REACTION TO AN AUDIOVISUAL STRESSOR AND HEALTH RISK BEHAVIOR IN INDIVIDUALS HAVING A TYPE BEHAVIOR PATTERN

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Introduction

In a modern society people constantly rush, are faced with many environmental requirements and various challenges. Nowadays, society encourages people to be aggressive, competitive and leading to be successful. Scientific literature defines the type of people, who are constantly rushing, live under constant stress as related to poor coronary heart disease (CHD) prognosis.

J. T. Kunnanatt (2011) notes that during the post-World War II period in USA there was a sudden and unexplained rise in CHD, particularly among middle-aged US citizens and more than half-a-million people died annually of heart attack. This confused both researchers and practitioners because traditional CHD risk factors such as high blood pressure, high level of cholesterol, smoking, a lack of physical activity failed to account for many of these deaths. In the mid of the 1950s two US cardiologists, M. Friedman and R. Rosenman noticed that a large number of their CHD patients shared the same complex of characteristic pattern, which they labeled as a type A behavior pattern (TABP). Cardiologists defined TABP as “an action-emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time, and is required to do so against the opposing efforts of other things and other persons” (Friedman, Rosenman, 1974: 67).

The major characteristics of TABP are considered to be covert hostility and anger, impatience and a tendency to lead, dissatisfaction with the work done, hunger for achievements, a tendency to lead and not to loose control of the situation (Palmer, Diez, Ascensio, 2001). People with TABP always move, walk, eat and talk rapidly, participate in many activities, work quickly and a lot and have little time to rest. When resting they feel guilty about wasting their time (M. M. Burg, 1993; Goštautas, Perminas, 1997; Scott, 2007). They are very ambitious, always try to achieve more than the others, want to lead in any situation, are impatient, often urge on the person who talks slowly, perform multiple tasks at the same time and are always tense (Friedman, Rosenman, 1975; Kunnanatt, 2011).

According to R.H. Rosenman and M.A. Chis-ney (1980) and F. Rhodewalt et al. (1991), CHD increased in most industrialized societies in the twentieth century is partly due to the fact that these societies encouraged TABP by rewarding those who are initiative, active, perform more quickly, aggressively, and competitively. That mechanism continues even now because in many situations hard-driving behavior individuals having TABP appear to be more successful than their less struggling but more balanced type B (TBBP) counterparts (Kunnanatt, 2011 cit. Steers, 1981).

However, a TABP living style leads to increased psychophysiological arousal that affects the health of the individual. In 1981 the National Institute of Health of US identified TABP as independent risk factor for CHD (Rosenman, 1982). Other scientists also confirmed TABP relation to CHD (Gar-rity et al., 1990; Kunnanatt, 2011). Cardiovascular diseases are the most common cause of death in the Lithuanian population. In 2010 cardiovascular diseases accounted for 56.1% of the deaths (Hygiene Institut of the Lithuanian Health Care Ministry). TABP is one of risk factors of cardiovascular diseases, so it is important to analyze it.

Despite numerous studies there are different opinions about the mechanism which relates TABP and health. One of the ideas is that TABP is related to higher psychophysiological reaction to stressors and health risk behavior (Guenole, Chernysheko, 2007; Murray, Barnes, Ekuma, 2005).

Individuals Having TABP Reaction to Stressors

It is believed that individuals having TABP are living under constant stress. In stressfull situations they also feel higher levels of stress (Slem, 1985). M. M. Burg (1993) indicates that a type A behavior personality tends to choose more challenging and demanding situations and evaluate those situations as more demanding than they really are. Thus they have stronger physiological response to stressfull situations and it also lasts longer (Burg, 1993; Kunnanatt, 2011).

Many studies (Burg, 1993; Kenneth, Hart, 1997; Guenole, Chernysheko, 2007) show that individuals having TABP tend to maintain a higher level of stress hormones throughout the day and it does not abate only after they go to sleep. Thus the harm-
full effects of stress hormones on the heart and the arteries are greater for TAPB individuals.

M. M. Burg (1993) and J. J. M. Vingerhoets et al. (2007) indicate that people having TAPB experience strong physiological arousal while reacting to a stressor: an increased production of epinephrine and norepinephrine, increased heart rate and blood pressure. L. J. Van Doornen and R. W. van Blokland (1989) also found that type A individuals have higher adrenaline excretion and diastolic blood pressure than subjects with TBBP. U. Lundberg (1982) agrees that TAPB is related to a higher sympathetic nervous system and katecholamine excretion while reacting to a stressor. A laboratory experiment of the same author (U. Lundberg, 1982) also shows that individuals having TAPB have higher psychophysiological arousal before giving the stressor than in the stressor phase.

In W. R. Lovallo and V. Pishkin’s (1980) study reactivity of autonomic nervous system was measured while giving two easily solvable tasks and one unsolvable task for 80 male students. Half of the participants in each group had to work in the conditions where a special 105 decibels noise was given in the background and another half solved the tasks in a quiet place. The results of the study showed that systolic blood pressure and skin conductance was higher in the rest phase in individuals having TAPB than in individuals having TBBP regardless of the noise or the complexity of the task.

A visual stimulation was given to 30 undergraduate and graduate students to measure their psychophysiological reaction to a stressor in J. Lee, Sh. Watanuku’s (2007) study. Reaction to stressor was measured in 3 phases: at rest, during stressor phase and after getting back to a usual state after the stressor. The results of the study showed that individuals having TAPB had higher sympathetic nervous system reactivity than individuals with TBBP at rest and during the stressor phase. Blood pressure decreased less and skin conductance rates remained higher in subjects with TAPB comparing to TBBP individuals. Unlike in previous studies, it was found that sympathetic nervous system reactivity was higher at rest in individuals with TAPB comparing to TBBP individuals.

M. Morell’s (1989) study showed that students having TAPB had a significantly higher skin electromagnetic activity level and a higher heart rate under laboratory stressor than TBBP individuals. Mean while F. Rhodewalt et al. (1991) argues that there is no difference between type A and type B persons’ reaction to stressors and only situation factors have an impact on more intense cardiovascular reactivity of type A individuals. D. M. Murray et al. (1985) also did not find any differences between TAPB and TBBP children’s heart rate and blood pressure in their reaction to a cognitive stressor.

In K. V. Jones’s (1985) study 24 healthy medical students (12 type A and 12 type B) were randomly assigned to be winners or loosers in a competitive task where the reaction time was measured. Individuals having TAPB who were assigned as winners were different from others and had significantly higher systolic blood pressure levels since the beginning of the task. Type A loosers appeared to slow down in their reaction time and lose interest in the competition at the very beginning of the study. The study suggested that constant simulation which individuals having TAPB get for successfully competing for rewards may be more important as a risk factor for CHD than a stress of losing.

**Health Risk Behavior in Individuals Having TAPB**

Health risk behavior is one of the most common phenomenon and problem in a modern society M. E. Vollrath (2006) notes that a personality has an impact whether an individual involves himself in health risk behavior or not. Physical inactivity, unhealthy eating, insufficient sleep, cigarette smoking and alcohol use are risk factors related to health, TAPB and CHD.

Buchman’s et al. (1991) study showed the relationship between TAPB and lower physical activity in both men and women medical student groups. I.M. Lee et al. (2000) found the relationship between men’s physical activity and decreased CHD risk. I. M. Lee at al. (2001) states that even light physical activity, for example, one hour of walking once a week, is associated with decreased CHD risk among women as well as in a women group having increased risk for CHD (overweight, with high cholesterol level, smokers). However, Eason’s et al. (2002) study showed no links between TAPB and physical activity.

There are many studies analyzing the relationship between a personality and diet but there is a lack of information about the relationship between TAPB and eating habits. However, one of TAPB components, rapid eating, is related to eating habits. Thus, it can be said that TAPB is not only related to rapid eating, but is related to unhealthy eating in general.

Sleep and sleep quality is also related to health as well as TAPB. S.J. McKelvie’s (1992) study showed that shorter sleep duration is associated with higher scores on TAPB. TAPB students report more (2,5 times) sleep problems comparing to their TBBP counterparts (Hicks, Pellegrini, 1982). There are also
indirect associations between sleep and sleep quality and TABP. TABP is associated with stress (Jimenez, Navia-Osorio, Diaz, 2009) and stress is associated with sleep quality and insomnia.

Smoking as well as TABP are one of the major risk factors of CHD (Goštautas, Perminas, 2004). Johnson’s et al. (1989) study confirmed the relationship between TABP and smoking. Researchers disclosed not only the link between TABP and smoking, but also the relationship between TABP and the effects of smoking (Lombardo, Carreno, 1987). TABP is related to higher alveolar carbon monoxide (COa) levels. The association between TABP and the number of puffs taken was not found, but the relationship between TABP and inhalation duration was found (70% longer for TABP than TBBP). These results suggest that TABP smokers may be at a greater risk for lung cancer. However, A. Goštautas and A. Perminas (2004) found an ambiguous cumulative effect of TABP and smoking upon myocardial infarction.

TABP is also associated with alcohol consumption. C.A. Camargo’s et al. (1986) study showed that men with TABP consumed twice as much alcohol as men with TBBP. N. Bages, L. Feldman, G. Chacón (1995) also confirmed that TABP is associated with increased alcohol consumption. A. R. Folsom’s et al. (1985) study showed that TABP men not only consume more alcohol (30% more than TBBP men), but are also more frequent rather than occasional alcohol users. The results of the study remained independent from age, income, smoking and marital status (Folsom et al., 1985). However, when talking about alcohol consumption relation with TABP, results are controversial. R. J. Glynn, L. O. de Labrie, D. M. Hou (1988) found that the socio-economic and marital status but not TABP influence alcohol consumption and the development of CHD.

To conclude, scientists found the relationship between TABP and reaction to various stressors and health risk behavior, however, results are inconsistent, so the aim of this study was to assess reaction to an audiovisual stressor and health risk behavior in individuals having type A behavior pattern.

It was hypothesized that:

- Individuals having higher TABP have higher psychophysiological reaction to an audiovisual stressor than individuals having lower TABP.
- Individuals having higher TABP are more involved in health risk behaviour than individuals having lower TABP.

Method

Two separate studies, related to reaction to an audiovisual stressor and health risk behaviour in individuals having TABP, were conducted. A. Goštautas et al. (1993) noted that TABP is characteristic for young people with higher education. So, university students were chosen to participate in both studies.

The study measuring the relationship between students’ reaction to an audiovisual stressor and TABP was done in 2009. 90 students from Vytautas Magnus University aged between 18-30 (mean age 21.9 ± 2.5) participated in this study. There were 19 (21.1%) men and 71 (78.9%) women.

Subjects completed the Students Jenkin’s Activity Survey (SJAS) (Yarnold et al, 1986) to measure their degree of TABP. SJAS was translated into Lithuanian according to the requirements for psychodiagnostic methods. Reliability of the questionnaire was calculated by Cronbach’s alpha, which was 0.554. The participants who scored above the mean in SJAS were attributed as having higher TABP (34 subjects) and those who scored below or equal to the mean, were attributed as having lower TABP (56 subjects).

Mind Media device NeXus 10 (serial number 0928050233, Holland) was used to evaluate the participants’ physical condition. Body temperature, skin conductance, heart rate and respiratory rate were recorded using this technology. The programme of the audiovisual stressor was used as a stressor. NeXus 10 technology meets the European Community Council Directive 93/42/EEC for medical device requirements (Mind Media B.V. User manual for NeXus-10, 2004/2005).

The research project was presented and discussed in a session of the Psychology Department at Vytautas Magnus University. It was concluded that it met the ethical requirements. Before the study the participants got all the information about the procedure and their role in this research. They knew that their physical response to stressors would be measured in the experiment and were informed that there could be some negative effects on their health. The participants read the study protocol and signed approved consents on informed participation. The study involved healthy people who had no health problems.

A psychophysiological reaction to the audiovisual stressor was recorded in 4 phases: at rest, while waiting for the stressor, during the stressor phase and after the stressor while getting back to their usual state. The electrodes recording information about their body temperature, skin conductance, heart rate and respiratory rate were attached to participants’ bodies and they were asked to relax. A landscape of water flowing quietly was displayed and slow and restful music was playing in the background during the rest phase. This relaxation phase lasted for about 3 minutes. Later the rhythm of the music started in-
tensifying and a warning about stress was shown on the screen. It said that a stressor would appear in 60 seconds and asked the participants to be ready for it. Then the researcher read the warning aloud as well. During the stressor phase, the participants were watching various intimidating images and hearing loud sounds related to the images shown. The stressor stage lasted for about 30 seconds and then a note on the screen appeared saying that the program could record their reaction to the audiovisual stressor. The relaxation phase after the stressor lasted for about 2 minutes more.

Due to the wrong attachment of electrodes that measured the heart rates of 4 participants’ skin conductance rates and 7 heart rate measurements were not included into the analysis of this study.

Another study, assessing the relationship between the students’ health risk behavior and TABP was made in 2011. 202 students from Kaunas University of Technology aged between 18-26 (mean age 19.5 ± 1) participated in this study. There were 63 (31.2%) men and 139 (68.8%) women.

The subjects completed SJAS to measure their degree of TABP. Reliability of the questionnaire was calculated by Cronbach’s alpha, which was 0.515. The participants who scored above the mean in SJAS were attributed as having higher TABP (95 subjects) and those who scored equal or below the mean, were attributed as having lower TABP (102 subjects).

For the assessment of health risk behaviour the subjects completed the Health Risk Behavior Inventory – Pilot Version (HRBI) (Irish, 2011). HRBI was translated into Lithuanian according to the requirements for psychodiagnostic methods. Physical inactivity, unhealthy diet, insufficient sleep, direct and indirect exposure to cigarette smoke and alcohol consumption sub-scales were used to measure the students’ unhealthy behavior in this study. The reliability of the questionnaire was calculated by Cronbach’s alpha, which was: physical inactivity (0.687), unhealthy diet (0.630), insufficient sleep (0.501), direct and indirect exposure to cigarette smoke (0.719), alcohol consumption (0.529).

### Results

One of the objectives in this study was to measure individuals’ having higher TABP reaction to an audiovisual stressor. It is argued that TABP persons are more responsive to stressors and the experienced stress lasts longer even after the stressor ends (Jenkins, Zyzanski, Rosenman, 1976; Morell, 1979; Slem, 1985; Stoney, Langer; Sutterer, 1987; Burg; 1993; Guenole, Chernysheko, 2007). U. Lundberg (1982) says that psychophysiological arousal in subjects having TABP is significantly greater even before the stressor starts than in subjects having TBBP. Thus, reaction to an audiovisual stressor was measured in three phases: while waiting for the stressor, during the stressor phase and after the stressor while getting back to their usual state.

It was expected that psychophysiological reaction to an audiovisual stressor of individuals having higher TABP will be greater than of individuals with lower TABP in all phases: while waiting for the stressor, during the stressor phase and after the stressor while getting back to their usual state. Thus, individuals having higher TABP will have higher skin conductance, lower skin temperature, higher respiratory rate and higher heart rate than individuals with lower TABP.

The hypothesis that individuals with higher TABP have higher psychophysiological reaction to the audiovisual stressor than individuals with lower TABP was verified by using a non-parametric Mann – Whitney criterion. Comparison of psychophysiological response to an audiovisual stressor in individuals having higher and lower TABP is presented in Table 1. The results of the study showed that there was no difference in subjects with higher and lower TABP in their reaction to an audiovisual stressor both while waiting for the stressor and during the stressor phase and after the stressor while getting back to their usual state (p>0.05).

| Table 1. Comparison of psychophysiological response to an audiovisual stressor in higher and lower TABP |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| **Psychophysiological rates**                   | **Mean Ranks**                                  | **Test Statistics**                              | **Asymp. Sig. (2-tailed)**                       |
|                                                 | Higher type A behaviour pattern | Lower type A behaviour pattern | Mann-Whitney (U) test | Z |  |
| Waiting for the stressor phase                  |                                                 |                                                 |                                                 |    |    |
| Skin conductance                                | 42.75                                          | 43.94                                          | 840.000                                         | -0.214 | 0.830 |
| Skin temperature                                | 45.93                                          | 44.43                                          | 903.500                                         | -0.226 | 0.790 |
| Heart rate                                      | 41.10                                          | 42.51                                          | 768.000                                         | -0.256 | 0.798 |
| Respiratory rate                                | 47.21                                          | 43.64                                          | 860.000                                         | -0.633 | 0.527 |
| Stressor phase                                  |                                                 |                                                 |                                                 |    |    |
The hypothesis that individuals having higher TAPB are more involved in health risk behaviour than those having lower TAPB was verified by using a non-parametric Mann – Whitney criterion. A Comparison of health risk behavior in individuals having higher and lower TAPB is presented in Table 2. The results of the study showed that there was no difference in subjects with higher and lower TAPB in their involvement in health risk behavior neither in physical activity, nor unhealthy diet, insufficient sleep, direct or indirect exposure to cigarette smoke or alcohol consumption (p>0.05).

### Table 2. Comparison of health risk behavior in individuals having higher and lower TAPB

<table>
<thead>
<tr>
<th>Health risk behavior</th>
<th>Mean Ranks Higher type A behaviour pattern</th>
<th>Mean Ranks Lower type A behaviour pattern</th>
<th>Mann-Whitney Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical inactivity</td>
<td>100,01</td>
<td>97,92</td>
<td>4742,000</td>
<td>-0,258</td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>98,00</td>
<td>100,07</td>
<td>4743,500</td>
<td>-0,254</td>
</tr>
<tr>
<td>Insufficient sleep</td>
<td>102,02</td>
<td>95,75</td>
<td>4536,500</td>
<td>-0,774</td>
</tr>
<tr>
<td>Direct and indirect exposure to cigarette smoke</td>
<td>92,26</td>
<td>104,17</td>
<td>4167,000</td>
<td>-1,475</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>94,89</td>
<td>102,34</td>
<td>4433,000</td>
<td>-0,921</td>
</tr>
</tbody>
</table>

### Conclusions

- There is no difference in individuals having higher or lower TAPB in their reaction to an audiovisual stressor.
- There is no difference in subjects with higher and lower TAPB in their involvement in health risk behavior.

### Discussion

The results of this study showed that there was no difference in subjects with more and less TAPB in their reaction to an audiovisual stressor. Conversely to these study results C. D. Jenkins, S. J. Zyzanski and R. H. Rosenman in 1976 stated that individuals having TAPB excrete more hormones, have higher heart rate and blood pressure when reacting to stressors and psychophysiological response of individuals having TBBP is lower.

M. Morell (1989) also found that students having TAPB had higher skin conductance rate and higher heart rate while reacting to the stressor than students having TBBP while studying the same age persons. Likewise W. R. Lovallo, V. Pishkin (1980) and J. Lee, Sh. Wanatuku (2007) found that skin conductance and systolic blood pressure were higher in individuals having TAPB than in individuals having TBBP. However, K. L. Frogatt and J. L. Cotton (1987) and F. Rhodewalt et al (1991) showed that there is no difference between individuals having TAPB and individuals having TBBP in their reaction to stressors.

The inconsistencies of the studies can be explained due to the fact that individuals could come to the experiment already having higher psychophysiological arousal because they were informed that their reaction to an audiovisual stressor will be measured.

M. Ch. Slem (1985) says that that individuals having TAPB subjectively perceive the same stressor as greater. So, individuals having higher TAPB might expect that the stressor will be scary and it might be that for some it looked not as scary as they imagined, so their psychophysiological stress indexes increased slightly because they increased even before the experiment. Additional data analysis supports this assumption. When measuring not reaction to an audiovisual stressor but comparing physiological characteristics between individuals having higher and lower TAPB, we found that participants with higher
TABP had higher and statistically significant respiratory rate than individuals with lower TABP.

One of the main characteristics of the TABP concept is competitiveness (Friedman, Rosenman, 1975; Palmer, Diez, Ascensio, 2001). So, it could be that individuals having TABP took this experiment as a challenge for them and tried to control their psychophysiological reaction to an audiovisual stressor because they wanted to do better than others. The theory of biofeedback says that people can learn to control their physiology and response to stressors (Scott, 2007).

It is said that students is one of the most unhealthy behavior risk groups. Physical inactivity, unhealthy eating habits, insufficient sleep, cigarette smoking and alcohol consumption are common in students’ life (Poteliūnienė, Viraliūnaitė, 2006). Although the relationship between health risk behavior and TABP was proved by earlier studies (Buchman et al., 1991; Bagés, Feldman, Chacón, 1995; McKelvie, 1992; Hicks, Pellegrini, 1982; Johnson et al., 1989; Camargo et al, 1986) but the relationship between TABP and students' physical inactivity, unhealthy diet, insufficient sleep, direct and indirect exposure to cigarette smoke and alcohol consumption was not found in this study. So, the results of the study could lead to the assumption that students’ lifestyle is unhealthy in general independently of the influence or relationship to TABP.

Differences between study results may also be due to different division in to type A and type B individuals by using different methods to measure TABP or different standarts when dividing individuals as having TABP or TBBP while using the same method. J. Th. Kunnanatt (2011) mentions that the originators of the TABP concept also stated procedural variations in research methodology such as subject selection, inconsistency in scoring methods, it could result in inconsistent study results related to TABP.

Differences also could occur because we divided individuals as having higher TABP and having lower TABP using a mean as a cutting point, e.i. individuals only had the characteristics of TABP but not necesarilly they were a pure type A. Moreover, the Cronbach alpha of Students Jenkin’s Activity Survey (SJAS) was not very high. That is why further studies measuring reaction to stressors and health risk behavior in individuals having TABP are needed.

References


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Summary

Type A behaviour pattern (TABP) is one of the challenges which people living in a modern society should deal with. Society encourages people to be competitive and leading to being successfull. It is convenient for people who have TABP to adjust to these society requirements because they are awarded for their behavior. On the other hand, there are evidences that TABP leads to coronary heart diseases (CHD). It is said that individuals having TABP tend to have CHD because they react to stressors more and tend to be involved in health risk behaviour. However, the results of the studies have been inconsistent. The study aimed at assessing reaction to an audiovisual stressor and health risk behaviour of individuals having TABP. The results of the study showed that there was no difference in subjects with higher and lower TABP in their reaction to an audiovisual stressor. There was also no difference between higher and lower TABP in their involvement in health risk behavior.

Keywords: type a behavior pattern (TABP), coronary heart disease (CHD), modern society, stress, audiovisual stressor, health risk behaviour.