THE CULTURE OF TIME IN NEUROPSYCHOLOGICAL ASSESSMENT: DO CULTURE-SPECIFIC TIME ATTITUDES EXPLAIN THE DIFFERENCE IN TIMED TEST PERFORMANCE BETWEEN RUSSIAN AND AMERICAN ADULTS?

Anna V. Agranovich

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Clinical Psychology) in the Department of Psychology.

Chapel Hill
2009

Approved by:

A. T. Panter, Ph.D. (Chair)

Karen Gil, Ph.D.

Joseph Lowman, Ph.D.

Antonio E. Puente, Ph.D.

Scott Schwartz, Ph.D.

Karla L. Thompson, Ph.D.

ABSTRACT

Anna V. Agranovich
The Culture of Time in Neuropsychological Assessment:
Do Culture-Specific Time Attitudes Explain the Differences in Timed Test Performance between Russian and American Adults?
(Under the direction of A. T. Panter, Ph.D.)

This study examines the relationship between attitudes toward time and performance on timed neuropsychological tests. Numerous publications indicated presence of cultural differences in attitudes toward time, but no published research yet addressed the challenges that individuals from cultures dissimilar to that of test-makers may face in formal testing due to cultural variations in time attitudes. To assess and compare attitudes toward time and being timed when tested, a measure of time attitudes relevant to timed test performance, Culture of Time Inventory- 33 items (COTI-33), was developed and validated in English and Russian, using 560 American and 517 Russian respondents. A stable and very similar five-factor model emerged across samples, revealing the following dimensions of time attitudes: (1) planning; (2) punctuality; (3) time management; (4) event-time orientation; and (5) attitudes to time-limited tests. COTI-33 was established to have high construct and discriminant validity and reliability. Subsequently, a 100 Russian and American adults completed COTI-33 along with a battery of timed neuropsychological tests, including: Color Trails Test (CTT): Parts 1 and 2; Ruff Figural Fluency Test (RFFT); Symbol Digit Modalities Test (SDMT); and Tower of London-Drexel Edition (ToL^{Dx}). The American group significantly outscored the Russian group on CTT1, CTT2, SDMT, and ToL^{Dx}

initiation time. The difference in ToL^{Dx} Total time and RFFT only approached significance at α =.05. The presence of cultural differences contradicted previously reported "culture-fairness" of these tests. Cultural differences also emerged in COTI-33 factor scores, where Americans rated Planning and Punctuality significantly higher than Russians. The differences in time attitudes partially mediated cultural differences in performance on CTT1, SDMT, and ToL^{Dx} initiation time, but did not account for the effect of culture in CTT2. In addition, significant effect of culture was revealed in ratings of familiarity with testing procedures, where a half of the Russian sample endorsed the lack of prior experience with timed and/or standardized tests. Familiarity with standardized testing was negatively related to the scores on CTT, ToL^{Dx}, and SDMT, suggesting that individuals who lack familiarity with standardized testing procedures tend to obtain lower scores on these times neuropsychological measures.

To Amy and Alina

ACKNOWLEDGEMENTS

Many would agree that writing a dissertation is similar to traveling along a long and uneven path, which sometimes appears clear and straightforward, but oftentimes takes unpredictable turns, and occasionally threatens to throw one "off the cliff." Writing a dissertation also means traveling along a "road not taken" or, at least, not well developed, and hence such turns, obstacles, and cliffs tend to happen rather often. It would be very difficult, if at all possible, to hold on the path, to persevere and keep moving forward alone. I have been lucky to receive plenty of support, encouragement, advice, and motivation from my mentors, my family, and my colleagues, and I am deeply grateful to each and every of them for helping me see this project through.

The path that led to this project originated quite a few years prior to beginning of my doctoral research. I am forever indebted to Dr. Antonio Puente, whose input in my career and life is immeasurable. I thank Dr. Puente for facilitating my transition from Russian to American psychology and for promoting my continuous involvement with both. His ideas and interest in cross-cultural neuropsychology helped shaping my research interests, and his continuous guidance and support throughout the years contributed immensely to my professional and personal growth.

My deepest thanks go to my dissertation advisors. Dr. Marilyn Hartman spent quite a few hours discussing and shaping the proposal. This dissertation would never materialize without Dr. Abigail T. Panter's continuous support, encouragement, and excitement about my progress (however modest it seemed at times). As she helped me get through the

statistical analyses, she was always encouraging me to believe in myself, in my work, and in my eventual success.

I thank with all my heart the members of my dissertation committee, Drs. Karen Gil, Joe Lowman, and Scott Schwartz, for their wise advice, their input in the development and execution of the study, and their tolerance and patience as I was traveling this long path. Dr. Karla Thompson offered her guidance and support during my internship year and beyond, helping me staying on track with my research, and ensuring that I have sufficient time set aside for dissertation work.

Dr. Patrick Logue from the Duke University Medical Center has offered his mentorship and unconditional support for many years; I am deeply grateful for his wisdom and encouragement.

This cross-cultural project was made possible by collaboration with my colleagues and friends in Russia: Drs. Zara Melikyan, Janna Glozman, Yuri Mikadze, Andrey Ryzhov, and Tamara Khodyreva, as well as Anna Khasina and Elina Igaunis, who assisted in translating and pilot-testing my measures, finding volunteers for the study, and/or collecting the data for the second phase of the study in Russia.

I highly appreciate the assistance I received from statistical consultants Cathy Zimmer, Chris Weisen, and Sharon Christ from the UNC Odum Institute in helping me make sense of the data and statistical analyses.

Partial financial support for this study was provided by Smith Dissertation Research Grant of University of North Carolina at Chapel Hill.

Most of all, I am grateful, to the degree I cannot express in words, to my husband, Dr. Leonid Dzantiev – for believing in me, for supporting me, for tolerating my endless working

hours, for motivating me to work harder, for making me laugh when I felt desperate; for his patience, tolerance, and encouragement during this laborious process. I thank my parents in far-away Germany for their help and support throughout the many years of my schooling. I thank my daughters, Amy and Alina, for bringing joy and meaning into my life and into my work, and for maintaining a cheerful and happy attitude despite my “working all the time.”

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

Figure

LIST OF ABBREVIATIONS

APM – Advanced Raven Matrices

COTI – Culture of Time Inventory

CTT – Color Trails Test

EAI – Evaluation Anxiety Inventory

RFFT – Ruff Figural Fluency Test

SDMT – Symbol Digit Modalities Test

ToL^{Dx} –Tower of London, Drexel Edition

UNC-CH – The University of North Carolina at Chapel Hill

INTRODUCTION

The effects of the cultural environment on cognition attracted interest of psychologists and neuropsychologists as early as the 1930's (see Luria, 1976; Nell, 1999; Vygotsky, 1930/1996, for review). Almost 80 years later, the relationship between current models of brain-behavior interaction and various cultural contexts remains undefined. The assumption of universality of higher mental functions has led to partial or incorrect understanding of cultural effects on human behavior and is reflected in current predominantly western, male, and Caucasian-oriented methods of neuropsychological assessment (Puente & Agranovich, 2003). Since the early 1990s, neuropsychology as a discipline has displayed a noticeable increase in interest in cultural factors and many neuropsychologists now agree that "culture shapes the mind" (Hedden, Park, Nisbett, & Lijun, 2002, p. 66) and advocate for the influence of cultural environment on neuropsychological performance in multiple domains by addressing the lack of cultural sensitivity in neuropsychological assessment procedures (e.g., Ardila, 2001; Horton, 2008; Nell, 2000). Despite increasing awareness of cultural factors and their implications for the assessment, the shift to "culture-fair" neuropsychology is slow and challenging, and an acknowledged solution to challenges of cultural neuropsychology is yet to be found.

A clearly voiced concern in the literature alerts clinicians that application of the existing North American tests and norms across cultures is often inappropriate (e.g., Ardila, 1995, 2001; Ardila & Rosselli, 2003). As Cole (1997, p. 36) pointed out, it is necessary to "keep culture in mind" when evaluating individuals from diverse backgrounds. Without such

cultural awareness, assessment results could be misleading, and potentially invalid. Furthermore, Nell (2000) argued that it is unreasonable to expect that test adaptation, limited to adequate translation and content substitution for more culturally appropriate, would eliminate culture-mediated differences. These expectations rest on an assumption of universality of cognitive abilities and equate cultural effects with linguistic differences: "If mind, like brain, is one, and therefore unitary in all humans, then neuropsychological assessment founded on human universals will work equally well in London, New York, or the subsistence farming villages of South Africa and Brazil. If mind is many, however …then identical tests may make geniuses of average people in one culture and imbeciles of equally average people in another" (Nell, 2000, p. 13).

Some argue that a seemingly obvious solution would be norming the tests on various cultural groups. A number of neuropsychologists have warned, however, that development of culture-specific norms for the existing North American neuropsychological instruments may be neither practical nor appropriate (e.g., Manly, 2004; Puente, Judd, Naverrete, & Rosselli, 2004). Taking into consideration infinite diversity of cultures for which the tests could be potentially normed, development of the specific-enough norms for each cultural group does not appear feasible. For instance, Puente and colleagues (2004) emphasized that, if there were norms for Hispanics, they might be quite different for Mexicans, Cubans, Puerto-Ricans, etc., and it is unclear which of them would be sufficiently "culture-specific."

Even if culture-specific norms existed, they would not necessarily be culturally appropriate because tests measure skills, knowledge, and abilities specific for the culture of the test-makers, and such skills, knowledge, and abilities might be not salient for other cultures (Ardila, 1995; Ardila & Moreno, 2001; Puente & Agranovich, 2001, 2003). Because

culture dictates what is relevant in a particular situation, some constructs might not exist or not be comparable across cultural groups (Ardila, 1995, 2001; Puente & Perez-Garcia, 2000). That is, cognitive abilities measured by neuropsychological tests are culturally learned, and different environmental and cultural contexts result in varied patterns of abilities. What may be worth learning in the Western world does not necessarily make sense in the Far East, or in remote villages of Russia or South Africa. Even though basic cognitive processes might be universal, cultural differences in cognition reside more in the situations to which particular cognitive processes are applied than in the existence of a process in one cultural group and its absence in another (Ardila & Moreno, 2001). Therefore, when testing an individual who is culturally dissimilar to the culture of test-makers using a North American assessment measure, it is necessary to discriminate if poor performance on a given task is a result of a brain dysfunction, or is due to lack of familiarity with the culture-bound constructs that are being measured by that test (Nell, 2000; Puente & Agranovich, 2003).

Taking into account frequent relocation of people of various cultural backgrounds around the world due to economic, vocational, and/or political reasons, as well as increasing diversity within many countries, it is unclear how to account for all cultural effects in neuropsychological assessment. To produce valid results and useful recommendations, cultural factors need to be accounted for at every stage of the neuropsychological evaluation, including review of the records, interview, test administration, and interpretation. As noted by Massimini and Della Fave (2000), biology, culture, and individuals are three interacting systems; hence, one of them should not be evaluated without considering the other two. The neuropsychological assessment results that are taken out of the cultural context, in which an examinee's mind has developed lack ecological validity.

Concept of Culture in Neuropsychology

The challenges of cross-cultural neuropsychological research begin with the definition of the key concept, *culture.* Some of the earliest studies of culture as a unique phenomenon can be traced back to the Greek historian and philosopher Herodotus (Cole, 1997). Currently, there are a number of definitions in use (see Herskovits, 1948; Triandis et al., 1972). Triandis (1972) proposed a useful discrimination between physical (e.g., tools, buildings, works of art, etc) and subjective (e.g., social norms, roles, beliefs, and values) cultures, implying that it is possible to be assimilated in the physical culture (i.e., a majority culture in one's country) but carry on a different subjective culture (i.e., maintain a life style, traditions and beliefs of a minority culture or a country of origin). Generally, culture refers to a body of customary beliefs and social norms that are shared by a group of people (Wong, et al., 2000). This definition is used in the present study, and the terms *culture-specific attitudes* and *cultural factors* are used interchangeably and refer to the above definition.

The theoretical background of cultural neuropsychology stems from the earlier work of Vygotsky and Luria (see Luria, 1976; Vygotsky, 1930/1996, for review). Vygotsky proposed that the origin of higher mental functions is located "not in the hidden properties of nervous tissue, but outside the organism of the individual person, in objectively existing social history, which is independent of the individual" (cited in Luria, 1965, p. 338). According to Luria (1980), cognitive functions are seen as complex functional systems that develop in historical context and change during ontogenesis, where social relations among people underlie all higher functions and their relationships. Luria's notion of "functional system" refers to a constellation of the brain areas involved in the executing a specific higher mental function. Each of these brain areas contributes to the function according to its own

individual characteristic. The same brain area may "belong" to several different functional systems and take part in different higher mental processes (Luria, 1966/1980). According to Luria-Vygotsky's theory, these brain networks develop in accord with cognitive experience in a specific cultural environment.

In the last two decades, research in cross-cultural neuropsychology has supported Luria-Vygotsky's theory. For example, Golden and Thomas (2000) suggested that culturally different individuals may approach problems with different functional systems. Cultural differences were reported to affect differential cortical activation during visual processing (Gutchess, Welsh, Boduroglu, & Park, 2006). Cultural norms, attitudes, and beliefs were reported to influence the approach to and performance on neuropsychological measures (Kotik-Friedgut, 2006). Clutural differences in the results of neuropsychological tests have been associated with familiarity with a testing situation (Ardila, 2001; Puente & Perez-Garcia, 2000), values and meanings behind specific test items (Ardila, 2001), attitudes towards time (Agranovich & Puente, 2007; Perez-Arce & Puente, 1997), modes of knowing (Ardila & Moreno, 2001; Greenfield, 1997; Luria, 1979), and patterns of abilities relevant in a specific culture (Ardila, 1995, 2001; Puente & Perez-Garcia, 2000).

According to the *Code of Fair Testing Practices in Education.* (2004), test employed in educational systems should be "fair to all test takers regardless of age, gender, disability, race, ethnicity, national origin, religion, sexual orientation, linguistic background, or other personal characteristics." Ideally, the same guidelines should apply to psychological and neuropsychological tests. However, such "fair" tests are difficult to come across.

The testing situation per se could present a very unfamiliar experience for a person from a cultural environment where one-to-one personal communication with a stranger is not

acceptable (Ardila, 2001). In some cultures clients would not allow a psychologist to "examine their mind" due to fear of testing or lack of testing experience; the data obtained in such cases should be interpreted with caution (Puente & Perez-Garcia, 2000).

The test content could also present a special challenge for an examinee because the values and meanings implied by certain test items may not necessarily transfer across cultures, regardless of how accurately and appropriately these items were translated. For example, a question "Why should people pay taxes?" from Wechsler Adult Intelligence Scales, 3rd Edition (WAIS-III, Comprehension subtest, Wechsler, 1997) may trigger different associations in a society where taxes are considered fairly spent as compared to a society where they are believed to be misused (Ardila, 2001; Greenfield, 1997). Items referring to animal protection could be perceived differently in hunting societies than in Western countries. Ardila (2001) reviewed numerous assumptions of Western cultures and compared them to values and meanings commonly observed in non-Western societies (e.g. countries of Latin America, Central Asia, and South Africa) and suggested that some of the cultural values that are common in the Western world (and are involved in the assessment procedure) might present a challenge for members of other cultural groups. Among such values are: the examiner's assumed background authority in the dyadic testing setting involving two strangers (examiner and examinee), the expectation of examinee's best and fastest performance on the test, and a stereotyped question-answer mode of communication.

Culture-specific influences are also prominent in language structures (Kotik-Friedgut, 2006), approaches to learning, and value placed on education (Hedden et al., 2002). Further, the quality of education, rather than a simple count of number of years of schooling, has a strong effect on neurocognitive functioning (Ardila, Rosselli, & Rosas, 1989; Markopoulos,

McLain, & Giuliano, 1997; Manly, Jakobs, Sano et al., 1999; Manly, Touradji, Tang, & Stem, 2003).

Although there has been growing attention to and awareness of cultural bias in existing neuropsychological measures, many North American standardized tests are being translated and used across cultures, with or without sufficient adaptation (Paul, Gunstad, Cooper, Williams, Clark, Cohen, et al., 2007). Therefore, it is critical to study the extent and means by which cultural factors could potentially affect performance on neuropsychological tests and take them into account when conducting evaluations of culturally dissimilar individuals.

Helms (2001) emphasized the importance of addressing several levels of equivalence in cross-cultural neuropsychological assessment. Functional equivalence refers to an extent to which the test scores have the same meaning in different cultural groups and measure the same psychological constructs with equal accuracy within these groups. Conceptual equivalence is a level of familiarity with the test items. Linguistic equivalence is the extent to which the language used in the tests has equivalent meaning across cultural groups. Psychometric equivalence is described as the extent to which tests measure the same construct at the same level across cultural groups. Contextual equivalence refers to the evidence that the cognitive ability being assessed is comparable across environments. In addition, it is important to maintain the testing condition equivalence and the sampling equivalence.

The present investigation is focused on the effects of culture-specific time attitudes on neuropsychological performance. Although attitudes towards time have been identified as one of the potential sources of cultural influence on neuropsychological test results

(Agranovich & Puente, 2007; Paul at al., 2007; Perez-Arce & Puente, 1997), there has been no empirical research that specifically addressed the effect of time attitudes on the outcome of timed neuropsychological tests. Perez-Arce and Puente (1997) argued that slowed performance on timed tests could mean prolonging a task of interest for a Hispanic (i.e., if an examinee is interested in a task, he/she would not rush to finish it but would rather enjoy the process), while a North American psychologist would likely interpret such behavior as a sign of brain dysfunction. Although time is a critical variable in American culture and in the testing settings, it is not necessarily as important for other cultures. Similar observations have been reported by Ardila (2001) and Levine (1997). Noteworthy, these suggestions are based on the authors' personal observations, many of whom are of Hispanic origin and/or had vast experience of working with clients from diverse backgrounds. Empirical support for these claims is limited. As will be discussed in detail below, several surveys of time attitudes have been developed and some of them have been applied in cross-cultural settings (e.g., Block, Buggie, & Matsui, 1996; Rojas-Mendez, Davies, Omer, Chetthamrongchai, & Madran, 2002; Sirsova, Mitina, Boyd, Davydova, Zimbardo, Nepryaho, et al., 2007). Unfortunately, none of the existing measures have been specifically linked to timed test performance in the neuropsychological assessment setting.

Given that most North American neuropsychological instruments are timed (Camara, Nathan, & Puente, 2000), it is very likely that cultural attitudes toward time could affect test results. Hence, it is particularly important to investigate how time attitudes might be associated with cultural diversity in the results of neuropsychological assessment. The first step in studying this construct is to define a multidimensional concept of time attitudes and to

examine its aspects that might influence a test-taker's approach to and results of neuropsychological tests.

Time attitudes: Defining the Concept

Publications in philosophy, anthropology, sociology, social psychology, consumer research, and marketing have been devoted to studying cultural differences in temporal behavior (e.g., Block, et al., 1996; Borodowsky & Anderson, 2000; Cotte, Ratneshwar, & Mick, 2004; Fraisse, 1963; Ko & Gentry, 1991; Rojas-Mendez et al., 2002). All of them agree that studying time presents a special challenge, as it seems virtually impossible to come up with an accepted definition of the concept. The challenge is that, although time is a fundamental dimension of human experience which is shared by all human beings, it can be "viewed" and experienced differently depending on an individual's cultural background and environment (Birth, 2004; Block et al., 1996). There is a consensus that attitudes towards time are socially constructed (Brislin & Kim, 2003; Ko & Gentry, 1991) and are unique for each culture. Time has been referred to as "silent language" of a culture (Hall, 1959, p.38), which affects people's behavior. Considering this metaphor, it is easy to infer that there might be as many differences in attitudes toward time as there are different cultures. Hence, understanding cultural attitudes towards time is important for understanding how people live and think.

Cultural differences in temporal behavior have been reported in time perception (Hill, Block, & Buggie, 2000), beliefs about time (Block et al., 1996; Hill, Block, & Buggie, 2000), prevalence in time orientation towards past, present, or future (Block et al., 1996; Rojas-Mendez et al., 2002; Sodowsky, Maguire, Johnson et al., 1994), pace of life (Levine & Norenzayan, 1999), metaphors of time (Birth, 2004; Dahl, 1995), characteristics of time-

styles (Cotte, Ratneshwar, & Mick, 2004), and attitudes towards time (Brislin & Kim, 2003; Rojas-Mendes, et al., 2002). Noteworthy, despite different terminology, time conceptualizations overlap to some degree. Some concepts fit into two or more categories of time, and even seemingly distinct categories are related. For the purpose of this investigation, categories of temporal behavior have been combined in greater, overarching clusters. The major clusters of conceptualization of cultural differences as they pertain to time are *time perception* and *time attitudes*.

Time perception is the experience or awareness of passage of time (Lehnon, 1967). According to Lehnon, time perception can be divided into four categories: (1) external time (clock time); (2) internal time estimates (internalized clock); (3) subjective time awareness; and (4) subjective time perspective. The former two categories refer to having an objective understanding of time, while the latter two refer to having a subjective experience of time. Culture has been reported to affect both of the subjective categories. Most cross-cultural research has focused on the subjective time perspective, particularly as it applies to culture's primary focus on the past, present, or future (Ko & Gentry, 1991). Studies in social psychology indicated that temporal perspective plays a fundamental role in people's social pursuits; it affects one's motivation, cognition, and emotions, as well as influences judgment, actions, and decision making (Sanna, Parks, Chang, & Carter, 2005; Sircova, et al., 2007; Zimbardo & Boyd, 1999).

Another dimension of time refers to as *time attitudes.* Brislin and Kim (2003) proposed a division of time attitudes into two major clusters: attitudes towards flexibility of time and attitudes towards pace of time. The major distinction in the first cluster is between clock and event time, which is closely related to importance placed on punctuality and

discrimination between task and social time at work settings. *Pace of time* refers to the prevalence of fast versus slow pace of life in a certain culture which, in turn, is reflected in the predominant time orientation (past, present, or future) and attitudes towards efficiency versus effectiveness.

Relevant to the clock versus event time distinction is the division between monochromic (m-time) and polychromic (p-time) time cultures (Hall, 1976). In the m-time cultures, the emphasis is on doing one thing at a time, being prompt, and adhering to schedules. Hall associated m-time with the prevalence of future-orientation. In contrast, in the p-time cultures several activities happen at once, people switch back and forth among various activities and place emphasis on interpersonal involvement and interactions rather then observance of schedules. P-time orientation is associated with present and past orientations. Hall suggests that Western cultures are likely to utilize m-time, whereas p-time is more common for Latin American and Mediterranean countries.[1]

According to Levine and colleagues (Levine, 1997; Levine & Norenzayan, 1999), in predominantly clock-time cultures, people are more concerned with scheduled appointments, make sure their watches and clocks are precise, and consider it inappropriate and/or impolite to be late for scheduled events. By segmenting the day, Western world individuals designate specific times for their daily activities. Rojas-Mendez and colleagues (2002) suggested that clock time is related to future orientation in individualistic, industrial, Western-type societies. This notion is also supported by Hall (1976) and Levine (1997), who pointed out that North

[1] There are contradicting views on time orientation prevailing in a certain culture. For instance, Brislin and Kim (2003) suggest that American culture can be described as present-oriented, which is reflected in prevailing tendency to live more in the here-and-now and have short-term perspectives, where time efficiency is important, and time is divided into smaller intervals to keep a good record of its use. They suggest that future-oriented cultures are characterized by more long-term perspective, taking relatively long time to have events started, as is often observed in the countries of Latin America.

American and Western European countries are predominantly clock-time-oriented. Time is seen as a valued commodity; therefore more time ought to be spent on subjectively important issues, time should be "used wisely, saved, and not wasted" (Brislin & Kim, 2003, p. 369). Illustrations of this attitude are imbedded within the culture (e.g., being paid hourly wages, hiring assistants to do less challenging work, and buying gadgets that are supposed to save time).

In contrast, event-time orientation, which is most common in Latin America, Russia, some Eastern European and developing countries, implies that behavior is largely determined by the natural course of events. Thus, it is appropriate to participate in an event until it reaches its natural end, and then start another event, without being too concerned about adhering to specific schedules. Similar to Hall's (1976) description of p-time, the emphasis here is on people and events rather than on schedules (Levine, 1997). These cultures are more present-oriented and tend to perceive time as more "flexible, elastic, relaxed, unlimited" (Brislin & Kim, 2003, p. 379), where time is to be "enjoyed" rather than "saved" (Perez-Arce & Puente, 1997; Puente & Agranovich, 2003; Puente et al., 2004).

Closely related to the distinction between the clock and event times is cultural emphasis on punctuality. For instance, in the clock-oriented Western World, being punctual for meetings, events, and appointments is subjectively more important than in event-time oriented Russia (Tongren et al., 2001), Latin and Mediterranean countries, and developing countries (Birth, 2004; Brislin & Kim, 2003).

In individualistic and collectivistic societies, there is a difference in time allocation to work and leisure during the work hours (Brislin & Kim, 2003). Manrai and Manrai (1995) observed that socializing during work day occurs more frequently in collectivistic cultures,

where development of the relationships is more critical for success of collaborative work than an individual accomplishment. In the United States, the average division of task versus social time at work is reported to be 80:20 per cent, whereas in India, Nepal, and Latin America the typical division of work and leisure time during work hours is 50:50 (Brislin & Kim, 2003). These and similar observations (e.g., Levine, 1997) are analogous to the distinction between clock and event time orientation, as well as m-time versus p-time conceptualization. Specifically, prevalence of social interaction at work has been noted in event-time or p-time cultures, which are often described as collectivistic societies.

A classifying dimension of *pace of life* was described by Levine and colleagues (Levine, 1997; Levine & Norenzayan, 1999), who found that the degree of emphasis on time is closely related to the pace of life: the more seriously people treat time, the faster the pace of life is. Pace of life, in turn, affects cultural concepts of time, which are reflected in attitudes toward efficiency at work. For example, whereas "fast service" is frequently seen as an equivalent to a "good service" in the United States, this is not necessarily the case in other cultures (Birth, 2004; Nell, 2000; Puente & Agranovich, 2003). Levine and Norenzayan (1999) found that cultural differences in the pace of life and attitudes towards time are particularly prominent between individualistic and collectivistic societies, where the individualistic cultures tend to be faster than collectivistic. According to Triandis (1995), this difference could be explained by a greater emphasis on individual achievement in an individualistic culture compared to prevailing emphasis on affiliation in collectivistic cultures. Achievement orientation leads to greater concern with time, in contrast to prevailing focus on well-being of the group in a collectivistic environment. This distinction is relevant for the present study because the chosen target comparison country, Russia, traditionally has

been a collectivistic culture and, despite its changing political and economic situation, the collectivistic attitudes are deeply imbedded in the culture.

In summary, the literature on time attitudes suggested that cultural differences play a role in people's approaches to and beliefs about time. More specifically, culture determines the prevalence of clock or event time orientation and dictates how much emphasis is placed on planning, observing schedules, or adhering to deadlines. Culture influences the pace of life, which, in turn, affects values placed on time and timeliness. Most publications reflected theoretical and anecdotal support for cultural influences on time attitudes; the empirical studies in this area are scarce. The next section is focused on reviewing empirical research devoted to development and utilization of time attitudes measures in cross-cultural studies.

Measures of Time Attitudes across Cultures

Several measures of attitudes toward time have been developed in the United States (Block et al., 1996; Fransis- Smythe & Robertson, 1999; Ko & Gentry, 1991; Rojas-Mendes et al., 2004; Zimbardo & Boyd, 1999), and a few of them have been applied in cross-cultural settings. Of the existing measures, most assess cultural differences in time orientation, particularly in the prevalence of the focus on past, present, or future, and/or the effect of culture on personal time experiences. The measures of time attitudes that have been used in cross-cultural contexts and contributed to the development of the present study are reviewed below.

Several cross-cultural studies of temporal behavior have been conducted using Temporal Inventory on Meaning and Experience (TIME), originally developed by Block and colleagues in the mid-1980's (Block et al., 1983-84). The questionnaire assesses beliefs about time and temporal experiences and is reported to be culture-sensitive (Block et al,

1996). This measure, however, only assesses a very limited scope of temporal attitudes, focusing on cultural orientation towards past, present, or future.

TIME has been applied in a series of studies with various cultural groups. Block and collaborators (1996) investigated differences in Japanese, Malawian, and American college students. Factor analyses revealed that beliefs concerning physical time and personal time differed across the three cultural groups, but beliefs about experienced and remembered duration were similar. Hill and colleagues (Hill, Block, & Buggie, 2000) applied the same concepts to studying differences in time attitudes in native African, African American, and White American samples. The results revealed significant effect of culture only in beliefs about physical time. These studies consistently revealed presence of cultural differences in beliefs about personal time and temporal experiences (e.g., greater importance of present over past, or future, in different cultural groups). The authors acknowledged limited validity and reliability of their findings due to lack of representative samples.

Cultural time orientation has been studied in the field of consumer research. Ko and Gentry (1991) developed a measure of time orientation using past versus future orientation paradigm. They compared responses of American and Korean students and found that future orientation prevailed among Americans, while past orientation was more prominent among Korean participants. Although the study had a number of limitations (e.g., small and non-representative samples), it brought to light possible cultural differences in time attitudes.

Rojas-Mendez and colleagues (2002) followed Ko and Gentry's (1991) initiative in the attempt to develop a valid and reliable survey for cross-cultural studies in consumer research. They tested their measure in UK, Saudi Arabia, Thailand, and Chile. The authors addressed the equivalence issues and established functional, metric, and conceptual item

equivalence in their measure, entitled Time Orientation Scale. The questionnaire included three constructs from the time attitude literature: (1) time orientation (past, present, or future), (2) time pressure, and (3) time planning. According to Rojas-Mendez and colleagues, these factors were confirmed in each cultural sample as well as across cultures. They reported presence of cultural differences in importance placed on past, present or future, as well as in item loadings for some factors. For example, in the Chilean group, planning factor included a statement with negative score: "I like things that happened unplanned", while in the groups with Western values this item did not have a significant loading. Such cultural differences suggest that certain patterns of thinking, behavior, or attitudes could be salient in one culture and irrelevant in another.

While cultural prevalence and/or importance placed on past, present, or future have been addressed in other measures (e.g., Block et al, 1993-94; Hill et al, 2000; Ko & Gentry, 1991), findings of cultural differences in attitudes toward planning and time pressure by Rojas-Mendez and colleagues (2002) present an important contribution to understanding of culture affects aspects of time. These two attitudes (planning time and time pressure) might affect the way people of various cultural backgrounds approach timed tasks and their approach to assessment per se.

Zimbardo and Boyd (1999) studied the past-present-future time orientation among North Americans with a focus on individual differences. They developed a measure of time perspective, Zimbardo Time Perspective Inventory (ZTPI), which assesses individual's temporally based beliefs, preferences, and values. Although the authors only identified factors related to emphasis of future, present, or past, many of the items in the questionnaire seem to reflect constructs also described by Rojas-Mendez (2002), such as time planning and

time pressure (e.g., “I make list of things to do,” or “It upsets me to be late for appointments,” respectively). The scale was developed in accord with the values of Western societies and its content appeared to be limited to ambitions, tasks and demands common in the Western world (Zimbardo & Boyd, 1999). Subsequently, the measure was translated and evaluated in other cultural contests, including Italy, Spain, France, and Russia (see Sirsova, 2005; Sircova, et al., 2007, for comparative review), revealing cultural differences in factor composition, although the models were found to be similar across these countries.

Overall, existing research on time attitudes in various cultural settings has indicated the presence of culture-specific factors that affect the way people perceive time-related concepts. None of the existing measures, however, addressed the influence of time attitudes on results of timed tasks, such as psychological, achievement, or vocational tests.

With regard to the effect of time attitudes on neuropsychological assessment, there is yet no published research. The studies and observations reviewed above, however, indicate that underlying culture-imposed time attitudes could account for substantial part of cultural differences found on neuropsychological measures where fast performance is critical. Importantly, in North America, students are exposed to timed tests from the beginning of elementary school and learn that working quickly on their assignments is as important as doing them correctly (Nell, 2000). Furthermore, research has shown that in the United States, students from the dominant culture are more “test-wise” (i.e., more accustomed to the approach and strategies necessary to succeed on a test) than their peers from non-dominant groups (Sternberg, 1984). Since majority of the neuropsychological tests are developed in North America and reflect the culture of test-makers, it is important to assess how culture-

specific time attitudes affect results of psychological assessment. The present study is designed to address this concern.

Rationale and Study Overview

Numerous publications indicated the presence of differences in attitudes toward time across cultures (e.g., Birth, 2004; Block, et al., 1996; Brislin & Kim, 2003; Borodowsky & Anderson, 2000; Ko & Gentry, 1991; Levin, 1997; Rojas-Mendez, et al., 2002); however, no published research addressing the challenges that taking timed tests can present to individuals from cultures dissimilar to that of test-makers yet exists. Hence, it is critical to develop a valid and reliable instrument to evaluate attitudes towards time relevant to one's experience with timed neuropsychological tests.

The goals of the present study were to assess and compare attitudes towards time and being timed when tested in Russian and American non-clinical adult samples, and to find out whether cultural differences in time attitudes affect neuropsychological test performance. In particular, the goals of the present study were: (1) to develop a questionnaire that would measure attitudes towards time and timed test performances for use across cultures; (2) to explore if differences in attitudes towards time, assessed with the proposed questionnaire, exist between Russian and American cultural groups; (3) to compare neuropsychological test performance of non-brain-damaged adults from Russia and the United States on timed neuropsychological tests to investigate the effect of culture on test results; and (4) to assess the relationship between culture-specific attitudes towards time and neuropsychological test performance in the two cultural groups.

The choice of Russian and American cultures is justified for several reasons. First and foremost, despite the fact that both Russia and the United States have strong schools of

Neuropsychology, the approaches to assessment have traditionally been quite different. The major difference is thought to be between North American quantitative, psychometric approach versus qualitative, individualized methods of assessment developed by Luria (1966/1980) that are predominantly used in Russia (see Tupper, 1999 for review). In addition, Russian and North American methods of neuropsychological assessment differ in their usage of timed measures as there are no standardized timed procedures in the original Lurian methods (Luria, 1966/1980). Even though the approach to neuropsychological evaluation utilized in Russian neuropsychology evolved and underwent some modifications (Homskaya, 1995, 1999; Korsakova, Mikadze, & Balashova, 2001; Vasserman, Dorofeeva, & Meerson, 1997), fast performance is seldom required during assessment procedures.

Increasing collaboration between American and Russian neuropsychological schools (Akhutina, Glozman, Moskovich, et al., 2005; Glozman & Tupper, 1995; Tupper, 1999) has resulted in mutual influence and enrichment. While Luria's theory has gained more popularity among Western neuropsychologists, Russian neuropsychologists have been adapting some of the North American tests and incorporating them in the existing assessment batteries. This collaboration appears fruitful and beneficial for individual patients and neuropsychology as a whole. However, to increase benefits of such collaboration, cultural differences ought to be considered. Since cultural attitudes to time might significantly affect methods of neuropsychological assessment, it appears important to review how time attitudes discussed above apply to the Russian culture.

"Russian Time" versus "American Time"

A review of very limited literature addressing temporal attitudes and behaviors in Russia suggested that time-related attitudes and skills (i.e., timeliness, promptness,

adherence to deadlines, and time efficiency) are not as relevant or not as well developed among Russian people as they are in American culture (Agranovich, 2005; Tongren, Hecht, and Kovach, 2001). The author has personal bi-cultural experience of differences between American and Russian people's understanding of "being on time" versus "late," and frequently observed that "Russian time" appears to have more flexible subjective units than "American time."

Time in Education

Cultures vary in their methods of teaching and cognitive assessment. In contrast with the American educational system, the school system in Russia historically has not utilized timed tests. Furthermore, oral exams prevail over written tests, and it is common to provide extra time upon request to finish an assignment, without penalty. An emphasis is placed mostly on quality and depth of information processing and presentation, while efficiency and time limits are by and large irrelevant and/or ignored.[2] Therefore, people in Russia are not generally as concerned with completing assignments or tests quickly and/or on time. This pattern is also reflected in neuropsychological assessment. For example, one of the major Russian handbooks of neuropsychological assessment (Vasserman, Dorofeeva, & Meyerson, 1997) suggests that the speed of testing must be individualized and that a neuropsychologist should not require that a patient works quickly on a task – a far cry from standardized North American approaches.

[2] There is no word for "efficiency" in the Russian language; both effectiveness and efficiency have the same meaning.

Time in Business

On the basis of their observations of and experience with working in Russian-American joint businesses in 1990s, Tongren and colleagues (2001) provided a comparative review of Russian and American approaches to public relations and business, with emphasis on the importance of recognizing the effects of cultural differences. Among other factors, they described differences in time orientation and efficiency, by contrasting American emphasis on the "clock time" (reflected in a tendency to view time as divided into distinct time slots for work, play, and "quality time," as well as in value placed in being prompt and on time) with Russian "event-time" approach, where time is divided among various activities that seldom require promptness (Tongren et al, 2001). In Russia, efficiency is not equal to the promise of the best outcome, but rather can be seen as a trade-off between quality and speed (Agranovich, 2005; Agranovich & Puente, 2007; Tongren at al., 2001). In his book "A geography of time," Levine (1997) alludes to flexibility of "Russian time", describing common (and culturally acceptable) tardiness for appointments; he further notes that words "hurry" and "rush hour," when translated in Russian, do not carry the urgency that they have in English (p. 7).

On a side note, literature search conducted in the Russian language throughout the existing Russian databases did not reveal any publications addressing time management skills. According to Khasina (in press), all presently existing training programs and workshops on time management in Russia exclusively utilize North American techniques and approaches.

It is reasonable to expect that cultural time attitudes in educational and business settings as well as in less structured environments might be reflected in the approach Russian

people take when working on tasks with pre-set time limits and, in particular, on timed neuropsychological measures. The notion that the differences in the culture of time between Russia and the United States translates in differences in timed neuropsychological test results was earlier investigated by the author and is the focus of the present study.

Relevant Prior Research

In the prior studies (Agranovich, 2005; Agranovich & Puente, 2007), the authors compared performances on timed and un-timed neuropsychological measures in closely matched samples of American and Russian normal adult volunteers. They employed eight neuropsychological tests, which had been selected according to the criteria set forth for cross-cultural research, as described by Ardila (1995) and Helms (1997), and had been previously described as "culture-fair" in empirical cross-cultural studies. In addition, a brief cultural attitudes scale was administered to assess familiarity with timed procedures, subjective importance of completing tests "as fast as possible," and relevance of the procedures to participants' common everyday experiences.

Despite assumed "culture-fairness" of the selected tests, the results revealed a significant effect of culture in the performance on Ruff Figural Fluency Test (RFFT) and Color Trail Test (CTT) - the only timed standardized North American tests used in the study. The American group scored significantly better on both tests. At the same time, there were no significant differences in performance on other tests, where speed of performance was not reflected in the scores. The authors pointed out that should American-validated norms for CTT be applied to the scores of Russian participants, 27.5 percent of the Russian sample would fall in the borderline to impaired range, while only one of the American participants scored in the below-average range. They proposed that these differences should not be

interpreted in terms of differences in of attention, concentration, or planning strategies, assessed by these tests. Rather they might be attributed to absence of exposure to timed tests and rare occurrence of experiences where timed performance is required or measured in everyday routine of Russian people. Indeed, the Russian group rated relevance of the tests to everyday experience and familiarity with testing procedures significantly lower compared to the American group.

The study results can only be viewed as preliminary due to a number of limitations, including small sample size and the cultural attitudes scale design. Nonetheless, the study illustrated culture-specific nature of cognitive abilities, earlier addressed in literature review and discussed extensively by Ardila (1995) and Greenfield (1997), and suggested that culture-specific attitudes could play a role in performance on timed tests. It also provided support to the notion that understanding the ecological validity of the neuropsychological tests is critical for the valid interpretation of the results (Ardila, 2001; Perez-Arce & Puente, 1997). To further investigate how culture-bound time attitudes may affect approach to and performances on timed tests, the present study focused on development of a valid and reliable measure of time attitudes and investigated the effect of the cultural differences in time attitudes on timed neuropsychological test scores.

Study Overview

The effect of culture-specific time attitudes on the results of timed neuropsychological measures was examined in Russian and American adults. To compare culture-specific approaches to relevant aspects of time, a measure of attitudes toward time and being timed when tested, entitled *The Culture of Time*, or COTI, has been developed and validated in the USA and in Russia (in English and Russian, respectively). The measure was

designed to assess the following dimensions of time: (1) analytic versus spontaneous approach to planning time; (2) attitudes towards punctuality and deadlines; (3) efficiency and time pressure; (4) clock versus event time orientation; and (5) attitudes to time-limited tests. It was expected that Russian and American groups would differ significantly in their pattern of answers for each dimension. In particular, Americans were expected to rate planning, efficiency, and punctuality higher than Russians, while the latter group would be more event-time oriented.

Subsequently, Russian and American adults were administered a short battery of standardized timed neuropsychological tests, and the COTI-33, revised after the first stage. The tests were selected according to the criteria set forth for cross-cultural neuropsychological research (e.g. Ardila, 1995, Helms, 1997; Puente & Agranovich, 2003; Puente & Perez-Garcia, 2000), which were discussed above. Furthermore, selected tests were relatively simple and easy to administer, and sampled a relatively large range of cognitive abilities. All items in the measures were reviewed for appropriate cultural content with regards to the intentions of each item, and the measures themselves have been accurately translated according to cognitive equivalence.

This study was designed to follow up and extend the earlier findings (Agranovich & Puente, 2007), which suggested that Russians and Americans differ in their performance on timed tests due to cultural differences in attitudes toward and experience with being timed when tested. It was expected that American group would outscore the Russian group across the timed measures. It was also expected that such cultural differences would be at least partially explained by culture-specific differences in attitudes towards time and timed test performance as measured by the COTI.

The study was conducted in two stages. The first stage constituted the psychometric development of a questionnaire for measuring attitudes toward time across cultures. The second study stage included neuropsychological assessment combined with COTI administration to examine the effect of time attitudes on timed neuropsychological test performance.

STAGE 1: DEVELOPMENT OF THE CULTURE OF TIME INVENTORY

The first phase of the project constituted a development a valid and reliable measure of time attitudes that would be applicable for cross-cultural research and potentially used in conjunction with the timed psychological tests to help understand influence of culturally determined attitudes toward time on test performance. The measure was developed in English and Russian, simultaneously. Although the study focuses only on two cultures, North American and Russian, the questionnaire was designed so that it could be adopted across various cultural groups.

Method

Content composition and pilot testing

The pilot version of a questionnaire entitled Culture of Time Inventory (COTI, see Appendix A) consisted of two parts: (1) general time attitudes and (2) attitudes toward timed tests. Part 1 of the measure included statements that reflected the following proposed dimensions: (1) Planning time; (2) Time management or efficiency; (3) Punctuality; and (4) Clock-time versus event-time orientation. Each dimension was measured by several items, some of which were derived from the existing time attitudes questionnaires, some represented modification of items from published measures, and others were created to reflect the time dimensions reviewed above. Part 2 of the COTI consisted of statements reflecting approaches specific to taking time-limited tests. Table 1 provides description of the

Table 1

Distribution of Culture of Time InventoryItems by Proposed Factors.

Dimension/ Statements	Source
Clock-time versus Event-time orientation	
For me, work and leisure time are separate.	1
I tend to do more than one thing at a time.	2
It upsets me to be late for appointments.	3
I do not tie my schedule to specific time slots and try to take care of whatever comes up.	new
I prefer to completely finish one task before starting another.	1
When I am involved in an activity, I do not pay attention to the time.	new
I am comfortable changing plans at the last minute when something more interesting or important comes up.	new
It is more important to enjoy what I am doing than to get it done within a certain time limit.	new
I prefer NOT to plan my day ahead but to go with the flow of events.	new
Punctuality	
I work more efficiently when I have a deadline.	new
However insignificant the task, it is important to have it done on time.	3
It is important for me to be on time.	4
It is OK to be late with what I consider low priority tasks.	new
I tend to be late to scheduled events.	new
I believe that a person’s day should be planned ahead.	new

Table 1 (Continued)

Distribution of Culture of Time Inventoryitems by proposed factors.

Planning	
I prefer to follow a schedule that I set in advance.	3
I use an appointment book or a planner to schedule ahead.	2
I try not to postpone things for later.	2
I make lists of things to do.	new
I do things impulsively, without planning.	3
I make decisions on the spur of the moment.	3
I tend to postpone doing things until the last moment.	3
I find it important to be efficient at my work.	3
Time Management/ Efficiency	
I try to have my work done by a specific time and then enjoy my spare time.	new
I often mix work and leisure activities, even if it means taking longer to have work done.	1
Being efficient at work is not among my high priorities.	new
I do not waste time.	new
I am often in a rush.	2
If I finish a task ahead of schedule, I am pleased.	2
I look at my watch frequently.	2
I constantly look for ways to save time.	2
I meet my obligations on time.	2

Table 1 (Continued)

Distribution of Culture of Time Inventoryitems by proposed factors.

I complete projects on time by making steady progress.	new
If things don't get done on time, I do not worry about it.	3
I take time doing things at my own pace, without rushing.	3
It is important for me to do a task well, no matter how long it takes.	new
I am not concerned with "saving time" - there is time for everything.	new
I believe that time is to be enjoyed as much as possible.	new
I tend to lose track of time when I am doing something I like.	new
There always will be time to catch up on my work.	new
I am not generally concerned with completing tasks as quickly as I can.	new

Note. Items that were derived or modified from published studies are marked accordingly in the "Source" column. New = this item was generated by the experimenter; 1 = Hall (1976); 2 = Rojas-Mendez et al. (2002); 3 = Zimbardo and Boyd (1999); 4 = Brisling and Kim (2003).

items selected for each of the dimensions and indicates the sources from which the items were drawn.

To address the construct validity of the measure and to control for bias in response patterns, each construct/factor was measured by several items of similar content with different wording. For example, the dimension *Planning* was reflected in the statements: "I prefer to schedule events ahead of time" and "I make lists of things to do." For each dimension, 50 to 60 percent of the statements were affirmative (e.g., "It is important for me to be on time"), and 40 to 50 percent were negative (e.g., "I am not concerned with how quickly I work"). For consistency purposes, all the COTI statements were respondent-oriented (i.e., presented in form of as I-statements).

In Part 1, responses were measured using a five-point Likert-type scale, where participants rated the degree of agreement with a statement from the least (1 = Completely Disagree) to the most (5 = Definitely Agree). To avoid order effect, the statements were randomized for each participant. In Part 2, the sixth option, *Not Applicable* has been added to the five -point Likert scale described above, to account for possible responses from the participants who do not have experience with timed tests. The pilot version of the measure consisted of 50 items (Appendix A).

Translation

The initial COTI development was conducted in English, although each item and the general framework of the questionnaire have been considered from a bi-cultural and bilingual English-Russian perspective. To establish conceptual equivalence of the measure, careful translation and back translation was conducted. The questionnaire was translated to Russian independently by three bilingual Russian-English speakers, for whom Russian is the native

tongue and who grew up in the Russian culture. Items, which were found inapplicable or were inconsistently translated by two or more individuals, were reworded so that all three translators agreed on the wording.

To ensure that translation was as precise as possible, the questionnaire was back-translated into English by two bilingual native English speakers. Any discrepancies in translation were addressed to equate the measures according to conceptual, functional, and metric equivalence. To ascertain functional equivalence, the items reflected the activities that are customary in both cultures and are relevant to both lifestyles. The metric equivalence requirement was addressed by making sure that the psychometric properties of the instrument show similar structure of the factors in both cultures (Rojas-Mendez, et al., 2002).

The Russian version of the measure is presented in the Appendix B. To minimize problems with translation and ensure conceptual equivalence, it had been pre-tested on 10 bilingual Russian Americans, residing in the United States, and five bilingual individuals, who received education in American institutions and presently reside in Russia.

Validation

Given that many COTI items might be related to measurements of individual differences, a brief measure of the "Big Five" personality traits was included with the questionnaire package to assess the discriminant validity of COTI. For the American sample, Big Five Inventory - 44 Items (BFI-44; John, Donahue, & Kentle, 1991) was employed. The BFI-44 assesses the following dimensions: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. The measure and scoring are presented in the Appendix C.

Several versions of Big Five Personality tests exist in Russia. The most widely excepted measure (Goldberg & Shmelev, 1993) is only partially similar to BFI and differs significantly in the meaning of the fifth factor ("Openness to Experience"), which in Russia is defined as "Intellect" and is measured by a number of logical and mathematical problems. This test takes over 60 minutes to complete and is reported to be anxiety-provoking, given that some of the problems, contributing to the "Intellect"' factor might be challenging and not be easily solved. Therefore, for the purpose of this study, a briefer (40 items) and most similar to the BFI-44 version of the Russian "Big Five" tests (Gretsov, 1995) was selected. It is presented in the Appendix D.

Participants

American group.

The American sample consisted of 570 non-brain-damaged adult volunteers age 18 to 45 years. Table 2 presents descriptive information about this sample. To ensure diversity and representativeness of the sample, recruitment of volunteers was not limited to a convenience sample available though the University of North Carolina at Chapel Hill participant pool (N = 200), but also involved various recruitment strategies in a broader community (N = 370), including email advertisement through the UNC informational email system, word of mouth (via email), and classified ads placed on the internet-based advertisement sites (http://raleigh.craigslist.org/vol; http://www.raleighlist.org/community/general). The content of the advertisement is presented in the Appendix E. Responses from 14 participants were excluded from the analysis, due to not meeting the native language (n = 3) or age (n = 5) requirements, or omitting responses to numerous items (n = 6); data from 556 volunteers from the United States were included in the analyses.

Table 2

Demographic Profile of the American (USA), Russian, and combined (global) Samples, Phase 1.

Variable	Global	USA	Russia
Gender, %:			
Male	37.4	40.1	34.4
Female	62.6	59.9	65.6
Age: Mean (SD)	26.84 (7.3)	26.33 (8.1)	27.38 (6.3)
Age range, %			
18-25	51.3	57.4	44.7
26-35	34.3	24.6	44.7
36-45	14.4	18.0	10.6
Education, years:			
Mean (SD)	15.89 (2.7)	15.77 (2.9)	16.01 (2.3)
Range	10 - 23	12 - 23	10 - 23
Education Level, %			
High School	7.4	8.1	6.6
Some college	29.6	44.1	14.1
College or equivalent	18.5	11.7	25.7
Some graduate school	21.2	14.2	28.8
Graduate/professional	23.3	21.9	24.8
Total sample size	1073	556	517

Russian Group.

The Russian group (N = 520) was recruited via similar methods in Moscow, St. Petersburg, Ryazan, and Tomsk over the course of eight months, in collaboration with colleagues from the Department of Psychology of the Moscow State University.

Recruitment strategies included email advertisement, recruitment among student population in exchange for a partial course credit in one of the psychology courses, and a word of mouth (via email), as well as advertisement on numerous university-affiliated internet sites and general public forums (e.g., http://kluver.3dn.ru/news; http://forum.myword.ru/; http://www.flogiston.ru/forum/; http://community.livejournal.com/msu_psy). Three participants missed too many answers and were excluded. The final sample included responses from 517 participants. Exploratory data analyses did not reveal any notable outliers among the respondents in either of the samples.

All efforts were made to match the samples according to gender, age, and education. In an attempt to collect as large and as diverse samples as possible, the only restrictions on the participation criteria were the age range (18-45 years), native language, and cultural background. Collected samples did not differ significantly by gender ($t(1071) = -1.78$, $p = .108$), age ($t(1071) = -1.46$, $p = .145$), or years of education ($t(1071) = 1.42$, $p = .155$). Although the groups differed in terms of self-reported level of education ($t(1071) = -3.99$, $p < .001$, $d = .24$), this self-reported difference is not necessarily meaningful.

Educational categories were worded similarly in both languages, but there are still noticeable cultural differences in educational systems and meaning of degrees between Russia and the United States. In Russia, until very recently, all institution of higher education

required five full years of residence. Often, the degree awarded upon graduation from a university would be equivalent to a Master's in the United States, which in Russia it is considered a "professional degree." In contrast, Ph.D. programs in Russia traditionally have not required a formal enrollment in coursework and primarily involved independent research, with an average time frame for obtaining a Ph.D. ranging between two to four years post college/university. Therefore, although many of the Russian participants reported having an advanced degree, these self-reported degrees are not necessarily equivalent to those awarded in the Unites States. Also, the absence of a participant pool in Russia did not allow for as large a sample of college students as in the USA. Nonetheless, the samples appear comparable according to subject variables.

Procedure

The participants recruited via the UNC-Chapel Hill participant pool system completed the questionnaire online at the online experiment participation system for Introductory Psychology students in the Psychology Department, located on the Human Participation in Research website at https://hpr.msu.edu/UNC/HPRExperimenters/. This software permitted participants to complete the study individually, in a private setting. Participants logged on, indicated consent to participate, and completed the questionnaire. Participants were given the option to submit questions about the study or the consent process by e-mail. Each participant completed the questionnaire in one one-hour experimental session and received one credit toward completion of the research participation requirement in the Introductory Psychology course.

American volunteers recruited via other means completed the measure online at https://uncodum.qualtrics.com. All Russian volunteers completed the Russian language

version of the measure online at https://uncodum.qualtrics.com. The procedure was identical to the one described above.

All identifying information was removed by the software to preserve participants' confidentiality. Each participant read an informed consent in his or her native language (English or Russian) prior to completing the questionnaire and indicated the agreement to participate in the study. The Informed Consent forms in both languages are provided in the Appendix F.

Data Analyses

Due to the lack of similar studies, no data exist to provide information about estimated effect sizes. According to MacCallum and colleagues (MacCallum, Widaman, Zhang, & Hong, 1999; MacCallum, Widaman, Preacher, & Hong. 2001), for a 33-item scale, where the number of items per factor ranged from four to ten, adequate sample size should be between 100 and 500, where the latter would be recommended "under the worst conditions" of low communalities and a larger number of weakly determined factors (MacCallum et al., 1999, p. 96). Thus, obtained sample of 1013 participants (556 and 517 participants per group), was more than sufficient to achieve high power results.

Negatively worded items (e.g., "I prefer not to plan my day ahead but to go with the flow of events") were recoded. Each sample (American, Russian, and combined/global) was randomly divided into two halves, and the Exploratory Factor Analysis (EFA) was conducted on a random half of each sample, using the Mplus 5.1 (Muthén, & Muthén, 2007) and SPSS 15.0. EFA was performed for two to six factors, using the Maximum Likelihood algorithm, and the factor structure in Oblique (Promax) rotation was examined. Each solution was explored by assessing scree plots, distribution and size of the item loadings, and a possible

interpretation of each solution. Subsequently, Confirmatory Factor Analysis (CFA) was performed on the other random halves of each sample to assess consistency of factors within and across cultures using the Mplus 5.1. The following indices were examined to assess the model fit: (1) Comparative Fit Index (CFI), (2) Tucker-Lewis Index (TLI), and (3) Root Mean Square Error of Approximation (RMSEA). Values of CFI and TFI greater than .95 are considered to be indications of a good model fit (Shumacker & Lomax, 2004). According to Browne and Cudeck (1993), RMSEA values below to .05 indicate close fit, values between .05 and .08 indicate good fit, and those between .08 and .10 indicate mediocre fit.

Results and Discussion

Exploratory Factor Analyses (EFA)

Initially, all fifty COTI variables were included in the analysis. Consistent with the proposed model, in numerous trials, the five-factor model emerged across the three samples (see Appendix G). Thirteen of the initial 50 items had small (below | .4|) and not statistically significant loadings across cultural groups and the global sample and therefore were excluded. These items were: COT2: “I look at my watch frequently;” COT4: “For me, work and leisure times are separate;” COT11: “I prefer to completely finish one task before starting another;” COT12: “I work more efficiently when I have a deadline;” COT17: “It is important for me to do a task well, no matter how long it takes;” COT19: “I am often in a rush,” COT20: “I am not generally concerned with completing tasks as quickly as I can;” COT21: “I tend to do more than one thing at a time;” COT26: “If I finish a task ahead of schedule, I am pleased;” TT2: “When taking a test with a time limit, I don’t start paying attention to time until a few minutes before the end of the test;” TT4: “When working on a timed test, my only concern is to answer the questions correctly;” TT6: “When taking a timed

test, I try to pace myself, monitoring how much time I spend on each item;" and TT9: "When taking a test with a time limit, I try to finish it as quickly as I can."

EFA was subsequently performed on the 37-item questionnaire, separately by each cultural group and for the combined sample, again revealing a five-factor model. Although most items loaded consistently on the same factors in both cultural groups and in the global sample, several items loaded on a certain factor in one cultural group, but did not load on any of the factors in the other. Thus, item COT35: "Being efficient at work is not among my high priorities," did not load to any of the factors in the American or global samples, but contributed to factor "Time Management" in the Russian sample. In contrast, items COT10: "I take time doing things at my own pace, without rushing," and COT34: "There always will be time to catch up on my work," only loaded on factor "Event-time" in the American sample but did not load on any factors in the Russian or global samples. For consistency purposes and because the questionnaire has been developed for use across cultures, these three items were excluded from subsequent analyses. EFA was performed on a 34-item measure, again revealing a stable five-factor model.

Of note, some items loaded on more than one factor in at least one of the groups. Also, some differences emerged in distribution between the Russian and American samples. Thus, item COT13: "I do things impulsively, without planning," had large loadings across samples on both "Planning" and "Event time." Item COT16: "I am comfortable changing plans at the last minute when something more interesting or important comes up," loaded on both "Planning" and "Event-Time" in the American and global samples, but only contributed to "Event-Time" in the Russian groups. Item COT 28: "I am not concerned with saving time; there is time for everything," contributed to two factors ("Planning" and "Event-time")

Table 3

Exploratory Factor Analysis for Global (Gl), Russian (RUS), and American (USA) Samples: Planning.

Variable Name	Variable Content	Gl	RUS	USA
COT3	I do not tie my schedule to specific time slots and try to take care of whatever comes up.	**.56**	**.61**	**.47**
COT7	I believe that a person's day should be planned ahead.	**.69**	**.74**	**.77**
COT13	I do things impulsively, without planning.	**.45**	**.68**	**.57**
COT16	I am comfortable changing plans at the last minute when something more interesting or important comes up.	.37	.35	**.48**
COT18	I prefer NOT to plan my day ahead but to go with the flow of events.	**.69**	**.77**	**.82**
COT 23	I prefer to follow a schedule that I set in advance.	**.74**	**.76**	**.85**
COT28	I am not concerned with saving time - there is time for everything.	**.42**	**.42**	**.42**
COT31	I make decisions on the spur of the moment.	.37	**.49**	**.51**
COT33	I make lists of things to do.	**.66**	**.56**	**.54**
COT38	I use an appointment book or a planner to schedule ahead.	**.65**	**.52**	**.57**
COT39	I constantly look for ways to save time.	**.50**	.38	**.50**
Cronbach α Coefficient		.84	.83	.85
Variance Explained, %		22.99	21.07	24.03

Note. Loadings above |.4| are bolded.

Table 4

Exploratory Factor Analysis for Global (Gl), Russian (RUS), and American (USA) Samples: Time Management.

Variable Name	Variable Content	Gl	RUS	USA
COT5	I do NOT waste time.	**.58**	**.53**	**.63**
COT9	I try not to postpone things for later.	**.67**	**.65**	**.66**
COT15	I mix work and leisure activities, even if it means taking longer to have work done.	**.56**	**.71**	**.46**
COT24	I find it important to be efficient at work.	**.43**	**.40**	.38
COT25	I tend to postpone doing things until the last moment.	**.75**	**.73**	**.84**
COT30	I try to have my work done by a specific time and then enjoy my spare time.	**.51**	**.50**	**.55**
COT32	I complete projects on time by making steady progress	**.71**	**.66**	**.73**
Cronbach α Coefficient		.80	.81	.81
Variance Explained, %		8.80	8.64	9.89

Note. Loadings above |.4| are bolded.

Table 5

Exploratory Factor Analysis for Global (Gl), Russian (RUS), and American (USA) Samples: Punctuality.

Variable Name	Variable Content	Gl	RUS	USA
COT1	It is important for me to be on time.	**.68**	**.75**	**.83**
COT6	It is more important for me to enjoy what I am doing than to get work done within a certain time limit.	**.44**	**.42**	.31
COT8	If things don't get done on time, I do not worry about it.	**.48**	.14	**.46**
COT14	I tend to be late to scheduled events.	**.55**	**.61**	**.72**
COT22	It upsets me to be late for appointments.	**.50**	**.45**	**.68**
COT24	I find it important to be efficient at work.	**.47**	**.48**	**.44**
COT28	I am not concerned with saving time - there is time for everything.	**.44**	.34	.31
COT29	It is OK to be late with what I consider low priority tasks.	**.66**	**.54**	**.62**
COT36	I meet my obligations on time.	**.56**	**.57**	**.56**
COT37	However insignificant the task, it is important to have it done on time	**.63**	**.54**	**.61**
Cronbach α Coefficient		.79	.75	.81
Variance Explained, %		6.83	7.18	6.91

Note: Loadings above |.4| are bolded.

Table 6

Exploratory Factor Analysis for Global (Gl), Russian (RUS), and American (USA) Samples: Event-Time.

Variable Name	Variable Content	Gl	RUS	USA
COT6	It is more important for me to enjoy what I am doing than to get work done within a certain time limit.	**.44**	.25	**.59**
COT8	If things don't get done on time, I do not worry about it.	.25	.11	**.48**
COT13	I do things impulsively, without planning.	**.74**	.33	**.48**
COT16	I am comfortable changing plans at the last minute when something more interesting or important comes up.	**.57**	.30	**.48**
COT18	I prefer NOT to plan my day ahead but to go with the flow of events.	**.73**	.18	**.56**
COT27	When I am involved in an activity, I do not pay attention to the time.	**.62**	**.73**	**.85**
COT28	I am not concerned with saving time - there is time for everything.	.31	.20	**.50**
COT31	I make decisions on the spur of the moment	**.70**	.31	**.44**
COT40	I tend to lose track of time when I am doing something I like.	**.58**	**.81**	**.55**
COT41	I believe that time is to be enjoyed as much as possible.	**.42**	**.40**	**.43**
Cronbach α Coefficient		.78	.74	.75
Variance Explained, %		5.39	5.11	5.64

Note. Loadings above |.4| are bolded.

Table 7

Exploratory Factor Analysis for Global (Gl), Russian (RUS), and American (USA) Samples: Timed Tests.

Variable Name	Variable Content	Gl	RUS	USA
TimeT1	I concentrate better on a test when it has a time limit.	**.63**	**.60**	**.74**
TimeT3	I dislike the idea of being timed when tested.	**.761**	**.75**	**.79**
TimeT5	I find it helpful to have a strict time limit on a test.	**.81**	**.82**	**.81**
TimeT7	The quality of my test performance is better when there is no time limit.	**.84**	**.90**	**.81**
TimeT8	I find tests with time limits stressful.	**.73**	**.70**	**.74**
Cronbach α Coefficient		.83	.80	.86
Variance Explained, %		4.39	4.77	4.46

Note: Loadings above |.4| are bolded.

in the American sample, loaded only on “Planning” in the global samples, but did not load in the Russian sample. Item COT31: “I make decisions on the spur of the moment,” also contributed differentially to “Planning” and “Event-Time” across samples. Items COT6: “It is more important for me to enjoy what I am doing than to get work done within a certain time limit,” and COT8: “If things don’t get done on time, I do not worry about it,” differentially contributed to “Punctuality” and “Event-Time” across groups. Initial factor loadings across the three samples are presented in the Appendix G. The results of the final EFA for each of the factors separately are presented in the Tables 3 through 7.

Confirmatory Factor Analysis (CFA)

CFA was conducted on the remaining random halves of the three samples. Initially, the five-factor structure, as shown in Tables 3 through 7, was tested. The model included several items that loaded on more than one factor. Initial solutions revealed an adequate but less than ideal model fit for the global (*CFI* = .92; *TLI* = .94; *RMSEA* = .08), Russian (*CFI* = .90; *TLI* = .93; *RMSEA* = .08) and American (*CFI* = .90, *TLI* = .94, *RMSEA* = .08) samples.

To achieve the simplest solution and improve the model fit, several modifications to the original tested model were included. Item COT28 (“I am not concerned with saving time, there is time for everything”) had very low and not statistically significant loadings on any factor across the three samples and therefore was excluded from the model. Modification indices were examined to identify particularly large areas of misfit, and items with high correlation errors modification indices (above 10.0) were added to the model, when the meaning of the items appeared to contribute to a specific factor. In total, four such additions were made.

In the global sample, item COT39: “I constantly look for ways to save time” was added to “Time Management.” In addition, inter-factor correlations were examined. As seen in Table 8, the correlations between factor “Time tests” and both “Planning” and “Time Management” were not statistically significant and approached zero. Therefore, these correlations were fixed at zero for further analyses. These modifications improved the model fit slightly for the global sample (*CFI* = 0.92; *TLI* = 0.95; *RMSEA* = 0.07). Although not “perfect,” this model fit is within acceptable limits for social science research (Browne & Cudeck, 1993; Hu & Bentler, 1995). All parameters in the global model were statistically significant at $p < 0.001$, and all the loadings were reasonably high, as presented in Table 9.

Similar steps were undertaken to derive the simplest model with the best possible fit for the Russian samples. As shown in Table 8, in the Russian sample, correlations of all COT factors with “Timed test” were not significant and approached zero, and therefore were eliminated. The final model had a reasonably good fit: *CFI* = 0.92, *TLI* = 0.94 and *RMSEA* = 0.07.

For the American sample, factor intercorrelations, modification indices, and individual item loadings along with their statistical significance were examined. Item COT18: “I prefer not to plan my day ahead, but go with the flow of event” had very low and not statistically significant contributions to “Event Time” and was removed. Correlations with high modification indices were examined. Item COT39: “I constantly look for ways to save time” was included in “Time Management.” Correlations between factor “Timed Test” and factors “Planning,” “Management” and “Punctuality” were removed from the model because their values were very low (approaching zero) and not significant, as shown in Table 8. These modifications improved the model fit (*CFI* = 0.95; *TLI* = 0.96; *RMSEA* = 0.07).

Table 8

CFA: Factor Correlation Matrices for Global, Russian, and American (USA) Samples

	Planning	Time Management	Punctuality	Event Time	Timed Tests
			Global		
Planning	-				
Time Management	.17**	-			
Punctuality	.22**	.33**	-		
Event-Time	.13**	.14**	.22**	-	
Timed Tests	-.01	.02	.06*	.06*	-
			Russian		
Planning	-				
Time Management	.17**	-			
Punctuality	.19**	.30**	-		
Event-Time	.04*	.04**	.05**	-	
Timed Tests	-.02	.01	.01	-.01	-
			USA		
Planning	-				
Time Management	.17**	-			
Punctuality	.25**	.27**	-		
Event-Time	.10**	.09**	.17**	-	
Timed Tests	.02	.01	.03	.08*	-

* $p < .05$; ** $p < .001$

The final solutions for the all three samples are presented in Table 9. Overall, the CFA results revealed comparable factor structures for both cultural groups and combined sample, and the CFA factor structure was very similar to that derived from the EFA. Factors "Panning," "Punctuality," and "Timed Tests" had identical item composition across samples. Three items, however, represent notable exceptions and contributed to differences between the two cultural groups in the final models for factors "Time Management" and "Event-time." Item COT39 "I constantly look for ways to save time" did not contribute significantly to the "Time Management" model in the Russian group, but was included in the American and global samples. Factor "Event-time" included item COT8 "If things do not get done on time, I do not worry about it" in the American sample, but did not in the Russian. In contrast, Item COT18 "I prefer not to plan my day ahead but to go with the flow of events" was included in the Russian model, but not in the American one. These subtle differences are likely to reflect different degree of relevance of time-related constructs in the Russian versus North American cultures.

A more rigorous comparison multiple-sample analysis across samples is beyond the scope of this project, especially given the content differences for items in each sample. Such detailed comparisons would warrant a separate study and are likely to become a focus of future research. The purpose of this project phase was to develop a measure of time attitudes that would be appropriate to use in cross-cultural studies along with timed neuropsychological tests. Given that similar factor structures emerged for two cultural groups and in the combined sample, and that the proposed factor structure was supported by CFA, the final 33-item version of COTI (presented in the Appendix H) appeared to serve this purpose well.

Table 9

Confirmatory Factor Analysis for the Random Half of the Global (Gl), Russian and American (USA) Samples.

Items	Global		Russia		USA	
	Load	S.E.	Load	S.E.	Load	S.E.
Factor 1: Planning						
COT3. I do not tie my schedule to specific time slots and try to take care of whatever comes up.	1.00	-	1.00	-	1.00	-
COT7. I believe that a person's day should be planned ahead.	1.40	.09	1.39	.11	1.52	.15
COT13. I do things impulsively, without planning.	.81	.09	1.04	.11	.78	.15
COT16. I am comfortable changing plans at the last minute when something more interesting or important comes up.	.83	.10	.43	.11	.65	.13
COT18. I prefer NOT to plan my day ahead but to go with the flow of events.	1.19	.09	1.19	.10	1.60	.15
COT23. I prefer to follow a schedule that I set in advance.	1.55	.10	1.41	.12	1.66	.16
COT31. I make decisions on the spur of the moment	.55	.09	.77	.11	.79	.14
COT33. I make lists of things to do.	1.12	.08	1.10	.10	1.05	.14
COT38. I use an appointment book or a planner to schedule ahead.	1.21	.09	1.15	.10	1.19	.14
COT39. I constantly look for ways to save time.	.64	.09	.76	.11	.80	.11
Factor 2: Time Management						
COT5. I do NOT waste time.	1.00	-	1.00	-	1.00	-
COT9. I try not to postpone things for later.	1.13	.08	1.29	.12	1.11	.10

Table 9 (continued)

Confirmatory Factor Analysis for the Random Half of the Global (Gl), Russian and American (USA) Samples.

Items	Global		Russia		USA	
	Load	S.E.	Load	S.E.	Load	S.E.
COT15. I mix work and leisure activities even if it means taking longer to have work done.	.69	.07	1.25	.12	.86	.10
COT24. I find it important to be efficient at work.	1.06	.09	1.13	.12	.46	.11
COT25. I tend to postpone doing things until the last moment.	1.26	.08	1.46	.13	1.26	.11
COT30. I try to have my work done by a specific time and then enjoy my spare time.	.92	.08	1.23	.13	1.05	.09
COT32. I complete projects on time by making steady progress.	1.23	.08	1.33	.13	1.03	.09
COT39. I constantly look for ways to save time.	.37	.07			.49	.09
Factor 3: Punctuality						
COT1. It is important for me to be on time.	1.00	-	1.00	-	1.00	-
COT8. If things don't get done on time, I do not worry about it.	.41	.06	.44	.08	.36	.08
COT14. I tend to be late to scheduled events.	.78	.04	.80	.07	.81	.06
COT22. It upsets me to be late for appointments.	.71	.05	.56	.08	.82	.06
COT29. It is OK to be late with what I consider low priority tasks.	.83	.04	.83	.07	.77	.06
COT36. I meet my obligations on time.	.89	.05	.85	.08	.45	.07
COT37. However insignificant the task, it is important to have it done on time.	.84	.04	.73	.08	.84	.05

Table 9 (continued)

Confirmatory Factor Analysis for the Random Half of the Global (Gl), Russian and American (USA) Samples.

Items	Global		Russia		USA	
	Load	S.E.	Load	S.E.	Load	S.E.
Factor 4: Event-Time						
COT6. It is more important for me to enjoy what I am doing than to get work done within a certain time limit.	1.00	-	1.00	-	1.00	-
COT8. If things don't get done on time, I do not worry about it.	.45	.10			.55	.17
COT13. I do things impulsively, without planning.	.76	.10	1.66**	.55	.93	.16
COT16. I am comfortable changing plans at the last minute when something more interesting or important comes up.	1.21	.12	1.58	.56	.54	.16
COT18. I prefer NOT to plan my day ahead but to go with the flow of events.	.39	.08	1.33**	.47		
COT27. When I am involved in an activity, I do not pay attention to the time.	1.23	.12	4.49**	1.49	1.30	.16
COT31. I make decisions on the spur of the moment.	.86	.10	1.91**	.61	.69	.16
COT40. I tend to lose track of time when I am doing something I like.	1.10	.11	3.39**	1.07	1.18	.17
COT41. I believe that time is to be enjoyed as much as possible.	.75	.09	1.28*	.54	.62	.12
Factor 5: Timed Tests						
Tt1. I concentrate better on a test when it has a time limit.	1.00	-	1.00	-	1.00	-

Table 9 (continued)

Confirmatory Factor Analysis for the Random Half of the Global (Gl), Russian and American (USA) Samples.

Items	Global		Russia		USA	
	Load	S.E.	Load	S.E.	Load	S.E.
Tt3. I dislike the idea of being timed when tested.	1.19	.04	1.28	.10	1.26	.06
Tt5. I find it helpful to have a strict time limit on a test	1.12	.04	1.28	.08	1.11	.06
Tt7. The quality of my test performance is better when there is no time limit.	1.16	.04	1.40	.10	1.12	.05
Tt8. I find tests with time limits stressful.	1.12	.04	1.31	.09	1.09	.05
Sample Size	551		273		270	
CFI	.92		.92		.94	
TLI	.95		.94		.95	
RMSEA	.07		.07		.07	
Cronbach α	.88		.86		.90	

Note. Dashes indicate the standard error was not estimated. CFI = Comparative Fit Index;

TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

*p < .05; **p < .005; all loadings without an asterisk are significant at p < .001.

Reliability of the COTI Scale

Assessment of the reliability of the COTI-33 scale revealed high Cronbach α coefficients for the global sample (α = .88), as well as for the Russian (α = .86) and American (α= 0.90) groups separately. These reliability coefficients are well within the acceptable range for exploratory scales (Nunnally & Bernstein, 1994). In addition, the reliability coefficients were calculated for each of the five factors. These coefficients ranged between 0.7 and 0.9, indicating sufficiently high reliability for each of the proposed factors and are presented in the bottom panel of Tables 3 through 7.

Relationship with "Big Five" Personality Traits

Some might argue that differences in punctuality or time management could be fully accounted by differences in individual personality traits. To ensure discriminant validity of the proposed time attitude scale (COTI-33), its factor structure was compared to the factor structure of the Big Five Inventory (BFI-44, John et al., 1991). The correlations between the two measures are given in Table 10. In both cultural groups, correlation analyses revealed significant and strong positive correlations with the Conscientiousness scale for the three of COTI factors (for American group: Planning, *r* = .53; Time Management, *r* = .69; and Punctuality, *r* = 49; for the Russian groups: Planning: *r* = .46; Time Management: *r* = .60; and Punctuality: *r* = .43). Significant moderate negative correlation was observed between the Event-Time orientation and Conscientiousness (for American sample: *r* = -.47; for the Russian sample: *r* = -.45). These data indicate that several time-related attitudes are related to a more general trait of conscientiousness.

In the American sample, Openness to Experience negatively and significantly correlated with Planning (r = -.22), Punctuality (r = -.12), and Time Management (r =-.22), although these correlations were rather small. In contrast, in the Russian sample, no relationship was observed between this personality trait and the COTI-33 factor scores. At the same time, Openness to Experience correlated positively and significantly with Event-Time orientation both in the American (r = .31) and in the Russian (r = .22) samples.

Overall, as was reasonable to expect, COTI scales designed to measure punctuality and time management skills were positively related to Conscientiousness in both samples, although the relationship was stronger in the American sample then in the Russian one. At the same time, these correlations were not high enough to indicate the any of these COTI factors would be fully accounted by individual differences in conscientiousness.

Furthermore, these results indicate that Conscientiousness might be seen as a multi-dimensional factor, which among other characteristics measures attitudes toward time and time management skills. The observed negative relationship between Conscientiousness and scores on Event-time orientation in both samples could also be interpreted in terms of time attitudes. According to Brislin and Kim (2003), in the event-time oriented cultures, time is not treated as such a valued commodity, and time-management skills and punctuality are not as emphasized or valued as in the clock-oriented schedules-driven western cultures.

Table 10

Correlation between BFI-44 personality traits and the Culture of Time Inventory (COTI-33) factors

BFI Factors	Planning	Time Manage-ment	Punctua-lity	Event Time	Timed Test
		American Sample			
Extraversion	-.08	.06	-.07	-.20	.03
Agreeableness	-.05	.15	.05	-.08	-.16
Conscientiousness	.53**	.69**	.49**	-.47**	-.03
Neuroticism	.24	-.03	.09	.19	-.10
Openness	-.22**	-.12**	-.22**	.31**	-.01
		Russian Sample			
Extraversion	-.08	.04	.04	.19	-.04
Agreeableness	-.05	.02	.14*	.12	.01
Conscientiousness	.46**	.60**	.39**	-.45**	-.02
Neuroticism	-.09	-.19	-.03	.14	-.07
Openness	-.04	-.01	-.06	.22**	.07

* $p < .05$ (2-tailed); ** $p < .01$ (2-tailed)

STAGE 2: TIME IN TIMED NEUROPSYCHOLOGICAL ASSESSMENT

The next phase of the study was conducted to examine if Russian and American non-clinical adult samples would differ in their performances on timed neuropsychological tests, and if such difference could be attributed to cultural differences in attitudes toward time and/or differences in experiences with being timed when tested. To investigate the relationship between time attitudes and timed tests results, neuropsychological screening was combined with COTI-33 administration. It was hypothesized that the American group would score better than the Russian group across the timed tests. Cultural differences in COTI-33 ratings were also expected to emerge and to explain, at least partially, the differences in timed test performance.

Method

Participants

Two groups of 50 adult volunteers, age 18 to 45, were recruited in the United States and Russia, respectively. To control for possible confounding effects of the subject variables, the samples were stratified and closely matched by age, education, and gender. Due to the difference in educational systems in Russia and the United States, which result in differences in number of years typically required to obtain a high school diploma or a college degree, the groups were matched by the education level (i.e. obtained degree or diploma) rather than by

number of years of schooling completed.[3] Although all efforts were made to make the samples as diverse and representative as possible, it was not feasible to include individuals with limited exposure to formal education, or those from severely disadvantaged social groups.

To ensure comparability of the samples, demographic characteristics (particularly related to education) were collected both as a part of the online questionnaire (COTI-33), and during in-person testing. For the Russian sample, the category "Education: degree" was interpreted according to the quality of reported degree (i.e., university degree obtained in a full time residency versus degree by mail or online; a degree from a four-year technical school or community college versus a five-year major university). The groups were equivalent in terms of sex (50:50 percent ratio of males and females in each sample), and did not differ significantly by age (t (98) = .21, p =.831), or level of education (t(98) = -.26, p =.793). Demographic characteristics of the samples are presented in Table 11.[4] Within the American group, 82.0 percent of participants self-identified as Caucasian, 12.0 percent as African American, 2.0 percent as Hispanic, and 4.0 percent as Asian-American. Ethnic characteristics were not collected for the Russian sample, where all participants were white. In terms of hand-dominance, 92.0 percent of American sample and 86.0 percent of the Russian samples were right-handed, and left-handed volunteers constituted 8.0 and 14.0 percent of the samples, respectively. The recruitment strategies for both American and Russian groups were identical to those described for Stage 1.

[3] In Russia, secondary school (including elementary, middle, and high school) operates on a six-day curriculum, and takes ten to eleven years to complete (a country-wide change from a 10-year to 11-year curriculum took place in early 1990s). According to the international credential evaluation agency, the World Education Services (WES), the Russian high-school curriculum is comparable to the North American.

[4] Matching of the Russian and American samples according to SES was not considered, given that in post-perestroika Russia education level and economic status do not generally correlate (Rivkin-Fish, 2009).

Only those volunteers whose native language was English (for the American sample) or Russian (for the Russian group), and who grew up in a respective culture were recruited in the study. Volunteers who were the students at the University of North Carolina at Chapel Hill received a partial credit in the Introductory Psychology course. Other qualified participants received monetary compensation for participation in the study. Because there historically has been no participant pool system in Russia, all participants from the Russian group received monetary compensation. Each volunteer read and signed an Informed Consent form in his/her native language (see Appendix F).

Procedure

American volunteers were tested individually in a comfortable private office atmosphere at the Department of Psychology at the University of North Carolina at Chapel Hill (by the author). The Russian participants were tested at similar conditions, at psychologist offices in Moscow or Ryazan, Russia, where testing was conducted by a qualified psychologist who had undergone prior training in standardized test administration.

To account for possible "experimenter's effect" in administration of time-limited tests, all test administration procedures were audio-recorded. Furthermore, data collection and test administration procedures were closely monitored via online and telephone collaboration, and all questions and concerns that emerged during the practice trials prior to the data collection were addressed. Subsequently, a qualified investigator evaluated selected recordings for adherence to time limits and standardized protocols.

The assessment procedure consisted of three steps: (1) health screening, completed over the phone prior to enrollment; (2) neuropsychological testing, and (3) completion of questionnaires online. Each participant completed the study in approximately 60 minutes.

Table 11

Demographic Profile of the Samples, Stage 2.

Variable	Global	USA	Russia
Gender, %			
Male	50	50	50
Female	50	50	50
Age, years:			
Mean (SD)	28.56 (8.37)	28.74 (8.68)	28.38 (8.13)
Median	28	28	28
Age range, %			
18-25	40	38	42
26-35	34	36	32
36-45	26	26	26
Education, years:			
Mean (SD)	15.22 (3.05)	16 (3.24)	14.44 (2.67)
Median	15	16	15
Range	10-23	12-23	10-18
Education level:			
Mean (SD)	3 (1.51)	2.96 (1.47)	3.04 (1.56)
Median	3	3	3
Degree, %			
High School	21	20	22
Some college	24	24	24
College or equivalent	15	20	10
Some graduate school	14	12	16
Graduate or professional	26	24	28
Total sample size	100	50	50

Screening

Volunteers were screened using a general health questionnaire (Appendix I), completed over the phone in participant's native language prior to the study. Volunteers with a reported history of traumatic brain injury, neurovascular incidents, psychiatric or seizure disorders, learning disabilities, Attention Deficit Hyperactivity Disorder, or color blindness were not included in the study.

Neuropsychological assessment

A brief battery of standardized neuropsychological tests described below was administered to each participant individually. To avoid the order effect, the test order was randomly varied.

Five standardized neuropsychological tests were selected from an existing comprehensive neuropsychological tests compendium (Lezak, Howieson, & Loring, 2004) according to the following criteria: the tests (1) matched requirements for cross-cultural neuropsychological research described above and were previously used in cross-cultural studies; (2) were non-verbal, to minimize effects of language differences; (3) had good psychometric properties; and (4) were timed. Thus, the test battery was comprised of the following measures.

1. Color Trails Test (CTT).

Trail making tests are among the most widely used measures in neuropsychological practice (Mitrushina, Boone, & D'Elia, 1999). The most recent of them is the CTT (D'Elia, Satz, Uchiyama, & White, 1994), which reportedly allows a broader application to cross-cultural studies compared to the original Trail Making Test A and B, while being similar to it

in terms of neuropsychological sensitivity (Maj, et al., 1993). CTT was developed as a measure of sustained visual attention and simple sequencing in individuals of 18 years of age and older. The test consists of two parts, CTT1 and CTT 2. On CTT1, the task is to draw a line connecting the circles numbered from 1 to 25 in numerical order regardless of the color of the circle - the odd numbers are in pink circles and the even numbers are in yellow circles. On CTT2 each number is presented twice, once in a pink circle and once in a yellow circle. The task is to draw a line connecting the circles in numerical order while alternating between the yellow and pink circles. The respondent must be able to recognize Arabic numerals and distinguish between pink and yellow colors. It is suggested that even if an individual is colorblind, he or she would still be able to detect the difference between colors on the basis of darkness, and hence to complete the task (D'Elia, et al., 1994).

The manual reports that test-retest reliability of the measure is .64 for CCT1 and .79 for CTT2. The test also is reported to have high construct validity, convergent validity, factorial validity, and criterion-related validity. The factor analysis of the CTT variables for the normative sample yielded four factors including speed of perceptual tracking, susceptibility to interference, simple perceptual sequencing, and impulsivity. For both parts of the test, the score represents the number of seconds taken to complete the task. Number of errors was also recorded according to standardized test procedures. For the purpose of this study, only two scores – times in seconds to complete CCT1 and CTT2 were included in the analyses.

2. Ruff Figural Fluency Test (RFFT).

RFFT (Ruff, 1996) is a measure of nonverbal fluency. It requires the respondent to generate as many different designs in a set period of time (one minute) by connecting

patterns of dots. The test was developed as a measure of nonverbal capacity for fluid and divergent thinking, ability to shift cognitive set, planning strategies, and executive ability to coordinate this process (Ruff, 1996). The test has been shown to be sensitive to right frontal lobe impairment. Reported test-retest reliability for RFFT the design scores is .76 (Ruff & Lights, 1987). The studies of the test's validity indicated that RFFT is sensitive to assessing planning, initiation, and divergent reasoning in clinical and nonclinical groups (Ruff, 1996). The test also appears to match the requirements for culturally appropriate methods of assessment, as it is short, easy to administer, and does not require any specific skills or knowledge that would differ significantly across cultures.

In the prior study, Agranovich and Puente (2007) reported significant differences in RFFT scores between Russian and American groups. Thus, inclusion of the measure in the present study was in attempt to replicate and confirm the earlier findings and to investigate if the differences might be attributable to culture-bound time attitudes. Two set of scores were collected for this test: (1) total number of unique designs created, and (2) error ratio, representing a ratio of total number of errors and total number of unique designs. For the purpose of the study, only the number of unique designs score was included in the analyses.

3. Tower of London-Drexel University.

The Tower of London-Drexel University (ToL^{Dx}; Culbertson & Zilmer, 2001) has been designed to assess higher-order problem solving and executive planning abilities. More specifically, ToL^{Dx} is sensitive to dysfunction in executive problem solving and planning, behavioral inhibition and impulse control, attentional allocation, cognitive flexibility, abstract reasoning, and rule-governed behavior. The test requires solving ten problems of ascending difficulty while being timed (plus two practice items) and takes approximately 10 to 15

minutes to complete. To solve each problem, an examinee has to place the beads in the target position(s) displayed by the examiner with the second set of beads, by moving colored beads one by one from one of the three sticks to another while following a number of rules. The instructions suggest that the problems should be solved in the least number of steps possible *and* as quickly as possible.

Generally, several scores are recorded, including total number of moves, total correct score (i.e., the number of problems solved using the minimum number of moves without extra moves), and three time scores, including Initiation time, Execution time, and Total Problem Solving time (which is the sum of the Initiation and Execution time). In addition, rule and time violations are recorded (i.e., if a particular problem is not solved in one minute, it is considered a time violation). For this study, only the Initiation Time and Total Time were compared.

Studies of ToL^{Dx} psychometric properties revealed that the test possesses moderate to high test-retest reliability ($r = .80$, $p < .001$) which was stable over time, and moderate temporal reliability ($r = .67$, $p < .001$) (Culbertson & Zillmer, 2001). The test underwent extensive criterion-related and construct-related validity testing, which suggested that ToL^{Dx} was a sensitive measure of executive problem-solving functions. ToL^{Dx} has been suggested as an appropriate test to apply across cultures (Nell, 2000) and it appears to satisfy all the requirements for culture-appropriate instruments discussed above.

4. Symbol Digit Modalities Test (SDMT).

Symbol Digit Modalities Test (SDMT, Smith, 1982) is a timed test of psychomotor performance. The test assesses complex scanning and visual tracking (Lezak, et al., 2004). An examinee is presented with a table of numbers one to nine and abstract symbols, where

each symbol corresponds to a certain number. Using the table as a key, an examinee is asked to fill missing numbers in the blanks by matching each of the presented symbols with a number. The test is timed and an examinee is given 90 seconds to write in as many numbers as possible. The score represents the number of correctly matched items. The test has been normed for adults 18 to 74 years of age. The test-retest reliability of SDMT ranges from .78 to .90 (Smith, 1982).

5. Advanced Progressive Matrices, Part 1 (APM).

This test was included along with the timed measures described above to ensure samples' equivalence according to general intelligence level. APM is a modification of the well-known Raven's Progressive Matrices (RPM, Raven, Court, et al., 1995) developed to test adults and adolescents of above average intelligence. The test requires the examinee to conceptualize spatial, design, and numerical relationships by choosing an answer from a multiple-choice answer key. According to the test manual (Raven, Raven, & Court, 1998), when the test is given in an un-timed mode, it assesses current capacity for perception and clear thinking. The test consists of two parts, APM 1 and APM 2. Most frequently, APM 2 is being used as a measure of nonverbal intelligence either alone or in combination with APM 1. It is suggested, however, that the APM 1 could be used separately for screening purposes and the results of the subtest are comparable to those of the standard version (Lezak et al., 2004; Raven, et al, 1998). APM 1 is comprised of 12 items of increasing difficulty and takes 5-15 minutes to complete. Reported test-retest reliability is very high for adults (r = .91) and its internal consistency is .73. The test has been standardized in several countries, including the Russian Federation, and matches the criteria set for cross-cultural neuropsychological assessment.

Only APM 1 was utilized in this study. The test administration was un-timed and a score representing the total number of correct responses across trials was used as a measure of general intelligence, to ensure comparability between groups.

Questionnaires

Culture of Time-33 Items (COTI-33) was administered to each participant upon completion of the neuropsychological assessment. The questionnaire was supplemented by a group of statements assessing participants' familiarity with testing situation and timed and/or standardized tests (Familiarity Factor), described in the Appendix I. In addition, a measure of test anxiety, Evaluation Anxiety Inventory (EAI; Richmond, Wrench, & Gorham, 2001), presented in Appendix K, was included to account for possible effect of evaluation anxiety on timed tests performance and on the responses about being timed when tested in the COTI-33. Although there are several test anxiety measures available, EAI was selected for its briefness in assessing the level of apprehension that people experience when they expect to be evaluated (usually by testing). The α reliability estimate for this instrument was reported to be above .85. The measure was translated and back-translated from English to Russian, following the translation requirements described above.

Immediately upon finishing the neuropsychological test battery, all participants completed all the questionnaires online, using a computer in the testing room. Upon completion of the assessment, each participant was debriefed as to the purpose of the study and was either given credit for participation (for UNC-CH students) or received monetary reimbursement.

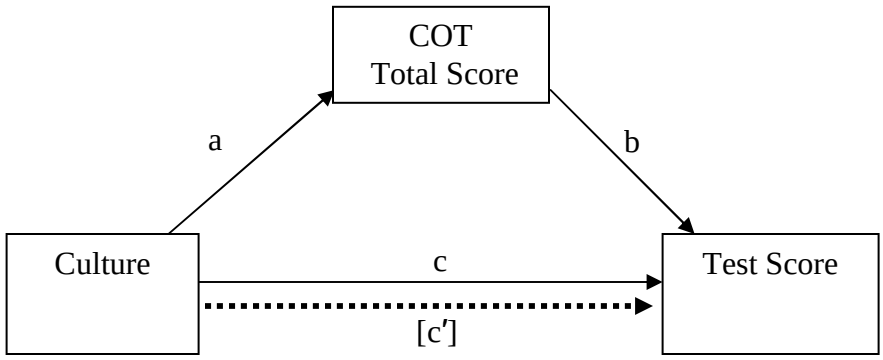
Data Analyses

According to a meta-analysis of 14 mediational studies in the field of psychology (MacKinnon, Lockwood, Hoffman, et al., 2002), a sample size between 50 and 100 individuals per group is sufficient to achieve high power results (.80 or higher), assuming medium effect size and a probability of Type 1 error set at α =.05. In particular, they report that, according to Sobel (1982), in a first-order mediational test a power of .86 with the medium effect size is achieved when a sample size equals 100. Because there are no guidelines or specific programs to calculate power for a specific model used in this study, Sobel's suggestion will be used as the closest in approximation to the present model. Thus, the sample size of a 100 participants (50 individuals for each cultural group) is more than sufficient for achieving high-power results.

As proposed by Preacher and Hayes (2008), an investigation of multiple indirect effects was conducted in two steps. The first step was to determine the total indirect effect by determining if the set of mediators (i.e., COTI-33 total score and all COTI-33 scores together) transmit the effect of culture on test performance, as shown in Figure 1-A. Step 2 constituted testing the hypotheses about the individual mediators, i.e. specific COTI-33 factor scores, in the context of the multiple-mediators model (see Figure 1-B). The goal of the second step was to investigate the specific indirect effects associated with each of the proposed factors as mediators.

The bootstrapping procedure for estimation of the total and specific indirect effects in mediational models as described by Preacher and Hayes (2004, 2008) was used to assess if cultural differences in the results of the neuropsychological tests are mediated by time attitudes assessed by COTI-33 and/or Familiarity Factor. In particular, each of the factor

A.



B.

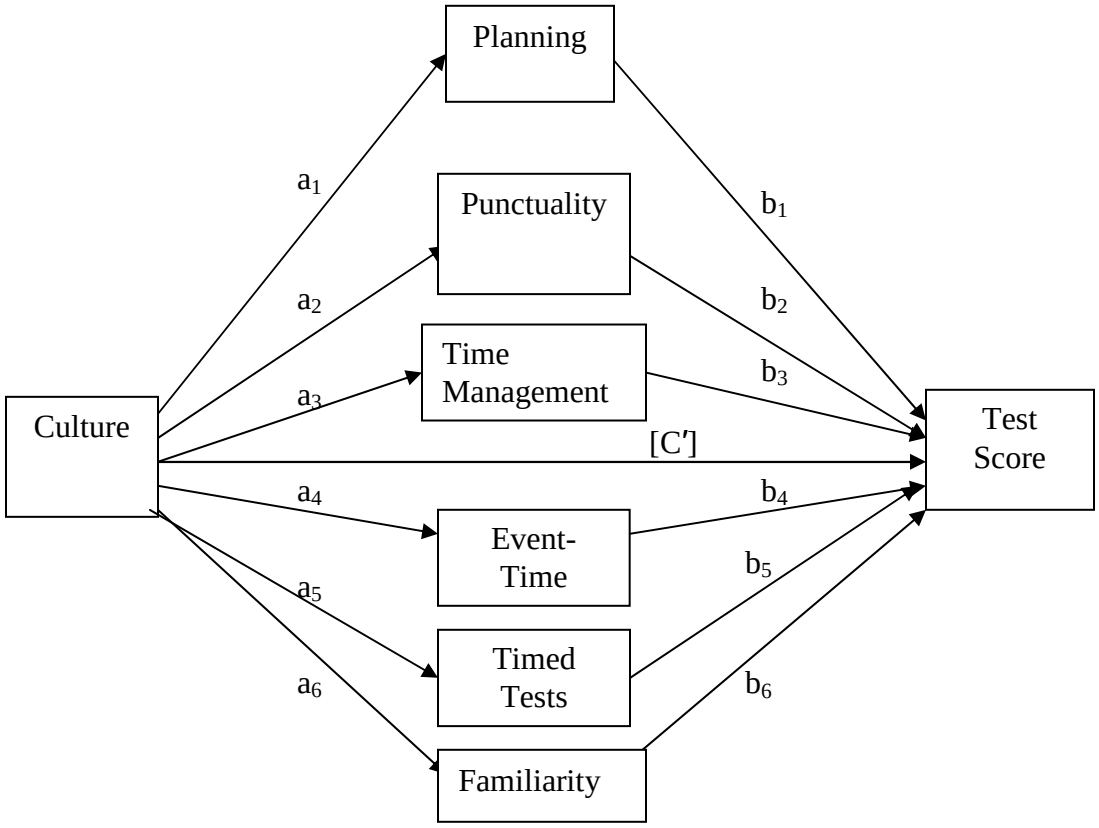


Figure 1. Illustration of (A) total indirect effect and (B) indirect effects in a multiple mediator model, where c is the total effect of Culture (IV) on Neuropsychological Test Score (DV), [c′] is the direct effect of IV on DV, and $a_i b_i$ are the specific indirect effects of DV on IV through mediators M_i

scores was entered separately in the model to assess if the effect of culture can be (at least partially) explained by any of the factors and/or combination of thereof. The bootstrap sampling distributions of the total and specific indirect effects were generated by creating a sample with replacement of size 1000 from the complete data set and calculating a total and specific mediation effects in the resample. The analysis was performed using interactive macros for SPSS developed by Preacher and Hayes (2008). Size and direction of the total and specific indirect effects, as well as program-generated confidence intervals were examined.

Results and Discussion

Exploratory Data Analyses

Between-group comparison of the ARM scores revealed no significant differences in estimated overall intelligence (t (98) = 1.78, p = .098). Given the lack of significant differences in scores on the measure of overall intellectual abilities, or in the subject variables described above, the samples appear to be comparable. Therefore only the raw scores for neuropsychological tests were included in the analyses. The descriptive statistics for each neuropsychological test score as well as tests for normality were used to describe the distributions of the scores in the two cultural groups and examine presence of possible outliers in the data. The distributions for all dependent variables approached normal and no significant outliers were identified in either cultural group. Descriptive statistics are presented in Table 12.

Table 12

Neuropsychological Test Results (Raw Scores) for the Russian and American (US) Groups.

Test: Score	Range		Mean		SD	
	US	Russia	US	Russia	US	Russia
CTT1:Completion Time, sec	18 - 47	16 - 71	27.78	35.30	6.93	11.57
CTT2: Completion Time, sec	36 - 88	40 - 109	54.30	64.94	11.67	16.89
RFFT: Unique Designs, N	71 - 146	50 - 128	105.46	99.26	16.40	17.73
ToL^{Dx}: Initiation Time, sec	9 - 104	22 - 209	49.26	66.98	24.43	39.30
ToL^{Dx}: Total Time, sec	100 - 390	110 - 577	221.72	247.68	69.59	85.31
SDMT: Total Score, N	46 - 80	33 - 84	62.76	58.12	8.89	11.12

Note. CTT1 = Color Trails Test, Part 1; CTT2 = Color Trails Test, Part 2; RFFT = Ruff Figural Fluency Test; ToLDx = Tower of London, Drexel Edition; SDMT = Symbol Digit Modalities Test.

Effect of Culture on Neuropsychological Test Scores

As was expected, across the measures, on average, the Russian groups took longer to complete timed tests or produced fewer items within the allocated time. As indicated in Table 13, initial analyses revealed significant cultural differences in test scores that were more profound for some timed tests than for others.

The large effect size was noted for significant cultural differences on both Color Trails Test (CTT) trials. This finding replicated the results previously reported by Agranovich and Puente (2007), where American group also significantly outperformed the Russian group on this test

Although on average Americans completed ToL^{Dx} faster than Russians (with medium effect size of between group difference: d = .37), this difference was mostly attributable to significant difference in ToL^{Dx} Initiation time (t(98) = 2.71, p = .008, d = .55), where Russians took 17 seconds longer (on average) to begin working on the task. The groups did not differ in execution time, but the Russians (M = 19.56), on average, completed the tasks in fewer steps than Americans (M = 28.54), t (98) = 2.48, p = .015. The Russian group also solved a larger number of problems using the minimum number of moves (ToL^{Dx} Total Correct: M = 6.30 for the Russian group; M = 4.58 for the American group; t (98) = -3.81, p < .001).These results indicated the less timed-tests-wise Russians might tend to put more emphasis on quality part of the instructions (i.e., solving the problem in fewer steps) than on the requirement to wok on the test as fast as possible.

Americans, on average, produced more symbols in 90 seconds on SDMT and this difference was statistically significant with a moderate effect size (t(98) = 2.30; p = .023, d = .47).

Table 13

Comparison of the Neuropsychological Test Results between the Russian and American Samples.

Test/Score	t	df	p	Cohen's ***d***
CTT1/Completion Time	-3.94	98	<.001	.79
CTT2/ Completion Time	-3.67	98	<.001	.73
RFFT/ Unique Designs	1.72	98	.089	.34
ToL^{Dx} / Initiation Time	-2.71	98	.008	.55
ToL^{Dx} / Total Time	-1.67	98	.098	.33
SDMT/ Total Score	2.30	98	.023	.47

Note. CTT1 = Color Trails Test, Part 1; CTT2 = Color Trails Test, Part 2; RFFT = Ruff Figural Fluency Test; ToL^{Dx} = Tower of London, Drexel Edition; SDMT = Symbol Digit Modalities Test. Cohen's d value below |.20| is considered small effect size, |.50| is medium, and above |.80| is large.

The American group outperformed the Russian in terms of production of the unique designed on RFFT, but the difference between samples only approached statistical significance, although with a decent effect size (p = .089, d =.37). No group difference was found in number of perseverative errors in this task.

Overall, the data provided support for the hypothesis about presence of the cultural differences on timed neuropsychological tests between the Russian and American normal adults. Although difference in the test scores for one of the measures (RFFT) was not statistically significant, the overall trend indicated that Americans tend to obtain better scores on time-limited tests compared to Russians. The possible explanations for these cultural differences are addressed below.

Effect of Culture on the COTI-33 Scores

Distributions of the COTI-33 total and factor scores across the two cultural groups were evaluated and compared. Between groups comparisons of the COTI-33 total score revealed significant difference between the Russian (M = 3.15, SD = 0.23) and American (M = 3.27, SD = 0.22) groups ($t(98) = 2.74$, p = .007, d = .53), indicating that American participants on average endorsed greater agreement with time-related rules, schedules, and efficiency demands compared to the Russian sample.

Cross-cultural comparisons of the factor scores revealed varied results. Significant effect of culture emerged only for two of the five COTI factors, “Planning” and “Punctuality,” where Americans rated their tendency to follow a schedule and/or adhere to timelines higher than did Russians. No significant differences between groups were observed for the other three factors. The Russian group scored slightly higher on Event-time

orientation, but the difference did not reach statistical significance. Descriptive statistics and results of the independent sample *t*-test are presented in Table 14.

Effect of Familiarity with Testing Procedures (Familiarity Factor)

The reliability of the 4-item Familiarity scale was higher for the Russian sample (Cronbach α = .84) than for the American sample (Cronbach α = .61). In the global sample, Cronbach α was .75.

The results of a *t*-test revealed a significant difference in overall rating of the familiarity factor, where American participants (M = 2.90, SD = 0.47) reported being more familiar than Russians (M = 2.36, SD = 0.72) with timed and/or standardized testing procedures ($t(98) = 4.44$, $p < .001$, $d = .90$).

Familiarity with standardized testing procedures was negatively related to the scores on CTT1 (r = -.28, p =.004), CTT2 (r = -.31, p = .002), and ToL^{Dx} Initiation Time (r = -.21, p = .028), suggesting that individuals who lack familiarity with standardized testing procedures tended to take longer to complete these times tests. Significant negative correlation was also found between SDMT score and familiarity with testing procedures (r = -.32, p = .026), indicating that the participants who were less familiar with standardized tests, tended to obtain a lower score on this test.

Qualitative analyses of the responses to questions designed to assess participants' familiarity with timed and/or standardized testing procedures and tests revealed that about a half of the Russian sample endorsed lack of experience with timed (18.0 percent answered *Never* and 32.0 percent *Seldom* to the statement "I took timed test before") and/or standardized (22.0 percent endorsed *Never* and 24.0 percent *Seldom* in response to statement "I have taken standardized tests before") tests. In contrast, in the American sample, none of

Table 14

Comparison of COTI factor scores for the Russian and American (USA) samples.

COTI Factor	Country	Mean	SD	*t (98)*	*p*	Cohen's *d*
Planning	USA	3.19	0.32	4.92	< .001	.99
	Russia	2.86	0.35			
Time Management	USA	3.31	0.48	1.55	.123	
	Russia	3.18	0.40			
Punctuality	USA	3.22	0.27	2.06	.042	.41
	Russia	3.09	0.35			
Event-Time	USA	3.01	0.51	-1.17	.246	
	Russia	3.15	0.68			
Timed Tests	USA	3.22	0.34	-1.37	.173	
	Russia	3.36	0.66			

the participants endorsed *Never* for either of these two questions, and only one and two of the participants answered *Seldom* to these two questions, respectively.

Mediation Effect of Time Attitudes on Timed Neuropsychological Test Scores

Mediation effect of COTI-33 total and factor scores on each of the timed neuropsychological test scores was assessed using SPSS macros for multiple mediator models, developed by Preacher and Hayes (2008). Differences between the coefficients representing a total and a direct effect of culture on a dependent variable (i.e., neuropsychological test score), and significance of specific direct and indirect factor effects were examined for each of the outcome variables separately.

1. Color Trail Tests- Part 1 (CTT1): Completion Time

The relationship between culture and CTT1 score was mediated by the COTI-33 total score (*effect* = -1.27 (.69), p = .054). As shown on Figure 2, the effect between culture and CTT1 score decreased when controlling for the time attitudes as measured by COTI-33. At that, the culture was a significant predictor of both COTI-33 total score and CTT1 score, and the COTI-33 score was a significant predictor of the CTT1 score, when controlling for the effect of culture.

As presented in Figure 3, when all COTI-33 factors, along with "Familiarity," were included simultaneously in the model, no total mediation effect was revealed (-1.46 (1.48), p =.325). However, as seen in Figure 4, when impact of each factor was evaluated individually, "Planning" had a significant effect on CTT1, and reduced the effect of culture on CTT1 scores, with the difference approaching significance (*effect* = -1.70 (.99), p = .051). More specifically, the effect of culture on the CTT1 score decreased when controlling for

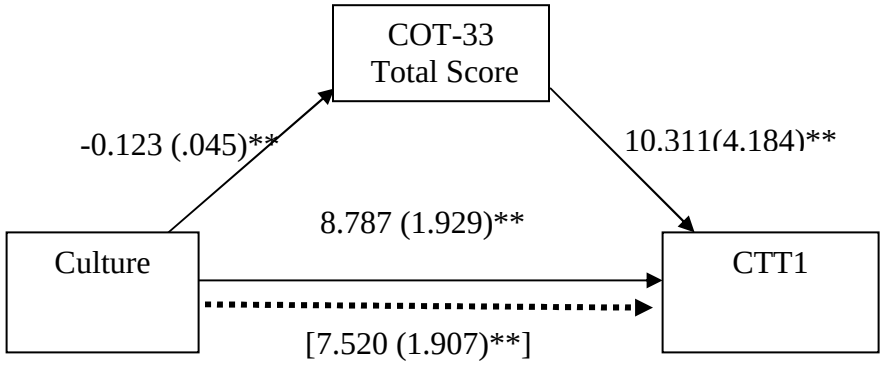


Figure 2. Mediation effect of COTI-33 total score on the relationship between culture and CTT1 score: effects and standard errors (in parentheses). The dashed line represents direct affect of Culture on CTT1 [coefficients are in parentheses]; * $p < .05$, ** $p < .01$.

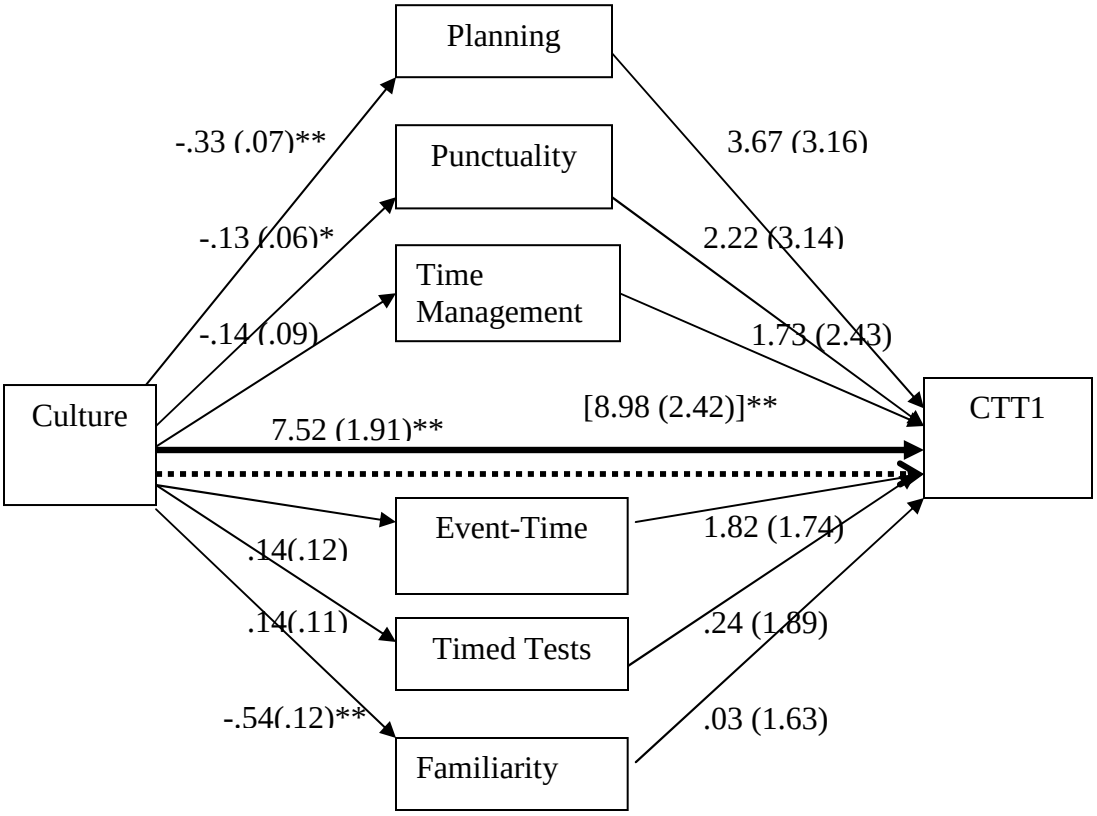


Figure 3. Mediation effects in a multiple mediator model for CTT1. Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on CTT1 score; the dashed line indicates the direct effect [in parentheses]; * p < .05, ** p< .01

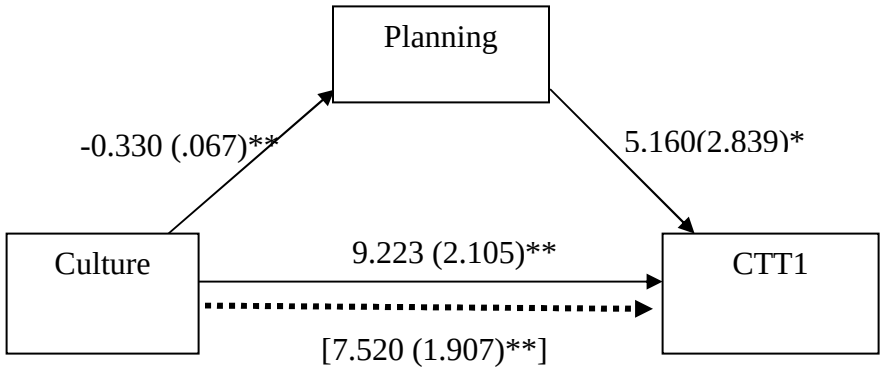


Figure 4. Mediation effect of Planning on the relationship between culture and CTT1 score: Effects and standard errors (in parentheses). The dashed line represents direct affect of Culture on CTT1 [coefficients are in parentheses]; * p < .05, ** p< .01

preferences in planning of one's daily activities and adhering to schedule (Planning factor). Given that the Russian group scored significantly lower in the Planning domain, the difference between the two cultural groups in CTT1 performance might, at least in part, be attributed to differences in this time-related attitude rather than to cultural differences in sustained visual attention, psychomotor speed, and simple sequencing, which this test is designed to measure.

2. Color Trails Test – Part 2 (CTT2): Completion Time.

No mediation effect of the total COTI-33 score (*effect* = -.16 (.80), p = .840) on the CTT2 results was observed. Inclusion of all factor in the mediation model simultaneously produced negligible reduction in the total effect, and the total indirect effect of the set of mediators was not significant (*effect* = 1.75 (2.24), p =.436). These findings are shown in Figure 5. Neither individual factors nor the measure of familiarity had a significant or substantial mediation effect on the CTT2 score. These results suggest that the reason underlying significant group differences in CTT2 completion time might be explained by different culture-related constructs and present an interesting area for future research.

3. Ruff Figural Fluency Test (RFFT): Number of Unique Designs

Although the total main effect of culture on RFFT score only approached significance (see Table 13), Figure 6 shows that COTI-33 as a whole appeared to mediate the difference between cultures (total *effect* = -3.74 (1.90), p = .047). Examination of the individual factor's effects revealed a significant indirect effect of Event-Time orientation of RFFT results (*effec*t = -1.68 (.70), p =.016), suggesting that higher endorsement of items constituting the Event-Time factor (i.e., "When I am involved in an activity, I do not pay attention to time") might be associated with lower RFFT scores. Greater endorsement of Event-Time orientation in the

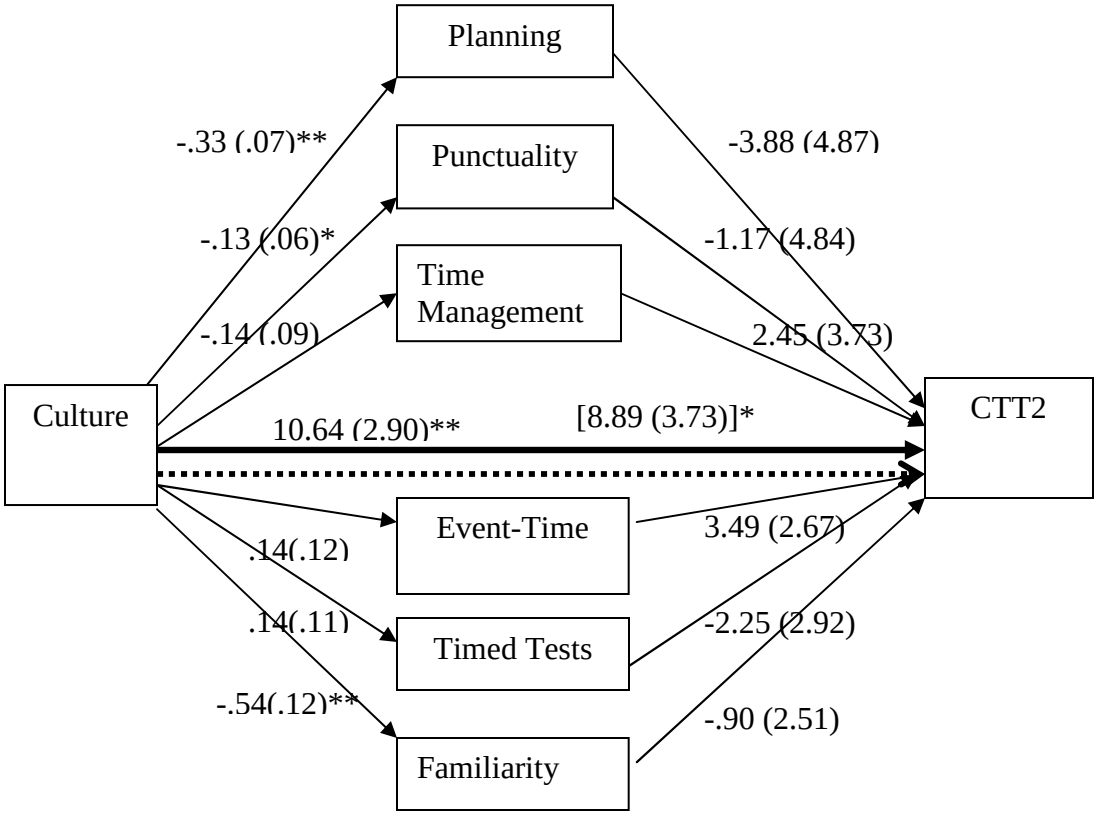


Figure 5. Mediation effects in a multiple mediator model for CTT2. Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on CTT2 score; the dashed line indicates the direct effect [in parentheses]; * p < .05, ** p< .01.

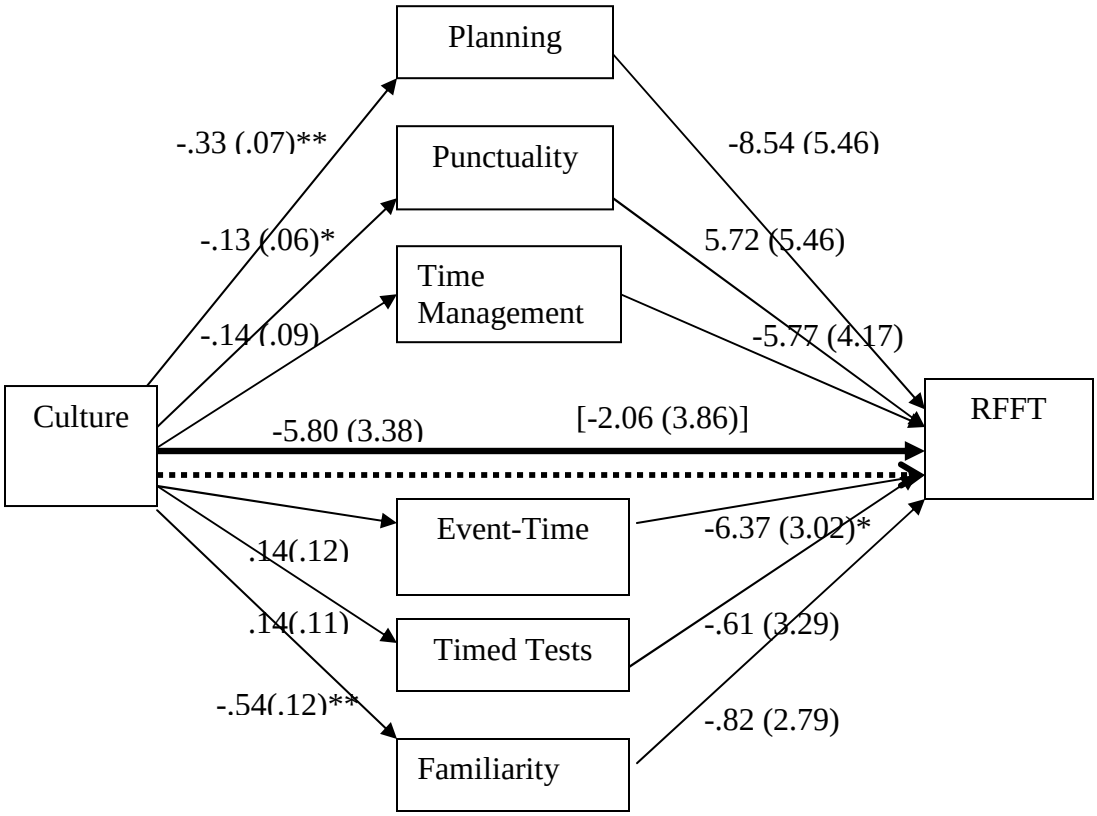


Figure 6. Mediation effects in a multiple mediator model for RFFT. Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on RFFT score; the dashed line indicates the direct effect [in parentheses]; * $p < .05$

Russian sample appeared to explain the effect of culture for RFFT, although the difference between the groups only approached significance. The direction of differences (Russians scores higher than Americans on Event-Time factor, but lower on RFFT) and the presence of mediator effect suggest that more event-time oriented individuals might work less quickly on the task, placing more attention on the process than on the speed.

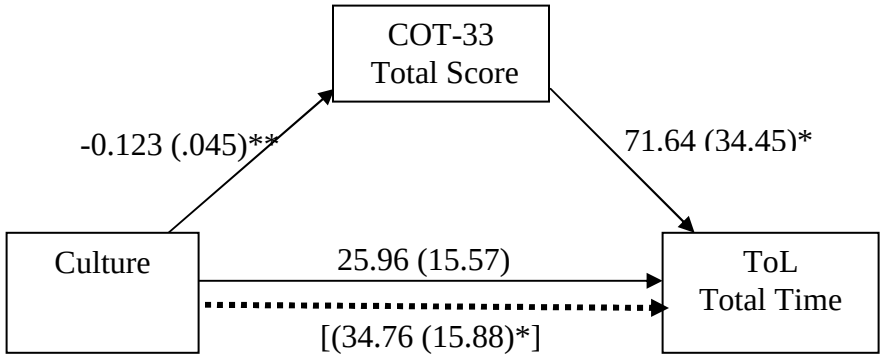
4. Tower of London (ToL^{Dx})

The American group outscored the Russian one in ToL^{Dx} Total Time, but this difference was by and large attributable to differences in the Initiation Time score, which was reduced by mediating effect of COTI-33 Timed Test factor.

The relationship between culture and the total time score for ToL^{Dx} was mediated by the COTI-33 as a whole (*effect* = -8.80 (4.27), p = .049). As the top panel of Figure 7 illustrates (Figure 7A), the effect of culture on the ToL^{Dx} score decreases when controlling for time attitudes as measured by COTI-33. Although the ToL^{Dx} total time score appeared to differ as a function of at least two of the time attitudes (Punctuality and Event Time orientation, see Figure 7B), testing of the multiple mediators model did not reveal significant indirect effects for any of the individual factors.

Although there was no significant total effect of COTI-33 that would explain cultural differences between the groups in Initiation time score for ToL^{Dx}, the examination of individual indirect effects in Figure 8 revealed a significant mediating effect of Timed Test factor (*effect* = - 2.76 (1.28), p = .031). These results suggest that positive perceptions of and presence of experience with time-limited test procedures (as is in the American sample) might be associated with reduction of initiation time. That is, individuals who tend to see benefits of and are familiar with timed tests might tend to try to shorten their test

A.



B.

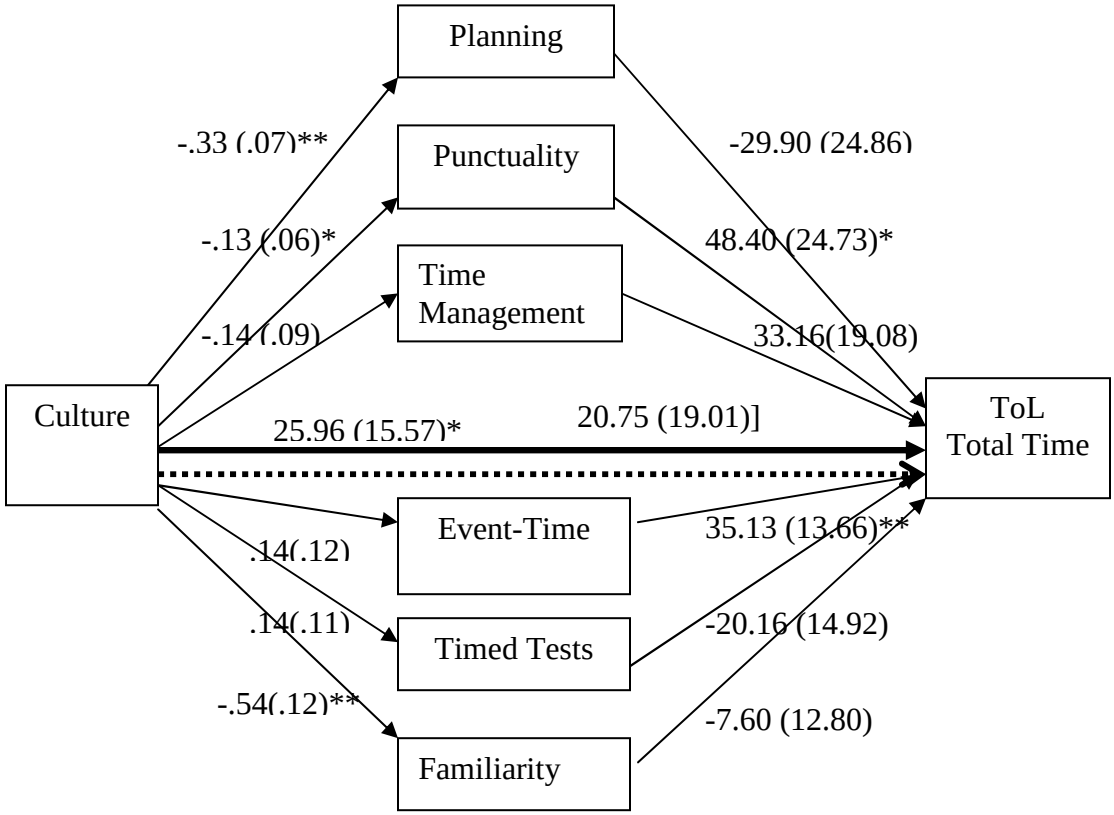


Figure 7. Mediation effects in a multiple mediator model for Tower of London (ToL^{Dx}), Total Time score. (A). Mediation effect of COTI-33 total score on the relationship between culture and ToL^{Dx}; (B) Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on ToL^{Dx} total score; the dashed line indicates the direct effect [in parentheses]; * $p < .05$, ** $p < .01$

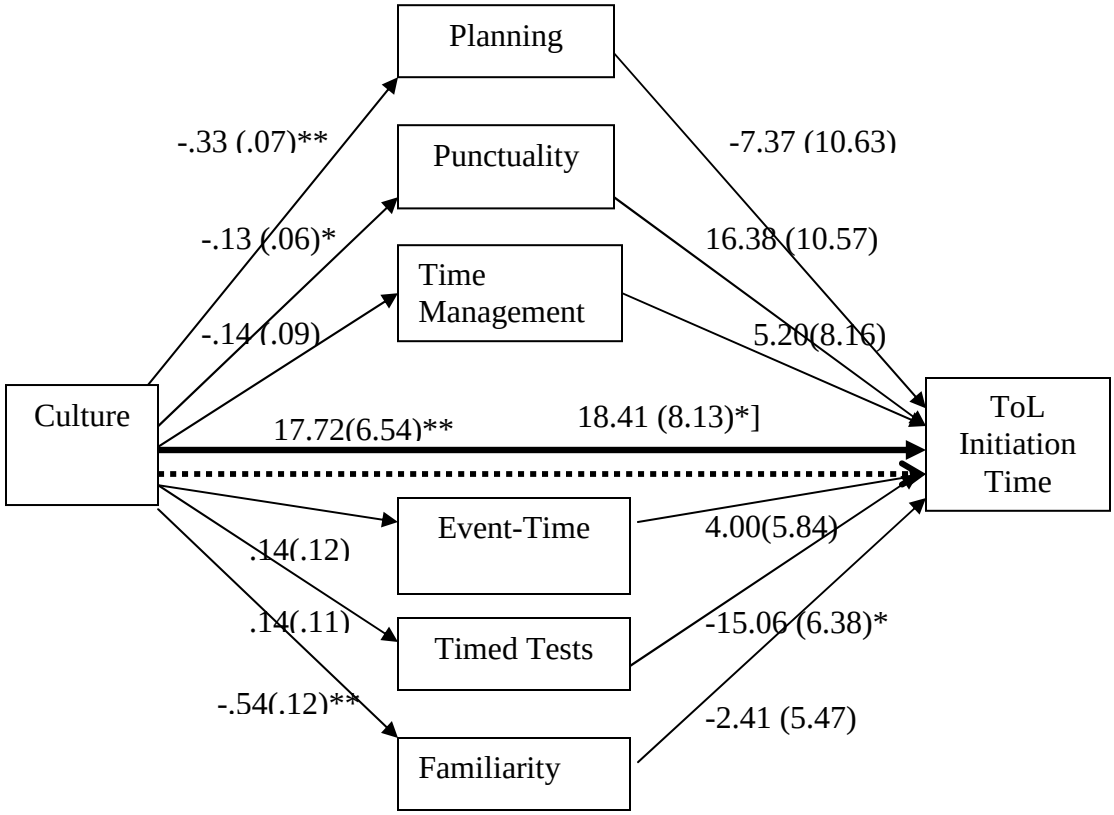


Figure 8. Mediation effects in a multiple mediator model for ToL^{Dx} Initiation Time. Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on test score; the dashed line indicates the direct effect [in parentheses]; * p < .05, **p<.01

performance time by beginning to work on the task more quickly than those whose attitude toward and experience with time-limited testing procedures is more negative. Although the shorter initiation time might be interpreted as an indicator of impulsivity, the current findings suggest that individuals who are more accustomed to timed tests tend to begin execution of the task sooner than those who are not as test-wise.

5. Symbol Digit Modalities Test (SDMT): Total Score.

Examination of relationship between the cultural groups and SDMT score when controlled for effect of COTI-33 factors did not indicate a presence of a total mediation effect (total *effect* = -.95 (.1.24), p = .44), although the direct affect of culture on SDMT was no longer statistically significant, suggesting that at least some of the factors might contribute to the explanation of a significant cultural differences on this test, as seen in Figure 9. Significant individual indirect effect on SDMT score was noted for Punctuality factor (-.76 (35), p = .029), indicating that lower SDMT scores in the Russian sample can be related to their lower ratings of items constituting Punctuality factor in the COTI-33.

Overall, the results of mediation analysis revealed variable effects across employed timed neuropsychological tests and across COTI-33 factor scores. COTI-33 as a whole partially accounted for the cultural differences in performances on CTT1, RFFT, and ToL^{Dx}, but did not mediate the relationships between culture and the test scores for CTT2 or SDMT. Four of the COTI-33 individual factors differentially served as mediators between the culture and one of the timed measures, suggesting that various aspects of attitudes toward time may affect timed neuropsychological test performance.

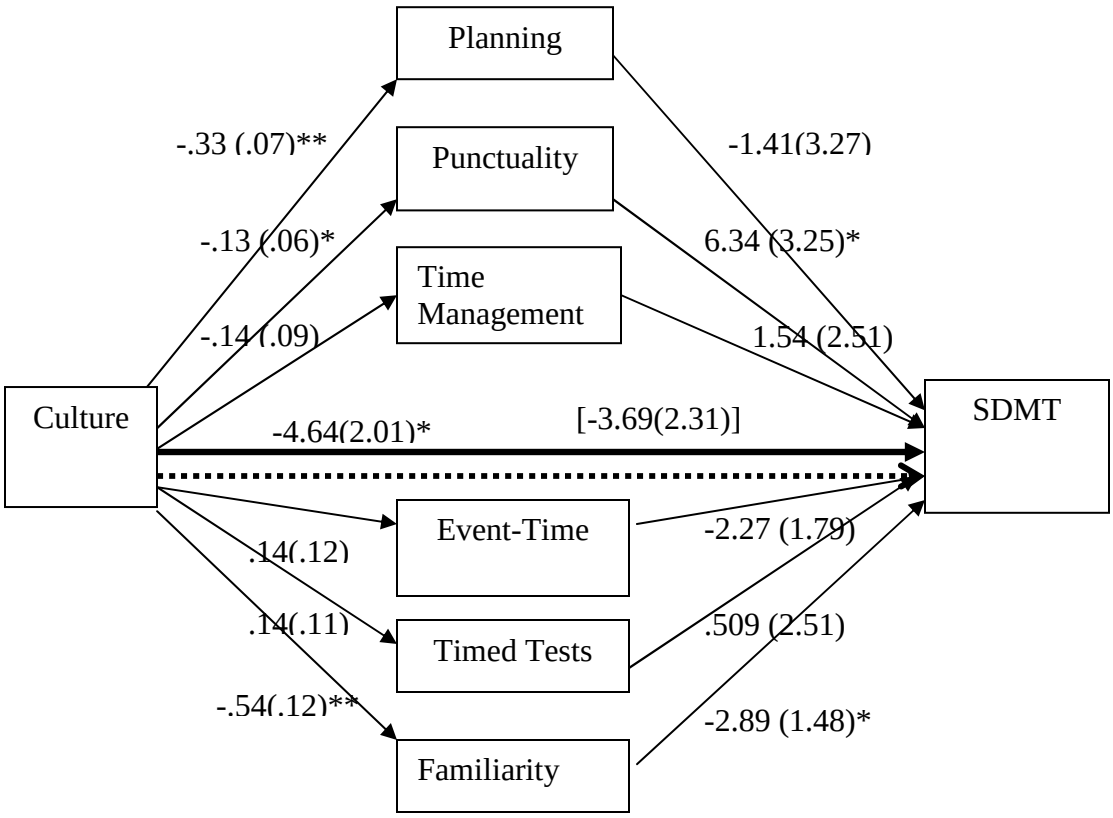


Figure 9. Mediation effects in a multiple mediator model for SDMT. Effects and standard errors (in parentheses) are presented for each factor-mediator. The thick line in the middle represents the total effect of Culture on SDMT score; the dashed line indicates the direct effect [in parentheses]; * p < .05, **p<.01

Effect of Test Anxiety on Test Results

Given that performance on time-limited psychological tests might be affected by test anxiety, the relationships between neuropsychological test scores, COY-33 factors and the scores on Evaluation Anxiety Inventory (EAI) were examined in a correlational analysis. As shown in the Table 15, in the American sample, the only significant relationship was found between the EAI scores and SDMT performance (r = .33, p =.018). Of note, this result did not indicate that anxiety was associated with poor test performance but, on the contrary, suggested that higher scores on the test anxiety measure was associated with higher scores on SDMT.

In the Russian sample, the EAI score positively correlated with the COTI Timed-Test factor score (r =.31, p = .032), logically suggesting that individuals who found timed test stressful or undesirable might tend to have higher level of test anxiety. However, given that a half of the Russian sample reported no or minimal experience with the timed tests and the type of evaluation procedures assessed by EAI is very uncommon in Russia, this relationship might simply indicate a higher level of apprehension before the unknown or unfamiliar evaluation procedures. Furthermore, many Russian participants commented on irrelevance of the statements in EAI to their experiences in evaluative situations (Khodyreva, 2008, personal communication). Therefore, the scores on this measure might not be particularly meaningful for the Russian sample, as the questions are not culturally related. Overall, although statistically significant, these correlations are rather weak to indicate a strong influence of test anxiety on any of the measures included in the study.

Table 15

Correlation of Neuropsychological Test Scores and COTI-33 Factors with Evaluation Anxiety Inventory (EAI) Total Score in the American (USA) and Russian Samples

Test Score or COTI Factor	USA	Russia
CTT1:Completion Time	.08	.03
CTT2: Completion Time	.04	-.06
RFFT: Unique Designs	-.23	-.07
ToL^{Dx} : Initiation Time	.16	-.26
ToL^{Dx} : Total Time	.14	-.23
SDMT: Total Score	-.33*	.23
COTI: Planning	-.17	.11
COTI: Time Management	-.25	-.03
COTI: Punctuality	-.21	-.22
COTI: Event-Time orientation	-.08	.01
COTI: Attitudes to Timed Tests	.14	.30*

Note. CTT1 = Color Trails Test, Part 1; CTT2 = Color Trails Test, Part 2; RFFT = Ruff Figural Fluency Test; ToL^{Dx} = Tower of London, Drexel Edition; SDMT = Symbol Digit Modalities Test; *p < .05

GENERAL DISCUSSION

This investigation consisted of two separate cross-cultural studies. The first aim was to develop a valid and reliable measure of time attitudes that would be applicable for cross-cultural studies. The second aim was to investigate whether the results of the neuropsychological test scores differed between Russian and American normal adults, and if so, if the culture-driven attitudes toward time might account for observed differences in the results of standardized timed neuropsychological tests.

COTI-33: Validity and Reliability

Although several measures of temporal constructs have been published (Block et al., 1996; Ko & Gentry, 1991; Rojas-Mendes et al., 2004; Zimbardo & Boyd, 1999), and some have even been validated in cross-cultural contexts (e.g., Rojas-Mendes et al., 2002; Sirsova et al., 2005, 2008), this study represents the first known attempt to assess time attitudes pertinent to performance on timed tests by addressing the constructs that appear relevant for working under imposed pressure of time limits. For that purpose, all items for the proposed scale have been derived from the theories of time perception, time attitudes, and cultural norms related to temporal behaviors.

The primary objective in the development of the proposed time attitude scale proposed, entitled *The Culture of Time Inventory– 33 Items* (COTI-33), was to create a valid measure with high construct validity. In valid scales, as is the case for COTI-33, all items explaining the main construct have a common core and consistently contribute to the

proposed model. A five-factor model emerged for both Russian and American groups, as well as for the combined cross-cultural sample. According to this model, general attitudes toward time were divided into four distinct categories: (1) Planning, (2) Punctuality, (3) Time Managements, and (4) Event-Time (as opposed to Clock-Time) Orientation. Although previous studies reported greater adherence to schedules and deadlines, as well as higher importance placed on punctuality and time-management skills in the clock-time oriented cultures (Brislin, & Kim, 2003; Borodowsky, & Anderson, 2000; Block, Buggie, & Matsui, 1996; Levine & Norenzayan, 1999), the results of this study clearly indicated presence of separate domains of time attitudes within and beyond a broad concept of clock-time orientation. In addition, for the first time a measure of attitudes pertaining specifically to time-limited tests was included in a time attitude scale along with a more general assessment of temporal constructs; attitudes to timed testing constituted the fifth factor in COTI-33.

The proposed scale was developed for use in cross-cultural context and with a hope to derive similar factor structures across countries. This objective was achieved by describing the five-factor solutions with almost identical factor compositions and meanings for each cultural groups and the combined sample. The CFA results provided support for COTI-33 convergent validity. With a few minor exceptions, the scale items consistently loaded on the proposed factors. At the same time, factor analyses also revealed slight differences in factor composition for the Russian and American groups, and the qualitative comparison suggested presence of minor cultural differences. Particularly, three of the proposed scales, measuring attitudes toward planning, punctuality, and time-limited tests, respectively, were well defined across samples. Additional work may be needed to develop further the remaining two constructs, “Time Management” and “Event-Time,” for which cross-cultural differences in

the scale compositions were reported. More rigorous multiple-sample comparisons of factor structures between cultures require a separate study. Still, a possible application of the scale at this point might be in interpreting the higher versus lower factor scores in the two cultural samples.

Although achieving high reliability for measures developed in cross-cultural context is often challenging (e.g. Rojas-Mendes et al., 2002), the reliability of the COTI-33 scale as a whole, and of each of its proposed factors, as measured by Cronbach α, was well above the acceptable threshold (Nunnally & Bernstein, 1994; Peterson, 1994). Hence, the proposed scale has high consistency within and across factors, both in Russian and in English.

To ensure that the meaning behind the COTI-33 scales is not limited to individual differences in personality traits that affect individual's relationship with time, COTI-33 factors were compared to a well-known measure of "Big Five" personality traits both In Russian (Gretsov, 1995) and in English (John, et al., 1991). The results provided adequate support for the scale's discriminant validity as attitudes toward time appeared to be distinct from several well-defined personality traits. Several proposed time attitude factors from the COTI-33 were related to Conscientiousness and/or Openness to Experience, but they measured a specific aspect of a trait, pertaining to time only. These findings suggested that highly conscientious people tend to be more punctual and to pay more attention to planning and managing their time, whereas individuals who score highly on Openness to Experience tend to place less value on planning and time management (at least, in the United States). At the same time, preference of Event-Time orientation was associated with lower Conscientiousness, but higher Openness to Experience. These current findings indicate that time-related attitudes may play an important role in explaining some of the personality traits.

Future studies might focus on a more detailed analysis of the relationship between BFI-44 scales and attitudes toward time as measured by proposed COTI-33 factors.

COTI-33: Final Model

The COTI-33 (presented in the Appendix H) was developed as a measure of time attitudes that could be utilized along with cognitive or neuropsychological testing to aid in understanding of culture- specific influences that might affect timed test scores. For the purpose of this project, the simplest model that had 100 percent overlap across samples was used for the second phase of the study. The proposed scale is comprised of 33 items, which are distributed across the following five subscales:

Subscale 1: Planning.

This scale is designed to measure attitudes toward planning tasks in advance. This involves generating a sequence of tasks, usually by writing down schedules and plans. Individuals who score high on this scale endorse an analytical approach to planning their activities, keeping a planner, and following predetermined schedules. Those who score low on this scale, tend to engage in activities spontaneously, and are not fond of appointment books. The scale consists of the following items:

1. I do not tie my schedule to specific time slots and try to take care of whatever comes up.
2. I believe that a person's day should be planned ahead.
3. I prefer to follow a schedule that I set in advance.
4. I make decisions on the spur of the moment.
5. I make lists of things to do.
6. I use an appointment book or a planner to schedule ahead.

Subscale 2: Punctuality

Designed to assess attitudes to being on time, this scale may help identify individuals who think of themselves as punctual and expect the same from others. High scorers on this scale consider themselves good judges of time and make relatively accurate estimations of the length of different activities, which helps them to be on time and meet deadlines. In contrast, those who score low on this scale are not too concerned about deadlines and timeliness, but also do not worry when they or others are late. The following statements constitute this scale:

1. It is important for me to be on time.
2. If things don't get done on time, I do not worry about it.
3. I tend to be late to scheduled events.
4. It upsets me to be late for appointments.
5. It is OK to be late with what I consider low priority tasks.
6. I meet my obligations on time.
7. However insignificant the task, it is important to have it done on time

Subscale 3: Time Management

This subscale evaluates attitudes about working under time pressure, prioritizing and separating activities and events. Individuals who score high on this scale perceive themselves as "efficient," highly clock-oriented, and tend to separate work and leisure activities in time. Those who score low on this scale my perceive themselves as "procrastinators" and tend to consider socialization at work place a valuable use of time. The scale consists of the following statements:

1. I do not waste time.
2. I try not to postpone things for later.

3. I mix work and leisure activities even if it means taking longer to have work done.
4. I find it important to be efficient at work.
5. I tend to postpone doing things until the last moment.
6. I try to have my work done by a specific time and then enjoy my spare time.
7. I complete projects on time by making steady progress.
8. I constantly look for ways to save time.

Subscale 4: Event-Time Orientation

This scale was designed to measure a preference for event-time orientation, where the main focus is put not on specific time units, but rather on the process, and its quality (Brislin and Kim, 2003). Individuals who score high on this measure tend to "ignore" the clocks and schedules, and place emphasis on enjoying their work and leisure time, while going with a flow of events. The following items were included in this scale:

1. It is more important for me to enjoy what I am doing than to get work done within a certain time limit.
2. If things don't get done on time, I do not worry about it.
3. I am comfortable changing plans at the last minute when something more interesting or important comes up.
4. I prefer not to plan my day ahead but to go with the flow of events.
5. When I am involved in an activity, I do not pay attention to the time.
6. I tend to lose track of time when I am doing something I like.
7. I believe that time is to be enjoyed as much as possible

Subscale 5: Attitudes toward Timed Test

This scale was added to the measure of more general time attitudes to specifically assess attitudes toward time-limited tests. High scores on this measure see themselves as successful timed-tests-takers and report to benefit from having preset time limits. In contrast, those who score low on this scale report negative attitudes toward the idea of being timed when tested and prefer evaluations that do not have imposed rigid time restrictions. The following items were included in this scale:

1. I concentrate better on a test when it has a time limit.
2. I dislike the idea of being timed when tested.
3. I find it helpful to have a strict time limit on a test.
4. The quality of my test performance is better when there is no time limit.
5. I find tests with time limits stressful.

COTI-33: Future Directions

This cross-cultural scale development project constituted comparisons across different languages, geographic locations, political and economic states, and cultural stereotypes. Because this study was limited to only two cultural groups, further investigation of cultural differences (and similarities) in time attitudes in other cultural setting would be of great interest. The proposed questionnaire had very similar factor compositions and structures across two cultural samples, so it is likely that it could be used in other cultures. Hence, its translation to other languages, validation and application in various cultural contexts presents an exciting future direction for cross-cultural studies of time attitudes.

Another possible meaningful and useful non-clinical application of the COTI-33 could apply to vocational assessment. It could help investigate if the differences in time attitudes affect individual performance in vocational settings, where time management is

deemed important (i.e., military, sports, public transportation). Earlier studies (e.g. Francis-Smythe & Robertson, 1999) indicated differences in time attitudes among members of different trades or professions. Hence, assessment of time attitudes toward planning, punctuality and time management along with personality assessment may provide useful information both for personnel selection and training.

When COTI-33 was administered to a 100 non-clinical adult participants in Russia and the United States, significant differences emerged in ratings of *Planning* and *Punctuality*, as well as in the total COTI-33 score, suggesting presence of cultural differences in these time-specific attitudes or behaviors. These findings supported the proposed hypothesis that in a relatively more event-time oriented Russia (Tongren, et al., 2001), subjective importance of being on time and breaking the day in the time-based units might be lower than in the primarily clock-oriented United States. These findings are of great importance to understanding culture-specific behaviors in general. They also may have significant implications for psychological assessment as discussed below.

Cultural Differences in Timed Neuropsychological Test Performance

Consistent with the proposed hypotheses, the American group achieved higher scores across all four timed neuropsychological tests that were employed in the study. These results confirmed and expanded previously reported findings (Agranovich & Puente, 2007) and once again suggested presence of cultural differences in performance on reportedly "culture-fair" tests. According to the reviewed literature (e.g. Maj et al., 2000; Nell, 2000), each of the selected tests was previously utilized in cross-cultural contexts and reported to be free of cultural bias. The study results provide evidence to the contrary.

Of particular interest is the large effect size of the differences observed in Color Trails Test (CTT) scores, given that the test was developed explicitly for cross-cultural comparisons and reportedly did not have any culture-specific attributes. The observed differences in CTT1 and CTT2 scores between the two very well matched samples that differed only by culture once again suggested that tests can be "culture-fair" only when used with the populations that are culturally similar to that of the test maker; otherwise psychologists might be at a serious risk of misinterpreting the lack of a culture-specific knowledge as a functional deficit. Once again, the study results highlight the notion that "culture-fair" tests are difficult, if at all possible, to come across, to define, or to develop. Therefore, care should be taken when assessing culturally-dissimilar individuals with North American timed instruments.

It was hypothesized that time attitudes, as assessed by the COTI-33, would mediate the cultural differences in timed test performance between the two countries. Statistical analyses provided partial support for this hypothesis. Thus, COTI-33 score reduced the group differences for the first part of the CTT1, a test designed to measure psychomotor speed. Of interest, the effect of culture on test score decreased when controlling for preferences in planning of one's daily activities or adhering to schedules. Values placed on punctuality affected scores on Symbol Digit Modalities Test (SDMT), another measure of psychomotor speed. Given that the Russian group scored significantly lower on both Planning and Punctuality domain, the difference between the two cultural groups in CTT1 and SDMT performance might, at least in part, be attributed to differences in these time-related attitudes, rather than to cultural differences in psychomotor speed.

In contrast, COTI-33 factors did not explain cultural differences observed in scores on the second and a more challenging part of the Color Trails Test (CTT2), requiring higher order of information processing, resistance to interference, and impulsivity control. It is unlikely that the differences between the two cultural groups are simply due to Americans' superiority in the assessed functions. Further exploration of cultural influences affecting performance on this test is in order.

Russian participants took longer to begin executing Tower of London (ToL^{Dx}) tasks, but this cultural difference was reduced by the effect of COTI-33 scores and specifically by accounting for attitudes to timed tests. At the same time, there was no difference between groups in task execution time *per se* or in the qualitative scores (total items correct, total moves, or number of rule violations). These findings suggest that lack of exposure to timed testing may lead to differences in importance placed on the initiating task "as fast as possible" and result in slower initiation time.

Undoubtedly, one explanation for the observed effect of culture may lie in the differences in exposure to timed and or standardized tests, as was also previously reported by Ardila (2001) and Puente and Perez-Garcia (2000) for Hispanic patients. Indeed, the Russian groups rated their familiarity with the employed type of testing procedures significantly lower that the American sample. In fact, about a half of the Russian participants reported never having taken a timed and/or standardized test before. Furthermore, across samples, individuals with lack of familiarity with standardized testing procedures tended to take longer to complete both trials of CTT, took longer to initiate moves on ToL^{Dx}, and obtained lower scores on SDMT. At the same time, "Familiarity factor" did not appear to fully explain

cultural differences in time neuropsychological tests. Further research should investigate presence of other culture-specific constructs that might contribute to observed differences.

One explanation might lie in cultural differences dealing with authorities and formal testing situations, which were reported to affect test results in other cultural groups (Ardila, 1995, 2001). It is possible that Russians and Americans treats authority and requests of the examiner with different degree of respect, or Russians might treat the "as fast as possible" part of directions as less important. A search for empirical support to these observations presents one of the directions for future research.

Addressing the Challenges of Cross-Cultural Research

In cross-cultural studies, it is very important to ensure equivalence of approaches, conditions, methods, and procedures (Helms, 1997). However, such equivalences are not that easy to achieve, when comparing psychological variables derived in different cultural context. As was discussed before, numerous cultural variables, affecting psychological test performance have been identified (e.g., Ardila, 1995, 2001; Ardila, Roselli, & Rosas, 1989; Byrd, et al., 2006; Greenfield, 1997; Gutchess et al., 2006; Hedden et al., 2002; Manly et al., 1999, 2003; Paul et al., 2007; Perez-Arce & Puente, 1997). Over the course of this study, cultural influences became apparent not only in the data patterns, but in the very approach to testing, standardized instructions, "personal" questions, and to psychology as a "science." Although all efforts were made to ensure equivalence of recruitment strategies, testing conditions, test items, and procedures, culture-related challenges surfaced at each and every step of the study. Specific examples and steps undertaken to ensure comparability between the Russian and American samples are discussed below.

Levels of Education

As was previously noted by Manly and colleagues (1999, 2003) and Marcopulos and colleagues (1997), equating different cultural groups by years of schooling might not always be appropriate due to differences in educational systems and quality of education across cultures. Introductory chapters described the differences between the Russian and North American systems of education, which created a challenge in assigning each Russian participant an appropriate degree level that would be equivalent to one in the North American system. While secondary education in Russia is very comparable to the school curriculum in the United States, quite a few differences exist between post-secondary and graduate/professional systems of education. To address this challenge, additional information about the quality of education was collected from Russian participants, including the type of educational institution (e.g., a major university versus a small community college; full time residency versus part time evening courses or "degree by mail;" a "real" diploma versus one "purchased" for vocational advancement), length and quality of the program (e.g.: a four-year college versus a five-year Master's-granting university; two-year research-only part-time Ph.D. versus an advanced degree, requiring class attendance as well as full time research and clinical or field practice). To make sample comparable by the education level, it was necessary to recruit participants with an advanced/ professional degrees, which in the United States commonly means a Ph.D., J.D., or M.D. When this requirement was explained to the Russian psychologists involved in subject recruitment and data collection, they responded: "Do you need [to include] Russian people with a degree, or the bright ones? This is not equivalent, you know!" These observations are supported by research of contemporary Russian culture (e.g. Rivkin-Fish, 2009). The self-reported and experimenter-described levels

of education were jointly interpreted by the author and the Russian psychologist (who collected the Russian part of the data), to arrive to a degree level that would be equivalent to the scale content (which was based on North American hierarchy of educational attainments).

Attitudes toward Psychology and Psychologists

Unfortunately, for many years, psychology has not been a popular or well-developed discipline in the Soviet Union, and only in the last 15 to 20 years it began to re-establish itself in the Russian academic institutions (see Grigorenko, Ruzgis, & Sternberg, 1997; Janoušek, & Sirotkina, 2003). Traditionally, Russian people had not been exposed to mental health services, unless severely mentally ill, and attitudes towards psychologists that range from cautious to negative, accompanied by the stigma about "mental problems" still prevail. Although there are several highly respected professional schools of psychology in the Russian Federation, there are also numerous educational facilities that produce "psychologists" by large numbers in two to four years, as this once prohibited discipline has become a popular trade. A combination of previous lack of exposure to psychological science or practicing psychologists and current excessive publicity of "pseudo-psychology" only supports a common misperception of psychology as a witchcraft rather than a science, with a common stereotype for a psychologist ranging from "a Freudian couch" to "someone who will tell you how to fix all your problems," to "this is only for crazy people," to "they are all charlatans." All these factors have made recruitment of the Russian sample rather complicated. Although most people did not mind completing questionnaires anonymously, when in-person participation in the study was required, many refused to participate; administration of several colleges declined access to their students or found the idea of making comparisons between Russians and Americans "not possible to approve."

Furthermore, many of the participants who initially agreed to participate in a "psychological study" were "deeply surprised" when they became aware of the nature of the study, because it did not correspond to what they perceived as "psychology" (Khodyreva, 2008, personal communication).

Mental Health Stigma

Although this study has serious implications for clinical neuropsychological assessment, it is imperative to test the hypotheses about the nature of cultural differences on the non-clinical samples first. For this purpose, limits were set on study participation to ensure comparability of the samples. Thus, according to the study design, all potential participants had to be screened for neurological and/or psychiatric conditions that affect neuropsychological test performance. American participants went through the screening questionnaire without any problems. Some potential volunteers admitted to a history of a traumatic brain injury or a neurological disorder or a learning disability, and were not included in the study. Selection of the participants was much more complicated in Russia. To quote a Russian collaborator who collected the Stage 2 data in Ryazan: "In healthy people, such questionnaire [Health Screening] may kill the motivation to participate in the study altogether, provoke sarcastic comments and a negative attitude" (Khodyreva, 2008, personal communication). In Russian culture, it is barely appropriate to ask a volunteer how he or she is feeling today; to ask a stranger whether he or she has had a brain injury or hospitalization due to mental health or a diagnosis of learning disability may be viewed as a personal insult. To assure that exclusion criteria were equivalent for the two cultural groups, the screening questionnaire in Russian was worded very carefully to avoid diagnostic labels, and was

supplemented with careful explanation of "why" the questions were asked as well as repeated reassurance of confidentiality.

Attitudes toward Testing

Importantly, the standardized testing approach employed in this study is quite dissimilar to the testing approach generally utilized by the Russian psychological school (Homskaya, 1999; Tupper, 1999). Observations during the Russian data collection reported by Khodyreva (2008, personal communication) echoed previously reported by Ardila (1995, 2001) cultural differences in attitudes toward standardized testing procedures. Thus, according to the Russian experimenter, "formality" of the testing situation tended to "kill rapport" and "create psychological barriers" (Khodyreva, 2008, personal communication). One of the most frequent feedback comments received from the Russian participants was "irritation with standardized instructions." Although the instructions were translated carefully to maintain functional equivalence, it was also important to keep the translation as close to the original as possible to ensure procedural equivalence. Most Russian study participants found instructions to be "too verbose." Although some of the American participants (as well as clinical neuropsychology patients) sometimes indicated that they understood the instructions before the experimenter provided the entire required text, they easily accepted an explanation that standardized testing requires that the instructions be read verbatim to each participant. In contrast, most Russian participants had difficulty adjusting to these standards, which were unusual for them. This observations once again underline the necessity not only to translate tests for use in different cultural context, but to adapt and adjust instructions to make them "culture-friendly," which can mean, perhaps, less formal. Adaptation of selected

tests for use with the Russian-speaking population could present a separate and much needed future project.

Another issue is related to a reaction of many Russian participants to audio recording of the procedure. Even though the experimenter put forward significant effort to explain that only test instructions were being recorded for comparison and standardization purposes (as was spelled out in the informed consent), in Russia several potential participants revoked their consent to participate when they realized that the session was to be recorded. Although some might argue that this only represents individual personality characteristics, it is also quite possible that deeply engraved mistrust and fear of authorities in Russia explains this reaction better. Of note, none of the American volunteers refused to participate due to being audio-recorded.

Some of the comments received by the Russian experimenter provided direct qualitative support to the main study hypothesis. Although the tests were timed and the test instructions repeatedly emphasized the need to work on each test "as fast as possible," many Russian participants commented: "I understand that I could do it in a simple or faster way, but I like this way better," or "It makes more sense to me to do it carefully, not quickly" (Khodyreva, 2008, personal communication).

Conclusions

The proposed scale, Culture of Time Inventory- 33 items, or COTI-33, presents a valid and reliable measure of time attitudes, pertaining to timed test performance. It has potential utility for cross-cultural studies, assessment of temporal attitudes in various vocations settings, and could aid in understanding of the cultural factors affecting performance on timed psychological and neuropsychological tests. The scale was developed

and validated in two countries with distinct languages, economic and political states, geographic locations, and cultural values that affect temporal behaviors. Although a noticeable within group variance due to individual differences exists in any cultural group, both qualitative observations and statistical analyses indicated that that the effect of culture does exist in time-related attitudes. Furthermore, individual differences in personality traits or test anxiety did not account for time attitudes themselves, nor explained the cultural differences observed in ratings of planning and punctuality dimensions.

The study once again revealed the presence of cultural differences in timed test performance between the Russian and American groups, thus providing additional support for the notion that "culture-fair" test are difficult, if at all possible to develop.

Although this study was conducted on non-clinical samples, it has strong implications for working with neurologically impaired individuals. Observed cultural differences strongly suggest that using standardized tests in assessment of individuals from a cultural background dissimilar to that of test-makers could produce misleading results that could erroneously be interpreted as a sign of neuropsychological deficit.

The observed differences in time attitudes partially accounted for cultural differences in the timed tests scores. However, it is important to investigate further what culture-specific variables, if any, provide explanation for the differences observed in these tests, which were designed to be as free of cultural influences as possible.

APPENDIX A

Culture of Time Inventory - 50 Items (COTI-50)

There are no right answers! We just want to know how you think about issues related to time. We would appreciate it though if you would answer all the questions. Thank you again for taking time to participate in the study!

PART I: Beliefs about time

Statements below refer to general approaches to and beliefs about time in various situations in work/academic settings. Please indicate the degree to which you agree or disagree with each statement: 1= Strongly Disagree; 2 = Somewhat Disagree; 3 = Neither Agree nor Disagree; 4 = Somewhat Agree; 5 = Strongly Agree.

N	Statement	1	2	3	4	5
1.	It is important for me to be on time.	☐	☐	☐	☐	☐
2.	I do not tie my schedule to specific time slots and take care of whatever comes up.	☐	☐	☐	☐	☐
3.	I do not waste time.	☐	☐	☐	☐	☐
4.	I work more efficiently when I have a deadline.	☐	☐	☐	☐	☐
5.	I believe that a person's day should be planned ahead.	☐	☐	☐	☐	☐
6.	I mix work and leisure activities, even if that means taking longer to have work done.	☐	☐	☐	☐	☐
7.	It is more important for me to enjoy what I am doing than to get it done on time.	☐	☐	☐	☐	☐
8.	I try not to postpone things for later.	☐	☐	☐	☐	☐
9.	I prefer to completely finish one task before starting another.	☐	☐	☐	☐	☐
10.	I do things impulsively, without planning.	☐	☐	☐	☐	☐
11.	For me, work and leisure times are separate.	☐	☐	☐	☐	☐
12.	I take my time doing things at my own pace without rushing from one activity to another.	☐	☐	☐	☐	☐
14.	I tend to be late to scheduled events.	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
15.	I am comfortable changing plans at the last minute when something more interesting or important comes up.	☐	☐	☐	☐	☐
16.	It is important to do a task well, no matter how long it takes.	☐	☐	☐	☐	☐
17.	I prefer NOT to plan my day ahead but to go with the flow of events.	☐	☐	☐	☐	☐
18.	I am often in a rush.	☐	☐	☐	☐	☐
19.	I am not generally concerned with completing tasks as quickly as I can.	☐	☐	☐	☐	☐
20.	I tend to do more than one thing at a time.	☐	☐	☐	☐	☐
21.	It upsets me to be late for appointments.	☐	☐	☐	☐	☐
22.	I prefer to follow a schedule that I set in advance.	☐	☐	☐	☐	☐
23.	I find it important to be efficient at work.	☐	☐	☐	☐	☐
24.	I tend to postpone doing things until the last moment.	☐	☐	☐	☐	☐
25.	It is important for me to do a task well, even if it takes longer than I expected.	☐	☐	☐	☐	☐
26.	If I finish a task ahead of schedule, I am pleased.	☐	☐	☐	☐	☐
27.	When I am involved in an activity, I do not pay attention to the time.	☐	☐	☐	☐	☐
28.	I am not concerned with “saving time” - there is a time for everything.	☐	☐	☐	☐	☐
29.	It is OK to be late for what I consider low priority tasks or events.	☐	☐	☐	☐	☐
30.	I try to have my work done by a specific time and then enjoy my spare time	☐	☐	☐	☐	☐
31.	I make decisions in the spur of the moment.	☐	☐	☐	☐	☐
32.	I complete projects on time by making steady progress.	☐	☐	☐	☐	☐
33.	I make list of things to do.	☐	☐	☐	☐	☐
34.	There always will be time to catch up on my work.	☐	☐	☐	☐	☐
35.	I meet my obligations on time.	☐	☐	☐	☐	☐
36.	However insignificant the task, it is important to have it done on time.	☐	☐	☐	☐	☐
37.	Being time-efficient is NOT among my highest	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
	priorities.					
38.	I use an appointment book or a planner to schedule ahead.	☐	☐	☐	☐	☐
39.	I constantly look for ways to save time.	☐	☐	☐	☐	☐
40.	I tend to lose track of time when I am doing something I like.	☐	☐	☐	☐	☐
41.	I believe that time is to be enjoyed as much as possible.	☐	☐	☐	☐	☐

PART II. Attitudes to timed testing.

The statements below refer to approaches to taking timed tests (that is, tests which have strict time limits, like GRE, SAT, GMAT, and some cognitive, intelligence, and achievement tests). Please indicate the degree to which you agree/disagree with each statement: 1= Strongly Disagree; 2 = Somewhat Disagree; 3 = Neither Agree nor Disagree; 4 = Somewhat Agree; 5 = Strongly Agree; 6 = Not Applicable.

N	Statement	1	2	3	4	5	6
1	I concentrate better on a test when it has a time limit.	☐	☐	☐	☐	☐	☐
2	When taking a test with a time limit, I don't start paying attention to time until a few minutes before the end of the test.	☐	☐	☐	☐	☐	☐
3	I dislike the idea of being timed when tested.	☐	☐	☐	☐	☐	☐
4	When working on a timed test; my only concern is to answer the questions correctly.	☐	☐	☐	☐	☐	☐
5	I find it helpful to have a strict time limit on a test.	☐	☐	☐	☐	☐	☐
6	When taking a timed test, I try to pace myself, monitoring how much time I spend on each item.	☐	☐	☐	☐	☐	☐
7	The quality of my test performance is better when there is no time limit.	☐	☐	☐	☐	☐	☐
8	I find timed tests stressful.	☐	☐	☐	☐	☐	☐
9	When taking a timed test, I try to finish it as quickly as I can.	☐	☐	☐	☐	☐	☐

PART 3. In this LAST section, please tell us some information about yourself.

1. Sex ☐ M ☐ F 2. Age: ___years

3. Education (total years of formal schooling completed): _____

4. Degree (please indicate the highest level of education achieved):
☐ High School
☐ Some College
☐ 4-year College or University
☐ Some Graduate School
☐ Graduate or Professional Degree

APPENDIX B

The Russian Version of the COTI-50

Отношение ко Времени в Различных Культурах

Пожалуйста примите к сведению, что в этом опроснике не существует правильных ответов! Нам было бы интересно узнать Ваши мысли по поводу культуры времени. Пожалуйста постарайтесь ответить на **все** вопросы в нашем опроснике. В начале каждой секции находятся инструкции. Пожалуйста прочтите их внимательно перед тем как начнете новую секцию.

ЧАСТЬ 1: Отношение ко времени.

Нижеприведенные утверждения связаны с общими представлениями и отношениями ко времени в разных ситуациях, связанных с работой/учебой. Пожалуйста определите степень, в которой каждое из утверждений является характерным для вашего поведения: 1 = Совершенно не согласен; 2 = Не согласен; 3 = Нейтрален; 4 = Частично согласен; 5 = Совершенно согласен.

Утверждение	1	2	3	4	5
Для меня важно быть пунктуальным.	☐	☐	☐	☐	☐
Я часто смотрю на часы.	☐	☐	☐	☐	☐
Я стараюсь решать проблемы по мере их поступления, не составляя предварительного расписания.	☐	☐	☐	☐	☐
Я следую принципу: «Делу время, а потехе час», разделяя время работы и досуга.	☐	☐	☐	☐	☐
Я не трачу время зря.	☐	☐	☐	☐	☐
Получать удовольствие от работы для меня важнее, чем завершить ее к определенному сроку.	☐	☐	☐	☐	☐

Утверждение	1	2	3	4	5
Я считаю, что день должен быть спланирован заранее.	☐	☐	☐	☐	☐
Я не переживаю, если не успеваю что-то сделать вовремя.	☐	☐	☐	☐	☐
Я стараюсь ничего не откладывать на потом.	☐	☐	☐	☐	☐
Я работаю в удобном для меня темпе и стараюсь без спешки переходить от одного дела к другому.	☐	☐	☐	☐	☐
Я предпочитаю полностью завершить одно дело перед тем как браться за другое.	☐	☐	☐	☐	☐
Я работаю быстрее и эффективнее, если работа должна быть завершена к определенному сроку.	☐	☐	☐	☐	☐
Я действую импульсивно, не планируя заранее.	☐	☐	☐	☐	☐
Мне свойственно опаздывать на запланированные мероприятия.	☐	☐	☐	☐	☐
Мне свойственно отвлекаться на дела, не связанные с работой, несмотря на то, что в итоге на завершение этой работы уходит больше времени.	☐	☐	☐	☐	☐
Я легко меняю свои планы в последнюю минуту, если появляется что-то более интересное или важное.	☐	☐	☐	☐	☐
Мне важно выполнить работу хорошо, вне зависимости от того сколько на это уйдет времени.	☐	☐	☐	☐	☐
Я предпочитаю не планировать свой день заранее и «плыть по течению».	☐	☐	☐	☐	☐
Я часто спешу.	☐	☐	☐	☐	☐
Я не стремлюсь заканчивать дела как можно быстрее.	☐	☐	☐	☐	☐
Мне свойственно заниматься несколькими делами одновременно.	☐	☐	☐	☐	☐
Я расстраиваюсь, если опаздываю на встречи.	☐	☐	☐	☐	☐
Я предпочитаю следовать заранее составленному мной расписанию.	☐	☐	☐	☐	☐
Для меня важно работать быстро и эффективно.	☐	☐	☐	☐	☐
Мне свойственно откладывать дела до последнего момента.	☐	☐	☐	☐	☐

Утверждение	1	2	3	4	5
Я доволен(льна), когда удается закончить работу раньше запланированного срока.	☐	☐	☐	☐	☐
Когда я чем-то увлечен(а), я не слежу за временем.	☐	☐	☐	☐	☐
Я не пытаюсь «беречь время» - время найдется для всего.	☐	☐	☐	☐	☐
Для меня допустимо не выполнять в срок несущественные задания.	☐	☐	☐	☐	☐
Я стараюсь завершить работу к определенному сроку, а после этого располагать своим свободным временем.	☐	☐	☐	☐	☐
Мне свойственно принимать решения спонтанно.	☐	☐	☐	☐	☐
Я заканчиваю работу в срок, потому что работаю планомерно.	☐	☐	☐	☐	☐
Я составляю список того, что мне нужно сделать.	☐	☐	☐	☐	☐
Я всегда найду время наверстать недоделанное в работе.	☐	☐	☐	☐	☐
Быстрота выполнения работы не входит в число моих приоритетов.	☐	☐	☐	☐	☐
Я пунктуально выполняю свои обязательства.	☐	☐	☐	☐	☐
Каким бы несущественным ни было задание, важно сделать его вовремя.	☐	☐	☐	☐	☐
Я пользуюсь ежедневником, чтобы планировать свои дела на будущее.	☐	☐	☐	☐	☐
Я постоянно ищу способы экономии времени.	☐	☐	☐	☐	☐
Когда я занимаюсь чем-то что мне нравится, я не замечаю как летит время.	☐	☐	☐	☐	☐
Для меня допустимо опаздывать на неважные с моей точки зрения мероприятия.	☐	☐	☐	☐	☐
Я считаю, что надо получать как можно больше удовольствия от того, как проводишь время.	☐	☐	☐	☐	☐

Часть 2. Отношение к тестам на время.

Нижеприведенные утверждения отражают отношение к тестам на время (то есть к тестам, которые имеют строгие временные ограничения). Примерами такого рода тестов являются тесты достижений, GRE, SAT, TOEFL и тесты, исследующие познавательные функции и интеллект). Пожалуйста, определите, насколько вы согласны с нижеприведенными утверждениями. Если Вам никогда не приходилось встречаться с тестами на время, выберите вариант «Неприменимо». Во всех остальных случаях постарайтесь определить степень вашего согласия/несогласия с каждым конкретным утверждением: 1 = Совершенно не согласен; 2 = Не согласен; 3 = Нейтрален; 4 = Частично согласен; 5 = Совершенно согласен; 6 = Неприменимо.

Утверждение	1	2	3	4	5	6
Я лучше концентрируюсь на тесте если он ограничен по времени.	☐	☐	☐	☐	☐	☐
Когда я выполняю тест на время, я начинаю обращать внимание на временные ограничения только за несколько минут до окончания теста.	☐	☐	☐	☐	☐	☐
Я не люблю сдавать экзамены/тесты со срогими временными ограничениями.	☐	☐	☐	☐	☐	☐
Я не стараюсь выполнить тест быстро, моя единственная задача - это правильно ответить на вопросы.	☐	☐	☐	☐	☐	☐
Наличие временных ограничений в тесте мне только на пользу.	☐	☐	☐	☐	☐	☐
Когда тест ограничен по времени, я стараюсь работать в определенном темпе, следя за тем, сколько времени я затрачиваю на каждый вопрос.	☐	☐	☐	☐	☐	☐
Я лучше справляюсь с тестом в отсутствие временных ограничений.	☐	☐	☐	☐	☐	☐
Я нервничаю больше обычного, когда тест ограничен по времени.	☐	☐	☐	☐	☐	☐
Когда я сдаю экзамен или тест на время, я пытаюсь его закончить как можно скорее	☐	☐	☐	☐	☐	☐

ЧАСТЬ 3. Для статистического анализа результатов, нам необходима следующая информация о Вас:

1. Ваш Пол ☐ М ☐ Ж 2. Возраст: _____полных лет

3. Образование (сколько всего лет Вы обучались в средних и/или высших учебных заведениях): _____ лет.

4. Закончили ли Вы что-либо из перечисленного (отметьте самую последнюю ступень, которую Вы завершили)?

☐ Средняя школа
☐ Профтех училище
☐ 4-х годичный колледж или институт
☐ Университет (5-6 лет)
☐ Магистратура/Аспирантура /Второе Высшее

Если у Вас есть какие-либо вопросы по поводу этого исследования, пожалуйста пошлите нам сообщение по електронной почте agranna@email.unc.edu и мы будем рыды ответить на все Ваши вопросы.

APPENDIX C

Big Five Inventory – 44 Items (BFI-44; John, et al, 1991)

Instructions: Here are a number of characteristics that may or may not apply **to your actual self**. For example, do you agree that **your actual self** is someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement: 1 = Strongly disagree; 2 = Disagree a little; 3 = Neither agree nor disagree; 4 = Agree a little, 5 = Strongly agree.

I see myself as someone who...

N	Statement	1	2	3	4	5
1	Is talkative	☐	☐	☐	☐	☐
2	Tends to find fault with others	☐	☐	☐	☐	☐
3	Does a thorough job	☐	☐	☐	☐	☐
4	Is depressed, blue	☐	☐	☐	☐	☐
5	Is original, comes up with new ideas	☐	☐	☐	☐	☐
6	Is reserved	☐	☐	☐	☐	☐
7	Is helpful and unselfish with others	☐	☐	☐	☐	☐
8	Can be somewhat careless	☐	☐	☐	☐	☐
9	Is relaxed, handles stress well	☐	☐	☐	☐	☐
10	Is curious about many different things	☐	☐	☐	☐	☐
11	Is full of energy	☐	☐	☐	☐	☐
12	Starts quarrels with others	☐	☐	☐	☐	☐
13	Is a reliable worker	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
14	Can be tense	☐	☐	☐	☐	☐
15	Is ingenious, a deep thinker	☐	☐	☐	☐	☐
16	Generates a lot of enthusiasm	☐	☐	☐	☐	☐
17	Has a forgiving nature	☐	☐	☐	☐	☐
18	Tends to be disorganized	☐	☐	☐	☐	☐
19	Worries a lot	☐	☐	☐	☐	☐
20	Has an active imagination	☐	☐	☐	☐	☐
21	Tends to be quiet	☐	☐	☐	☐	☐
22	Is generally trusting	☐	☐	☐	☐	☐
23	Tends to be lazy	☐	☐	☐	☐	☐
24	Is emotionally stable, not easily upset	☐	☐	☐	☐	☐
25	Is inventive	☐	☐	☐	☐	☐
26	Has an assertive personality	☐	☐	☐	☐	☐
27	Can be cold and aloof	☐	☐	☐	☐	☐
28	Perseveres until the task is finished	☐	☐	☐	☐	☐
29	Can be moody	☐	☐	☐	☐	☐
30	Values artistic, aesthetic experiences	☐	☐	☐	☐	☐
31	Is sometimes shy, inhibited	☐	☐	☐	☐	☐
32	Is considerate and kind to almost everyone	☐	☐	☐	☐	☐
33	Does things efficiently	☐	☐	☐	☐	☐
34	Remains calm in tense situations	☐	☐	☐	☐	☐
35	Prefers work that is routine	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
36	Is outgoing, sociable	☐	☐	☐	☐	☐
37	Is sometimes rude to others	☐	☐	☐	☐	☐
38	Makes plans and follows through with them	☐	☐	☐	☐	☐
39	Gets nervous easily	☐	☐	☐	☐	☐
40	Likes to reflect, play with ideas	☐	☐	☐	☐	☐
41	Has few artistic interests	☐	☐	☐	☐	☐
42	Likes to cooperate with others	☐	☐	☐	☐	☐
43	Is easily distracted	☐	☐	☐	☐	☐
44	Is sophisticated in art, music, or literature	☐	☐	☐	☐	☐

APPENDIX D

Russian Version of the BFI - 40 Items (Gretsov, 1995)

Оцените применимость к себе каждого из приведенных ниже утверждений. Пожалуйста, отвечайте искренне: «правильных» и «неправильных» ответов здесь нет, каждый из них свидетельствует о Вашем индивидуальном своеобразии. Отвечайте быстро, не задумываясь слишком долго над вопросами; выбирайте тот вариант ответа, который первым приходит в голову: 1 = Нет, это не обо мне; 2 = Иногда это обо мне, иногда - нет; 3 = Да, это точно обо мне.

N	Утверждение	1	2	3
1	Для меня лучший отдых — пообщаться в веселой компании.	☐	☐	☐
2	Я иногда чувствую себя очень веселым или печальным даже без серьезной причины.	☐	☐	☐
3	Меня очень интересует все новое, что появляется вокруг.	☐	☐	☐
4	Я всегда осуществляю то, что запланировал.	☐	☐	☐
5	Когда я с кем-то в ссоре, то обычно сам делаю первый шаг, чтобы помириться.	☐	☐	☐
6	Я часто нуждаюсь в друзьях, которые могли бы меня поддержать и утешить.	☐	☐	☐
7	У меня легко меняется настроение.	☐	☐	☐
8	Мне кажется, что пословица «все новое — это хорошо забытое старое» неверна.	☐	☐	☐
9	Я умею рассчитывать свое время так, что успеваю сделать все нужное.	☐	☐	☐
10	Меня можно назвать человеком мягкосердечным.	☐	☐	☐
11	Я очень люблю ходить в гости.	☐	☐	☐
12	Иногда я волнуюсь так сильно, что не могу усидеть на месте.	☐	☐	☐
13	Меня можно назвать человеком весьма любопытным.	☐	☐	☐

N	Утверждение	1	2	3
14	Думаю, что окружающие считают меня очень ответственным человеком.	☐	☐	☐
15	Я человек доверчивый.	☐	☐	☐
16	Меня часто тянет к приключениям, я люблю «встряхнуться».	☐	☐	☐
17	Однообразие мне быстро надоедает, вызывает скуку.	☐	☐	☐
18	У меня широкий круг интересов, разнообразные увлечения.	☐	☐	☐
19	Я аккуратен и осмотрителен в словах и в делах.	☐	☐	☐
20	Я охотно откликаюсь на самые разнообразные просьбы друзей и знакомых.	☐	☐	☐
21	Большинство знаний я получаю из общения со сверстниками, а не из книг или школьных уроков.	☐	☐	☐
22	Бывает, я чувствую себя очень уставшим без всякой причины.	☐	☐	☐
23	Я легко ориентируюсь в неожиданных ситуациях.	☐	☐	☐
24	Если мои желания вступают в противоречие с потребностями, то я всегда выбираю не то, что хочу, а то, что должен делать.	☐	☐	☐
25	Думаю, что окружающие не считают меня эгоистом.	☐	☐	☐
26	Я человек разговорчивый.	☐	☐	☐
27	Считаю, что характеристика «спокойный» — ко мне не подходит.	☐	☐	☐
28	Думаю, что большинство окружающих считают, что я человек творческий, с богатым воображением.	☐	☐	☐
29	Полагаю, что назвать меня ленивым нельзя.	☐	☐	☐
30	Я избегаю соперничества с другими людьми.	☐	☐	☐
31	Мне нравятся большие шумные компании.	☐	☐	☐
32	Меня часто одолевают сомнения по самым разным поводам.	☐	☐	☐
33	Я люблю размышлять над причинами и последствиями происходящих в моей жизни событий.	☐	☐	☐

N	Утверждение	1	2	3
34	Когда я поставил перед собой цель, то готов преодолеть большие трудности на пути к ней.	☐	☐	☐
35	Думаю, что я человек щедрый.	☐	☐	☐
36	У меня лучше получается работать в обществе других людей, а не в одиночестве.	☐	☐	☐
37	Меня легко развеселить или расстроить.	☐	☐	☐
38	Мне нравится узнавать все новое — даже когда это идет вразрез с моими знаниями и убеждениями.	☐	☐	☐
39	Прежде чем сделать что-либо, я всегда задумываюсь о возможных последствиях.	☐	☐	☐
40	Мне доставляет удовольствие помогать другим людям.	☐	☐	☐

APPENDIX E

Content of the Email Advertisement Used to Recruit Participants

A. American Group

Subject: INFORMATIONAL: Would you take time to think about *time*?

Have you ever noticed that different people treat time differently? What does *being on time* mean to different people? How late is *really late*? Have you ever wondered if time standards are different around the globe? If you have a few minutes to help us advance cross-cultural psychological research about people's attitudes towards time, please consider participating in our study!

The goals of the research are (1) To learn more about people's attitudes towards time and experience with time-limited tests, and (2) To explore if these beliefs and attitudes differ across cultures.

Who can participate?

- If you are a native English speaker, who grew up in North America
- Are between 18 and 45 years of age
- Have about a few minutes to spare to advance psychological research
- Have access to a computer with internet connection

Please click on the link below to complete a short survey:

http://uncodum.qualtrics.com/SE?SID=SV_9tycMLZ8EH5RMGw&SVID=Prod

Contact us: email arranna@email.unc.edu with any questions or to get any addition information about the study. The Behavioral Affairs Institutional Review Board of the University of North Carolina at Chapel Hill has approved this study. (PSYC 06-0544; approval date 11/13/06)

B. Russian Group.

Дорогие сограждане,

Приглашаю Вас поучаствовать в кросс-культурном исследовании, направленном на изучение отношения ко времени в разных странах. Это исследование - часть диссертационного проекта. Для того, чтобы диссертация материлизовалась, необходимо, чтобы как минимум 400 русско-говорящих (и русско-думающих) людей в возрасте от 18 до 45 лет заполнили предлагаемый опросник онлайн.

На заполнение опросника уходит в среднем 10-15 минут. Буду Вам очень признательна, если Вы заполните этот опросник И перешлете его своим друзьям, родственникам, коллегам, студентам и знакомым, проживающим в России.

Критерии отбора участников исследования:

- Возраст - 18-45 лет
- Свободное владение русским языком
- Принадлежность к "Российской культуре" - то есть, меня интересуют только ответы людей, выросших и проживающих в России.

Ссылка на опросник:

http://uncodum.qualtrics.com/SE?SID=SV_9tycMLZ8EH5RMGw&SVID=Prod

Вопросы, комментарии, а также предложения по улучшению опросника присылайте по электронной почте agranovich@gmail.com . Еще раз - огромное спасибо!

APPENDIX F

Informed Consent Forms

THE UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL

Consent to Participate in a Research Study through the Psychology Participant Pool (Stage 1- Online survey option)

IRB Study # 06-0544 **Consent Form Version Date:** 8-05-2008

Title of Study: The Culture of Time

Principal Investigator: Anna V. Agranovich, M.A. **Faculty Advisor:** Abigail Panter, Ph.D.

UNC-Chapel Hill Department: Psychology **UNC-Chapel Hill Department:** Psychology
Email Address: agranna@email.unc.edu **Email Address:** panter@unc.edu

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

We are investigating the differences in attitudes towards time across cultures. Some psychologists theorize that our beliefs about time depend on our cultural environment and cultural norms. Thus, psychologists suggest that different cultures have different standards about the importance of deadlines, being on time, or arriving late, etc. This study is focused on studying such differences between North American and Russian cultures. The ultimate aim of this study is to develop a valid measure of time attitudes that may be relevant to timed psychological assessment.

How many people will take part in this study?

We hope to obtain data from approximately 800 adults, half of them being from the United States, and half from Russia.

How long will your part in this study last?
The study should take no more than one hour. Therefore, you will receive **1 hour of credit** towards your Psychology 101 research requirement. If you decide at any point that you do not wish to continue, you may leave with no negative consequences.

Please be aware, however, that to receive credit for the experiment you must complete the entire survey. **You will not be able to save your work, exit the questionnaire, and return to it later, thus it must all be completed in one session.** Please plan your time accordingly and allocate a full hour to spend on the questionnaire, just as you would for a regular in-person experiment session. If you complete the survey in less than 1 hour, however, you will receive credit for the full hour. Remember also that there are other ways to fulfill your research requirement in addition to study participation.

What will happen if you take part in the study?
You will complete a survey about time attitudes, which consists of 3 parts with about 50 questions total. You do not have to answer any questions you do not wish to answer, for any reason. More specific directions will be provided during the study, and you may ask questions by emailing agranna@email.unc.edu. We will also tell you more about the rationale for the study afterwards.

What are the possible benefits from being in this study?
Research is designed to benefit society by gaining new knowledge. Though you may not receive any direct benefit from participating in this study, you will learn more about psychological research in general and this topic in particular.

What are the possible risks or discomforts involved from being in this study?
We do not anticipate you will experience any risks or discomforts.

How will your privacy be protected?
Your data are anonymous. Neither your name, e-mail address, nor any other identifying information will be associated with your questionnaire responses. We will assign a participant ID to your data when we download it, but the data will not be connected to you personally by any identifiers.

The researchers will maintain a list of participants who provided their consent to participate in the study, but no information on this list will link you to your individual data. Rather, the researchers will simply have a list of participants who consented to participate, and a separate set of data. The lists of participants will be destroyed at the conclusion of data collection. The data will only be accessible to the researchers, and will be stored on a secure website. Data from this study may be kept for seven years, in keeping with the requirements of academic journals, after which time the data may be destroyed. In any presentations, written reports, or publications, no one will be identifiable and only group results will be presented. To further protect your privacy, we recommend completing the questionnaire when you are alone or in a location where others cannot see your responses on the computer screen.

Will you receive anything for being in this study?

You will not receive any financial incentive for taking part in this study, but you will receive credit towards your Psychology 10 research requirement.

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. Unfortunately, the online format does not permit participants to ask questions real-time while you are completing the questionnaire itself. You can e-mail the experimenter, but you may not receive a response while you are online, completing the questionnaire. If you have questions or concerns, however, please do feel free to e-mail Anna Agranovich at agranna@email.unc.edu and we will respond to your e-mail as soon as possible.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research participant, you may contact, anonymously if you wish, the Behavioral Institutional Review Board at 919-962-7761 or aa-irb@unc.edu.

Participant's Agreement:
Please click below to indicate the following:
I have read the information provided above. I have asked all the questions that I have at this time. I voluntarily agree to participate in this research study.

____ I am 18 or older

(Participant clicks a "submit" button to indicate consent.)

Please print a copy of this consent form for your records.

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Consent to Participate in a Research Study
(Online survey option outside of the Participant Pool)

IRB Study # 06-0544 **Consent Form Version Date:** 8-05-2008

Title of Study: The Culture of Time

Principal Investigator: Anna V. Agranovich, M.A. **Faculty Advisor:** Abigail Panter, Ph.D.

UNC-Chapel Hill Department: Psychology
Email Address: agranna@email.unc.edu

UNC-Chapel Hill Department: Psychology
Email Address: panter@unc.ed

What are some general things you should know about research studies?
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?
We are investigating the differences in attitudes towards time across cultures. Some psychologists theorize that our beliefs about time depend on our cultural environment and cultural norms. Thus, psychologists suggest that different cultures have different standards about the importance of deadlines, being on time, or arriving late, etc. This study is focused on studying such differences between North American and Russian cultures. The ultimate aim of this study is to develop a valid measure of time attitudes that may be relevant to timed psychological assessment.

How many people will take part in this study?
We hope to obtain data from approximately 800 adults, half of them being from the United States, and half from Russia.

How long will your part in this study last?

The study should take no more than one hour. Note that you will not be able to save your work, exit the questionnaire, and return to it later; thus it must all be completed in one session. If you decide at any point that you do not wish to continue, you may discontinue with no negative consequences.

What will happen if you take part in the study?
You will complete a survey about time attitudes, which consists of 3 parts with about 50 questions total. You do not have to answer any questions you do not wish to answer, for any reason. More specific directions will be provided during the study, and you may ask questions by emailing to agranna@email.unc.edu. We will also tell you more about the rationale for the study afterwards.

What are the possible benefits from being in this study?
Research is designed to benefit society by gaining new knowledge. Though you may not receive any direct benefit from participating in this study, you will learn more about psychological research in general and this topic in particular.

What are the possible risks or discomforts involved from being in this study?
We do not anticipate you will experience any risks or discomforts.

How will your privacy be protected?
Your data are anonymous. Neither your name, e-mail address, nor any other identifying information will be associated with your questionnaire responses. We will assign a participant ID to your data when we download it, but the data will not be connected to you personally by any identifiers.

The data will only be accessible to the researchers, and will be stored on a secure website. Data from this study may be kept for seven years, in keeping with the requirements of academic journals, after which time the data may be destroyed. In any presentations, written reports, or publications, no one will be identifiable, and only group results will be presented.

To further protect your privacy, we recommend completing the questionnaire when you are alone or in a location where others cannot see your responses on the computer screen.

Will you receive anything for being in this study?
You will not receive any financial incentive for taking part in this study**.**

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. Unfortunately, the online format does not permit participants to ask questions real-time while you are completing the questionnaire itself. You can e-mail the experimenter, but you may not receive a response while you are online, completing the questionnaire. If you have questions or concerns, however, please do feel free to e-mail Anna Agranovich at agranna@email.unc.edu . We will respond to your e-mail as soon as possible.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research participant, you may contact, anonymously if you wish, the Behavioral Institutional Review Board at 919-962-7761 or aa-irb@unc.edu.

Participant's Agreement:

Please click below to indicate the following:
I have read the information provided above. I have asked all the questions that I have at this time. I voluntarily agree to participate in this research study.

____ I am 18 or older

(Participant clicks a "submit" button to indicate consent.)

Please print a copy of this consent form for your records.

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Consent to Participate in a Research Study through the Psychology Participant Pool
(Stage 2)

IRB Study # 06-0544 **Consent Form Version Date:** 8-5-08
Title of Study: The Culture of Time and Timed Psychological Test Performance.

Principal Investigator: Anna Agranovich, M.A. **Faculty Advisor:** Abigail Panter, Ph.D.
UNC-Chapel Hill Department: Psychology **UNC-Chapel Hill Department:** Psychology
Email Address: agranna@email.unc.edu **Email Address:** panter@unc.edu

---

What are some general things you should know about research studies?
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?
In this study, we would like to investigate cultural differences in performance on neuropsychological tests. The purpose of this study is to find out whether such differences exist between North American and Russian cultural groups and investigate contribution of cultural factors to such differences.

How many people will take part in this study?
We hope to obtain data from approximately 50 individuals from the United States and 50 from Russian Federation, most of them being undergraduate students.

How long will your part in this study last?
The study should take no more than two hours (this amount of time differs from what you describe in proposal). Therefore, you will receive **2 hours of credit** towards your Introductory Psychology research requirement. If you decide at any point that you do not wish to continue, you may leave with no negative consequences. You will receive credit for the time spent in the study. For example, if you leave after half an hour, you will receive 0.5

hours of research credit. Remember also that there are other ways to fulfill your research requirement in addition to study participation.

What will happen if you take part in the study?
You will be administered several short paper and pencil tests that are used to assess various cognitive skills and will be asked to complete an online survey about attitudes towards time. You may find some of these tasks easy, whereas other might be more difficult. You do not have to answer any questions you do not wish to answer, or complete the tests you do not want to do for any reason. More specific directions will be provided during the study, and you may ask questions at any time. We will also tell you more about the rationale for the study afterwards.

What are the possible benefits from being in this study?
Research is designed to benefit society by gaining new knowledge. Though you may not receive any direct benefit from participating in this study, you will learn more about psychological research in general and this topic in particular.

What are the possible risks or discomforts involved from being in this study?
We do not anticipate you will experience any risks or discomforts.

How will your privacy be protected?
The researchers will make every effort to protect your privacy. Your name will only appear on this informed consent form and in the records for the Introductory Psychology Participant Pool. Your test results and responses to the questionnaires will only be associated with a code number that we assign, but that number is not and will not be connected in any way with your name. Thus, your responses are anonymous. The data will only be accessible to the researchers, and will be stored separately from consent forms and anything that might identify you. Data from this study may be kept for seven years, in keeping with the requirements of academic journals, after which time the data may be destroyed. In any presentations, written reports, or publications, no one will be identifiable and only group results will be presented.

Will you receive anything for being in this study?
You will not receive any financial incentive for taking part in this study, but you will receive credit towards your Psychology 101 research requirement.

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research participant, you may contact, anonymously if you wish, the Behavioral Institutional Review Board at 919-962-7761 or aa-irb@unc.edu.

Participant's Agreement:

I have read the information provided above. I have asked all the questions that I have at this time. I voluntarily agree to participate in this research study.

____ I am 18 or older

_____	_____	
Participant's Signature	Printed Name of Participant	Date

Please sign one copy and give it to the researchers, and keep the other copy for your records.

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Consent to Participate in a Research Study
(Stage 2- Outside of the Participant Pool)

IRB Study # 06-0544 **Consent Form Version Date:** 8-5-08

Title of Study: The Culture of Time and Timed Psychological Test Performance.

Principal Investigator: Anna Agranovich, M.A.
UNC-Chapel Hill Department: Psychology
Email Address: agranna@email.unc.edu

Faculty Advisor: Abigail Panter, Ph.D.
UNC-Chapel Hill Department: Psychology
Email Address: panter@unc.edu

What are some general things you should know about research studies?
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?
In this study, we would like to investigate cultural differences in performance on neuropsychological tests. The purpose of this study is to find out whether such differences exist between North American and Russian cultural groups and investigate contribution of cultural factors to such differences.

How many people will take part in this study?
We hope to obtain data from approximately 50 individuals from the United States and 50 from Russian Federation.

How long will your part in this study last?
The study should take no more than two hours. If you decide at any point that you do not wish to continue, you may leave with no negative consequences.

What will happen if you take part in the study?

You will be administered several short paper and pencil tests that are used to assess various cognitive skills and will be asked to complete an online survey about attitudes towards time. You may find some of these tasks pretty easy, whereas other might be more difficult. You do not have to answer any questions you do not wish to answer, or complete the tests you do not want to do for any reason. More specific directions will be provided during the study, and you may ask questions at any time. We will also tell you more about the rationale for the study afterwards.

What are the possible benefits from being in this study?
Research is designed to benefit society by gaining new knowledge. Though you may not receive any direct benefit from participating in this study, you will learn more about psychological research in general and this topic in particular.

What are the possible risks or discomforts involved from being in this study?
We do not anticipate you will experience any risks or discomforts.

How will your privacy be protected?
The researchers will make every effort to protect your privacy. Your name will only appear on this informed consent form. Your test results and responses to the questionnaires will only be associated with a code number that we assign, but that number is not and will not be connected in any way with your name. Thus, your responses are anonymous. The data will only be accessible to the researchers, and will be stored separately from consent forms and anything that might identify you. Data from this study may be kept for seven years, in keeping with the requirements of academic journals, after which time the data may be destroyed. In any presentations, written reports, or publications, no one will be identifiable and only group results will be presented.

Will you receive anything for being in this study?
You will receive $10 for taking part in this study.

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research participant, you may contact, anonymously if you wish, the Behavioral Institutional Review Board at 919-962-7761 or aa-irb@unc.edu.

Participant's Agreement:
I have read the information provided above. I have asked all the questions that I have at this time. I voluntarily agree to participate in this research study.
____ I am 18 or older

_____	_____	_____
Participant's Signature	Printed Name of Participant	Date

Department of Psychology
University of North Carolina - Chapel Hill
in collaboration with
Moscow State Lomonosov University
Contact Person: Anna Agranovich, M.S.
Email: agranna@email.unc.edu
IRB Study # 06-0544

СОГЛАСИЕ НА УЧАСТИЕ В ИССЛЕДОВАНИИ
(Stage 1)

Предлагаемый Вам опросник являются частью кросс-культурного исследования, направленного на выявление различий в отношении ко времени у Россиян и Американцев. Для того, чтобы осуществить наше исследование, как минимум 800 добровольцев из обеих стран должны заполнить этот опросник на в электронной сети. На его заполнение уходит приблизительно от 15 до 25 минут.

Для того, чтобы учавствовать в нашем исследовании Вам потребуется доступ к интернету. Никаких специальных навыков или знаний от Вас не требуется: в нашем опроснике нет правильных или неправильных ответов; му хотим лишь узнать различаются ли ответы на групповом уровне. Участие в исследовании сугубо добровольное, то есть, если по какой-либо причине Вы решите отказаться от участия в эксперименте, Вы вольны сделать это в любой момент.

Результаты опросника не будут доступны ни для кого кроме экспериментатора. Это означает, что Ваше ответы никак не будут связаны с Вашим именем - им будет присвоен номер, по которому Ваша личность не может быть идентифицирована. Результаты исследования пройдут статистическую обработку и будут опубликованы в виде групповых данных, а не индивидуальных результатов.

Это исследование является частью диссертационной работы, которая проводится на базе University of North Carolina at Chapel Hill, в США и Московского Государственного Университета. Если у Вас возникнут вопросы, связанные с исследованием, Вы можете послать их електронной почтой Анне Агранович по адресу agranna@email.unc.edu

Все исследования, включающие работу с людьми, проходят оценку комитетом, целью работы которого является защита Ваших прав и благосостояния. Если у Вас есть вопросы, касающиеся Ваших прав как участвника этого исследования, Вы можете задать их (анонимно, если желаете) Institutional Review Board по электронной почте IRB_subjects@unc.edu.

Если, ознакомившись с условиями и процедурой эксперимента, Вы даете свое добровольное согласие на участие в описанном выше исследовании, нажмите на кнопку **«Продолжить»,** которая приведет Вас к опроснику.

Department of Psychology
University of North Carolina - Chapel Hill
in collaboration with
Moscow State Lomonosov University
Contact Person: Anna Agranovich, M.S.
Email: agranna@email.unc.edu
IRB Study # 06-0544

СОГЛАСИЕ НА УЧАСТИЕ В ИССЛЕДОВАНИИ
(Stage 2)

Предлагаемые Вам тесты являются частью кросс-культурного исследования, направленного на выявление различий между Российской и Американской группами. С этой целью 100 добровольцев из обеих стран должны пройти тестирование при помощи предлагаемых коротких методик, каждая из которых занимает от 5 до 25 минут. В целом, исследование включает 6 методик и несколько опросников занимает около полутора часов.

Для выполнения тестов не требуется никаких специальных навыков или знаний, однако от Вас ожидается концентрация внимания на каждом конкретном задании и желание выполнить его как можно лучше.

Участие в исследовании сугубо добровольное, то есть, если по какой-либо причине Вы решите отказаться от участия в эксперименте, Вы вольны сделать это в любой момент.

РезультатыВашихтестов не будут доступны ни для кого кроме экспериментатора. Это означает, что Ваше имя не будет указано нигде кроме этой формы, а всем тестам будет присвоен номер, по которому Ваша личность не может быть идентифицирована. Результаты исследования пройдут статистическую обработку и будут опубликованы в виде групповых данных, а не индивидуальных результатов.

Это исследование является частью диссертационной работы, которая проводится на базе University of North Carolina at Chapel Hill, в США и Московского Государственного Университета. Если у Вас возникнут вопросы, связанные с исследованием, Вы можете послать их електронной почтой Анне Агранович по адресу <agranna@email.unc.edu> или задать их экспериментатору в ходе тестирования.

Все исследования, включающие работу с людьми, проходят оценку комитетом, целью работы которого является защита Ваших прав и благосостояния. Если у Вас есть вопросы, касающиеся Ваших прав как участвника этого исследования, Вы можете задать их (анонимно, если желаете) Institutional Review Board по электронной почте IRB_subjects@unc.edu.

Я, _____, ознакомился (лась) с условиями и процедурой эксперимента и даю свое добровольное согласие на участие в описанном выше исследовании.

_____ _____
Подпись Дата

APPENDIX G

Table G1

Exploratory Factor Analysis: Initial Factor Loadings for 50-item 5-Factor Model for the global (Gl), Russian (R), and American (US) samples.

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
COT1	It is important for me to be on time.						.42	.61	.47	.82						
COT2	I look at my watch frequently.															
COT3	I do not tie my schedule to specific time slots and try to take care of whatever comes up.	.49	.50	.45												
COT4	For me, work and leisure times are separate.															
COT5	I do NOT waste time.				.65	.58	.69									
COT6	It's more important for me to enjoy what I am doing than to get work done within a certain time limit.							.56	.50				.59			
COT7	I believe that a person's day should be planned ahead.	.74	.67	.76												

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
COT8	If things don't get done on time, I do not worry about it.							.48	.47				.52			
COT9	I try not to postpone things for later.				.69	.65	.63									
COT10	I take time doing things at my own pace, without rushing.												.51			
COT11	I prefer to completely finish one task before starting another.															
COT12	I work more efficiently when I have a deadline.															
COT13	I do things impulsively, without planning.	.59	.54	.55							.47	.61	.41			
COT14	I tend to be late to scheduled events.							.51	.41	.77	.56					
COT15	I mix work and leisure activities even if it means taking longer to have work done.				.66	.71	.58			.42						
COT16	I am comfortable changing plans at the last minute when something more interesting or	.45		.49							.55	.67	.41			

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
	important comes up.															
COT17	It is important for me to do a task well, no matter how long it takes.															
COT18	I prefer not to plan my day ahead but to go with the flow of events.	.76	.59	.80				.41		.43		.57	.49			
COT19	I am often in a rush.															
COT20	I am not generally concerned with completing tasks as quickly as I can.															
COT21	I tend to do more than one thing at a time.															
COT22	It upsets me to be late for appointments.							.47	.41	.55						
COT23	I prefer to follow a schedule that I set in advance.	.79	.76	.83	.44	.52				.43						
COT24	I find it important to be efficient at work.				.51		.43	.53								
COT25	I tend to postpone doing things until the last moment.				.72	.68	.81									

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
COT26	If I finish a task ahead of schedule, I am pleased.															
COT27	When I am involved in an activity, I do not pay attention to the time.										.53	.52	.51			
COT28	I am not concerned with “saving time” - there is time for everything.	.42		.43									.59			
COT29	It is OK to be late with what I consider low priority tasks.				.50			.57		.60						
COT30	I try to have my work done by a specific time and then enjoy my spare time.				.45	.55	.57									
COT31	I make decisions on the spur of the moment.	.52		.53							.53	.69	.45			
COT32	I complete projects on time by making steady progress.				.69	.68	.73									
COT33	I make lists of things to do.	.57	.65	.57												
COT34.	There always will be time to catch up on my work.												.46			

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
COT35	Being efficient at work is NOT among my high priorities.					.42										
COT36	I meet my obligations on time.				.57	.52	.54	.49		.65						
COT37	However insignificant the task, it is important to have it done on time.				.51	.54	.42	.53		.52						
COT38	I use an appointment book or a planner to schedule ahead.	.51	.59	.52												
COT39	I constantly look for ways to save time.	.46	.44	.52	.42			.43								
COT40	I tend to lose track of time when I am doing something I like.										.43	.45	.52			
COT41	I believe that time is to be enjoyed as much as possible.										.41	.40	.42			
Tt1	I concentrate better on a test when it has a time limit.													.51	.45	.62
Tt2	When taking a test with a time limit, I don’t start paying attention to time until a few minutes before the end of the test.															

Item	Statement	Planning			Management			Punctuality			Event-time			Timed Test		
		Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US	Gl	R	US
Tt3	I dislike the idea of being timed when tested.													.75	.68	.76
Tt4	When working on a timed test; my only concern is to answer the questions correctly.															
Tt5	I find it helpful to have a strict time limit on a test.													.68	.64	.79
Tt6	When taking a timed test, I try to pace myself, monitoring how much time I spend on each item.															
Tt7	The quality of my test performance is better when there is no time limit.													.80	.78	.81
Tt8	I find timed tests stressful.													.69	.68	.68
Tt9	When taking a timed test, I try to finish it as quickly as I can.															

Note: Loadings below .4 are omitted.

APPENDIX H

Culture of Time Inventory-33 Items (COTI-33)

Final Version

PART I: Beliefs about time

Statements below refer to general approaches to and beliefs about time in various situations in work/academic settings. Please indicate the degree to which you agree or disagree with each statement: 1= Strongly Disagree; 2 = Somewhat Disagree; 3 = Neither Agree nor Disagree; 4 = Somewhat Agree; 5 = Strongly Agree.

N	Statement	1	2	3	4	5
1.	It is important for me to be on time.	☐	☐	☐	☐	☐
2.	I do not tie my schedule to specific time slots and try to take care of whatever comes up.	☐	☐	☐	☐	☐
3.	I do not waste time.	☐	☐	☐	☐	☐
4.	It's more important for me to enjoy what I am doing than to get work done within a certain time limit.	☐	☐	☐	☐	☐
5.	I believe that a person's day should be planned ahead.	☐	☐	☐	☐	☐
6.	If things don't get done on time, I do not worry about it.	☐	☐	☐	☐	☐
7.	I try not to postpone things for later.	☐	☐	☐	☐	☐
8.	I do things impulsively, without planning.	☐	☐	☐	☐	☐
9.	I tend to be late to scheduled events.	☐	☐	☐	☐	☐
10.	I mix work and leisure activities even if that means taking longer to have work done.	☐	☐	☐	☐	☐
11.	I am comfortable changing plans at the last minute when something more interesting or important comes up.	☐	☐	☐	☐	☐
12.	I prefer not to plan my day ahead but to go with the flow of events.	☐	☐	☐	☐	☐
13.	It upsets me to be late for appointments.	☐	☐	☐	☐	☐
14.	I prefer to follow a schedule that I set in advance.	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
15.	I find it important to be efficient at work.	☐	☐	☐	☐	☐
16.	I tend to postpone doing things until the last moment.	☐	☐	☐	☐	☐
17.	When I am involved in an activity, I do not pay attention to the time.	☐	☐	☐	☐	☐
18.	It is OK to be late with what I consider low priority tasks.	☐	☐	☐	☐	☐
19.	I try to have my work done by a specific time and then enjoy my spare time.	☐	☐	☐	☐	☐
20.	I make decisions on the spur of the moment.	☐	☐	☐	☐	☐
21.	I complete projects on time by making steady progress.	☐	☐	☐	☐	☐
22.	I make lists of things to do.	☐	☐	☐	☐	☐
23.	I meet my obligations on time.	☐	☐	☐	☐	☐
24.	However insignificant the task, it is important to have it done on time.	☐	☐	☐	☐	☐
25.	I use an appointment book or a planner to schedule ahead.	☐	☐	☐	☐	☐
26.	I constantly look for ways to save time.	☐	☐	☐	☐	☐
27.	I tend to lose track of time when I am doing something I like.	☐	☐	☐	☐	☐
28.	I believe that time is to be enjoyed as much as possible.	☐	☐	☐	☐	☐

PART II. Attitudes to timed testing.

The statements below refer to approaches to taking timed tests (that is, tests which have strict time limits, like GRE, SAT, GMAT, and some cognitive, intelligence, and achievement tests). Please indicate the degree to which you agree/disagree with each statement: 1= Strongly Disagree; 2 = Somewhat Disagree; 3 = Neither Agree nor Disagree; 4 = Somewhat Agree; 5 = Strongly Agree.

N	Statement	1	2	3	4	5
1	I concentrate better on a test when it has a time limit.	☐	☐	☐	☐	☐
2	I dislike the idea of being timed when tested.	☐	☐	☐	☐	☐
3	I find it helpful to have a strict time limit on a test.	☐	☐	☐	☐	☐
4	The quality of my test performance is better when there is no time limit.	☐	☐	☐	☐	☐
5	I find timed tests stressful.	☐	☐	☐	☐	☐

APPENDIX I

Health Screening Questionnaire for Stage 2

ID_____ Phone Number: _____Date/time scheduled _____
Age _____ Gender F M Education_____(yrs)_____(degree)

	Yes	No
Is English your native language?		
Do you have any vision problems that are not corrected by wearing glasses? If yes, describe. (Can you read normally?)		
Are you color blind?		
Do you have any problems with your hearing? If yes, describe.		
The next few questions relate to specific types of health problems you may have had. Please tell me whether you have ever had that particular kind of problem. If you don't feel comfortable answering the question, just let me know.('Yes' responses result in exclusion)		
Have you ever had: a) a stroke or TIA (transient ischemic attack; small stroke) ?		
b) a brain tumor?		
c) a seizure (fits, convulsions, epilepsy)?		
d) a head injury (concussions) such as from a fall or car accident? How many? *Criterion: less than 3 head injuries* If yes, and less than 3, did you lose consciousness? For how long? *(Criterion: total time must be less than 10 minutes)*		
Do you have any (other) neurological problems? If so, describe.		
Have you been hospitalized for emotional problems in the past 5 years?		
Are you currently taking medications for mental or emotional problems?		
Are you currently taking medication to help you sleep? If yes, how often? *(If taken on a regular basis, exclude. If taken occasionally, then include the individual has not taken sleeping medication for the two preceding days.)*		
Have you ever been diagnosed with learning disability? If yes, what type/age of diagnosis?		
Have you ever been told that you have an Attention Deficit/Hyperactivity Disorder?		
Have you ever repeated a grade?		
Have you had any major health problems not previously mentioned? If yes, describe.		
What medications, if any, do you take (both prescription and over the counter), and what do you use the medication for? Name of medication Reason for taking medication _____ _____ *(Exclude if any of these drugs have known cognitive effects)*		
Final assessment: Eligible for participation		

ОПРОСНИК СОСТОЯНИЯ ЗДОРОВЬЯ

№ Испытуемого_____ Дата:_____ Возраст_____ Пол М Ж
Образование ____лет Среднее Неп.Высшее Высшее Второе-Высшее/Аспирантура

Для того, чтобы узнать, можете ли Вы участвовать в этом исследовании, мне необходимо задать Вам несколько вопросов. Большинство из этих вопросов касаются Вашего здоровья. Вы не возражаете? *(В случае положительного ответа на любой из нижеследующих вопросов - исключить)*

		Да	Нет
1	Есть ли у Вас проблемы со зрением, не корректируемые очками? Если да – мешают ли они читать?		
2	Говорили ли Вам врачи, что у Вас дальтонизм мим цветоаномалия?		
3	Есть ли у Вас проблемы со слухом?		
Следующие несколько вопросов касаются конкретных проблем или заболеваний. Пожалуйста сообщите мне, если у Вас когда-либо были:			
4	Инсульт или ишемический инфаркт		
5	Опухоль головного мозга		
6	Эпилентические или судорожные припадки		
7	Сотрясения мозга - Если да, то сколько? Теряли ди Вы сознание? (если больше 3х, и/или потеря сознания больше 10 минут в целом – исключить)		
8	Другие неврологические заболевания?		
9	Были ли Вы госпитализированы по поводу эмоциональных растройств в течение последних 5 лет (депрессия, психоз, тревожность)?		
10	Принимаете ли Вы медикаменты по поводу эмоциональных или психических расстройств (напр. антидепрессанты или нейролептики)?		
11	Принимаете ли Вы снотворное? Если да, то как часто? (*Исключите, если регулярно принимает снотворное. Если принимает только изредка, то убедитесь, что испытуемый не принимал снотворного в ночь перед тестированием)*		
12	Были ли у Вас диагностированы трудности обучения (алексия, аграфия, и т.п.)?		
13	Говорили ли Вам когда-нибудь, что у Вас есть дефицит внимания (ADHD)?		
14	Приходильсь ли Вам оставаться на второй год в школе?		
15	Есть ли у Вас какие-либо серьезные проблемы со здоровьем, которых мы еще не коснулись? Если да - опишите пожалуйста.		
16	Принимаете ли Вы какие-либо лекарства на постоянной основе? Если да, то какие? *(исключите если стимулянты или препараты психогенного действия)*		
Пригоден для участия в исследовании			

APPENDIX J

Familiarity Factor

We would like to learn about your prior experience with standardized or times tests, similar to those you just completed. Please let us know if you had experiences described below, and if yes, how often you participated in the following situations:

	Statement	Never	Seldom	Sometimes	Often
1.	I have taken timed tests before.	☐	☐	☐	☐
2.	These tests remind me of tasks I had to do in school.	☐	☐	☐	☐
3.	I have taken standardized tests before.	☐	☐	☐	☐
4.	I have done something similar to these tests before.	☐	☐	☐	☐

APPENDIX K

Evaluation Anxiety Inventory (EAI, Richmond, et al., 2001)

Directions: This questionnaire is composed of statements students have used to describe how they feel in evaluation/examination/test-like situations in their class. After each statement, indicate the number that best describes how you generally feel about taking a test or exam or being in an evaluative situation. There are no right or wrong answers. Work quickly and report your first impression. Please indicate the degree to which each statement applies to you by marking whether you: 1= Strongly Disagree; 2 = Somewhat Disagree; 3 = Neither Agree nor Disagree; 4 = Somewhat Agree; 5 = Strongly Agree.

N	Statement	1	2	3	4	5
1	I feel apprehensive while preparing for a test.	☐	☐	☐	☐	☐
2	I feel tense when I am studying for a test or exam.	☐	☐	☐	☐	☐
3	I am calm when I am studying for a test.	☐	☐	☐	☐	☐
4	I feel peaceful when I am studying for a test.	☐	☐	☐	☐	☐
5	I feel fear and uneasiness when taking an exam or being evaluated.	☐	☐	☐	☐	☐
6	I feel self-assured when taking an exam	☐	☐	☐	☐	☐
7	I feel fearful when preparing for a test.	☐	☐	☐	☐	☐
8	I feel ruffled when the test is handed to me.	☐	☐	☐	☐	☐
9	I am jumpy and nervous while taking a test.	☐	☐	☐	☐	☐
10	I feel composed and in control while taking an exam.	☐	☐	☐	☐	☐
11	I am bothered and tense when I am being evaluated.	☐	☐	☐	☐	☐
12	I feel satisfied when my exam is completed.	☐	☐	☐	☐	☐

N	Statement	1	2	3	4	5
13	I feel safe during evaluative situations.	☐	☐	☐	☐	☐
14	I feel flustered and confused when I start a test.	☐	☐	☐	☐	☐
15	I am cheerful after I turn in my test.	☐	☐	☐	☐	☐
16	I feel happy about how I did in evaluation situations.	☐	☐	☐	☐	☐
17	I feel dejected and humiliated an hour before an exam.	☐	☐	☐	☐	☐
18	I feel pleased and comfortable while taking a test.	☐	☐	☐	☐	☐
19	I feel confident while taking a test.	☐	☐	☐	☐	☐
20	I feel unhappy throughout an exam period.	☐	☐	☐	☐	☐

Russian Version of the EAI

Оценка Ситуетивной Тревожности в Экзаменационных Услоыиях

Инструкции: Этот опросник представляет собой набор утверждений, которые были использованы студентами при описании их ощущений во время экзамена или оценочных ситуаций. Для каждого утверждения, выберите вариант, который наилучшим образом отражает Ваши ощущения во время экзамена/зачета или другой ситуации, в которой Вас оценивали. В этом опроснике нет верных или неверных ответов. Просто выберите первый ответ, пришедший Вам в голову: 1 = Совершенно не согласен; 2 = Не согласен; 3 = Нейтрален; 4 = Частично согласен; 5 = Совершенно согласен.

	Утверждение	1	2	3	4	5
1	Когда я готовлюсь к тесту, я испытываю страх и тревожусь	☐	☐	☐	☐	☐
2	Я испытываю напряжение когда готовлюсь к тесту/экзамену	☐	☐	☐	☐	☐
3	Когда я готовлюсь к тесту/экзамену, я спокоен	☐	☐	☐	☐	☐
4	Я чувствую себя расслабленно при подготовке к тесту/экзамену	☐	☐	☐	☐	☐
5	Я испытываю страх и беспокойство во время экзамена или в ситуации, когда меня оценивают	☐	☐	☐	☐	☐
6	Я уверен в себе во время экзаменов	☐	☐	☐	☐	☐
7	При подготовке к экзамену, я испытываю страх	☐	☐	☐	☐	☐
8	Когда мне дают тест, я испытываю раздражение	☐	☐	☐	☐	☐
9	Я нервничаю, когда сдаю экзамены	☐	☐	☐	☐	☐
10	Во время экзамена я собран и хорошо себя контролирую	☐	☐	☐	☐	☐
11	Я волнуюсь и испытываю напряжение когда меня оценивают	☐	☐	☐	☐	☐

	Утверждение	1	2	3	4	5
12	Я испытываю удовлетворение, когда экзамен закончен	☐	☐	☐	☐	☐
13	Я чувствую себя в безопасности в оценочных ситуациях	☐	☐	☐	☐	☐
14	В начале экзамена я чувствую себя расстроенным и в замешательстве	☐	☐	☐	☐	☐
15	Я радуюсь, когда экзамен закончен	☐	☐	☐	☐	☐
16	По окончании экзамена я доволен собой/своей работой	☐	☐	☐	☐	☐
17	За час до экзамена я чувствую себя униженным и удрученным	☐	☐	☐	☐	☐
18	Во время теста/экзамена я ощущаю себя комфортно	☐	☐	☐	☐	☐
19	Я уверен в себе во время теста/экзамена	☐	☐	☐	☐	☐
20	Во время сессии я чувствую себя несчастным	☐	☐	☐	☐	☐

Scoring Procedure:

Step 1: Add responses for the **Bolded** items.

Step 2: Add responses for the remaining items.

Score = 80 - Total 1 + Total 2

Score should be between 20 and 140. Scores of 105 and above indicate high test anxiety.

Scores of 55 and below indicate low test anxiety. Scores between 55 and 105 indicate

moderate test anxiety.

REFERENCES

Agranovich, A. (2005). Cross-cultural differences in neuropsychological performance: A comparison between Russian and American samples. In T. Akhutina, J. Glozman, L. Moskovich, & D. Robbins (Eds.). *A.R. Luria and contemporary psychology: Festschrift celebrating the centennial of the birth of Luria* (pp. 187-194). New York: Nova Science Publishers.

Agranovich, A.V., & Puente, A.E. (2007). Do Russian and American normal adults perform similarly on neuropsychological tests? Exploratory study of the effects of culture on neuropsychological test performance. *Archives of Clinical Neuropsychology, 22,* 273-282.

Akhutina, T. V., Glozman, J. M., Moskovich, L, & Robbins, D. (Eds.) (2005). *A. R. Luria and contemporary psychology: Festschrift celebrating the centennial of the birth of Luria*. New York: Nova Science Publishers.

Ancona, D. G., Okhuysen, G., & Perlow, L. (2001). Taking time to integrate temporal research. *Academy of Management Review, 26*, 512-529.

Ardila, A. (1995). Directions of research in cross-cultural neuropsychology. *Journal of Clinical and Experimental Neuropsychology, 17,* 143-150.

Ardila, A. (2001). The impact of culture on neuropsychological test performance. Course 13. Presented at 21st *Annual Conference of National Academy of Neuropsychology*. San Francisco, CA.

Ardila, A., & Moreno, S. (2001). Neuropsychological test performance in Aruaco Indians: An exploratory study. *Journal of International Neuropsychological Society, 7*, 4, 510-515.

Ardila, A., Roselli, M., & Rosas, P. (1989). Neuropsychological assessment in illiterates: Visuo-spatial and memory abilities. *Brain and Cognition, 11*, 147-166.

Birth, K. K. (2004). Finding time: Studying the concepts of time used in daily life. *Field Methods, 16,* 70-84.

Block, R. A., Buggie, S. E., & Matsui, F. (1996). Beliefs about time: Cross-cultural comparisons. *The Journal of Psychology, 130*, 5-22

Brislin, R. W., & Kim, E. S. (2003). Cultural diversity in people's understanding and uses of time. *Applied Psychology: An International Review, 52*, 363-382.

Borodowsky, G. H., & Anderson, B. B. (2000). A cross-cultural study of consumer attitudes toward time. *Journal of Global Marketing, 13*, 93-109.

Browne, M. W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.

Byrd, D. A., Miller, S. W., Reilly, J., Weber, S., Wall, T., & Heaton, R. (2006). Early environmental factors, ethnicity, and adult cognitive test performance. *Clinical Neuropsychologist, 20,* 243-260.

Camara, W.J., Nathan, J.S., & Puente, A.E. (2000). Psychological test usage: Implications in professional psychology. *Professional Psychology: Research and Practice, 31,* 141-154.

Code of Fair Testing Practices in Education. (2004). Washington, DC: Joint Committee on Testing Practices.

Cole, M. (1997). *Cultural psychology: a once and future discipline.* Cambridge, MA: Harvard University Press.

Comfrey, A. L., & Lee, H. B. (1992). *A First Course in Factor Analysis*. Hillsdale, NJ: Erlbaum.

Cotte, J., Ratneshwar, & Mick, D. G. (2004). The times of their lives: Phenomenological and metaphorical characteristics of consumer lifestyles. *Journal of Consumer Research, 31,* 333-345.

Culbertson, W. C., & Zillmer, E. A. (2001). *Tower of London –Drexel University (ToL^{Dx}). Technical Manual.* NY: Multi-Health Systems.

Francis-Smythe, J., & Robertson, I. (1999). Time-related individual differences. *Time & Science, 8,* 273-292.

Goldberg, L. & Shmelev, A. G. (1993). Cross-cultural study of “Big Five” personality traits in Russian and English languages [Межкультурное исследование лексики личностных черт: «Большая пятерка» факторов в английском и русском языках]. *Psychologichesliy Zhurnal, 14,* 4, 32 – 39 (Rus.).

Golden, C. J., & Thomas, R. B. (2000) Cross-cultural application of the Luria-Nebraska Neuropsychological Test Battery and Lurian principles of syndrome analysis. In E. Fletcher-Janzen, T.L. Strickland, & C.R Reynolds (Eds.), *Handbook of cross-cultural neuropsychology (*pp. 305-315). New York: Kluwer/Plenum.

Gorusch, R. L. (1983). *Factor Analysis* (2nd Ed.). Hillsdale, NJ: Erlbaum.

Greenfield, P.M. (1997). You can't take it with you. Why ability assessment don't cross cultures. *American Psychologist, 52,* 1115-1124.

Gretsov, A.G. (1995). Russian version of the "Big Five' personality traits adapted from Costa and McCrae's model [«Большая пятерка» личностных качеств не основании модели личности Косты и Мак-Крея]. Retrieved from http://agretsov.narod.ru/Big5.doc (Rus.).

Grigorenko, E., Ruzgis, P., & Sternberg, R.J. (1997). *Psychology of Russia: past, present, future*. Nova Publishers.

Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin, 103*, 265-275.

Gurievich, A. J. (1976). Time as a problem of cultural history. In L. Gardet, A. J. Gurievich, A. Kagame, et al. (Eds.), *Cultures and time*. Paris: UNESCO press.

Gutchess, A. H., Welsh, R., Boduroglu, A., & Park, D. (2006). Cultural differences in neural function associated with object processing. *Cognitive, Affective & Behavioral Neuroscience, 6*, 102-109.

Hall, E. (1959). *The silent language.* NY: Doubleday.

Hedden, T., Park, D. C., Nisbett, R. & Lijun, J. (2002). Cultural variation in verbal versus spatial neuropsychological function across the lifespan. *Neuropsychology, 16*, 65-73.

Helms, J. E. (1997). The triple quandary of race, culture, and social class in standardized cognitive ability testing. In D. P. Flanagan, J. L. Genshaft, & P. L. Harrison (Eds.), *Contemporary intellectual assessment* (pp. 517-532). New York: Guilford.

Hill, O. W. Block, R. A., & Buggie, S. E. (2000). Culture and beliefs about time: Comparisons among black Americans, black Africans, and white Americans. *Journal of Psychology, 134*, 443-162.

Homskaya, E.D. (1995). *Neuropsychology today*. Moscow: Moscow University Press.

Homskaya, E.D. (1999). The neuropsychological school of A.R. Luria. In E.D. Homskaya (Ed.) *Neuropsychology handbook* (pp.53-59). Moscow: Russian Psychological Society Press.

Horton, A. M. (2008). Multicultural neuropsychological assessment: The future of neuropsychology. In: A.M. Horton & D. Wedding (Eds.), *The neuropsychology handbook (3rd Ed.*, pp. 345-366). New York: Springer.

Hu, L.T., & Bentler, P. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural Equation Modeling. Concepts, Issues, and Applications* (pp.76-99). London: Sage.

Hui, C. H., & Triandis, H. C. (1985). Measurement in cross-cultural psychology: A review and comparison of strategies. *Journal of Cross-Cultural Psychology, 16*, 131-152.

Janoušek, J. & Sirotkina, I. (2003). Psychology in Russia and Central and Eastern Europe. In T. M. Porter & D. Ross (Eds.), *The Modern Social Sciences* (pp. 432- 448). Cambridge University Press.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory: Technical report*. Berkeley: University of California, Institute of Personality and Social Research.

Ko, G., & Gentry, J. W. (1991). The development of time orientation measure for use in cross-cultural research. *Advances in consumer research, 18,* 135-142.

Korsakova, N., Mikadze. Y., & Balashova, E. (2001). *Neuropsychological diagnosis of learning disabilities in elementary school students*. Moscow: Pedagogicheskoe Obschestvo (Rus.).

Kotik-Friedgut, B. (2006) Development of the Lurian Approach: A Cultural Neurolinguistic Perspective. *Neuropsychology review, 16,* 43-52.

Kotik-Friedgut, B., & Ardila, A. (2005). Systemic-dynamic Lurian theory and contemporary cross-cultural Neuropsychology. In T. Akhutina, J. Glozman, L. Moskovich, & D. Robbins (Eds.), *A.R. Luria and contemporary psychology: Festschrift celebrating the centennial of the birth of Luria* (pp. 187-194). New York: Nova Science Publishers.

Le Poidevin, R. (2004, Winter Edition).The Experience and Perception of Time, *The Stanford Encyclopedia of Philosophy,* Edward N. Zalta (Ed.), URL = http://plato.stanford.edu/archives/win2004/entries/time-experience/.

Levine, R. (1997). *A geography of time*. New York: Basic Books.

Levine, R., & Norenzayan, A. (1999). The pace of life in 31 countries. *Journal of Cross-Cultural Psychology, 30,* 178-205.

Lezak, M. D., Howieson, D. B., & Loring, D. W. (2004). *Neuropsychological assessment (4th Ed).* New York: Oxford University Press.

Luria, A. R. (1976). *Cognitive development: Its cultural and social foundations*. Cambridge, MA: Harvard University Press.

Luria, A. R. (1979). *The making of mind: A personal account of Soviet psychology*. Cambridge, MA: Harvard University Press.

Luria, A. R. & Vygotsky, L. N (1930/1992). *Ape, primitive man, and child: Essays in the history of behavior.* Boston, MA*:* Harvester Wheatsheaf.

MacCallum, R.C., Widaman, K.F., Preacher, K.J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research, 36,* 112-121.

MacCallum, R.C., Widaman, K.F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Bulletin, 4*, 84-99.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to study test mediation and other intervening variable effects. *Psychological Methods, 7*, 83-104.

Maj, M., DiElia, L., Satz, P., Jansen, R., Zauding, M., Uchiyama, C., et al. (1993). Evaluation of two new neuropsychological tests designed to minimize cultural bias in the assessment of HIV-1 seropositive persons: A WHO study. *Archives of Clinical Neuropsychology*, 8, 123-135.

Manly, J. J., Jakobs, D. M., Sano, M., Merchant, C. A., Small, S. A., & Stern Y. (1999). Effect of literacy on neuropsychological test performance in nondemented, education-matched elders. *Journal of the International Neuropsychological Society, 5*, 191-202.

Manly, J. J., Touradji, P., Tang, M-X.,& Stem, Y. (2003). Literacy and memory decline among ethnically diverse elders. *Journal of Clinical and Experimental Neuropsychology, 25*, 680-690.

Manrai, L., & Manrai, A. (1995). Effects of cultural-context, gender and acculturation on perception of work versus social/leisure time usage. *Journal of Business Research, 32,* 115-128.

Marcopulos, B., McLain, C., & Giuliano, A. (1997). Cognitive impairment or inadequate norms: A study of healthy, rural, older adults with limited education. *Clinical Neuropsychologist, 11,* 111-131.

Marlowe, W. B. (2000). Multicultural perspectives on neuropsychological assessment of children and adolescents. In: E. Fletcher-Janzen, T. L. Strickland, & C. R Reynolds (Eds.) *Handbook of cross-cultural neuropsychology* (pp.145-165). New York: Kluwer/Plenum.

Muthén, L. K., & Muthén, B. O. (1998-2007). *Mplus user's guide* (5th Ed.). Los Angeles, CA: Muthén & Muthén.

Nell, V. (1999). Luria in Uzbekistan: The vicissitudes of cross-cultural neuropsychology. *Neuropsychology Review, 9*, 45-52.

Nell, V. (2000). *Cross-cultural neuropsychological assessment: Theory and practice*. Mahwah, NJ: Erlbaum.

Nunnally, J. & Bernstein, I. (1994) *Psychometric theory (3rd Ed.)* New York: McGraw Hill

Osborne, J. W., & Costello, A. B. (2004). Sample size and subject to item ratio in principal components analysis. *Practical Assessment, Research & Evaluation*, 9. Retrieved June 8, 2006 from http://PAREonline.net/getvn.asp?v=9&n=11

Paul, R. H., Gunstad, J., Cooper, N., Williams, L. M., Clark, C. R., Cohen, R., Lawrence, J., & Gordon, E. (2007). Cross-cultural assessment of neuropsychological performance and electrical brain function measures: Additional validation of an International Brain Database. *International Journal of Neuroscience, 117,* 549-568.

Peterson, R. A. (1994). A meta-analysis of Cronbach's Coefficient Alpha. *Journal of Consumer Research, 21,* 381-391.

Plake, B. S., Impara, J. C., & Spies, R. A. (Eds.). (2003). *The fifteenth mental measurement yearbook*. Lincoln, NE: Buros Institute of Mental Measurement.

Perez-Arce, P. & Puente, A.E. (1997). Neuropsychological assessment of ethnic minorities. The case of assessing Hispanics living in North America. In R.J. Shordone & C.J. Long (Eds.) *Ecological validity of neuropsychological tests* (pp.283-300). Delray Beach, FL: St. Lucie Press.

Preacher, K., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research: Methods, Instruments, and Computers, 36,* 717-731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40,* 879-891.

Puente, A. E., & Agranovich, A.V. (2001). Are neuropsychological tests measuring cultural knowledge? A review of V. Nell's Cross-cultural neuropsychological assessment. *Applied Neuropsychology, 9,* 121-124.

Puente, A. E., & Agranovich, A. V. (2003). The cultural in cross-cultural neuropsychology. In M. Hersen, G. Goldstein, & S.R. Beers (Eds.), *Comprehensive handbook of psychological assessment, Vol. 1: Intellectual and neuropsychological assessment*. (pp. 321-332). New York: Wiley & Sons.

Puente, A. E., Judd, T., Navarrete, M. G., & Rosselli, M (2004). Recent updates on the evaluation of the Spanish speaker. Course 40, *National Academy of Neuropsychology*, Seattle, WA.

Puente, A. E., & Perez-Garcia, M. (2000). Neuropsychological assessment of ethnic minorities: Clinical issues. In initial Cuellar & initial Paniagua (Eds.) *Handbook of Multicultural Mental Health* (pp. 419-435). New York: Academic Press.

Rojas-Mendez, J. I., Davies, G., Omer, O., Chetthamrongchai, P., & Madran, C. ***(2002***). A time attitude scale for cross-cultural research. *Journal of Global Marketing, 15,* 117-147.

Reise, S. P., Walter, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision. *Psychological Assessment, 12,* 287-297.

Richmond, V. P., Wrench, J. S., & Gorham, J. (2001). *Communication, affect, and learning in the classroom.* Acton, MA: Tapestry Press.

Rivkin-Fish, M. (2009). Tracing landscapes of the past in class subjectivity: Practices of memory and distinction in marketizing Russia. *American Ethnologist, 36*, 79–95.

Roselli, M., Ardila, A. & Rosas, (1990). Neuropsychological assessment in illiterates II: Language and praxis abilities. *Brain and Cognition, 12,* 281-296.

Sanna, L., Parks, C., Chang, E., & Carter, S. (2005). The Hourglass Is Half Full or Half Empty: Temporal Framing and the Group Planning Fallacy. *Group Dynamics: Theory, Research, and Practice*, *9*, 173-188.

Shumaher, R. E. & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd Ed). Mahwah, NJ: Erlbaum.

Sirsova, A. (2005). Psychological time: approbation of Zimbardo's test of temporal perspective [psychologicheskoe vremya: aprobatsija metodiki Zimbardo po vremennoi perspective]. *Vestnik of Moscow State Univerisity, Series 14*, 1.

Sircova, A., Mitina, O., Boyd, J., Davydova, I., Zimbardo, P., Nepryaho, T., et al. (2007). The phenomenon of time perspective across different cultures: Review of researches using ZTPI Scale. *Cultural-Historical Psychology*, *4*, 19-31.

Sirsova, A., Sokolova, E., & Mitina, O. (2007). Zimbardo's test of time perception [Metodika Zimbardo po vremennoi perspective]. *Psychologicheskaja Diagnostika, 1*.

Smith, A. (1982). *Symbol Digit Modalities test (SDMT)*. Manual (revised). Los Angeles: Western Psychological Services.

Tongren, N., Hecht, L.,and Kovach, K. (2001). Recognizing cultural differences: Key to successful U.S.-Russian enterprises. *Public Personnel Management, 24*, 1-17.

Triandis, H. C., Vassiliou, V., Vassiliou, G., Tanaka, Y, & Shanmugam, A.V. (1972). *The analysis of subjective culture*. New York: Wiley.

Vasserman, L. I., Dorofeeva, S. A., & Meyerson, Y. A. (1997). *Methods of neuropsychological diagnostics: Practical manual.* St. Petersburg, Russia: Stoipechat (Russian).

Wong, T. M., Strickland, T. L., Fletcher-Janzen, E., Ardila, A., & Reynolds, C. R. (2000). Theoretical and practical issues in the neuropsychological assessment and treatment of culturally dissimilar patients. In: E. Fletcher-Janzen, T.L. Strickland, & C.R Reynolds (Eds.). *Handbook of cross-cultural neuropsychology* (pp. 3-18). New York: Kluwer/Plenum.

Zimbardo, P. G., & Boyd, J. N. (1999).Putting time in perspective: A valid, reliable individual-differences metric. Journal of Personality and Social Psychology, 77, 1271-1288.