



The Polychronic–Monochronic Tendency Model

PMTS scale development and validation

Jay D. Lindquist and Carol J. Kaufman-Scarborough

ABSTRACT. Polychronicity has traditionally been defined as a form of behavior wherein a person engages in two or more activities during the same block of time, while monochronicity occurs when a person engages in one activity at a time. These concepts have become increasingly relevant in discussions of 'time personality', worktime in the home, and technological impacts on time. Other underlying dimensions of polychronicity also exist, such as preferences and feelings towards whether to combine activities or not. In order to reflect this more complex perspective, a validated, updated measure of a person's polychronic–monochronic overall tendency is needed. The present study is a re-inquiry and extension of the Polychronic Attitude Index (PAI), introduced in 1991. In the current research plan we propose, develop, and validate a general five-item comprehensive 'reflective' single factor extended model. The general Polychronic–Monochronic Tendency Model is constructed using confirmatory factor analysis. The five-item summated scale from this model is named the Polychronic–Monochronic Tendency Scale (PMTS). A series of five separate studies were used to variously test for social desirability response bias, internal consistency, discriminant validity, and nomological validity. The PAI is also compared statistically to PMTS with the latter being clearly stronger. A discussion of the results and research implications are presented. **KEY WORDS** • measurement • monochronicity • multiple simultaneous activities • polychronicity • polychronic–monochronic tendency

Introduction

In today's technology-driven society, individuals have many opportunities to combine their marketplace, home, and work activities. Internet shopping, for instance, can take place virtually anywhere while doing something else at the same time. Personal computers allow individuals to bring their workplaces into their homes (Brocklehurst, 2001; Tietze and Musson, 2002), telecommuting while the clothes dryer is going and dinner is in the oven. Cell phones and personal digital assistants (PDAs) enable us to access the Internet while shopping at a mall, taking a break at work, waiting in line at the supermarket, eating lunch at a restaurant, or having a suit marked for alteration by a tailor. Finally, information technologies have increased in the home (Silverstone 1993; Horning et al., 1999), allowing for many new activity combinations, such as recording a movie while watching another television show and spending time with one's family. As a result, the distinctions between time and space (location) are becoming more blurred as individuals demand more products and services that allow them to be 'at work' while 'at home', and vice versa.

Despite the increased opportunities for polychronic behavior, prior studies have found that not all persons are comfortable with simultaneous activities, and instead prefer to do things one at a time (Kaufman et al., 1991a; Bluedorn et al., 1999; Cotte and Ratneshwar, 1999). Such persons are thought to be 'monochronic' in their preferences for everyday activities, products, and workplace culture. Recognizing this alternative tendency, there are many products and services that are aimed at those who typically prefer to do one activity at a time, such as reading a good book, using a table saw to cut wood for a fence, or playing a computer game that takes much focus and coordination. Some individuals shop with focus on finding one item at a time, or will not turn their cell phone on while grocery shopping because they want no interruptions, or when they turn the television on they watch the same network all evening or a program from beginning to end without switching to another.

In recent studies, polychronicity has become quite relevant in discussions of 'time personality' (Francis-Smythe and Robertson, 1999), worktime in the home (Tietze and Musson, 2002), and technological impacts on time (Silverstone, 1993). It is frequently mentioned as an underlying construct in discussing an individual's tendencies to combine activities, but its measurement has suffered from incomplete development, situation-specific measures, and a lack of rigorous testing. We propose that other dimensions of polychronicity/monochronicity exist that are not consistently accounted for in models and scales. Rather than being independent of a particular context, existing measurement scales have tended to remain discipline-specific and are often linked to specific situations such as the marketplace (PAI – Kaufman et al., 1991a), the workplace (IPV – Bluedorn et al., 1992; Bluedorn et al., 1999), and more recently, to personality

in an integrative study of multiple time concepts (TPI – Francis-Smythe and Robertson, 1999).

In the present study, we propose, develop, and validate a five-item comprehensive ‘reflective’ single factor model. A reflective model is one where such things as the inherent (latent) tendency, position, or value structure of a person results in or drives certain behaviors, positions or feelings. These results or outcomes should statistically co-vary. Hence measures of internal consistency are appropriate. A reflective construct is alternatively called a ‘latent’ construct. The alternative to a reflective model is an ‘emergent’ or ‘formative’ construct. Here certain behaviors or feelings are observed and are ‘drivers’ of the construct. These formative indicators should not co-vary and measures of internal consistency do not apply. We believe that a person has a general polychronic–monochronic tendency. This results in the individual exhibiting behaviors and feelings toward such behaviors in line with her or his tendency position. This is a reflective model or construct. The current study is an extension and re-inquiry of the Polychronic Attitude Index (PAI), the first published metric established to measure polychronicity. The construct that we name the Polychronic–Monochronic Tendency Model is based on theory flowing out of an extensive literature review and the use of exploratory and confirmatory factor analysis. A series of five separate studies were variously used to test for social desirability response bias, internal consistency reliability, and discriminant validity with potentially similar scales from other disciplines, discriminant validity with potentially similar scales within individual marketplace behavior, and nomological validity. We draw on the rich heritage of multidisciplinary time studies in order to build our approach.

Polychronic and Monochronic Time Use Background: Theory, Key Findings and Measurement Methods

Polychronic and monochronic behavior were first conceptualized and named by anthropologist Edward T. Hall (1959). He studied a number of cultures in various parts of the world and identified patterns of behavior that were common among them. He conceptualized ‘time’ as a ‘silent language’ that communicated meaning and ordered activities. He also observed that societies organized their time use monochronically or polychronically. This distinction is well known and is frequently used in comparative cultural analysis.

According to Hall, Northern European and western cultures, which he called ‘low-context’, are thought to have a tendency to generally concentrate on one activity at a time. This he defined as ‘monochronic time use’. Among such cultures time is seen as comparable to money, in that it may be “saved,” “budgeted,” and “spent.” In contrast Hall postulated that ‘polychronic time use’ is

found in 'high-context' cultures such as exist in the Middle East, Southern Europe, and Central and South America. In these countries, people (individuals) are more likely to engage in two or more activities during the same time block. Flexibility in time use and changes of activity are common and expected. A block of time can have many activities within it and people are expected to flow comfortably from one activity to another. Hall also asserted that people within a culture 'preferred' to behave more monochronically or more polychronically, as their society dictated (Hall and Hall, 1987). More recently it was found that polychronic or monochronic tendency is independent of 'context' (see Palmer and Schoorman, 1999).

Economic models and time use accounting

In attempting to understand the growth of industrialization in western nations, studies in home economics and sociology approached time as one of several economic resources (Becker, 1973), implicitly emphasizing the monochronic perspective through their computations and analysis. Daily time use by individuals was 'expected' to sum to 24 hours (Robinson, 1977). Researchers were also interested in determining how the most efficient output could be achieved as people used their time (for thorough reviews, see Juster and Stafford, 1991). Respondents' reported hours and minutes that were subsequently analyzed in terms of specific occupations or household demands.

The data gathering approach in this period was primarily the 'time diary' method. It allowed reports of individuals' daily time use to be organized and tabulated (Robinson, 1985). It was described as a 'complete accounting of time'. Study participants were instructed to log the time spent in all daily activities over a fixed period in days. Though not a focus of these studies, evidence of polychronic time use was present. Respondents were asked what they were doing during certain bounded time periods. This was followed by questions tied to the situation in which the respondent found himself or herself. People were asked where they were, with whom they were, and whether they were 'doing anything else at the same time'. These 'doing anything else' activities provided evidence of polychronic behavior, but were arbitrarily called 'secondary activities', since such activities were viewed as not requiring the 'primary' attention of the respondent (Walker and Woods, 1976). In the 1975–1976 *Time Allocation Study*, Hill (1985) reports that the dominant forms of secondary activities included such things as work, housework, and shopping.

Polychronicity as a 'hidden' construct

As noted earlier, the common practice was to code one activity as primary and another as secondary, based on the level of attention given by the individual.

The secondary or polychronic activities were regarded as a 'methodological problem' since time was 'bounded' and could only be used for a single purpose (Juster and Stafford, 1991). However, researchers found that the total hours of a week's activities reported by respondents in several studies frequently summed to more than 168 (7 days x 24 hours) (Robinson, 1985). Such discrepancies were often resolved by recoding the data into sequential monochronic (non-overlapping) activities of shorter duration.

Some analysts cited concerns regarding this measurement problem in the time diary databases. For instance, Peskin (1982) noted that there was 'considerable uncertainty associated with the measurement and valuation of household work', since there were instances of 'joint production' in household work. In another case, Hefferan (1982: 32) reported that 'the greater the demands on the employed woman's time, the more likely she is to "dovetail" household productive activities', by sequencing parts of one activity with parts of another. A focus on primary activities alone 'masked the intensity' of various activities, minimizing the actual impact of polychronic time in people's lives. Polychronicity became somewhat of a 'hidden' construct, being found in the data, but eliminated through recoding or time budget accounting that forced the sum of daily activities to 24 hours a day and 168 hours a week. The next 'wave' of time studies, however, began to bring such concepts into the forefront of discussion.

Dissatisfied with the limitations of the fixed resource approach, consumer researchers attempted to unify existing multidisciplinary time theories into frameworks for research (for reviews, see Jacoby et al., 1976; Feldman and Hornik, 1981; Holbrook and Lehmann, 1981; Hirschman, 1987). While the influence of time on behavior was well accepted, the subjective perceptions of the general use of time had not been sufficiently explored (Feldman and Hornik, 1981; Hirschman, 1987; Bergadaa, 1990; Lehmann, 1999). Researchers began to question whether how people 'feel' about time affected the products and services that they used. Also, the 'subjective' aspects of polychronic and monochronic time use were revealing men and women's perceptions, beliefs, feelings, and preferences as these behaviors were acted out (Kaufman et al., 1991b).

Blurring the home and the workplace

At the same time, interest grew in the interactions between people's time at home and at work as several significant changes took place. Women entered the workplace in greater numbers, workers began to have many more options for their workdays through flextime and weekend work schedules, and increased technologies made it possible for more employees to work at home.

The impact of women's employment

For instance, studies examining 'working women' identified numerous strategies that were followed in their attempts to manage the demands of employment, family, marriage, marketplace behavior and their own personal interests. Specific strategies such as using convenience foods (Reilly, 1982) and time saving durables such as household appliances were studied (Strober and Weinberg, 1980; Nickols and Fox, 1983). Freezers were sold and used as a way to balance the pressures of work and home life (Shove and Southerton, 2000). The resulting evidence indicated that many working women were engaging in multiple simultaneous activities throughout the day, including socializing with families while shopping (Walker and Woods, 1976; Geerken and Gove, 1983; Nickols and Fox, 1983). Products and services were being sought that enabled wives to group activities together in ways that were comfortable to them. While not formally described as polychronic time use, such strategies demonstrated that many activities were being carried out within the same fixed clock blocks of time. However, little information was gathered in the consumer studies area indicating how the individuals 'felt' about combining individual activities in these ways or doing one activity at a time. For this perspective, we turn to studies in sociology, anthropology, and health (Adam, 1995).

Flexitime and weekend work schedules

Outside of the household, employment opportunities also changed to allow individuals to work different shifts, potentially at times round the clock and on weekends. Such a broadening of worktime schedules caused some researchers to carefully examine whether the elimination of 'collective times for rest and socialization' might instead create the need for a more pressured 'balancing act' having 'troublesome social consequences' (Garhammer, 1995). Researchers began to investigate how working at home affected people's abilities to handle interruptions throughout their worktime (Tietze and Musson, 2002), when chores are intermingled with work tasks. Such a question provides an ideal context to examine individual's attitudes towards polychronic behavior.

Although trades have been conducted at home for centuries, such as dress-making and farming, new opportunities have grown as more workplaces have adopted the flexibility to allow employees to take some or all of their work responsibilities into their homes. In fact, a substantial number of persons all over the world have responded by creating workspaces within their homes (Perin, 1998; Tietze and Musson, 2002). Some carry out manual jobs such as assembling piecework for an industry, while others may stuff envelopes, perform child care, conduct computer analysis, and conduct home office work (for a detailed overview of homeworking activities around the globe, see Felstead and Jewson, 2000).

The time use of husbands and wives is significantly affected when either or

both spouses are in the workplace. They must juggle jobs, perhaps children, and a multitude of other demands that may present conflicting schedules. And, as the opportunities to carry one's work into one's home have increased, the boundaries of time and space between the home and the outside world become blurred by the advances of 'modernity', as new 'times' emerge through the forces of capitalism, the growth of industrialism, non-conventional organizational structures, and technological innovations (Friedland and Boden, 1994; Daly, 1996).

Technology and workspaces in the home

Finally, the introduction of information technologies both at work and at home have blurred the distinctions between the two, as persons at home can work on their employment tasks via their home computers and Internet connections. Similarly, individuals at work can 'start' and monitor various tasks at home through remote controls and stored memory functions. Thus, a meal might cook at home in a preset oven, while an individual at work emails themselves attachments to work on later in the day from their home office. These new technologies increase the opportunities for individuals who so desire to act polychronically and people in general may be 'nurtured by technology' to become more polychronic in behavior. Also the culture itself, as it accepts technological innovations, may become more predisposed to polychronic behavior.

A research team from Ohio State University in the USA developed a series of research projects aimed at examining the specific occasions of simultaneous media usage by individuals (Pilotta et al., 2004). That is, their research asked whether persons who were using more than one medium in their homes at the same time would be able to pay attention to several messages or actions at the same time. Terming this occurrence 'media multitasking', they gathered data from a very large sample of US consumers to determine how widespread such behavior is. Their premise was that, given that people are limited to 24 hours each day, and given that people have a number of new media available in their work and home environments, individuals would increase their simultaneous use of media such as watching television while using one's laptop computer to check email and to surf the Web. While such a project would have been another ideal laboratory for critical study of polychronicity, these researchers neither discussed polychronicity nor did they attempt to see if there was a relationship between a person's polychronic-monochronic tendency position and multiple simultaneous media use. These findings open the door to a discussion of the possibility of situation-specific polychronic-monochronic tendency and the PMTS scale proposed in this article could be used as a measure in these contexts.

The development and testing of time use instruments

In the late 1970s through the early 1990s, researchers in several disciplines pursued the development of scales to attempt to measure different aspects of time perception and use (for a thorough review, see Francis-Smythe and Robertson, 1999). In psychology, the F-A-S-T Scale was constructed as a multi-item measure of four theoretical dimensions of what the authors named 'time orientation'. These were 'focus, activity, structure, and tenacity' (Settle et al., 1972). Schriber and Gutek (1987) used principal components factor analysis to extract 13 usable scales known as the 'Time Dimensions Scales'. Bond and Feather (1988) proposed and tested the 'Time Structure Questionnaire (TSQ)' in order to examine the structure and purpose in individuals' use of time. The 'Time Management Behavior Scale (TMBS)', developed by Macan et al. (1990), was used to investigate the complex dynamics of time management among college students and in organizational settings (see also Macan, 1994, 1996). While some statements in each of these scales dealt with activity scheduling, interruptions, changes, planning, completion, and preferences, none addressed monochronic or polychronic behavior as specific topics.

The emergence of the polychronicity construct and measurement

Researchers in management (Bluedorn and Denhardt, 1988) and marketing (Gentry et al., 1990; Lane et al., 1989) argued the need for a set of measures whose goal was the deliberate examination of polychronic and monochronic time use. With an emphasis on polychronic behavior, Kaufman et al. (1991a) developed and tested the PAI. This four-item one-dimensional scale was among the first published measures of 'polychronic time use'. The original PAI scale is shown in Appendix 1.

The value of the Cronbach's Alpha indicator of internal-consistency reliability for this measure was .68, a lower than desired value, yet acceptable in early stages of scale development (Cronbach, 1951). A discriminant validity check with Reilly's Role Overload scale yielded a correlation value of $-.15$ demonstrating that the two scales were measuring different constructs (Reilly, 1982). The negative sign of the correlation was as expected since high polychronic attitude position should result in a lesser feeling of being in role overload. Further, the chi-square analysis showed no significant differences on gender, age, income or marital status. The gender finding was especially interesting because the widely held belief that women in the USA were in general more polychronic than men was not supported by the data. Francis-Smythe and Robertson (1999) also found no statistically significant difference in their polychronicity scores for men and women. All things considered, the PAI was an initial step in the quest for polychronic-monochronic tendency measurement.

However, at the time of its construction this was not fully recognized by its developers.

The PAI scale was then used in several marketplace, management, and computer science applications. Included were the banking industry (Bluedorn et al., 1992), Internet use (Mosley-Matchett, 1996), and technological development (Kaufman and Lane, 1997). Manrai and Manrai (1995) examined its application in cross-cultural contexts. In developing the Time Personality Indicator (TPI) one of the surviving polychronicity scale items was also from the PAI (Francis-Smythe and Robertson, 1999). Slocombe and Bluedorn (1997) included the PAI scale in their management context research, modifying it to fit work group situations and adding other items. The resulting scale, the Index of Polychronic values (IPV), is primarily focused on tasks, projects, and assignments in the workplace with 7 of its 10 items containing such words (Bluedorn et al., 1999). It was specifically developed to measure polychronicity as a 'dimension of organizational culture' (Bluedorn et al., 1999: 207). It is therefore a situation-specific (workplace-group or workplace-individual) scale that appears to measure 'multitasking' in the workplace rather than individual polychronic-monochronic tendency, a much broader construct. Hence the IPV cannot rightly be classified as a general measure of monochronic-polychronic tendency.

Finally, Francis-Smythe and Robertson (1999) hypothesized that individuals could be described by a multidimensional construct called a 'Time Personality', that includes behaviors, cognitions, and affect. After presenting a comprehensive review of time measures from multiple disciplines, the authors tested a combined set of existing time measures with newly constructed items, which were administered to several samples of participants and refined through factor analysis. Polychronicity emerged as one of five final dimensions of Time Personality, and was found to be represented by eight items accounting for four percent of the explained variance in their sample. Their findings appear to be consistent with existing theory, given that 'high scorers . . . enjoy flipping between activities . . . and . . . low scorers prefer to concentrate on one activity at a time' (Francis-Smythe and Robertson, 1999: 280). Unfortunately for students of polychronicity, Francis-Smythe and Robertson did not reveal specifically whether any of the surviving scale items were taken from the existing PAI or IPV. In addition, the validity checks were conducted against other time-related scales, but the latter are less likely to be associated with polychronicity.

Our work reported in this article focuses on the development and testing of a measure of polychronic-monochronic tendency that is independent of specific disciplines and that can be usefully applied in the home, workplace or marketplace.

Goals of the present research

The goals of the present research are to develop and validate a model of polychronic–monochronic tendency, extending the work of Kaufman et al. (1991a), Bluedorn et al. (1999), and Francis-Smythe and Robertson (1999). It is to be a construct that (1) more thoroughly reflects the multidisciplinary theory underlying monochronic-polychronic tendency, (2) is general in nature, removing the situation specificity tied to the home or workplace found in other measures, (3) is not biased towards polychronic behavior, and (4) is statistically valid and reliable. A multiple study approach will be followed to do this.

Problem Statement: Proposing a Polychronic–Monochronic Tendency Model

Conceptualizing a tendency towards polychronic/monochronic behaviors

After reviewing the time literature beginning with Hall (1959) and consulting recent discussions on measurement model specification (Jarvis et al., 2003; MacKenzie, 2003), we propose to develop a more exacting reflective model of polychronic–monochronic tendency and its resultant measurement scale. We have named the model, The Polychronic–Monochronic Tendency Model. The measurement scale is The Polychronic–Monochronic Tendency Scale (PMTS).

This approach follows Hall who named and defined certain behaviors at opposite ends of a spectrum/continuum as polychronic and monochronic behavior. He also stated that people within a culture would be predominantly at some position on the spectrum and that this position was culturally learned. He also asserted that people would have a ‘preference’ to be at a specifically learned position. The idea of ‘preference’ points to more than simply engaging in mono- or poly-behavior, it is a precursor to our concept of polychronic–monochronic tendency. Hall also stated that all members of a society would not be at the same place on the polychronic–monochronic continuum, regardless of the ‘average’ position ‘preferred’ by the culture. For instance, even though the USA is considered by Hall to be monochronic as an overall cultural characteristic, we know that some individuals are highly polychronic. Further, he speaks of polychronic and monochronic behaviors as being cultural markers. Most recently, he stated:

In the strictest sense, a polychronic culture is a culture in which people value, and hence practice, engaging in several activities and events at the same time. Monochronic cultures are more linear in that people prefer to be engaged in one thing at a time. (Hall, interviewed by Bluedorn, 1998: 110).

The focus of our work is on developing a model of individual tendency toward either monochronic or polychronic behavior and the degree of a person’s

positive feelings about his or her position on that continuum. No attempt is made to favor or emphasize one end of the continuum over the other. Is polychronic–monochronic tendency an adaptive characteristic of an individual as we might conclude from Hall's cultural observations or is this a dispositional or inherent trait that we see acted out not in line with the norm? This is similar to the running discussion as to whether a person's 'personality' is based on 'nurture' or 'nature'. Our Position is that this tendency inherently exists within each of us even though the societies in which we live (family, reference groups, social classes, subcultures, culture) may have a preferred tendency. Therefore our overall tendency will be to varying degrees internally and externally influenced.

Besides behavioral measures, we propose that the tendency model should also include measures of: (1) *preference* for a type of behavior along the monochronic–polychronic continuum and *positive/negative feelings* measures about the preferred behavior of the individual, (2) *liking* to engage in multiple simultaneous activities or doing one activity at a time, and (3) *feeling comfortable* with this behavior as the outcomes of one's tendency.

We propose to characterize 'polychronic–monochronic tendency' as a reflective construct (principal factor model, Jarvis et al., 2003). As discussed earlier, this construct is expected to include measures of an individual's preferred behavior and feelings about polychronicity/monochronicity and what they perceive is *right* for them. Since this is a reflective construct, an individual's position on each one of the measures would be a function of, or *driven* by, his or her actual polychronic–monochronic tendency position. Prior studies indicate that some individuals have positive feelings about polychronic behavior and others have positive feelings about monochronic behavior. That is, some people are comfortable doing only one thing at a time, while others enjoy juggling activities. Hence a person's position along the continuum from polychronic to monochronic tendency determines his or her preferences. That is not to say that they always are able to follow their tendency preference, especially in employment situations. If a person is required, against his or her desires, to behave polychronically or monochronically, such behavior would *not* be deemed to be appropriately in line with their tendency. Likewise and individual may have positive feelings about polychronic or monochronic behavior in certain situations because it allows him or her to achieve preferred outcomes, but might not enjoy or feel comfortable with the experience. As in the workplace situation this person would not score as highly toward her or his true side of the tendency scale. We feel that the consideration of the behavioral feelings and preferences that flow from a person's polychronic–monochronic tendency should be a vital part of the construct.

An example of monochronic tendency behavior would be the individual who is watching television one evening and selects one network, watches only the

programs on that network including the embedded and between program commercials and programming promos, does not even speak much to others, and uses the remote control only to turn the set on and off and select the channel. He or she prefers to watch television this way being comfortable with this approach (Lindquist and Kaufman-Scarborough, 2000). Turning to behavior illustrating polychronic tendency, we see the grocery shopper who is having photos processed, sushi made, and is calling mom on the cell phone concerning a greeting card purchase, all during the same clock block of time. Again he or she prefers to grocery shop this way, is comfortable doing so, and likes the juggling of activities.

Hall also postulated that these two ways of using time are 'culturally-learned' and that each should be recognized as representing actual time use patterns (Lee, 1999). Again, he emphasized the cultural influence on time use patterns, stating:

Monochronic (polychronic) time is arbitrary and imposed, that is, learned. Because it is so thoroughly learned and so thoroughly integrated into our [U.S.] culture, it is treated as though it were the only natural and logical way of organizing life. Yet, it is not inherent in man's biological rhythms or his creative drives, nor is it existential in nature. (Hall, 1983: 45)

Methodology

The research program, following a re-inquiry and extension approach, (1) develops and then evaluates a general measure of individual monochronic-polychronic tendency based on PAI (Kaufman et al., 1991a) and the literature, and then by way of nomological tests, (2) empirically further demonstrates its validity, and (3) compares the model to the PAI.

Five quantitative studies are reported here. Since we are proposing a reflective model, tests of internal consistency will be used as one of the procedures to evaluate our model (Jarvis et al., 2003). The overall procedure followed is similar to Lastovicka et al. (1999) in his study of 'frugality'. Our first study develops a reliable (replicable) measure of polychronic-monochronic tendency, including a check for social desirability response bias confounds. The second is a model test in the general population and discriminant validity tests of the PMTS against existing potential parallel scales and the potential confounding of social desirability response bias. The third and fourth studies are discriminant validity tests against potentially similar individual consumer behavior constructs. This applications area was chosen because of the perceived future usefulness of the PMTS in examining the impact of tendency on such areas as consumer shopping behavior, specific product and service selection, and consumer bundling of products and services. This dictates that in fact the PMTS is a true measure of polychronic-monochronic tendency and that other market-

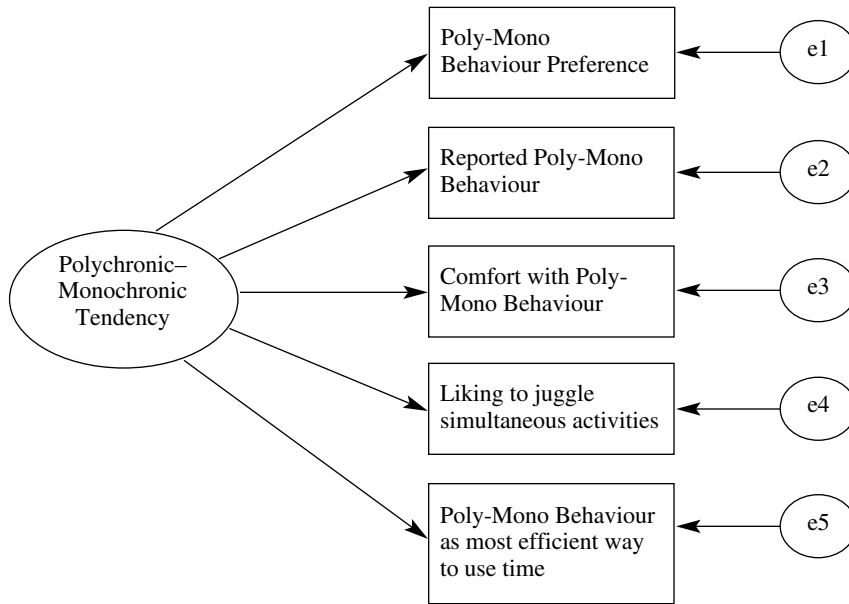
place measures do not properly measure this construct. The fifth study consists of nomological checks of the model against reported behaviors and a comparison of the PMTS with the PAI.

Study 1: Model and scale development and checks for social desirability response bias

The first action to be accomplished in Study 1 was the identification of potential items for polychronic–monochronic tendency determination. Fifty questions (statements) were selected based on the literature and tied to preferences, behavior, feelings and other statements that had potential to be part of a reflective polychronic–monochronic tendency construct (Settle et al., 1972; Bond and Feather, 1988; Kaufman et al., 1991a; Bluedorn et al., 1999; Cotte and Ratneshwar, 1999; Kaufman-Scarborough and Lindquist, 1999a). Several items were either revised or newly developed by the authors in order to give equal emphasis to ‘monochronically’ oriented statements. Examples include statements such as ‘I get more things done each day by doing one activity at a time’ and ‘I almost always complete one activity before beginning another’. Care was taken to ensure that items were not situation specific and they were phrased to maximize their general applicability. For example, ‘in most situations in my life I perform best under pressure’, is an item included in this first round of scale development. The items comprised the input list used for an item reduction procedure using exploratory factor analysis.

The sample consisted of 265 adults who self-administered the instrument. The sample was drawn using a convenience quota sampling procedure in the south west region of a Midwestern state in the USA. Data collectors personally delivered and picked up the questionnaires. The quota conditions were that the sample was to be one half male and one half female with each of these groups of adults 18 years of age and older to be equally divided into 18 to 44 years of age and 45 years of age and older. The questionnaire contained 65 items. Fifty were potential polychronic–monochronic tendency items. Since self-reports were involved, the seven-item Strahan and Gerbasi Social Desirability Response Bias X1 scale (1972) as revised by Fischer and Fick (1993) was included. The remaining were demographic items. Seven-point Likert scales were used for all but the demographic questions, ranging from 7 (strongly agree) to 1 (strongly disagree).

Data were collected using a convenience quota sampling method in a medium-size midwestern city. The male–female split in this non-student sample was approximately 50/50. Each gender sample was also equally split into groups of 18–44-year olds and 45 years of age and older. Only non-minority, US citizens were included in the sample to prevent potential results confounding based on subcultural or cultural background influences.



Note: There are five underlying indicators that are part of the polychronic-monochronic tendency construct

FIGURE 1
The polychronic-monochronic tendency model

The data set was randomly split in half with 133 respondents for the 'model generation analysis' and 132 in the 'replication analysis' sample. When doing structural equation modeling, using a maximum-likelihood estimation approach, the recommended sample size range is 100 to 200 (Hair et al., 1998).

Model generation analysis

Data reduction was carried out on the randomly chosen sample of 133 respondents using a principal components unrotated factor solution approach. The extraction was based on Eigenvalues of at least 1. The Scree Plot indicated a one-factor solution, as did the variances explained. The first factor accounted for 42.4 percent of the variance. Twenty-seven of the variables loaded at .5 or above on the first factor.

Model generation was based on theory and the data being analyzed (Joreskog and Sorbom, 1993). A confirmatory factor analysis was used to find the single-

TABLE 1
Study 1 and Study 2 – maximum-likelihood estimates of a
one-common-factor model

Items	Study 1: Generation sample	Study 1: Validation sample	Study 2: General population sample
I prefer to do two or more activities at the same time	.90	.88	.81
I typically do two or more activities at the same time	.82	.88	.73
Doing two or more activities at the same time is the most efficient way to use my time	.85	.80	.85
I am comfortable doing more than one activity at the same time	.88	.82	.75
I like to juggle two or more activities at the same time	.85	.85	.84
	<i>n</i> = 133	<i>n</i> = 132	<i>n</i> = 141
Fit indices			
GFI adjusted for d.f.	.97	.90	.86
RMR – root mean square residual	.04	.07	.10
RMSEA	.00	.10	.14
90% confidence interval of root mean square error of approx.	.00, .09	.01, .17	.07, .21
Bentler's CFI	1.00	.99	.97
Bentler and Bonnett's NNFI	.99	.98	.96
Chi-square, Pr with d.f. = 5	3.15, .68	11.24, .05	18.08, .003
Variance extracted	73.9%	71.8%	63.1%
Cronbach's alpha	.93	.93	.90

Note: Factor loading estimates: Λ_{λ}

factor model that would fit the data well, be theoretically sound, and yield a parsimonious solution. A five-item good fitting model was found using the SAS Proc Calis approach. Figure 1 is an illustration of the reflective Polychronic–Monochronic Tendency Model that was found. Note that five indicators are shown. Hence Table 1 shows five items and, in column one, the standardized factor loading estimates and fit indices.

Notice that all of the standardized factor loadings range from .82 to .90. The Goodness of Fit Index (GFI), the Bentler Comparative Fit Index (CFI), and Bentler and Bonnett's Nonnormed Fit Index (NNFI) are all above the .9 value

minimum (Bollen, 1989) and 'close to .95' (Hu and Bentler, 1999). Further, the bounds of the root mean square error confidence interval are .00 and .09. The root mean square residual (RMR) was less than the .08 'reasonable fit' value advocated by Browne and Cudek (1993) and the root mean square error of approximation (RMSEA) less than the .06 suggested by Hu and Bentler (1999). Note that variance extracted by the model is 73.9 percent. This is very good and well above the 50 percent minimum recommended by Fornell and Larcker (1981). Cronbach's Alpha was .93, an excellent internal-consistency value. This high level of intercorrelation is expected for a reflective model where indicators should 'share a common theme' (Jarvis et al., 2003). Chi-square was not statistically significant, a positive outcome, and none of the standardized residuals exceeded an absolute value of 2.58. The five items (the resultant PMTS) that are measures for The Polychronic-Monochronic Tendency Model are listed in Appendix 2. The model illustrates what we view as a theoretically stronger measure of polychronic-monochronic tendency than the PAI (Kaufman et al., 1991a).

Since the PMTS is to be used to position individuals along the polychronic-monochronic continuum, the scale must be designed for replication in other situations and among other populations. This suggests the use of a summated scale is a better approach than a scale based on factor scores. The need for replicability over orthogonality was the key to this decision (Hair et al., 1998). There is a note of caution here in that a possibility exists that using a summated scale score to represent a reflective model may result in measurement error effects (Jarvis et al., 2003). However, the authors feel that the strong theoretical foundations of the model and the very consistent results of the statistical analyses and validity outcomes to this point strengthen the case for using a summated scale to represent the model.

A check for social desirability response bias was also carried out. This is recommended when gathering self-reported information from individuals so that there is assurance that the results are not confounded by such bias (Fischer and Fick, 1993). The correlation between the five-item PMTS (sum of item scores, with the item relating to doing one activity at a time being reverse scaled) and the revised Strahan and Gerbasi X1 seven-item scale was $-.06$; a 'no correlation finding'. Hence one can conclude that there is no evidence of a socially desirable response set operating.

Replication analysis

The second half of the randomly split sample ($n = 132$) was used in an attempt to replicate the model. Hence only confirmatory factor analysis was used (Joreskog and Sorbom, 1993). The second column in Table 1 contains the results of the test on the structure found in the model generation analysis phase. The structure was replicable and well fitting with the fit statistics slightly lower than

for model generation. The social desirability response bias check yielded a correlation value with the PMTS of $-.12$, a very small association. Social desirability response bias is not present in these data.

Study 2: Tests of model structure in the general population, potential response bias confounds, and preliminary discriminant validity

Study 2 had multiple objectives. First, would the five-item PMTS structure fit a second distinct data set? Next, will the answers provided by respondents be influenced by social desirability? Here we used both the Strahan and Gerbasi revised X1 scale (7-items) and the version 6 modified 37-item Paulhus Social Desirability Response Bias Scale (BIDR) (Robinson et al., 1991). The double check was seen as prudent to show that the results were truly not being confounded by such bias. Finally, is the PMTS correlated with potentially similar scales, namely, Reilly's Role Overload (Reilly, 1982) and Spence et al.'s (1987) Type AB 'achievement striving' and 'impatience/irritability' personality scales? These are checks of discriminant validity. In a later study we will look at discriminant validity where the PMTS will be compared to potentially similar measures of individual marketplace behavior.

Concerning role overload, Kaufman et al. (1991a) tested the assertion that 'demands placed by different roles may sometimes be satisfied within the same time block' to see if role overload measurement would suffice as a substitute for PAI. They found a statistically significant $-.15$ correlation value between PAI and Reilly's scale. This led to the conclusion that there was little association between the two. It seemed prudent that we should run the same test.

Conte et al. (1999) offered an analysis of polychronicity and Type AB personality (TABP) behavior, suggesting a relationship. They used the 'achievement striving' (AS) and 'impatience/irritability' (II) scales proposed in Spence et al. (1987). These two subcomponents of the TABP measure are described as 'the tendency to be active and to work hard at achieving one's goals' (AS) and 'reflects intolerance, frustration, and obsession with time' (II). The Conte et al. (1999) position was that polychronicity is likely related to AS and II. They suggested that AS people and II people might 'attempt to multitask' in order to accomplish more goals in the same amount of time. They used the IPV (Bluedorn et al., 1999) to represent polychronicity (recall it is our assertion that IPV is indeed a multitask measure) and correlated this with the seven-item AS scale and the five-item II scale. The correlations were $.17$ and $.09$, respectively, indicating little correlation. The question is whether overall polychronic-monochronic tendency, our broader construct, may be measuring something that is similar to either AS or II. Hence a discriminant validity comparison of PMTS to AS and II is in order.

The data set was gathered using the exact same method as for Study 1 and

consisted of 141 non-student adults. The instrument was self-administered and included the scales already mentioned plus demographic items.

Polychronic–Monochronic tendency model test

Attention should again be turned to Table 1. In column three find the summary of the fit indices of the confirmatory factor analysis. We see that the indices are comparable though slightly lower than those found in the study 1 generation sample model and the study 1 validation sample model. The general model of polychronic tendency is replicable. A z-analysis of the skewness and kurtosis values of the distribution of the PMTS scores revealed that the distribution was 'normal' for this respondent sample. This finding points to being able to capture people all along the continuum, and that individuals may indeed be normally distributed within a society even though cultures may vary in mean position. The mean score for the sample was 22.7 whereas the average of 5 (lowest possible score by a respondent) and 35 (highest) would be 20. This shows that the respondent group was on average in the neutral position but toward the polychronic tendency side.

Social desirability response bias confound checks

Table 2 is a summary of the correlations among the PMTS and the other five scales presented to the respondents. The Strahan and Gerbasi X1 revised social desirability response bias scale and the Paulhus social desirability response bias scale (BIDR) showed a .6 correlation with each other, this is in the 'large' or 'strong' range (.5 to 1.0), as one would expect. However, the correlations of these two with the PMTS were $-.07$ and $.05$, respectively, confirming that the results found were not confounded by the respondents giving socially desirable answers. This was in line with the study 1 bias check. The Cronbach's Alpha values for the two bias scales are given in Table 2.

Discriminant validity tests

Is there evidence that measuring an individual's perception of role overload is another way of measuring his or her polychronic–monochronic tendency? Recall that Kaufman et al. (1991a) also tested this potential match between Reilly's role overload measure and PAI. They found a correlation of $-.15$ (small). Referring to Table 2 we see the correlation between PMTS and the Reilly scale is $.11$. The role overload measure is not the same as PMTS. Discriminant validity is demonstrated.

Two subscales of a measure of type AB personality were also included among the discriminant validity checks. Table 2 shows the correlations between PMTS and AS and II. They were $.29$ and $.12$, respectively. These association levels are too small to be of consequence. Neither of the two measures would be appropriate substitutes for PMTS. Discriminant validity is demonstrated. Also note that

TABLE 2
Study 2 – correlations among scales: discriminant validity checks and potential response bias confounds tests

	Polychronic Monochronic Tendency Scale (PMTS)	Strahan and Gerbasi Social Desirability Response Bias (S & G)	Paulhus Social Desirability Response Bias (BIDR)	Reilly Role Overload	Type AB Achievement Striving (AS)	Type AB Impatience Irritability (II)
PMTS	(.90)					
S & G	-.07	(.68)				
BIDR	.05	.60	(.79)			
Reilly	.11	-.02	-.14	(.87)		
AS	.29	.05	.11	.21	(.74)	
II	.12	-.25	-.17	.42	.29	(.68)

Notes: Correlation of .21 is statistically significant at the .01-level (2-tailed). Correlations at .25 and above are statistically significant at the .001-level (2-tailed). Sample size = 141. The numbers on the diagonal in parentheses are the Cronbach's Alphas for each scale.

the Cronbach's Alpha for the PMTS was .90 and those of the other five scales ranged from .68 to .87.

Studies 3 and 4: Discriminant validity tests against potentially similar individual consumer behavior constructs

Further checks of discriminant validity were conducted. Since the PAI was initially developed in a consumer behavior context, we attempted to determine if the PMTS is indeed measuring something different than other similar individual consumer behavior constructs. For this test, we chose four validated scales that could potentially have behavior related to polychronicity and monochronicity, in their underlying switching and changing behaviors. For example, it is possible that persons with a polychronic tendency are more likely to be 'brand switchers' since polychronicity suggests greater activity changing and simultaneous activity. That is, similar to changing between activities, perhaps polychronic persons also change frequently from one brand to another. Another related follow-up assumption would be that polychronic–monochronic tendency might be indicated by measuring an individual's level of multiple to single brand loyalty or willingness to try new products, that is, a measure of *innovativeness*. Also, one would expect that the probability of variety seeking among activities

is higher in the more polychronic person's life than in the more monochronic individual's. Monochronic persons, who seem to prefer order and sticking to the same activity within a given time period, might be more likely to stick with the same products and not be attracted by variety. Polychronic persons, on the other hand, might also seek 'product or service variety' in the marketplace or even buy on *impulse*, changing from their planned brand to something spontaneously.

Discriminant validity tests

A high level of correlation between one or more of the scales used to measure the four constructs (brand switching, innovativeness, variety seeking, impulse buying) and the PMTS would indicate that there is a good chance that these existing marketplace behavior scale(s) would suffice and that a scale to measure polychronic-monochronic tendency does not add to our understanding. The four constructs and the measurement scales used in this study are: Raju's (1980) 'Innovativeness Scale' (Spearman-Brown reliabilities .80, .85, two studies), Raju's (1980) 'Brand Switching Scale' (Spearman-Brown reliabilities .78, .83, two studies), Donthu and Gilliland's (1996) 'Variety Seeking Scale' (Cronbach's Alpha .87), and Rook and Fisher's (1995) 'Impulse Buying Scale' (Cronbach's Alphas .88, .82, two studies). Though in some cases other scales designed to measure the same marketplace behavior construct were found in the literature, the four chosen are seen as representative and with good internal consistency reliability.

Study 3 examines a known-groups population

In conducting validity tests, researchers have frequently recruited persons who were thought to possess the trait under investigation in order to examine how such persons score on the measurement scale being developed (Lastovicka et al., 1999). Ideally, the authors could have recruited polychronic or monochronic persons via a subscription to a specific publication, participation in a special interest group, or membership in a chat room. However, we were unable to identify a readily available method. Instead we chose to distribute the self-administered questionnaires to persons who were in two situations in which the likelihood for polychronic behavior, namely, combining activities would be quite high. Families at a neighborhood swim club and families at a little league baseball field during games were selected. Half of the questionnaires were completed at each location. The location of these two was a large metropolitan area in the eastern part of the USA. The sample size was 201. A convenience sampling method was used without gender and age quotas. Again a participant had to be an adult US citizen. One hundred and one of the respondents were at a swim club and 100 were at a little league baseball field. The ratio of women to men was 69 percent to 31 percent. Though not tested in the current study, the two to one female to male ratio results may be different than the one to one

TABLE 3
Study 3 – known groups sample: PMTS compared to four
consumer behaviour marketplace scales

	PMTS	Innovativeness	Brand Switching	Variety Seeking	Impulse Buying
PMTS	(.93)				
Innovativeness	.14	(.73)			
Brand Switching	.04	.59	(.73)		
Variety Seeking	.04	.37	.36	(.83)	
Impulse Buying	.12	.20	.18	.33	(.89)

Notes: Correlation value of .17 is statistically significant at the .01-level (2-tailed) and correlations at .18 and above are statistically significant at the .001-level (2-tailed). Sample size = 201. The numbers in parentheses on the diagonal are the Cronbach's Alphas for each scale.

results found in all other studies for this project. The reason there were over twice as many women as men is that more men declined to participate than women and more women were available in the stands and on the grounds at the little league while more men were involved in the games. The age split also was skewed in favor of 18- to 44-year olds. Seventy percent of the sample was in this age group, the remainder were 45 years of age and older. The age split in this sample may also affect the ability to compare the results with the other studies. This younger age sample dominance was not unexpected when one considers who would more likely be involved in a swim club and in little league, that is, families with young to teenage children.

The correlations between PMTS and each of the other four scales are found in Table 3. The correlations run from .04 to .14; these are 'small' correlations. The conclusion reached for the study 3 respondents is that PMTS is not perceived to be the same as any one of the four individual marketplace behaviors based on the scales used. Hence discriminant validity is confirmed in all cases when PMTS is compared to measures of innovativeness, brand switching, variety seeking, and impulse buying. The Cronbach's Alphas are shown on the diagonal of the table. The PMTS internal consistency coefficient is .93 and the other four coefficients range from .73 to .89. The four scales tested against the PMTS used items that were Likert-type, seven position agreement scales identical to those for PTMS items.

Study 4 replication

The data for study 4 were gathered using a convenience quota sampling method identical to that carried out for studies 1 and 2, but a year later. The sample was

TABLE 4
Study 4 – Midwest sample: PMTS compared to four
consumer behaviour marketplace scales

	PMTS	Innovativeness	Brand Switching	Variety Seeking	Impulse Buying
PMTS	(.93)				
Innovativeness	.29	(.78)			
Brand Switching	.22	.69	(.79)		
Variety Seeking	.30	.47	.44	(.83)	
Impulse Buying	.12	.34	.30	.34	(.93)

Notes: Correlation value of .13 is statistically significant at the .01-level (2-tailed) and correlations at .21 and above are statistically significant at the .001-level (2-tailed). Sample size = 322. The numbers in parentheses on the diagonal are the Cronbach's Alphas for each scale. All scales were Likert-type seven position agreement with '1' being 'strongly disagree' and '7' being 'strongly agree.'

322 non-student adults. The instrument was self-administered and included the scales already mentioned for study 3 plus demographic items.

The results of the correlation and internal consistency analyses are found in Table 4. The correlations between PMTS and each of the four individual consumer behavior scales were higher for this sample than that used for study 3. They ranged from .12 to .30. The levels of correlation with the PTMS are still small in all cases. Recall this was a balanced male female and balanced age sample whereas the study 3 sample was two to one female to male and 70 percent were 18- to 44-years old. This might have accounted for the differences in correlation values along with sampling effects. The conclusion reached is that the respondents in this study perceived some scale associations, but very little. Hence discriminant validity in this second study is confirmed in each case when PMTS is compared to measures of innovativeness, brand switching, variety seeking, and impulse buying. The diagonal of the table lists the Cronbach's Alpha for PMTS and the other four measures. The coefficient for PMTS is .93, as it was in study 3. The internal consistency coefficients for the four individual behavior measures ranged from .78 to .93.

Study 5: Nomological validity tests and concurrent model comparison

The data were collected for study 5 using the same methodology and location as for studies 1, 2 and 4. The sample size was 375, and the profile was balanced with an equal split on gender and each of these two groups had half of the respondents 18 to 44 years of age and half 45 and older. Included in the instru-

TABLE 5
Study 5 – nomological validity checks correlations of
PMTS with behavioral variables

Scale/Item	PMTS
Greatest number of simultaneous daily activities (mean value 3.7 activities)	.51
Average number of simultaneous daily activities (mean value 2.67 activities)	.46
Combine activities and chores around the house	.55
Give television undivided attention	-.33
Brand purchase habits	.11

Notes: All correlations at absolute value of .23 and above statistically significant at the .01-level (2-tailed). The .11 is statistically significant at the .05-level (2-tailed). Scales for all items were seven position Likert-type agreement with '1' being 'strongly disagree' and '7' being 'strongly agree.'

ment for this data collection were the four items that make up the PAI scale.

A preliminary check for social responsibility response bias using the Strahan and Gerbasi Scale showed a correlation between this scale and PMTS of $-.04$ (no correlation). Hence no answer bias was present.

Nomological validity tests

Respondents were asked to report the greatest number and the average number of simultaneous activities they engaged in on a typical day. The overall mean values were 3.7 (greatest number) and 2.67 (average number). The correlations between these quantities and the PMTS were .51 and .46, respectively, showing nomological validity tied to reported behavior. A third check of nomological validity was to ask people to report on the combining of activities and chores around the house. The correlation with PMTS was .55, a positive nomological outcome. Fourth, people were asked about whether they gave their undivided attention to the television when watching, a media-use check. Here the correlation was $-.33$, as expected, since polychronic people have a tendency to switch channels more, watch more programs simultaneously, and divide attention between television viewing and other activities (Lindquist and Kaufman-Scarborough, 2000). All of the scales used in the nomological tests consisted of Likert-type, seven position agreement scales where 1 was 'strongly disagree' and 7 was 'strongly agree'.

Finally, respondents were asked about brands selection in general over the past 12 months. Did they always buy the same brand, split purchases between two brands, or three brands or more. The correlation coefficient was .11 in this

case showing 'small' association. We concluded that there was evidence of nomological validity among the findings related to reported behavior concerning number of simultaneous activities carried out on an average day, combining of chores and other activities, and television viewing, but the brand purchase pattern data gathered do not work as a test of such validity.

Concurrent model comparison

The study 5 data for the two constructs, the Polychronic–Monochronic Tendency Model and the Polychronic Attitude Index were input to the Proc Calis CFA program for analysis. The results are summarized in Table 6. The Polychronic–Monochronic Tendency Model is the better of the two models. This conclusion is primarily based on a comparison of the standardized factor loadings of the models and the resultant variance extracted for this respondent pool. Degrees of freedom of the two model scales and internal-consistency reliability (Coefficient Alpha) also support this conclusion. All the factor loadings were .80 and above and the average loading was .84 for the current model. In the case of the PAI only one factor loading exceeded .8 and the average across the four items was .69. The Polychronic–Monochronic Tendency Model yielded a value of 71.4 percent of variance extracted. The variance extracted by PAI was 49.3 percent, which is slightly less than the 50 percent recommended minimum (Fornell and Larcker, 1981). In general, the fit indices of both models were good. However, the Cronbach's Alpha for the PAI was .76 versus .93 for the Polychronic–Monochronic Tendency Model. There is some concern about the fit indices found for the PAI since the four-item scale had only two degrees of freedom (see chi-square statistics). Likely the fit numbers for PAI are too high. The standardized factor loadings and the resultant lower value of variance extracted also confirm this possibility.

An additional measure relating to the position along the monochronic–polychronic tendency continuum being seen as the *most efficient way to use one's time* was found as part of the Polychronic–Monochronic Tendency reflective model.

Correlations were also run between the scales. These are reported in Table 7 along with mean scale scores, standard deviations, and Alpha values. The correlation of .75 is at the 'large' level. This would be expected since two of the four PAI items (liking or disliking to juggle several activities at the same time and comfortable doing several things at the same time) in another form appear in the PMTS. Also, the two scales are designed to attempt to measure or position people along the polychronic–monochronic tendency continuum. We are seeing concurrent validity. However, the PMTS, based on its theoretical foundations and CFA results is the strongest.

Calculating the mean position on the monochronic–polychronic tendency continuum, with a lower score (from 1 to 7 for each item) being more mono-

TABLE 6
Study 5 – Midwest sample: comparison of the PMT and PAI models

Items	Polychronic- Monochronic Tendency Model	Polychronic Attitude Index (1991)
The numbers given match the listings of the statements in the appendix		
1	.91	.88
2	.85	.56
3	.80	.58
4	.80	.74
5	.86	
	<i>n</i> = 373	<i>n</i> = 372
Fit indices		
GFI adjusted for d.f.	.91	.98
RMR – root mean square residual	.06	.05
RMSEA	.11	.05
90% confidence interval of root mean square error of approx.	.07, .15	.00, .12
Bentler's CFI	.98	1.00
Bentler and Bonnett's NNFI	.98	.99
Chi-square, Pr, d.f.	27.4, .0001, 5	3.53, .17, 2
Variance extracted	71.4%	49.3%
Cronbach's alpha	.93	.76

Note: Factor loading estimates: Λ_x

TABLE 7
**Midwest sample: means, standard deviations, intercorrelations, and coefficients
alpha reliabilities for PMTS and PAI**

	No. of items	Mean	SD	PMTS	PAI
PMTS	5	23.6	7.77	(.93)	
PAI	4	17.3	5.38	.75	(.76)

Notes: All correlation values are statistically significant at the .001-level (2-tailed). Sample size = 373. The numbers in parentheses on the diagonal are the Cronbach's Alphas for each scale.

chronic and a higher score being more polychronic, we see: PMTS mean (23.6/5 = 4.72), which is very near 'slightly agree' – more polychronic and the PAI mean (4.33) – about a third of the way from neutral to 'slightly agree' – more 'neutral'. These results also point to their measuring a similar construct.

Discussion

This reinquiry and extension of the foundational PAI model of polychronic–monochronic tendency was carried out using a five-study approach. The validation process for the extended reflective model is comprehensive and rigorous. Further, the introduction of checks for social desirability response bias for each study gives us greater faith in the self-reported data analyzed. The samples in four out of five studies were made up of adult, non-students who were screened to include only non-minority US citizens. Further, half of the participants of studies 1, 2, 4, and 5 were male and half female and each of these gender pools was split 50–50 into age groups of 18–44 years and 45 years and older. Study 3 also consisted of qualified adults though the convenience sample was younger and more female dominated than the other four. General discriminant validity checks with role overload and Type A/B personality were carried out along with discriminant validity checks against marketplace behaviors (innovativeness, brand switching, variety seeking, and impulse buying). The results confirmed the difference of PMTS from any of them.

Comparisons were then made across the two models. We found the scales were related; yet the PMTS model proposed in this project was a significant improvement over the foundational PAI model and can replace the PAI as the standard for measuring general polychronic–monochronic tendency among non-minority adults in the USA. The research confirms that polychronic–monochronic tendency is multi-faceted. One must measure: (1) preference to behave more monochronically or more polychronically, (2) to what extent a person reports typically behaving as preferred (two items), (3) whether they are comfortable behaving this way, (4) whether they like to juggle two or more activities at a time, and (5) whether they see behaving in their preferred way as the most efficient way to use their time. In sum, a reflective model of polychronic–monochronic tendency is composed of five main indicators shown in Figure 1. Therefore a five-item scale (PTMS) is to be used to measure the construct (see Appendix 2). These indicators are: (1) polychronic–monochronic behavior preference, (2) reported polychronic–monochronic behavior, (3) comfort with polychronic–monochronic behavior, (4) liking to juggle simultaneous activities, and (5) polychronic–monochronic behavior as the most efficient way to use of time.

Limitations and opportunities within the present study

While our approach has added to the polychronicity–monochronicity literature, there is considerable work yet to be done in the future. As in many studies, our data have limitations that are addressable in future rounds of research. First, while our samples were adequate for model development and validation,

samples across groups on such bases as subcultures, gender, age, lifestyle, culture, and reference groups would be very interesting to study. There is also a need to compare actual behaviors to those reported. Certainly this might be operationally difficult to carry out, but would provide another sound nomological test.

Appropriate regression analysis involving the PMTS as the independent variable and various types of general and specific behaviors as dependent variables could be carried out to see what its predictive power is. Another question of interest is that when a person tries to act polychronically (or monochronically) or actually does, will the comfort and enjoyment items potentially reveal whether these are 'voluntary' or 'forced' behaviors. A tendency-position score closer to the side of the scale away from normal for that person could give an indication of this. On the other hand a person may engage in non-preferred behavior to achieve certain outcomes though she or he is neither comfortable with nor enjoying the process. Again the tendency position score would be away from normal. Differentiating between causes for similar 'deviant' scores is another research challenge.

Research implications

Work and home

A validated measure of polychronic–monochronic tendency can provide us with a useful tool in trying to thoroughly examine how individuals balance their time between work and home. In addition, it would be useful to determine whether an individual's own tendencies toward monochronicity or towards polychronicity actually 'match' the time cultures found in their workplace and/or in their homes. For instance, suppose that a highly polychronic individual is employed by a company that is rigidly tied to scheduled and sequences of activities. The individual might experience considerable job stress due to the mismatch. It would also be interesting to examine whether individuals develop a time culture in their homes that matches their own position along the polychronic–monochronic tendency continuum.

Consumer research

Based on the combination of responsibilities and activities within specific homes, future research can focus on the impact of polychronic and monochronic time styles on shopping for various types of products and services in the context of the use occasion. Also, how is choice of product or service affected by a person's position the monochronic–polychronic tendency continuum? Potential impact on product and service design and positioning also calls for exploration. Are there viable individual market segments whose main distinguishing factor is

level of monochronic or polychronic tendency? Are individuals different or similar across cultures in these tendencies? Findings in these areas should prove useful in addressing the marketing mix decisions of a firm or organization.

Internet use and technology linking work and home

There is no doubt that the Internet has become a widely-used part of people's lives, whether at home, at work, in the marketplace, while commuting, or elsewhere. How they use the Internet has been the subject of many studies (for instance, see the special issue of the *Journal of the Academy of Marketing Science* 2002). One consistent finding is that people are often engaged in other activities, whether on or off their computers, when they are using the Internet. The PMTS might be used, for instance, to determine which persons are more likely to shop on the Internet while they are at work. It would be interesting to learn how they juggle their work and individual activities, whether their search and evaluative processes are affected by switching back and forth to work activities, and whether they would make the same purchase in a work setting than they would while shopping interactively at home.

Salesperson selection and training

One intuitive assumption concerning salesperson's behavior is that a good salesperson is able to juggle many clients, incoming phone calls, and accounts all at the same time. Although it has not been formally studied in academic research, the relationship between polychronic tendency and successful personal selling can be examined using the PMTS scale. For instance, a firm with a sales force could administer the PMTS to all of its salespeople. Salespeople could also be classified by managers as to their performance on the job. A rating score could be assigned based on performance position. Next, the correlation between performance ratings and PMTS scores could be determined. If there is a strong positive correlation an examination of the actual PMTS scores could be used and cut-off points determined based on job performance level. In the future as job openings occurred the PMTS would be administered to candidates and their scores would be considered as part of the hiring decision. While many employment advertisements mention the ability to juggle activities, it is doubtful that personnel screening includes execution of a polychronic–monochronic tendency scale.

Cross-cultural studies

Finally, an individual-level, situation-independent scale of polychronic–monochronic tendencies would enable researchers to determine the extent to which members of a specific culture match the overall cultural timestyle that is predominant. As noted earlier, anthropological researchers have identified and classified numerous cultures, subcultures, and countries according to whether

their members are primarily polychronic or monochronic. The PMTS would allow researchers to further examine the variation in tendency and the resulting preferences, behaviors, feelings toward juggling, comfort with behaviors, and sense of efficiency when behaving polychronically or monochronically within a specific cultural group in order to build in-depth understanding of time from a cross-cultural perspective.

References

- Adam, B. (1995) *Timewatch: The Social Analysis of Time*. Cambridge: Polity Press.
- Becker, G. (1973) 'A Theory of Marriage: Part I', *Journal of Political Economy* 81(July–Aug): 813–46.
- Bergadaa, M. M. (1990) 'The Role of Time in the Action of the Consumer', *Journal of Consumer Research* 17(3): 289–302.
- Bluedorn, A. C. (1998) 'An Interview with Anthropologist Edward T. Hall', *Journal of Management Inquiry* 7(June): 109–15.
- Bluedorn, A. C. and Denhardt, R. B. (1988) 'Time and Organizations', *Journal of Management* 14(2): 299–320.
- Bluedorn, A. C., Kalliath, T. J., Strube, M. J. and Martin, G. D. (1999) 'Polychronicity and the Inventory of Polychronic Values (IPV): The Development of an Instrument to Measure a Fundamental Dimension of Organizational Culture', *Journal of Managerial Psychology* 14(3–4): 205–30.
- Bluedorn, A. C., Kaufman, C. J. and Lane, P. M. (1992) 'How Many Things Do You Like to Do at Once?: An Introduction to Monochronic and Polychronic Time', *The Academy of Management Executive* 14(2): 17–26.
- Bollen, K. A. (1989) *Structural Equations with Latent Variables*. New York: Wiley.
- Bond, M. J. and Feather, N. T. (1988) 'Some Correlates of Structure and Purpose in the Use of Time', *Journal of Personality and Social Psychology* 55(2): 321–9.
- Brocklehurst, M. (2001) 'Power, Identity, and New Technology Homework: Implications for New Forms of Organizing', *Organization Studies* 22(3): 445–66.
- Browne, M. W. and Cudek, R. (1993) 'Alternative Ways of Assessing Model Fit', in K.A. Bollen and J. S. Long (eds) *Testing Structural Equation Models*, pp. 136–61. Newbury Park, CA: Sage.
- Conte, J. M., Rizzuto, T. E. and Steiner, D. D. (1999) 'A Construct-Oriented Analysis of Individual-Level Polychronicity', *Journal of Managerial Psychology* 14(3–4): 269–87.
- Cotte, J. and Ratneshwar, S. (1999) 'Juggling and Hopping: What Does It Mean to Work Polychronically?', *Journal of Managerial Psychology* 14(3–4): 184–204.
- Cronbach, L. J. (1951) 'Coefficient Alpha and the Internal Structure of Tests', *Psychometrika* 16: 297–334.
- Daly, K. J. (1996) *Families & Time: Keeping Pace in a Hurried Culture*. Thousand Oaks, CA: Sage.
- Donthu, N. and Gilliland, D. (1996) 'The Infomercial Shopper', *Journal of Advertising Research* 36(2): 69–76.
- Feldman, L. P. and Hornik, J. (1981) 'The Use of Time: An Integrated Conceptual Model', *Journal of Consumer Research* 7(March): 407–17.

- Felstead, A. and Jewson, N. (2000) *In Work, at Home: Towards an Understanding of Homeworking*. London: Routledge.
- Fischer, D. G. and Fick, C. (1993) 'Measuring Social Desirability: Short Forms of the Marlowe-Crowne Social Desirability Scale', *Educational & Psychological Measurement* 53(2): 417-724.
- Fornell, C. and Larcker, D. F. (1981) 'Evaluating Structural Equation Models with Unobservable Variables and Measurement Error', *Journal of Marketing Research* 18(February): 39-50.
- Francis-Smythe, J. and Robertson, I. (1999) 'Time-related Individual Differences', *Time & Society* 8(2): 273-92.
- Friedland, R. and Boden, D. (eds) (1994) *NowHere: Space, Time, and Modernity*. Berkeley: University of California Press.
- Garhammer, M. (1995) 'Changes in Working Hours in Germany: The Resulting Impact on Everyday Life', *Time & Society* 4(2): 167-203.
- Geerken, M. and Gove, W. R. (1983) *At Home and At Work: The Family's Allocation of Labor*. Beverly Hills, CA: Sage.
- Gentry, J. W., Ko, G. and Stoltman, J. J. (1990) 'Measures of Personal Time Orientation', in J. C. Chebat and V. Venkatesan (eds) *Time and Consumer Behavior*. Montreal: UQAM.
- Hair, J. F., Jr, Anderson, R. E., Tatham, R. L. and Black, W. C. (1998) *Multivariate Data Analysis*, 5th edn. Upper Saddle River, NJ: Prentice Hall.
- Hall, E. T. (1959) *The Silent Language*. Garden City, NY: Doubleday.
- Hall, E. T. (1983) *The Dance of Life: The Other Dimension of Time*. Garden City, NY: Doubleday.
- Hall, E. T. and Hall, M. R. (1987) *Hidden Differences: Doing Business with the Japanese*. Garden City, NY: Anchor Press/Doubleday.
- Hefferan, C. (1982) 'New Methods for Studying Household Production', *Family Economics Review* 3: 30-3.
- Hill, M. S. (1985) 'Patterns of Time Use', in T. F. Juster and F. P. Stafford (eds) *Time, Goods and Well-Being*, pp. 133-76. Ann Arbor, MI: Institute for Social Research, University of Michigan.
- Hirschman, E. C. (1987) 'Theoretical Perspectives of Time Use: Implications for Consumer Behavior Research', *Journal of Individual Research* 2: 51-81.
- Holbrook, M. B. and Lehmann, D. R. (1981) 'Allocating Discretionary Time: Complementarity Among Activities', *Journal of Consumer Research* 7(March): 395-406.
- Horning, K.-H., Ahrens, D. and Gerhard, A. (1999) 'Do Technologies Have Time?: New Practices of Time and the Transformation of Communication Technologies', *Time & Society* 8: 293-308.
- Hu, L. and Bentler, P. M. (1999) 'Cutoff Criteria for Fit Indexes in Covariance Structure', *Structural Equation Modeling* 6(1): 1-55.
- Jacoby, J., Szybillo, G. J. and Berning, C. K. (1976) 'Time and Individual Behavior: An Interdisciplinary Overview', *Journal of Consumer Research* 2(March): 320-39.
- Jarvis, C. B., Mackenzie, S. B. and Podsakoff, P. M. (2003) 'A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Individual Research', *Journal of Consumer Research* 30(2): 199-218.
- Joreskog, K. G. and Sorbom, D. (1993) *LISREL 8: Structural Equation Modeling with the Simplis Command Language*. Chicago, IL: Scientific Software International.
- Juster, F. T. and Stafford, F. P. (1991) 'The Allocation of Time: Empirical Findings,

- Behavioral Models, and Problems of Measurement', *Journal of Economic Literature* 29(2): 471–522.
- Kaufman, C. F. and Lane, P. M. (1997) 'Understanding Individual Information Needs: The Impact of Polychronic Time Use', *Telematics and Informatics* 14(2): 173–84.
- Kaufman, C. F., Lane, P. M. and Lindquist, J. D. (1991a) 'Exploring More Than 24 Hours a Day: A Preliminary Investigation of Polychronic Time Use', *Journal of Consumer Research* 18(3): 392–401.
- Kaufman, C. F., Lane, P. M. and Lindquist, J. D. (1991b) 'Time Congruity in the Organization: A Proposed Quality-of-Life Framework', *Journal of Business and Psychology* 6(1): 79–106.
- Kaufman-Scarborough, C. and Lindquist, J. D. (1999a) 'Time Management and Polychronicity: Comparisons, Contrasts, and Insights for the Workplace', *Journal of Managerial Psychology* 14 (3–4): 288–312.
- Kaufman-Scarborough, C. and Lindquist, J. D. (1999b) 'The Polychronic Attitude Index: Refinement and Preliminary Individual Marketplace Behavior Applications', in Anil Menon and Arun Sharma (eds) *Marketing Theory and Applications*, Vol. 10, pp. 151–7.
- Lane, P. M., Kaufman, C. J. and Lindquist, J. D. (1989) 'More than 24 Hours a Day', in T. Childers (ed.) *Marketing Theory and Practice*, pp. 123–30. Chicago, IL: American Marketing Association.
- Lastovicka, J. L., Bettencourt, L. A., Hughner, R. S. and Kuntze, R. J. (1999) 'Lifestyle of the Tight and Frugal', *Journal of Consumer Research* 26(June): 85–98.
- Lee, F. J. and Taatgen, N. A. (2002) 'Multitasking as Skill Acquisition', unpublished paper, Rensselaer Polytechnic Institute.
- Lee, H. (1999) 'Time and Information Technology: Monochronicity, Polychronicity and Temporal Symmetry', *European Journal of Information Systems* 8: 16–26.
- Lehmann, D. R. (1999) 'Introduction: Individual Behavior and Y2K', *Journal of Marketing* 63(Special Issue): 14–18.
- Lindquist, J. D. and Kaufman-Scarborough, C. (2000) 'Polychrons and Monochrons: How Do They Watch and Use Television', Harlan E. Spotts and H. Lee Meadow (eds) *Developments in Marketing Science*, Vol. 23, pp. 204–8. Coral Gables, FL: Academy of Marketing Science.
- Macan, T. A. (1994) 'Time Management: Test of a Process Model', *Journal of Applied Psychology* 79(3): 381–91.
- Macan, T. A. (1996) 'Time-Management Training: Effects on Time Behaviors, Attitudes, and Job Performance', *The Journal of Psychology* 130(3): 229–36.
- Macan, T. A., Shahani, C., Dipboye, R. and Phillips, A. P. (1990) 'College Students Time Management: Correlations with Academic Performance and Stress', *Journal of Educational Psychology* 82(4): 760–8.
- MacKenzie, S. B. (2003) 'The Dangers of Poor Construct Conceptualization', *Journal of the Academy of Marketing Science* 31(3): 323–6.
- Manrai, L. A. and Manrai, A. K. (1995) 'Effects of Cultural-Context, Gender, and Acculturation on Perceptions of Work versus Social/Leisure Time Usage', *Journal of Business Research* 32: 115–28.
- Mosley-Matchett, J. D. (1996) 'The Effects of Internet-Based Interactive Marketing on Individual Impressions of Service Quality', in *Proceedings of the American Marketing Association Summer Educator Conference*, pp. 541–8.
- Nickols, S. Y. and Fox, K. D. (1983) 'Buying Time and Saving Time: Strategies for

- Managing Household Production', *Journal of Consumer Research* 10(September): 197–208.
- Palmer, D. K. and Schoorman, F. D. (1999) 'Unpackaging the Multiple Aspects of Time in Polychronicity', *Journal of Managerial Psychology* 14(3–4): 323–44.
- Perin, C. (1998) 'Work, Space, and Time on the Threshold of a New Century', in P. J. Jackson and J. M. van der Wielen (eds) *Teleworking: International Perspectives*, pp. 40–55. New York: Routledge.
- Peskin, J. (1982) 'Measuring Household Production for the GNP', *Family Economics Review* 3: 16–25.
- Pilotta, J. J., Schultz, D. E., Drenik, G. and Rist, P. (2004) 'Simultaneous Media Usage: A Critical Consumer Orientation to Media Planning', *Journal of Consumer Behaviour* 3(3): 285–92.
- Raju, P. S. (1980) 'Optimum Stimulation Level: Its Relationship to Personality, Demographics, and Exploratory Behavior', *Journal of Consumer Research* 7(December): 272–82.
- Reilly, M. D. (1982) 'Working Wives and Convenience Consumption', *Journal of Consumer Research* 8(March): 407–18.
- Robinson, J. P. (1977) *How Americans Use Time: A Social-Psychological Analysis of Everyday Behavior*. New York: Praeger.
- Robinson, J. P. (1985) 'The Validity and Reliability of Diaries versus Alternative Time Use Measures', in F. T. Juster and F. P. Stafford (eds) *Time, Goods, and Well-Being*, pp. 33–62. Survey Research Center, Institute for Social Research, University of Michigan.
- Robinson, J. P., Shaver, P. R. and Wrightsman, L. S. (1991) *Measures of Personality and Social Psychological Attitudes*, Vol. 1, pp. 37–41. New York: Academic Press.
- Rook, D. W. and Fisher, R. J. (1995) 'Normative Influences on Impulsive Buying Behavior', *Journal of Consumer Research* 22(December): 305–13.
- Schriber, J. B. and Gutek, B. A. (1987) 'Some Time Dimensions of Work: Measurement of an Underlying Aspect of Organization Culture', *Journal of Applied Psychology* 72(4): 642–50.
- Settle, R. B., Alreck, P. and Glasheen, J. W. (1972) 'Individual Time Orientation and Individual Life Style', in H. K. Hunt (ed.) *Advances in Consumer Research*, Vol. 1, pp. 315–19. Ann Arbor, MI: Association for Consumer Research.
- Shove, E. and Southerton, D. (2000) 'Defrosting the Freezer: From Novelty to Convenience', *Journal of Material Culture* 5(3): 301–19.
- Silverstone, R. (1993) 'Time, Information, and Communication Technologies and the Household', *Time & Society* 2(3): 283–311.
- Slocombe, T. E. and Bluedorn, A. C. (1997) 'Organizational Behavior Implications of the Congruence Between Preferred Polychronicity and Experienced Work-Unit Polychronicity', *Journal of Organizational Behavior* 20(1): 75–99.
- Southerton, D. (2003) "'Squeezing Time": Allocating Practices, Coordinating Networks, and Scheduling Society', *Time & Society* 12(1): 5–25.
- Spence, J. L., Helmreich, R. L. and Pred, R. S. (1987) 'Impatience versus Achievement Strivings in the Type A Pattern: Differential Effects on Students' Health and Academic Achievement', *Journal of Applied Psychology* 72: 522–28.
- Strober, M. H. and Weinberg, C. B. (1980) 'Strategies Used by Working and Nonworking Wives to Reduce Time Pressures', *Journal of Consumer Research* 6(March): 338–48.

- Tietze, S. and Musson, G. (2002) 'When "Work" Meets "Home": Temporal Flexibility as Lived Experience', *Time & Society* 11(2-3): 315-34.
- Walker, K. and Woods, M. E. (1976) *Time Use: A Measure of Household Production of Family Goods and Services*. Washington, DC: American Home Economics Association.

JAY D. LINDQUIST, PhD is Professor Emeritus of Marketing at Western Michigan University. ADDRESS: Department of Marketing in the Haworth College of Business, Western Michigan University, Kalamazoo, MI 49008-3812, USA.
[jay.lindquist@wmich.edu]

CAROL KAUFMAN-SCARBOROUGH is Professor of Marketing at the School of Business at Rutgers University. ADDRESS: School of Business at Rutgers University, Camden, New Jersey 08102, USA.
[email: ckaufman@camden.rutgers.edu]

APPENDIX 1
Measures of Polychronic-Monochronic Tendency:
The PAI Scale (Kaufman et al., 1991)

1. I do not like to juggle several activities at the same time. (r)
2. People should not try to do many things at once. (r)
3. When I sit down at my desk, I work on one project at a time. (r)^a
4. I am comfortable doing several things at the same time.

^aItem 3 was eliminated by Kaufman et al. (1999b) due to the situation-specificity of the 'desk' item. The PAI was developed to specifically measure individual level polychronicity. (r) indicates that the item is to be reversed in scale sum.

APPENDIX 2
Measures of Polychronic-Monochronic Tendency:
The Polychronic-Monochronic Tendency Scale (PMTS)

1. I prefer to do two or more activities at the same time.
2. I typically do two or more activities at the same time.
3. Doing two or more activities at the same time is the most efficient way to use my time.
4. I am comfortable doing more than one activity at the same time.
5. I like to juggle two or more activities at the same time.

