reporting: Perceptual and emotional aspects of chemical sensitivity. *Toxicology and Industrial Health*, *10*, 497-511.
- Pennebaker, J.W. (2000). Psychological factors influencing the reporting of physical symptoms. In A.A. Stone & J.S. Turkkan (Eds.), *The science of self-report: Implications for research and practice* (pp. 299-315). Mahwah: Erlbaum.
- Phillips, D.P., & Feldman, K.A. (1973). A dip in deaths before ceremonial occasions: Some new relationships between social integration and mortality. *American Sociological Review*, *38*, 678-696.
- Phillips, D.P., & King, E.W. (1988). Death takes a holiday: Mortality surrounding major social occasions. *The Lancet*, *24*, 728-732.
- Phillips, D.P., & Smith, D.G. (1990). Postponement of death until symbolically meaningful occasions. *Journal of the American Medical Association*, *263*, 1947-1951.
- Ray, S. (1990). Immunological measures of stress in the applied arena. *Occupational Psychology*, *12*, 8-10.
- Riipinen, M. (1997). The relationship between job involvement and well-being. *Journal of Psychology*, *131*, 81-89.
- Roueche, B. (1988). The fumigation chamber. In B. Roueche (Ed.), *The medical detectives* (pp. 361-374). New York: Plum Books.
- Sanders, G.S., & Malkis, F.S. (1982). Type A behavior, need for control, and reactions to group participation. *Organizational Behavior and Human Decision Processes*, *30*, 71-86.
- Sluiter, J.K. (1999). *How about work demands, recovery, and health? A neuroendocrine field study during and after work*. Amsterdam, the Netherlands: Ponsen & Looijen B.V.
- Spence, J.T., & Robbins, A.S. (1992). Workaholism: Definition, measurement, and preliminary results. *Journal of Personality Assessment*, *58*, 160-178.
- Spencer, R.L., Kalman, B.A., & Dhabhar, F.S. (2000). Role of endogenous glucocorticoids in immune system function: Regulation and counterregulation. In B. McEwen (Ed.), *Handbook of physiology* (pp. 281-423). New York: Oxford University Press.
- Sterling, P., & Eyer, J. (1988). Allostasis: A new paradigm to explain arousal pathology. In J. Fisher & J. Reason (Eds.), *Handbook of life stress, cognition, and health* (pp. 629-649). New York: Wiley.

- Strauss-Blasche, G., Ekmekcioglu, C., & Marktl, W. (2000). Does vacation enable recuperation? Changes in well-being associated with time away from work. *Occupational Medicine, 50*, 167-172.
- Strauss-Blasche, G., Ekmekcioglu, C., & Marktl, W. (2002). Moderating effects of vacation on reactions to work and domestic stress. *Leisure Sciences, 24*, 237-249.
- Strauss-Blasche, G., Riedmann, B., Schoberger, W., Ekmekcioglu, C., Riedmann, G., Waanders, R., Fries, D., Mittermayr, M., Marktl, M., & Humpeler, E. (2004). Vacation at moderate and low altitude improves perceived health in individuals with metabolic syndrome. *Journal of Travel Medicine, 11*, 300-306.
- Strelau, J. (1996). The regulative theory of temperament: Current status. *Personality and Individual Differences, 20*, 131-142.
- Strelau, J. (1998). *Temperament: A psychological perspective*. New York: Plenum.
- Suls, J., & Rittenhouse, J.D. (1990). Models of linkages between personality and disease. In H.S. Friedman (Ed.), *Personality and disease* (pp. 38-64). New York: Wiley.
- Torelli, P., Cologno, D., & Manzoni, G.C. (1999a). Weekend-headache: A retrospective study in migraine without aura and episodic tension-type headache. *Headache, 39*, 11-20.
- Torelli, P., Cologno, D., & Manzoni, G.C. (1999b). Weekend-headache: A possible role of work and life-style. *Headache, 39*, 398-408.
- Van Luitelaar, G. (1997). Stress en hartinfarcten [Stress and myocardial infarctions]. *De Psycholoog, 7-8*, 295-298.
- Vingerhoets, A.J.J.M., Van Huijgevoort, M., & Van Heck, G.L. (2001, March). "Leisure sickness": A pilot-study on its prevalence, phenomenology, and background. Poster presented at the 59th Annual Meeting of the American Psychosomatic Society, Monterey, CA.
- Vingerhoets, A.J.J.M., Van Huijgevoort, M., & Van Heck, G.L. (2002). Leisure sickness: A pilot study on its prevalence, phenomenology, and background. *Psychotherapy and Psychosomatics, 71*, 311-317.
- Vingerhoets, A.J.J.M., Ratliff-Crain, J., Jabaaij, L., Tilders, F.J.H., Moleman, P., & Menges, L.J. (1996). Self-reported stressors, symptom complaints and psychobiological functioning II: Psychoneuroendocrine variables. *Journal of Psychosomatic Research, 40*, 191-203.
- Weiss, B. (1992). Behavioral toxicology: A new agenda for assessing the risks of environmental pollution. In J. Grabowski & G.R. VandenBos (Eds.), *Psychopharmacology: Basic mechanisms and applied interventions* (pp. 167-207). Washington, DC: American Psychological Association.
- Westman, M., & Eden, D. (1997). Effects of a respite from work on burnout: Vacation relief and fade-out. *Journal of Applied Psychology, 82*, 516-527.

Received: 21. 05. 2007.