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Measurement Instrument**

The Development of a Communication Specific

Multitasking Measurement Instrument

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Abstract

This paper presents the results of the development of the communication specific multitasking scale. This instrument is designed to measure an individual's ability to perform multiple communication tasks simultaneously or in rapid succession. Following item selection and testing, a Chronbach item reliability analysis reveals an alpha .82, indicating a strong of internal consistency. As hypothesized, the locus of control was found significantly correlated with multitasking abilities. The respondents with internal locus of control scored higher on multitasking abilities than those with external locus of control. The study revealed significant gender differences, signifying that females are more likely to be engaged in multitasking activities. The discussion section includes several suggestions for the future research.

Introduction

“Don’t bother me – I’m busy!” Attempting to accomplish more than one task at the same time or focusing on one’s work while distracted by something else can be difficult, but many do it everyday. Technological advances have changed the contemporary work environment making it possible for people to perform more than one activity simultaneously. In other words, technological advances have brought on increase in multitasking (Caroli & Van Reenen, 2001). Moreover, many jobs are even required to do so. For example, multitasking is one of the most important job requirements for pilots (Maschke & Goeters, 1991). It is also essential for many jobs such as school bus drivers, fire fighters, prevention supervisors, gaming dealers (Fleishman, Constanza, & Marshall-Miles, 1999), and salespersons (Stokes, Toth, Searcy, Stroupe, & Carter, 1999).

The prior studies into multitasking have shown that it is typical for managers, physicians, analysts, software developers and small office workers to engage in at least some multitasking due to numerous interruption at work (e.g., Chrishom, Dornfeld, Nelson, & Cordell, 2001; Rouncefield, Hughes, Rodden, & Viller, 1994; Gonzalez, & Mark, 2004).

Very often multitasking involves communication (e.g.: talking on the phone while driving; surfing the Web while listening to the lecture). However, very few communication studies have been conducted on this topic. This paper summarizes multitasking research from different disciplines, develops and validates a measure of multitasking abilities. It also explores the possibilities of applying the multitasking scale within communication research.

Defining Multitasking

Scientists claim that the ability to perform several separate tasks consecutively while keeping the goals of each task in mind is a uniquely human trait (Koechlin, Basso, Pietrini, Panzer, & Grafman, 1999). Anthropologist Edward Hall (1959) began studying this phenomenon in the 1950s, labeling it *polychronic time use* or *polychronicity*. Hall (1959) described *time* as a cultural artifact, a “silent language,” communicating meaning through its use and culturally agreed upon perspectives and definitions. He considered *polychronicity* as only one of many aspects of culture and as a form of communication.

Following Hall (1959), Bluedorn (2002) has defined *polychronicity* as the extent to which “people (1) prefer to be engaged in two or more tasks or events simultaneously and are actually so engaged (the preference strongly implying the behavior and vice versa), and (2) believe their preference is the best way to do things” (p. 51). Thus, individuals who prefer to complete one task, activity, or project before becoming involved with another are said to be monochronic, whereas individuals who prefer to be involved with several tasks, activities, or projects at once are said to be polychronic (Bluedorn, 2002).

In the 1990s, *multitasking*, the new term for polychronicity drifted from computer culture into common practice (Nechipor, 2005). Since computers have become an essential part of our daily life, the term *multitasking* has slowly penetrated into our everyday vocabulary (Nechipor, 2005). However, the terms *multitasking* and *polychronicity* are only partial synonyms (Bluedorn, 2002). In computing, multitasking is a method by which multiple tasks or processes share common processing resources. It means that a computer with a multiprocessor is able to execute two or more tasks

simultaneously (Nechipor, 2005). This is the reason that the *multitasking* concept combines both speed and activity pattern dimensions rather than simply focusing on activity patterns as *polychronicity* (Bluedorn, 2002). Moreover, *multitasking* has become synonymous with the communication technology-infused workplace of today (Turner & Reinsch, 2007).

Other interdisciplinary terminologies for what is now known as *multitasking* include such terms as *task switching* (Monsell, 2003) *primary-secondary and concurrent activities* (Hendrix & Qualls, 1981), *joint production* (Peskin, 1982), *dovetailing* (Hefferan, 1982), *overlapping activities* (primary, secondary or tertiary) (Floro & Miles, 2003), and *multicommunicating* (Turner & Reinsch, 2007).

Deldridge (2000) defines multitasking as “accomplishing multiple-task goals in the same general time period by engaging in frequent switches between individual tasks” (p.1). This definition of multitasking incorporates only task switching, it doesn’t take into consideration performing simultaneous activities. For example, should we consider “driving and talking on the phone” a task switching or performing two tasks simultaneously? In order to explain possible variations in multiple tasks performance, Kieras, Meyer, Ballas, & Lauber (2000) classified multitasking into four broad categories.

The first category is *discrete successive tasks*, which can be described as alternating rapidly between two tasks. This kind of multitasking is usually associated with the computer use. For example: While searching for or through electronic information, users are often thinking and working on multiple problems concurrently, but search systems require them to search sequentially (Spink, 2004). The second category is

discrete concurrent tasks, when a primary and secondary task is performed simultaneously, with short delays between the two (listening to a lecture while searching for supporting information on the Internet). *Elementary continuous tasks* constitute the third category. In this case a person performs one task continuously, with occasional insertion of short discrete tasks (e.g. interrupting Internet research with occasional checking of email). Lastly, the fourth category includes *compound continuous tasks*, when two primary tasks are performed concurrently (e.g. flying an airplane and communicating with air traffic controllers simultaneously).

Polak (1999) proposes another division of simultaneous activities into two different categories: *parallel* and *on-call activities*. He explains that parallel activities are such that two independent activities are done simultaneously, e.g. listening to the lecture and surfing in the Internet. On-call activities are those that limit our options for doing other things - the second activity constrains the first activity. An example of on-call activities is cooking while watching a sleeping child. Generally, the other activity has to do with the care of another person. Polak (1999) suggests that the major difference between on-call and parallel activities is that the latter have a stochastic time demand. He also notes that parallel activities are easy to aggregate, but on-call simultaneous activities are difficult to define and measure appropriately.

Bluedorn (2002) introduces the typology of simultaneous tasks, which is based on the degree of differences among the task engaged. He argues that when considering multitasking behaviors it matters whether the tasks are similar, or whether they vary along one or more dimensions. For instance, is a person who engages simultaneously in several different tasks more polychronic than someone who engages simultaneously in

the same number of similar tasks? Bluedorn (2002) proposes four types of behavior patterns: quantitative polychronicity, quantitative monochronicity, qualitative polychronicity, and qualitative monochronicity. A quantitative polychronic pattern involves engaging several similar tasks simultaneously, whereas a quantitative monochronic pattern involves engaging in task and completing it and then moving on to another similar task. Conversely, the qualitative polychronic pattern involves engaging several dissimilar tasks simultaneously; the qualitative monochronic pattern involves engaging in a task and completing it before engaging another but dissimilar task.

Thus, multitasking as a concept is more complex than defined by Deldridge (2000). Multiple tasks can be performed concurrently as well as successively. Thus, for the purposes of this study, *multitasking is defined as accomplishing multiple-task goals in the same general time period either simultaneously or by engaging in frequent switches between individual tasks.*

By nature, multitasking is composed of individual tasks, and these tasks could be anything including communication tasks. As Daly (1987) wrote, in communication research we need theoretical formulation of “how, when, and why... dispositions affect the way in which people communicate” (p.32). Multitasking can be perceived as one of the ‘how’ dispositions which affect communication. Multitasking behavior may lead to variation in communication outcomes. For example, talking to the customer and simultaneously writing emails may reduce the effectiveness of the message. Having the instrument to measure the multitasking abilities is important for communication research.

Thus, the research question for this study is the following:

RQ1: Is the communication specific multitasking scale reliable and valid?

Correlates of multitasking

The commonly held perception that women are more polychronic than men (Hall, 1983) was never supported by empirical research. However, the studies in both developed and developing countries show commonalities among women's tendencies to multitask (Roldan, 1985; Benton, 1989; Lozano, 1989; Szebo & Cebatorev, 1990; Moser, 1993; Floro & Miles 2003). Self-employed women frequently combine income-earning activities with domestic chores such as cleaning, cooking and childcare (Floro & Miles, 2003).

Floro and Miles (2003) suggest that multitasking depends on a variety of economic, demographic and social factors. These include social norms, household life cycle and composition, educational level, sex, income and employment status. The researchers found that multitasking declines with the age and increases with education and income levels. Fully employed people are more likely to pursue simultaneous goals than the unemployed or part-time employed.

In their study of 310 randomly selected adult inhabitants of a residential neighborhood of Philadelphia, Kaufman, Lane, and Londquist (1991) found that polychronicity is positively correlated with the respondents' levels of formal education: the more formal education, the more polychronic the respondent. However, Kaufman et al. found no difference in preference for monochronicity and polychronicity in relation to age.

People's performances in dual tasks depend highly on their skills in the individual tasks (Alport, Antonis & Reynolds, 1972). That is, being skilled in one task allows a person to perform it and other tasks with negligible impact on the overall performance of

both tasks. For example, a skilled driver might have little difficulty talking with a friend while driving, whereas a novice driver might find it difficult. However, Shallice McLeod and Lewis (1985) found even if the subject is highly skillful and trained in a task performance, one should expect a decrement of anything up to 10% in performance as a result of the requirement to monitor two tasks simultaneously.

The psychological research indicates that people with Type A¹ personalities focus their attention primarily on central tasks and attend less to peripheral tasks than do Type B's² (Matthews & Brunson, 1979). This makes Type A personalities more polychronic. Moreover, introverts are less able to multitask than extroverts (Lieberman & Rosenthal, 2001).

The polychronic preferences may differ culturally. Based on his own observations, Hall (1983) concluded that cultures in the Mediterranean world were more polychronic than the cultures of Northwestern Europe. In the New World, Latin America was more polychronic than the United States (Hall, 1983). Gesteland (1999) classified Nordic and Germanic Europe, North America and Japan as monochronic; the Arab world, most of Africa, Latin America, and south and Southeast Asia as polychronic; with Russia, much of Eastern, Central Europe, and Southern Europe, China, Singapore, Hong Kong, and South Korea as "in between". O'Hara-Devereaux and Johansen (1994) suggested that

¹ Type A behavior pattern is characterized by competitiveness, achievement striving, impatience, and feeling of being under pressure. (Friedman & Rosenman, 1974).

² Type B behavior refers to the absence of the Type A characteristics or the presence of them at a much lesser degree (Friedman & Rosenman, 1974).

“polychronic time is characteristic of high-context people and monochronic time is characteristic of low-context people” (p. 61).

Several studies have examined these hypothesized cultural differences regarding polychronicity, but the results of these studies have generally not supported these predictions. For example, Tinsley (1998) found that American managers were more polychronic than Germans and Japanese managers, who did not differ from each other. Conte, Rizzuto and Steiner (1999) found that French and American students did not differ from each other on polychronicity.

Polychronicity has also been studied as a fundamental dimension of organizational culture (Onken, 1999; Bluedorn, Kalliath, Strube, & Martin, 1999). Onken (1999) suggested that polychronic organization value behaviors where individuals perform several tasks at once, such as talking on the phone and eating lunch simultaneously. Therefore, in polychronic organizations, more activities are scheduled during a day, with short periods of time spent on each of several projects as individuals move back-and forth among projects throughout the day. “Polychronic time stresses the involvement of people and the completion of transactions rather than adherence to schedules. Individuals who exist in a polychronic culture tend to interact with several people at once and are continually involved with each other. The flow of information is continuous, and polychronic people are immersed in each other's business as they stay in touch with one another” (Onken, 1999, p. 232). Cotte and Ratneshwar (1999) noted that in polychronic organizations people believe that it is appropriate to have a meeting with a colleague only to interrupt it several times to flag down someone who is passing by one's office to ask for verbal reports on different projects.

Studying polychronicity as a temporal dimension of organizational culture, in a sample of 198 departments in two hospitals, Bluedorn et al. (1999) found that polychronicity was significantly, negatively correlated with punctuality values and an emphasis on schedules and deadlines. Following Bluedorn et al. (1999), Conte and Jacobs (2003) examined relationships between polychronicity and three work outcomes (i.e., lateness, absence, supervisory ratings of job performance), while also considering more traditional predictor constructs such as the Big Five personality dimensions of conscientiousness, extraversion, intellectance, agreeableness and neuroticism and cognitive ability. The researchers found that individual polychronicity was positively correlated to very important organizational behaviors: lateness and absenteeism, and these relationships varied in according to respondents' gender, work experience, and cognitive ability. Polychronicity was also significantly, negatively correlated with a composite measure of supervisory performance ratings that assessed dependability, schedule adherence, and attentiveness on the job. Conte and Jacobs (2003) also found that polychronicity was negatively related to conscientiousness. Thus, polychronicity was significantly associated with both objective and subjective measures of job performance.

In order to study the effects of organizational norms on polychronic communication, Turner, Grube, Tinsley, Lee and O'Pell (2006) surveyed and interviewed the employees of a high tech organization. The researchers found that strong organizational norms for instant messaging (IM) and e-mail use, as well as supervisory behavior, influenced employees' use of IM and e-mail and even more so when employees have strong polychronic orientations. Turner et al. (2006) revealed those individuals with high polychronic orientations were most flexible in their ability to adapt to the

communication needs of the organization. Similarly, those with low polychronic orientations experienced difficulties in adapting to the organization's communication media norms. In addition, individuals with low polychronic orientations reported having a hard time switching modes of multiple simultaneous conversations. They might be able to participate in multiple conversations at once if they were all instant messages but not when they involved telephone and instant messages.

Thus, multitasking abilities or polychronicity is related to several variables: education level and age; achievement striving and extraversion; skillfulness in task performance; job performance; ability to adapt to the communication needs of an organization, lateness and absenteeism; and conscientiousness.

Locus of Control

In 1966, Rotter published the article on the Locus of Control (LOC) construct and an accompanying scale. His scale was designed to assess people's generalized expectancies regarding the origin of reinforcers. People interpret the reasons for outcomes of their actions and events in their lives differently. Some look to themselves as the source of success or failure, while others are convinced outside sources determined the outcome. LOC is divided into bipolar characteristics of internal control and external control. Rotter (1966) defines internal LOC as that situation in which individuals feel that some reinforcement follows and is caused by some action on their part. External LOC entails the belief that reinforcement comes not as a result of personal action but rather as the result of some external factors such as luck, fate, or powerful "others."

Since 1960s the concept of locus of control (LOC) as a personality trait has undergone thorough research, and hundreds of studies have targeted LOC as a primary

area of investigation. As Fisher (1978) suggested that individual differences and one's conceptual filters play central role in selecting and processing communication messages, the LOC construct was applied into communication research. For example, Arntson, Mortensen, and Lustig (1980) noted that being apprehensive, externals are unable to initiate or control conversations. Internals are also more persuasive and employ fewer coercive strategies (Goodstadt & Hjelle, 1973; Phares, 1965), whereas externals are more open to persuasive attempts (Steinfatt, 1987).

Rubin (1993) considered LOC important for explaining communication behavior, because it refers to the mastery of one's environment. Individual differences such as one's sense of control of person's life influence motives to communicate and dispositions to future communication. Rubin (1993) found that externals perceive communication as less rewarding and less satisfying, tend to avoid communication, and are motivated to communicate more ritualistically than internals.

Internals see themselves as being responsible for the outcomes of their actions and interactions, and they have a tendency toward pro social and competent behavior such as achievement and relationship development (Nowicki & Duke, 1983). Internals are assertive, self-directed, feel powerful, and extroverted (Lefcourt, 1982). According to Lieberman and Rosenthal (2001) extroverts are more able to multitask than introverts. This suggests that internals should be better in multitasking than externals. Based upon previous research and reasoning, the following hypothesis is offered:

H1: Locus of control is significantly correlated with multitasking abilities: individuals with internal locus of control should be more likely to multitask than the individuals with external locus of control.

Methods

Participants and Procedures

The survey instrument used was a questionnaire consisting of two scales and one section of demographic variables. The questionnaire was administered to 182 (88 male, 94 female) undergraduate students enrolled in public speaking courses at a large Southeastern university.

Part one consisted of the 19-item likert-type multitasking questionnaire requested whether the respondents agree or disagree with the statements using a standard five-point scale. Subjects were not provided with the definition of “multitasking”. Nearly all items³ included at least one communication task, which is performed simultaneously or in rapid succession with the other task. (A copy of the 19-item questionnaire can be found in Appendix A).

Part two was a previously validated scale measuring internal-external locus of control as conceptualized by Rotter (1966). The scores on this scale range from 0 (most external) to 23 (most internal). In addition, the respondents were asked to complete basic demographic information.

Results

Cronbach’s alpha was computed to determine internal consistency of the multitasking scale. When all 19 items were included in an initial reliability analysis, the scale achieved a coefficient alpha of .81. The examination of corrected item-total correlations suggested that deleting item #19 from the scale could considerably improve its internal consistency (see Table 1 in appendix B).

³ Except for it4ems, which were designed to measure general attitude towards multitasking.

Balancing the need for a high level of internal consistency and sufficient variance in item responses, 18 of the original 19 items were retained. The index for internal consistency (Chronbach's alpha) for the 18-item Multitasking Scale is .82. The correlations between individual items and the total scale scores ranged from .23 to .65

Being an exploratory study, it is reasonable to undertake a factor analysis of the 18-item data to identify different indices of multitasking. A Varimax rotation identified underlying factors in the data (see Table 2). Items 4, 6, 7, 8, 10, 11, 14, 15, 16 were highly inter-correlated. These items describe the 'general multitasking abilities' or 'attitudes towards multitasking'. The factor analysis also showed items 5, 12, 13 as highly correlated. The items were specifically written to measure the ability to perform primary and secondary task simultaneously. Lastly, items 17 and 18, which referred to 'computer' multitasking, loaded together for a third factor.

One of the very interesting findings of this study is that items 1, 2, 3 and 9 were highly inter-correlated. It is possible, that driving/ talking on the phone overlapping activities is an example of multitasking, which depends highly on person's skills in the individual tasks, and also constitutes another variable in multitasking. Also, item 2 (listening to the music or watching TV while exercising) may be related to breaking the monotony of work. But all items in the fourth factor deal with the ability to perform two primary tasks simultaneously.

An independent samples *t* test on total scores of 18 final items revealed significant gender differences $t=-2.337$ $df=181$ $p=0.02$. The female respondents score higher on this scale than male respondents, suggesting that females are more likely to be engaged in multitasking activities.

In order to evaluate the hypothesized relationship between multitasking abilities and locus of control, Person r product-moment correlation coefficients were computed between these two variables. Significant correlations were found between multitasking abilities and locus of control ($r=+.188$, $p=.012$). Thus, the hypothesis was supported.

Discussion and Limitations

The scale development procedure resulted in 18-item multitasking scale, which appears to have some claim for reliability and validity. The final scale consists of several facets, such as: 1) general multitasking abilities, 2) computer multitasking, 3) ability to perform two primary tasks simultaneously, and 4) ability to perform primary and secondary tasks simultaneously.

The results of the study supported the commonly held perception that women are more polychronic than men (Hall, 1983, p. 52). It is believed that it may be socially influenced, because prevailing social and gender norms influence the division of labor (Creighton, 1999). Society usually perceives breadwinning to be the primary role of men while childcare is principal work for women. These distinct social constructs have a number of implications. One is that they influence the division of labor within the household by creating time pressure for women as they are confronted with a multiplicity of roles (Creighton, 1999).

In this study the multitasking abilities have been explored as an important antecedent to how people communicate in different contexts. Individual differences such as one's sense of his/her life influence motives to communicate and dispositions to future communication (Rubin, 1993). The results of the study suggest that the individuals with internal locus of control are tend to combine multiple activities simultaneously more

often than the individuals with external locus of control. The possible explanation to this is that internals are assertive, self-directed, feel powerful, and extroverted (Lefcourt, 1982). They more active in achieving their goals and experience more time pressure than externals. Multitasking for internals is maybe one of the time saving strategies.

It is important to note that the reported results are only generalizable to these undergraduate students in the Southeastern large public university. Future research will be necessary to demonstrate the scale's potential for generalizability beyond this group. The undergraduate students differ from the general population not only in age, socioeconomic status, and general education level, but also possibly in skills and attitudes towards multitasking. Multitasking is usually related to availability of technology. The 18-21 year olds grew up with more technology available than, for example, 30 year old people. The 18-21 year olds may have significantly different multitasking abilities than older generation.

The implications of multitasking scale for the communication research design are intriguing. If the multitasking abilities can be changed in predictable ways, than they may function as both dependent and independent variable. For example, multitasking abilities may be related to a great many variables, among them communication apprehension, communication satisfaction, role overload, stress, stimulus avoidance, and sensation seeking.

Studies of multitasking during conversation or while composing electronic messages would add greatly to the body of knowledge in communication. Also, there is room for more study of the actual nature of the communication process during multitasking. If someone is IMing or composing email while attending a meeting or

lecture, what is the resulting quality of the electronic communications being attempted? One hypothesis might be that the multitasker saves his own time, but it takes longer for the recipient of his electronic messages to decipher meaning. In addition, more research is needed on the effects of electronic media consumption as a secondary activity in a multitasking scenario. Does the nature of the specific media program affect productivity? Is multitasking more problematic during news programs or entertainment programs? How do people negotiate their phone usage, email composition, music listening and TV viewing almost simultaneously, and what effect does this have on their retention of information? There are countless questions related to multitasking for communication scholars to address.

References

- Arntson, P., Mortensen, C. D., & Lustig, M. W. (1980). Predispositions toward verbal behavior in task-oriented interaction. *Human Communication Research, 6*, 239-252.
- Benton, L. (1989) Homework and industrial development: Gender roles and restructuring in the Spanish shoe industry. *World Development, 17*, 255-266.
- Bluedorn, A. C. (2002). *The human organization of time: Temporal realities and experience*. Stanford, CA: Stanford University Press.
- Bluedorn, A. C., Kalliath, T. J., Strube, M. J., & Martin, G. D. (1999). Polychronicity and the inventory of polychronic values: Development of an instrument to measure a fundamental dimension of organizational culture. *Journal of Managerial Psychology, 14*, 205–230.
- Caroli, E., & Van Reenen, J. (2001). Skill-biased organizational change? Evidence from a panel of British and French establishments. *The Quarterly Journal of Economics, 116*, 1449-1492.
- Chisholm, C.D., Dornfeld, A.M., Nelson, D.R., & Cordell, W.H. (2001). Work interrupted: A comparison of workplace interruptions in emergency departments and primary care offices. *Annals Of Emergency Medicine, 38*, 146-151.
- Conte, J. M., Rizzuto, T. E., & Steiner, D. D. (1999). A construct-oriented analysis of individual-level polychronicity. *Journal of Managerial Psychology, 14*, 269–287.
- Conte, J.M., & Jacobs, R.R. (2003). Validity evidence linking polychronicity and big five personality dimensions, absence, lateness, and supervisory performance rating. *Human Performance, 16*, 1007-1029.

- Cotte, J., & Ratneshwar, S. (1999). Juggling and hopping: What does it mean to work polychronically? *Journal of Managerial Psychology*, *14*, 184–204.
- Creighton, C. (1999). The rise and decline of the ‘male breadwinner family’ in Britain. *Cambridge Journal of Economics*, *23*, 519-41.
- Daly, J.A. (1987). Personality and interpersonal communication: Issues and directions. In J.C. McCroskey & J.A. Daly (Eds.), *Personality and interpersonal communication* (pp.13-41). Newbury Park, CA: Sage.
- De la Case, L.G., Gordillo, J.L., Mejias, L.J., Rangel, F., & Romero, M.F. (1998). Attentional strategies in Type A individuals. *Personality and Individual Differences*, *24*, 59-69.
- Delbridge, K.A. (2000). *Individual differences in multi-tasking ability: Exploring the nomological network*. Unpublished doctoral dissertation, Michigan State University, East Lansing.
- Fisher, B. A. (1978). *Perspectives on human communication*. New York: Macmillan
- Fleishman, E.A., Constanza, D.P., & Marshall-Mies, J. (1999). Abilities. In N.G. Peterson, M.D. Mumford, W.C. Borman, P.R. Jeanneret, & E.A. Fleishman (Eds.), *An Occupational information system for the 21st century: The development of O*NET* (pp.175-195). Washington D.C.: American Psychological Association.
- Floro, M.S., & Miles, M. (2003). Time use, work and overlapping activities: Evidence from Australia. *Cambridge Journal of Economics*, *27*, 881-904.
- Friedman, M., & Rosenman, R.H. (1974). *Type of behavior and your heart*. New York: Knopf.

- Gesteland, R.R. (1999). *Cross-cultural business behavior: Marketing, negotiating, and managing across cultures*. Copenhagen: Copenhagen Business School Press.
- Gonzalez, V.M., & Mark, G. (2004). "Constant, constant multitasking craziness": Managing multiple working spheres. *Proceedings of CHI, ACM Press*, 97-104.
- Goodstadt, B. E., & Hjelle, L. A. (1973). Power to the powerless: Locus of control and the use of power. *Journal of Personality and Social Psychology*, 27, 190-196.
- Hall, E. T. (1959). *The Silent Language*. Garden City, NY: Anchor/Doubleday.
- Hall, E. T. (1983). *The dance of life: Other dimensions of time*. Garden City, N.Y.: Anchor Press.
- Hall, E.T. (1983). *The dance of life: The other dimension of time*. Garden City, NY: Anchor Press.
- Hefferan, C. (1982). Workload of married women. In School, K.K. and Tippet, K. (Eds.), *Family Economics Review* (pp. 10-15). Hyattsville, MD: Agricultural Research Service.
- Helgesen, S. (1995). *The female advantage: Women's way of leadership*. Currency: Doubleday.
- Hembrooke, H., & Gay, G. (2003). The laptop and the lecture: The effects of multitasking in learning environments. *Journal of Computing in Higher Education*. 15, 1-19.
- Hendrix, P., & Qualls, W. (1981). Assessing the validity of subjective measures of household task responsibility with time-budget data. In K. Bernhardt et al. (Eds.), *1981 Educator's Conference Proceedings* (pp. 143-145). Chicago: American Marketing Association.

- Kaufman, C.F., Lane, P.M., & Lindquist, J.D. (1991) Exploring more than 24 hours a day: *A preliminary investigation of polychronic time use. The Journal of Consumer Research, 18*, 392-401.
- Kieras, D.E., Meyer, D.E., Ballas, J.A. & Lauber, E.J. (2000). Modern computational perspectives on executive mental processes and cognitive control: Where to from here? In S. Monsell & J. Driver (Eds.), *Control of cognitive processes: Attention and performance* (pp. 681-712). Cambridge, MA: MIT Press.
- Lane, p., Kaufman, C., & Londquist, J. (1989). More than 24 hours a day. In AMA *Winter Educators' Conference: Marketing Theory and Practice, Chicago, American Marketing Association.*
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 46*-70.
- Lee, F. J., & Taatgen, N. A. (2002). Multitasking as skill acquisition. In W. D. Gray & C. D. Schunn (Eds.), *Proceedings of the 24th Annual Conference of the Cognitive Science Society* (pp. 572-577). Mahwah, NJ: Erlbaum.
- Lefcourt, H. M. (1982). *Locus of control: Current trends in theory and research* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Lieberman, M.D. & Rosenthal, R. (2001). Why introverts can't always tell who likes them: Multitasking and non-verbal decoding. *Journal of Personality and Social Psychology, 80*, 294-310.
- Lozano, B. (1989). *The Invisible Force: Transforming American Business with Outside and Home-Based Workers*. New York: The Free Press.

- Maschke, P., & Goeters, K.-M. (1999). *Job analysis of ab-initio flight students in comparison with active line pilots*. Hamburg, Germany: DZLR
- Matthews, K.A., & Brunson, K. M. (1979). Allocation of attention and Type A coronary prone behavior. *Journal of Personality and Social Psychology*, 37, 20081-2090.
- Moser, C. (1993) Adjustment from below: Low-income women, time, and triple role in Guayaquil, Ecuador. In S. Radcliffe and S. Westwood (Eds.), *Viva: Women and popular Protest in Latin America*, New York and London: Routledge.
- Nechipor, A.A. (2005). *The semantic changes in computer terminology*. Unpublished Doctoral dissertation, Kyiv National University, Ukraine.
- Nowicki, S., Jr., & Duke, M. P. (1983). The Nowicki-Strickland Life-Span of Control Scales: Construct validation. In H. M. Lefcourt (Ed.), *Research with the locus of control construct: Volume 2. Developments and social problems* (pp. 9-51). New York: Academic Press.
- O'Hara-Devereaux, M., & Johansen, R. (1994). *Global work: Bridging distance, culture, and time*. San Francisco, CA: Jossey-Bass.
- Onken, M.H. (1999). Temporal elements of organizational culture and impact on firm performance. *Journal of Managerial Psychology*, 14, 231-243.
- Peskin, J. (1982). Measuring household production for the GNP. In School, K.K. and Tippet, K. (Eds.), *Family Economics Review* (pp. 16-25). Hyattsville, MD: Agricultural Research Service.
- Phares, E. J. (1965). Internal-external control as a determinant of amount of social influence exerted. *Journal of Personality and Social Psychology*, 2, 642-647.

- Pollak, R. (1999, August). Notes on time use. *Monthly Labor Review, Bureau of Labor Statistics*, 7-11.
- Roldan, M. (1985). Industrial outworking, struggles for the reproduction of working class families and gender subordination. In N. Radcliffe and E. Minione (Eds.), *Beyond the Employment: Household, Gender and Subsistence*, Oxford: Basil Blackwell.
- Rouncefield, M., Hughes, J.A., Roddden, T., & Viller, S. (1994). *Working with "constant interruptions": CSCW and the small office* (Research Report CSCW/10/1994). Lancaster, England: Lancaster University.
- Rouncefield, M., Hughes, J.A., Roddden, T., & Viller, S. (1994). *Working with "constant interruptions": CSCW and the small office* (Research Report CSCW/10/1994). Lancaster, England: Lancaster University.
- Rubin, A.M. (1993). The effects of locus of control on communication motivation, anxiety, and satisfaction. *Communication Quarterly*, 41, 161-171.
- Rubinstein, J. S. (2001). Executive control of cognitive processes in task switching. *Journal of Experimental Psychology*, 27, 763-797.
- Shallice, T., McLeond, P., & Lewis, K. (1985). Isolating cognitive modules with dual-task paradigm: Are speech perception and production separate processes? *Quarterly Journal of Experimental Psychology*, 37, 507-532.
- Spink, A. (2004). Multitasking information behavior and information task switching: an exploratory study. *Journal of Documentation*, 60, 336-351.
- Steinfatt, T. M. (1987). Personality and communication: Classical approaches. In J. C. McCroskey & J. A. Daly (Eds.), *Personality and interpersonal communication* (pp. 42-126). Newbury Park, CA: Sage.

- Szebo, L., & Cebotarev, E. A. (1990). Women's work patterns: A time allocation study of rural families in St.Lucia. *Canadian Journal of Developement studies*, 11, 259-278.
- Tinsley, C. (1998). Models of conflict resolution in Japanese, German, and American cultures. *Journal of Applied Psychology*, 83, 316–323.
- Turner, J. W., & Tinsley, C. (2002, August). *Polychronic communication: Managing multiple conversations at once*. Paper presented at the annual meeting of the Academy of Management, Denver, CO.
- Turner, J., Grube, J., Tinsley, C., Lee,C., & O’Pell, C. (2006). Exploring dominant media: How does media use reflect organizational norms and effects performance. *Journal of Business Communication*, 43, 220-252.
- Turner, J.W., & Reinsch, N.L. (2007). The business communicator as presence: Multicomunicating, equivocality and status at work. *Journal of Business Communication*, 44(1), 36-58.
- Wasson, C. (2004). Multitasking during virtual meetings. *Human resource planning*, 27, 47-60.

APPENDIX A

Original items (items 6, 7, 8, 11, 15, 16, 17 are reverse-coded):

1. I like talking on the phone while I am driving.
2. I frequently listen to music or watch TV when exercising.
3. I frequently flip between different shows when watching television.
4. I can easily understand and comprehend material presented in class lectures while I am doing something unrelated.
5. I frequently IM (Instant Message) while I am performing other work on my computer.
6. Multitasking stresses me out.
7. I often concentrate on completing one task before moving on to another.
8. I feel overwhelmed trying to handle more than one task at a time.
9. I frequently do other tasks while talking on the phone.
10. It is easy for me to keep track of multiple projects simultaneously.
11. I find it difficult to concentrate on tasks when people talk to me.
12. I like to have a TV or radio on while I read.
13. I often listen to music or watch TV when studying (working).
14. I frequently try to accomplish several projects or tasks at the same time.
15. I agree with the saying: "To do two things at once is to do neither".
16. Multi-tasking makes me tired.
17. I usually close programs/browsers before opening other programs/browsers when using a computer.
18. I frequently keep multiple programs/browsers open on my computer.
19. I usually watch TV or read when I eat.

APPENDIX B

Table 1

19-Item Total Statistics

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
one	.32	.80
two	.23	.81
three	.24	.81
four	.52	.79
five	.30	.80
six	.65	.78
seven	.42	.79
eight	.55	.79
nine	.46	.79
ten	.46	.79
eleven	.29	.80
twelve	.39	.80
thirteen	.43	.79
fourteen	.55	.79
fifteen	.60	.78
sixteen	.48	.79
seventeen	.29	.80
eighteen	.35	.80
nineteen	.03	.82

Table 2

Rotated Component Matrix

	Component			
	1	2	3	4
six	.80	.07	.08	.14
eight	.80	.01	.06	-.03
fifteen	.73	.16	.09	.09
ten	.72	-.05	.10	-.06
sixteen	.64	.19	-.04	-.02
seven	.64	-.12	.09	.10
fourteen	.64	.18	.15	.07
four	.63	.25	.06	-.01
eleven	.42	.26	-.16	-.08
twelve	.15	.81	-.01	.09
thirteen	.19	.81	.01	.13
five	.03	.54	.31	.13
eighteen	.13	.17	.87	.01
seventeen	.17	-.01	.87	-.01
nine	.43	-.03	.05	.63
two	-.07	.16	-.13	.62
three	-.03	.09	-.04	.60
one	.29	.01	.06	.48