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Is temperament activity-specific? Validation of the Structure of Temperament Questionnaire-Compact (STQ-77)

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Abstract

The paper presents benefits of activity-specific model of temperament, and a study of concurrent and discriminant validity of the Structure of Temperament Questionnaire-Compact (STQ-77). The 12 temperamental scales of STQ-77 include 3 emotionality scales and 9 scales measuring dynamical aspects of activity analysed separately for physical, social and intellectual activities (activity-specific approach). The validity of STQ-77 was measured using 220 Canadian participants with the I7 Impulsiveness questionnaire, Locus of Control scale, estimated school grades and time required to complete two tests. The results show high correlation between the three I7 scales and the three similar STQ-77 scales. There is also activity-specific correspondence between school grades estimates, time of testing and STQ-77 scores. The importance of separation of temperament characteristics in three types of activity is discussed.

Key words: STQ-77, I7, locus of control, activity-specific approach.

Resumen

Este estudio presenta los beneficios del modelo de temperamento de actividad específica, y un estudio de la validez concurrente y discriminante del Cuestionario de Estructura del Temperamento-Compact (STQ-77). Las doce escalas temperamentales del STQ-77 incluyen tres escalas de Emotividad y nueve escalas que miden aspectos dinámicos de la actividad, analizando separadamente las actividades físicas, sociales e intelectuales (modelo de actividad específica). La validez del STQ-77 se midió con 220 participantes canadienses con el Cuestionario I7 de Impulsividad, la Escala de Locus de Control, el grado escolar estimado y el tiempo requerido para completar las dos pruebas. Los resultados mostraron una correlación alta entre las tres escalas del I7 y las tres escalas semejantes del STQ-77. Se encontró también correspondencia específica de la actividad entre grados escolares estimados, tiempo empleado en las pruebas y puntuaciones STQ-77. Se discute la importancia de separar las características del temperamento en los tres tipos de actividad.

Palabras clave: STQ-77, I7, locus de control, aproximación específica a la actividad.

The goals of the present study were: 1) to investigate the benefits of the activity-specific approach in assessment of temperament, which separates the dynamic properties of human behavior in three different types of activities: physical, social-verbal

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and intellectual; 2) to investigate concurrent validity of 3 new scales of the Compact Structure of Temperament Questionnaire (STQ-77): Empathy, Impulsivity and Sensitivity to sensations.

In 1917 Dodge, who studied then mental fatigue, suggested that physical and mental efforts are regulated by different nervous processes. The idea that human temperament traits probably differ in social-verbal and physical activities, was also proposed by Nebylitzyn (1976) and was developed by Rusalov (1979, 1989) in his activity-specific theory of temperament. Rusalov inherited the laboratory of differential psychology and psychophysiology after Teplov and Nebylitzyn and studied the psychophysiological correlates of the consistent individual differences in EEG, evoked potentials, absolute thresholds in visual, auditory, and tactile modalities, strength of excitation in auditory and visual modalities, mobility in auditory and visual modalities, problem solving in deterministic and probabilistic conditions, the speed of problem solving using a variety of intellectual tests, time spent attempting unsolvable problems and the number of times that a subject gave up while attempting to solve a task. From these experiments Rusalov concluded that temperamental traits are activity-specific: the energetic level or tempo of performance might be different for the same individual in physical, social or intellectual activities, therefore, the aspects of the performance of these activities should be assessed and analyzed separately.

On the one hand, it appears "obvious" that a person who, for example, exhibits an ability for long and intense communication is not necessarily able to sustain long and intense physical or mental work. On the other hand, many models of temperament and personality follow a so-called "general arousal" approach, considering only one general trait related to the energetic component of behaviour: "liveliness" (Cattell, 1965), "strength of excitation" (Pavlov, 1941; Strelau, 1999), "extraversion" (Eysenck, 1967; Rothbart, 1988; Big Five model, including Costa & McCrae, 1992), "activity" (Buss & Plomin, 1984; Windle & Lerner, 1986), approach behavioural system (Gray, 1991), drive persistence (Carver & White, 1994; Cloninger, et al, 1994) or just "arousal" (Mehrabian & Back, 1978).

The same is true for lability (i.e. how easily the activity can be started and carried out) as applied to various types of activity: a fast-talking person might not necessarily be able to manipulate objects swiftly or perform rapid mental calculations, and so on. Several temperament models however did measure just general "psychic tempo" (Stern, 1990), "speed of actions" (Lazursky, 1921), "mobility" (Pavlov, 1941; Strelau, 1999), "lability and dynamism" (Nebylitzyn, 1963), "flexibility" and "rhythmicity" (Thomas & Chess, 1977), or "briskness" (Strelau & Zawadski, 1993).

This study investigated the general validity of the activity-specific approach, which underlines the need for a separate assessment of the traits in relation to various types of activity. In order to examine the question concerning the validity of the activity-specific approach we had to demonstrate the discriminant validity of the activity-specific scales measuring temperament. If the pattern of correlation between the real performance of people and those scales which measure aspects of the three types of activity shows matching specificity of the scales then it would support the activity-specific approach to temperament. If such correlations are absent or fail to follow the specificity of the

scales, then both the discriminant validity and the activity-specific approach would not be supported. In terms of real performance indicators we chose the time required for an individual to complete the tests together with high school grades in three types of activities. In our opinion, high school grades should not be considered as a final or valid presentation of the actual abilities of a person, nevertheless, good performance on assignments related to the 3 categories (physical, social-verbal, math/science) can reflect the degree of ease with which a person performed these types of assignments. From this perspective we did not expect high effect sizes among the correlations, but rather statistically significant correlations between the 3 groups of grades and 3 groups of STQ-77 scales in correspondence with the types of activity.

Based on the results of his experiments, which showed activity-specific structure of temperament, Rusalov developed the Structure of Temperament Questionnaire (STQ). The Extended version of the STQ has 12 items per each of 12 scales, assessing four traits: ergonicity (energetic component), plasticity, tempo of activity, and emotionality in three types of activities verbal-social, physical objects-related), and intellectual (mental) (Rusalov, 1989, 1997, 2004). During the experimental validation of the STQ in the 1980's-90's, the performance of subjects on the following measures were compared with the STQ scales in a series of studies: speed of writing, reading and speed of generation of words, maximal and optimal tempo of performance in sensory-motor tasks and intellectual (including unsolvable) tasks, performance on non-verbal tasks with which subjects were unfamiliar, rigidity of perception in tactile and visual modalities, duration of the switch between one way of solving the task to another, mobility in attention, variability in line drawing (Rusalov, 1979, 1989, Rusalov & Trofimova, 2007). In the studies of concurrent validity of the STQ it was compared to Eysenck's EPQ (Brebner & Stough, 1993; Rusalov, 1989; Zin'ko, 2006), NEO-FFI (Bodunov, Bezdenezhnykh, & Alexandrov., 1996; Dumenci, 1995), Strelau's PTS (Bodunov et.al., 1996; Ruch, Angleitner, & Strelau, 1991; Strelau, 1999, Trofimova, 2009), meaning attribution to neutral objects (Trofimova, 1999), the Motivation for Achievement scale (Vorobieva, 2004), adaptivity strategies in the Dembo-Hoppe Level of Aspiration experiment (Zin'ko, 2006), 25 measures of Mobility (Rathee & Singh, 2001), Dissociative Experiences Scale (Beere & Pica, 1995). References to STQ validation with the choice of profession, Rogers Adaptivity scale, the Torrance's Nonverbal Tests of Creative Thinking, Rotter's Locus of Control scale, with other 8 measures of plasticity, STAI, MAS, Wechsler, Shepard and Gotshield Figure tests, Rosenzveig test, Cattell's 16-PF inventory, and with the school grades of high-school students can be found in Rusalov and Trofimova (2007). The administration of the English version of the STQ (STQ-E) to American, Australian and Canadian samples demonstrated that it had a factor structure similar to the Russian language version, and it possessed good reliability and internal consistency (Bishop, Jacks, & Tandy, 1993; Bishop & Hertenstein, 2004; Dumenci, 1995, 1996; Rusalov, 1997, 2004; Stough, Brebner, & Cooper, 1991; Rusalov & Trofimova, 2007). Chinese (STQ-C), Urdu (STQ-U) and Polish (STQ-P) Extended versions of the STQ, administered in corresponding populations, showed reliability coefficients in the range 0.70-0.86, item-total correlations in the range 0.42-0.63, and all versions demonstrated robust factor structures similar to those of the original version (Trofimova, 2010b).

The Compact version of the (STQ-77, Rusalov & Trofimova, 2007), consists of 6 out of 12 items on each scale of the Extended STQ, which had the highest item-total correlation. The STQ-77 upgraded the original Rusalov's model of temperament according to Luria's neuropsychological description of regulational blocks. In addition to an "energetic" block attributed to general ARAS and limbic system activity (reflected in the Ergonicity and Emotionality traits if Rusalov's model), and a "programming", integration-mobility block (reflected in Plasticity and Tempo traits), Luria described a "sensory-informational block", which controls the "tuning" of attention to certain types of stimuli and information (Luria, 1966). As the result, the STQ-77 describes the structure of temperament as having four dimensions consisting of emotionality and three dynamical aspects of activity - arousal, lability and sensory orientation-applied to intellectual, communicative and physical types of activity. Emotionality is presented in this model as a limbic-driven emotional markers of the arousal, lability and orientation aspects of activity (Figure 1) (Trofimova, 2010c, 2011). Two Plasticity scales (physical and social) were unified into one, three Emotionality scales were also unified into one, the scale of Intellectual Tempo was renames as Sensitivity to Probabilities. As a result of this upgrade, five scales in the Extended STQ were re-labeled and re-structured within STQ-77, and three new scales of Empathy, Sensitivity to Sensations, and Impulsivity were added to the list of scales. (Rusalov & Trofimova, 2007).

	Energetic aspect	Lability	Sensitivity to
Probabilistic tuning (Frontal cortex → ARAS)	Intellectual Endurance, **ERI**	Plasticity, **PL**	... to probabilities, **PRO**
↓↓↓ **Deterministic aspects** (ARAS → cortex) ↑↑↑	Motor Endurance, **ERM** Social Endurance, **ERS**	Motor Tempo, **TMM** Social Tempo, **TMS**	... to sensations, **SS** ..to others – Empathy, **EMP**
Emotionality (Limbic-endocrinal system)	Self-confidence, **SLF**	Impulsivity, **IMP**	Neuroticism, **NEU**

Figure 1. The structure of temperament in the STQ-77 model.

The validity studies were conducted for English and Russian versions of the STQ-77. The factor analysis of the STQ-77 showed the same four factors as those found for the Extended STQ, namely factors of Motor Activity, Social Activity, Intellectual Activity and Emotionality (Rusalov & Trofimova, 2007; Trofimova, 20010c). Studies of the concurrent and discriminant validity of the English STQ-77 scales used Strelau's Pavlovian Temperament Survey and an experiment with a task requiring intense verbal and intellectual activity; the validity of the Russian STQ-77 was studied with Zuckerman's Sensation Seeking Scales (SSS-V), NEO-FFI, Achieving Tendency scale (Trofimova, 2010a, 2010c) and clinical symptoms of anxiety and symptoms (Trofimova & Sulis, 2010). It should be noted that STQ-77 uses relational statistics between scales rather than scale-by-scale scores, and the interpretation of the profile on the STQ-77 mainly takes into consideration only the relative position of the scales' values. The

analysis of the highest and the lowest values of the profile answers two questions: (1) what is the leading temperamental trait(s), i.e. formal dynamical aspects of activity, that the given individual has which determines his or her style of problem solving and performance; (2) what is the weakest temperamental trait(s) in this individual which is being compensated by other traits.

In this study we further investigate various aspects of validity of the new and rearranged scales of the English STQ-77: the concurrent validity of the new STQ-77 scales, i.e. the Impulsivity, Sensitivity to Sensations and Empathy scales is studied using the measure of temperament, the I_7 Impulsiveness Questionnaire, which has similar three scales. Rotter's Locus of Control Scale (LC) scale was also used to investigate the content validity of the STQ-77's re-arranged scales of Self-Confidence, Plasticity and Sensitivity to Probabilities. The reason behind this was the definition of the locus of internal control as an attribution of events happening to people according to their own actions and abilities. Such attribution implies not only self-confidence, but also the objective ability to adapt to changing circumstances, to prepare for it, and to control it. If the scales of Plasticity, Sensitivity to Probabilities and Self-Confidence would show statistically significant correlation with the LC scale then their content corresponds to such abilities.

METHOD

Participants

227 Canadian participants, volunteers (30%) and psychology students of McMaster University (Hamilton, Ontario, Canada) took part in this study during 2007-2008. Records with a high social desirability as measured by the Validity scale of the STQ-77 (see Validity scale description below) and with a random response pattern were taken out, and the final data consisted of the records from 220 participants, 129 males, 91 females, aged 17-54 (M= 25.05, SD= 11.2), of mixed White (70%), Chinese (9.2%), Indian (8.7%), Middle Eastern (6.8%), Malaysian (3.9%), and Caribbean (1.5%) background. University students received a practicum credit for their participation.

Measures

Compact Structure of Temperament Questionnaire (STQ-77) (Rusalov & Trofimova, 2007). The STQ-77 has 77 statements, assigned to 12 temperamental scales (6 items each) and the validity scale (5 items) listed below. Subjects respond according to a Likert scale format: "strongly disagree (1)," "disagree (2)," "agree (3)," "strongly agree (4)". The scales are:

1-3: Ergonicity group, scales of Motor, Social and Intellectual Ergonicity: the ability of an individual to sustain prolonged physical (ERM), social (ERS) or mental (ERI) activity.

4-5: Lability group, scales of Motor and Social Tempo: preferred speed of physical activity (TMM), speed of speech and reading and of other verbal activities (TMS) and Plasticity scale, assessing the ability to adapt quickly to changes

in situations, to change the program of action, and to shift between different tasks (PL).

6-9: Sensitivity group: Sensitivity to Sensations scale (SS), assessing the sensitivity of an individual to basic physical sensations and pleasures, a tendency for sensation-seeking and risk-taking behaviour; Empathy scale (EMP) assessing sensitivity of an individual to another person's emotional state, and Sensitivity to Probabilities (PRO) scale assessing ability of an individual for adequate understanding and expectations of probable events, the efficient extraction and processing of new knowledge.

10-12: Emotionality group: Self-confidence scale (SLF): the tendency to be optimistic and confident (sometimes overly optimistic) in own performance, to ignore other people's warnings and criticism; Impulsivity scale (IMP): the lability of emotional reaction, a poor ability to control immediate impulses for actions; Neuroticism scale (NEU): low tolerance of uncertainty with expectations of a negative outcome.

13: Validity scale-social desirability tendency in answers. Results within the range of 15-20 on the validity scale should be considered invalid as the respondents are likely to demonstrate positive impression bias in their responses.

I7 Impulsiveness Questionnaire (Eysenck *et al*., 1985). I7 has 54 questions, assigned to three scales: Impulsiveness (19 items), Venturesomeness (16 items) and Empathy (19 items). The original questionnaire has a two-choice format (yes/no), but in our study we used a four-choice format: "definitely No", "rather No," "rather Yes," "definitely Yes", to improve the reliability of the results. The reliability coefficients reported by Eysenck *et al*. (1985) were: .84 for males, .83 for females on the Impulsiveness scale, .85 for males, .84 for females on the Venturesomeness scale, and .69 for males and females on the Empathy scale.

Rotter Locus of Control Scale (Rotter, 1966). This scale consists of 13 items, each having a forced-choice between two contradicting statements. High scores on this scale indicate a tendency for people to attribute their own success to internal factors, such as their own abilities and efforts, and to rely primarily on these efforts ("internal locus of control"). Low scores indicate a tendency to attribute failure and success to situational and external factors ("external locus of control"). The reliability coefficients from various reports are in the range of .72-79.

Estimated high school grades. All participants completed a brief biographical questionnaire and provided an estimate of their actual grades in high school (on a numerical scale from 1 (worst) to 4 (best) with any fraction in between) for three types of assignments: 1) athletics; 2) social-verbal; 3) math and science assignments.

Time of completing two tests (STQ-77 and I7) was measured in minutes. The participants were instructed to reply quickly but to be sure that they read each statement carefully.

Procedure

All subjects received debriefing and signed an informed consent form before testing. All participants completed a brief biographical questionnaire and described tests. In completing the tests subjects were instructed that their time of testing was recorded. University students received a practicum credit for their participation. Statistical processing included the calculations of the descriptive scale statistics (means, SD, minimum and maximum values) and correlations between all the measures applied.

RESULTS

The scale statistics for the applied measures are presented in Table 1. The number of subjects completing the measures varied as indicated in the Table 1, as several records were incomplete. In terms of the concurrent validity of the three new STQ-77 scales (Impulsivity, Sensitivity to Sensations and Empathy), there were high (d >.50) correlations with the (respective) I7 scales of Impulsiveness, Venturesomeness and Empathy (see Table 2). The STQ-77 scales of Self-confidence, Plasticity, and Sensitivity to Probabilities positively correlated with the internal locus of control, while the Neuroticism scale correlated negatively. These four scales had the highest correlation with the internal locus of control, significant at p= 0.001, with medium effect sizes. The scales of Motor Ergonicity and Tempo, Social and Intellectual Ergonicity also had significant (at p= 0.01 level) positive correlations with the internal locus of control.

In terms of the discriminant validity of the STQ-77 scales, the time required to complete the tests had only one significant negative correlation with the Social Tempo scale of the STQ-77, i.e. subjects that reported a higher Tempo of speaking, reading and understanding speech required in fact less time to read and complete the tests. The high school grades on social-verbal assignments also had a significant negative correlation with the time of test completion.

Table 1. Descriptive scale statistics for the used measures: means (*M*), confidence intervals (*CI, 0.95*), standard deviations (*SD*) and Cronbach coefficient (*Alpha*). Canadian sample, *N*= 220.

STQ-77 scales, N = 220	*M*	*CI*	*SD*	*Alpha*
Motor Ergonicity	16.90	16.37-17.44	4.0	0.85
Motor Tempo	17.06	16.67-17.46	3.0	0.75
Sensitivity to sensations	15.73	15.30-16.17	3.3	0.73
Social Ergonicity	18.14	17.64-18.63	3.7	0.80
Social Tempo	16.16	15.74-16.57	3.1	0.68
Empathy (sensitivity to others)	18.76	18.43-19.10	2.5	0.70
Intellectual Ergonicity	15.41	15.02-15.80	3.0	0.72
Plasticity	16.00	15.66-16.35	2.6	0.75
Sensitivity to probabilities	16.49	16.11-16.87	2.8	0.72
Self- confidence	16.78	16.42-17.14	2.7	0.69
Impulsivity	15.38	14.99-15.77	2.9	0.74
Neuroticism	16.60	16.23-16.97	2.8	0.71
I_7 scales, N = 206				
Impulsiveness	45.71	44.50-46.92	8.83	.88
Venturesomeness	42.83	41.69-43.97	8.27	.84
Empathy	55.29	54.23-56.36	7.76	.83
Locus of Control Scale, *N*= 193	7.90	7.50-8.29	2.78	0.71
Time to complete two tests, *N*= 196	20.31	19.51-21.12	5.49	
Grades (*N*= 180): Athletics	2.70	2.56-2.85	0.98	
Grades: Verbal Activities	2.96	2.83-3.09	0.86	
Grades: Math/Science	2.89	2.75-3.02	0.89	

Table 2. The correlation between the STQ-77 scales and I_7, scales, Locus of Control Scale (LC), time to complete two tests ("Time"), and estimated school grades.

STQ-77	I_7 (N= 206)			N= 193	N= 196	School grades (N= 180)		
	IMP	VEN	EMP	LC	Time	Athletics	Verbal	Science
ERM	.00	.28***	.04	.20**	-.08	.53***	.16*	.01
TMM	.01	.28***	.01	.22**	-.11	.45***	.12	.02
SS	.34***	.64***	-.02	.07	-.13	.20**	-.01	.00
ERS	-.10	.08	.14*	.14*	-.02	.20**	.28***	-.02
TMS	.00	.14*	.10	.21**	-.31***	.04	.27***	.09
EMP	-.13	-.03	.73***	-.02	-.10	-.06	.13	.08
ERI	-.31***	-.06	.01	.19**	-.07	-.11	.18	.26***
PL	-.07	.12	-.01	.32***	-.14	.19**	.10	.22**
PRO	-.24**	-.05	-.09	.29***	-.06	-.04	.06	.12
SLF	.06	.07	.05	.25***	-.10	.13	.19**	.11
IMP	.51***	.18*	-.05	-.17**	-.09	-.06	.00	-.03
NEU	-.01	-.21**	.34***	-.28***	.06	-.23**	-.03	-.16
I_7 IMP	-	-	-	-.19**	-.12	-.07	.17*	-.12
I_7 VEN	-	-	-	.14*	-.07	-.02	.04	.12
I_7 EMP	-	-	-	-.12	-.02	-.20**	-.03	.03
LC	-	-	-	-	.02	.08	.14	.20**
Time	-	-	-	-	-	-.10	-.30***	-.14

Note: * p <0.05, ** p <0.01, *** p <0.001

The highest correlations between the estimated school grades and the STQ-77 scales followed the activity-specific pattern: grades in athletics correlated most strongly with the Motor Ergonicity and Tempo scales, grades in social-verbal assignments with the Social Ergonicity and Tempo scales, grades in science and mathematics with the Intellectual Ergonicity and Plasticity scales.

Correlations of medium to high size were found between the I_7 Impulsiveness scale and the STQ-77 Sensitivity to Sensation scale (positive), the Intellectual Ergonicity scale (negative), the Sensitivity to Probabilities scale (negative). The I_7 Venturesomeness scale correlated positively with the STQ-77 scales of Motor Ergonicity and Tempo, Social Tempo, and Impulsivity, and negatively with the Neuroticism scale of the STQ-77. The I_7 Empathy scale showed a positive correlation with the Neuroticism scale of the STQ-77. Grades in physical activities showed significant positive correlations with the Sensitivity to Sensations, Plasticity, and Social Ergonicity scales, while grades in social-verbal activities showed a significant positive correlation with the Self-Confidence scale of the STQ-77.

DISCUSSION

The results of this study demonstrate the high concurrent validity of the STQ-77 scales of Impulsivity, Sensitivity to Sensations and Empathy as compared to the corresponding I_7 scales of Impulsiveness, Venturesomeness and Empathy. The negative correlation between the STQ-77 Intellectual Ergonicity scale (which measures the ability of an individual to stay attentive on a mental task for a long time) and the I_7 Impulsiveness scales also demonstrates the concurrent validity of this STQ-77 scale as a measure of the ability to inhibit direct and immediate impulses. The correlations of the STQ-77 scales with the Locus of Control scale followed the content of these scales, supporting the content validity of the Plasticity, Self-Confidence, Sensitivity to Probability and Neuroticism scales. The Plasticity scale assesses the subjective feeling of the ability to adapt to changing situations and to remain in control in spite of changes; the Self-confidence scale of the STQ-77 was designed to measure the tendency of individuals to be (over)confident, secure, and resilient to criticism, which, along with low neuroticism help a person to establish the internal locus of control (as attribution of success to one's own abilities and efforts). The Sensitivity to Probabilities reflects the ability of a person to process existing information, to anticipate in advance the outcomes of events and of their own actions, and overall to adequately appreciate reality, which may explain the correlation of this scale with the internal locus of control.

The results also demonstrate the discriminant validity of these STQ-77 scales and support the STQ activity-specific approach, which distinguishes the dynamical aspects of several types of activity: physical (motor), social-verbal, and intellectual. The recording of the time required to complete two tests showed that subjects with higher Social Tempo required less time to complete the task requiring fast reading and comprehension of the text and quick switches from one topic to another. This association of a specific class of performance with a specific tempermental trait supports the activity-specific approach. From this perspective, the speed of performance of verbal tasks should not be simply attributed to a general arousal (or to a general factor of Extraversion, or general Mobility), but should be measured with scales specifically designed to assess the lability of performance in verbal and social activity.

The estimated school grades also correlated with the scales of the STQ-77 in a very specific manner. There was a strong correspondence between the highest correlations on each of the three types of school activities and the STQ-77 scales assessing the dynamical aspects of the corresponding activities: physical, verbal, and intellectual, and much weaker correlations with the remaining scales. The pattern of these correspondences was in favour of the activity-specific model although the effect sizes related to social-verbal and intellectual activities were not as high as the effect sizes for physical activities, but still statistically significant at the $p = 0.001$ level. This weakened effect size might arise because academic performance in social-verbal and intellectual activities is subject to more confounding factors such as continuing maturation of the frontal and temporal cortex of the teenage brain, or social and cultural factors, which

have a bigger impact on performance in social and mental activities than in athletic assignments in school years.

These results appear to reflect the sub-specialization of sensory-motor, temporal and frontal cortical areas according to at least three types of activities. One reason why the other models of temperament and personality were not emphasizing individual differences based upon the neurobiology of physical, verbal and intellectual abilities is that historically the studies of such differences were carried out in different areas of psychology. For example, studies of the types of nervous systems started in the psychophysiology of animals consequently missing "human" types of activities: verbal-social and mental-intellectual. Personality models, on the other hand, were mostly derived from the lexicon describing human behavior and were heavily loaded by descriptors used in social interactions, with less focus on physical and intellectual types of human activity. Studies of intelligence focused on the ability for abstraction and were somehow detached from other aspects of everyday activities. The STQ approach helps to overcome the parochialism of personality theories and neurophysiological models and to make them compatible with the point of view of the dynamics of activity.

The other results are based on statistically significant, albeit weaker, correlations, which are nevertheless interesting from the perspective of the phenomenon of "projection through capacities" described by Trofimova (1999). Projection through capacities suggests that a person perceives and organizes his or her life based mostly on internal capacities rather than on external requirements and expectations. First, the Ergonicity and Tempo scales for both Motor and Social, and the Plasticity scale of the STQ-77 positively correlated with the internal locus of control, as demonstrated in the tendency of people with higher physical tempo to be capable of long and/or intense activities and mobility. Second, the positive correlation of the Motor Ergonicity and Tempo scales of the STQ-77 with the I_7 Venturesomeness scale can be also understood as a "projection through capacities": physical capacities, such as energy level and lability of the individual influence the choice of stimulation, and the perception of the probability of success, which may explain why more energetic and mobile people had higher scores on the Venturesomeness scale of the I_7.

The STQ-77 as well as the other two tests used in this study were self-report measures and had limitations common for such measures, and the experiment and estimated school grades were able to reflect the content of only some, but not all STQ-77 scales. As the STQ-77 has 12 temperamental scales, it is impossible to investigate all scales in a single study and to cover all aspects of the STQ-77 in a single article. Future studies are needed to complement the study reported in this article.

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