

Journal of Applied Psychology

Time Is Tight: How Higher Economic Value of Time Increases Feelings of Time Pressure

Sanford E. DeVoe, and Jeffrey Pfeffer

Online First Publication, January 17, 2011. doi: 10.1037/a0022148

CITATION

DeVoe, S. E., & Pfeffer, J. (2011, January 17). Time Is Tight: How Higher Economic Value of Time Increases Feelings of Time Pressure. *Journal of Applied Psychology*. Advance online publication. doi: 10.1037/a0022148

Time Is Tight: How Higher Economic Value of Time Increases Feelings of Time Pressure

Sanford E. DeVoe
University of Toronto

Jeffrey Pfeffer
Stanford University

The common heuristic association between scarcity and value implies that more valuable things appear scarcer (King, Hicks, & Abdelkhalik, 2009), an effect we show applies to time as well. In a series of studies, we found that both income and wealth, which affect the economic value of time, influence perceived time pressure. Study 1 found that changes in income were associated with changes in perceived time pressure. Studies 2–4 showed that experimentally manipulating time's perceived economic value caused greater feelings of time pressure and less patient behavior. Finally, Study 5 demonstrated that the relationship between income and time pressure was strengthened when participants were randomly assigned to think about the precise economic value of their time.

Keywords: income, time pressure, value, scarcity

The stresses of modern work life are apparently both ubiquitous and consequential. Menzies (2005) documented that many people feel as if there are not enough hours in the day and that people perceive that they are working longer and harder than ever before. These feelings of stress and overwork are important, as the idea that psychological stress is consequential for numerous outcomes is well established (e.g., Gupta & Beehr, 1979; Hendrix, Ovalle, & Troxler, 1985; Kristensen, 1996; Latack, 1986). Parker and DeCotiis (1983, pp. 160–161) noted, “job stress contributes to health-related problems among workers and to organizational problems such as employee dissatisfaction, alienation, low productivity, absenteeism, and turnover.”

One of the two components of job stress Parker and DeCotiis (1983) uncovered was feeling under time pressure at work, which was most strongly predicted by the number of hours worked per week. Their findings are consistent with organizational psychologists' focus on stress as coming from the quantitative amount of time employers demand from their workers (e.g., Perlow, 1999) and research examining the effect of the number of hours worked and also work schedules (e.g., shift work) on a variety of health

outcomes (e.g., Kleiner & Pavalko, 2010). Although some have argued that working time and time demands have increased in the past several decades (e.g., Schor, 1991), evidence on this point is at best equivocal. Robinson and Godbey (1997, p. 25) argued that national surveys documenting an increase in reports of time pressure are not necessarily grounded in either an actual lack of free time or more time spent working. Careful analysis of time diary studies over the past 5 decades shows that the number of hours worked has remained relatively constant (e.g., Aguiar & Hurst, 2007).

This ambiguity about whether or not there has been an actual change in working hours in the face of an increase in perceived time stress and overwork raises the possibility that something other than the number of hours worked or even conditions of work can contribute to feelings of being pressed for time. Thus, some research has focused on individual differences such as negative affectivity as a factor influencing how people respond to work stressors (e.g., Brief, Burke, George, Robinson, & Webster, 1988; Moyle, 1995).

While one source of time scarcity can come from the objective insufficiency of an individual's time to cope with multiple demands and expectations and another cause of time pressure could be individual differences that influence how people react to the conditions they face, yet another source of perceived time pressure can arise from people feeling they lack sufficient time to do all the things that they want to do (Restegary & Landy, 1993). Consistent with this argument, Robinson and Godbey (1997) maintained that the greater feelings of time pressure result from the exceedingly high aspirations of what to do with the time people have available and argued that the problem of time famine is, in most instances, a perceptual one. The literatures on heuristic decision making (e.g., Gilovich, Griffin, & Kahneman, 2002) and opportunity costs (Hamermesh & Lee, 2007) both suggest that the economic value or worth of someone's time can affect perceived time pressure because, as King, Hicks, and Abdelkhalik (2009, p. 1459) noted, “attaching high value to an object produces biased perceptions of its scarcity.” In the series of studies reported here, we examined

Sanford E. DeVoe, Rotman School of Management, University of Toronto, Toronto, Ontario, Canada; Jeffrey Pfeffer, Graduate School of Business, Stanford University.

This article uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economics and Social Research (Melbourne Institute). The findings and views reported in this article, however, are those of the authors and should not be attributed to either FaHCSIA or the Melbourne Institute.

Correspondence concerning this article should be addressed to Sanford E. DeVoe, Rotman School of Management, University of Toronto, Toronto, ON, Canada M5S 3E6. E-mail: Sanford.DeVoe@rotman.utoronto.ca

whether the economic value of one's time is, in fact, one causal factor affecting feelings of time pressure.

Background and Hypotheses

The association between value and scarcity has a long history. More than 100 years ago, Carver (1908, p. 628) noted that "value and scarcity are always found together and never separated." In psychology, the association between value and scarcity has typically been examined in one causal direction, namely, that the scarcity of something increases its value (e.g., Lynn, 1992). King et al. (2009, p. 1459) commented, "That the scarcity of objects enhances their value is a widely known principle in the behavioral sciences."

Dai, Wertenbroch, and Brendl (2008) were among the first to turn the causal connection around, arguing that people would heuristically use the customary association between value and scarcity to assume that if something were more valuable, it would also be presumed to be more scarce. They found that "people judge the frequency of class of objects on the basis of the subjective value of the objects" (Dai et al., 2008, p. 18). In other words, if objects were valuable, they were perceived to be scarce (low in frequency) and vice versa, an effect they termed the *value heuristic*. Pursuing this insight, King et al. (2009) showed that when the monetary and psychological value of life were increased, the concept of death (the scarcity of life) became more salient.

Not having enough time and not having enough money (poverty) both reflect scarcity—in one case, the scarcity of money or material goods and, in the other case, the scarcity of sufficient time (Goodin, Rice, Bittman, & Saunders, 2005). Hamermesh and Lee (2007) focused on the critical differences between these two sources of scarcity: Since time is a finite resource, the greater abundance of goods and experiences that are available for purchase with greater financial wealth will lead to a greater sense of time pressure because the opportunity cost of time increases both in terms of the cost of time not spent working as well as the expanding set of options available for people during their free time. Hamermesh and Lee argued that people with higher incomes had a greater opportunity cost or value of their time, and that, as a consequence, variations in income could explain variations in the experience of time pressure.

Hamermesh and Lee's (2007) logic is similar to but also somewhat distinct from the heuristic association between scarcity and value observed by King et al. (2009) and Dai et al. (2008). Hamermesh and Lee argued that higher income provides people a wider set of alternatives on which to spend time and that because time is more valuable, people feel a greater pressure to not waste time. Using survey data from four countries, they found that "holding hours of market and household work constant, additional earnings—and thus a higher value of time—also lead to greater time stress" (Hamermesh & Lee, 2007, p. 382). One alternative explanation for their results—that jobs that are more financially rewarding are associated with a greater number of hours worked (e.g., Brett & Stroh, 2003)—was ruled out in their study by the finding that respondents with higher incomes consistently reported experiencing greater time pressure even after controlling for the number of hours worked, both on the job and at home.

However, two important alternatives for the relationship between the economic value of time and time pressure still remain.

First, this relationship could be produced by stable individual differences in the propensity to experience time pressure. For instance, it may be that people who are prone to experience time pressure (e.g., Type A personality) simply seek out higher paying jobs. Second, this relationship could be produced by higher paying jobs demanding more that causes greater feelings of time pressure. Indeed, differences in job dimensions such as the closeness of supervision and the quality of training offered have been shown to affect feelings of time pressure (Parker & DeCotiis, 1983). Such an alternative account of the relationship between the economic value of time and time pressure would be consistent with a compensable factors approach used to determine pay level, where jobs with more responsibility and, as a consequence, more time pressure pay better. Support for this compensable factors alternative comes from the finding by Kahneman, Krueger, Schkade, Schwarz, and Stone (2006) that higher income jobs were associated with the experience of greater tension and stress during the workday.

Both an economic perspective with its focus on opportunity costs and the heuristic decision-making approach with its emphasis on the association between scarcity and value predict a positive association between individuals' economic value of time and their feelings of time pressure. This positive association should emerge above and beyond individual differences and job factors and be amenable to experimental manipulations of the economic value of time. Thus, we hypothesized the following.

Hypothesis 1: The economic value of time will be positively associated with the experience of greater time pressure.

The value of time may also manifest itself in behavior. For instance, the classic study by Darley and Batson (1973) demonstrated that inducing feelings of time pressure made people less patient in responding to requests for assistance. A clear implication of the heuristic decision logic that a higher economic value of time increases the perception that time is scarce is that a higher economic value of time will be associated with exhibiting less patient behavior. Thus, we also hypothesized the following.

Hypothesis 2: The value of time will be positively associated with impatient behavior.

Although the economic value of time should generally relate to feelings of time pressure and impatient behavior, there are circumstances that should moderate this relationship and make it either stronger or weaker. That is because the opportunity costs of time and its economic value are not necessarily always salient until one is prompted to think about them (Frederick, Novemsky, Wang, Dhar, & Nowlis; Northcraft & Neale, 1986). For instance, DeVoe and Pfeffer (2009) showed that the relationship between money and happiness is stronger when the value of one's time has been made salient by having people explicitly calculate their approximate hourly wage rate. In a similar fashion, the value heuristic that maintains a positive association between economic value and perceived time pressure would be expected to operate more strongly when the economic value of one's time has greater salience. Therefore, we hypothesized the following.

Hypothesis 3: The positive association between the economic value of time and time pressure will be strengthened when the precise monetary value of time is made more salient.

In this article, we report several empirical tests of the causal link between the value of time and feelings of time scarcity. We began by examining natural variations in the economic value of time and time pressure using nationally representative panel data where stable individual differences and job factors may be controlled. Then, we conducted a series of experiments where we directly manipulated the perceived economic value of time and its salience. This multimethod approach provided consistent evidence of a causal relationship between the economic value of time and its perceived scarcity.

Study 1

Research by Hamermesh and Lee (2007) provided cross-sectional evidence that income was associated with time pressure in four different countries (i.e., Australia, Germany, Korea, and the United States). In our first study, which sought to provide more robust causal evidence for the effect of the value of time on the experience of time pressure, we used the only data set of the four that measured time pressure longitudinally. We analyzed seven waves of a data set nationally representative of Australia, which allowed us to observe natural within-person variation in income as the measure of the economic value of time and relate that variation to concurrent self-reports of time pressure over multiple periods.

These data permitted us to accomplish several things. First, we could use a longitudinal study design to control for the variance in time pressure unique to the individual by estimating a nested model. This allowed us to control for an individual-difference account of the relationship between the value of time and time pressure. Second, another alternative explanation for the association between income and time pressure is that jobs that pay more may demand more and that this causes greater feelings of time pressure. This possibility has not previously been empirically examined. Differences in job dimensions such as the closeness of supervision and the quality of training offered have been shown to affect feelings of time pressure (Parker & DeCotiis, 1983). This alternative account of the relationship between the economic value of time and perceived time pressure would be consistent with a compensable factors approach used to determine pay level, where jobs with more responsibility and, as a consequence, more time pressure pay better. We controlled for such job differences at least to some extent by including a dummy variable for whether the respondent had supervisory responsibilities. We also controlled for the number of hours worked on all jobs, number of hours spent doing housework, age, marital status, and number of children to take into account other factors that might affect time pressure.

Data and Measures

We analyzed data collected in multiple waves of the Household, Income and Labour Dynamics in Australia (HILDA) survey. HILDA is an annual household survey started in 2001, and it interviews each person in the household age 15 years and over (adult members). HILDA is nationally representative of households in Australia, and the same individuals are reinterviewed in

successive waves where all adult members who split off into new households are also reinterviewed. Extensive documentation of the survey may be obtained through the HILDA homepage (<http://www.melbourneinstitute.com/hilda>).

All of the measures employed in this study were repeated across each of the waves we analyzed. Individuals lacking full responses to the variables analyzed in this article were excluded listwise from the data set. For maximum comparability, we further limited the sample to responses from individuals who indicated their current employment status as employees—we excluded from the analysis people who were not working or were self-employed. As a requirement for modeling the nested nature of the data, we excluded respondents who had less than three waves of observations during the period of time examined. The resulting sample consisted of 35,589 observations nested within 6,846 respondents.

Dependent variable. The measure of time pressure was the identical one utilized by Hamermesh and Lee (2007). Respondents rated on a 1 (*Never*) to 5 (*Almost always*) scale “How often do you feel rushed or pressed for time?”

Independent variables.

Income. As a measure of the economic value of time, we used income, with the variable imputed by HILDA for household current weekly gross wages and salary from all jobs in Australian dollars.

Control variables. We included a measure of hours worked per week at all jobs, supervision (coded 0 = not, 1 = job has supervisory responsibilities), age, education (coded 0 = not, 1 = if highest education level achieved was a bachelor’s degree or higher), marital status (coded 0 = not, 1 = if currently married), hours of housework (per week), and number of children (14 years old or younger). Although stable individual-difference variables were constant across individuals in this longitudinal design, we nevertheless explicitly modeled the influence of gender (coded 0 = female, 1 = male).

Results and Discussion

Descriptive statistics and intercorrelations among the study variables are provided in Table 1. In interpreting the matrix, it is important to keep in mind that time is excluded from the matrix because it is constant across individuals and that the statistics for Level 1 variables are for those variables averaged over time. There is little value in interpreting Level 1 relations among the variables (e.g., Judge & Hurst, 2008). To facilitate an unbiased examination of the relationship between income and time pressure, we employed a multilevel modeling approach using hierarchical linear modeling software (Raudenbush, Bryk, Cheong, & Congdon, 2004), with separate within-subject and between-subjects levels.

This flexible multilevel modeling approach has a number of advantages. First, it is appropriate for the nested nature of the data, in that individual observations over time were nested within persons. Second, it does not require that all individuals be measured at all occasions. Finally, using the nested nature of this longitudinal data permitted us to test whether the within-subject change in income was correlated with the concurrent changes in time pressure. The clear strength of this analysis is that it is able to estimate this within-subject relationship net of stable individual

Table 1
Descriptive Statistics and Intercorrelations of Variables in Study 1 (HILDA)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Time pressure	3.46	.87	—									
2. Income	1,546.37	969.56	.06*	—								
3. Hours worked all jobs	36.69	13.97	.12*	.16*	—							
4. Supervise (1 = supervise)	.49	.50	.07*	.14*	.28*	—						
5. Age	38.63	12.07	-.23*	.00	.15*	.05*	—					
6. Education (1 = bachelor's degree or more)	.30	.46	.13*	.20*	.08*	.11*	-.05*	—				
7. Marital status (1 = married)	.66	.47	.08*	.10*	.16*	.09*	.23*	.08*	—			
8. Hours of housework	9.94	9.21	.05*	-.09*	-.26*	-.09*	.18*	-.08*	.14*	—		
9. Number of children	.69	1.00	.20*	-.05*	-.03*	.02*	-.52*	.01	.20*	.12*	—	
10. Gender (1 = male)	.47	.50	-.08*	.02*	.36*	.12*	-.02*	-.01	.03*	-.38*	.00	—

Note. Because time is constant (invariant) between individuals, it is excluded from the table. Level 1 variables were averaged over all time periods; thus, the correlations reported above for income and time pressure do not accurately estimate true Level 1 relationships among Level 1 variables. Gender is the only Level 2 variable, based on 32,645 observations nested within 6,331 respondents across waves in HILDA. HILDA = Household, Income and Labour Dynamics in Australia survey.

* $p < .05$.

differences as well as other time-varying covariates entered into the model.

In our analysis, yearly measures of the variables were nested within individuals, and we group-mean-centered the predictors at Level 1 of our hierarchical linear model. Thus, we specified the following Level 1 equation,

$$\begin{aligned}
 Y_{ij} = & \pi_{0j} + \pi_{1j} * (\text{income}) + \pi_{2j} * (\text{hours worked at all jobs}) \\
 & + \pi_{3j} * (\text{supervision}) + \pi_{4j} * (\text{age}) \\
 & + \pi_{5j} * (\text{education}) + \pi_{6j} * (\text{marital status}) \\
 & + \pi_{7j} * (\text{hours of housework}) \\
 & + \pi_{8j} * (\text{number of children}) + e_{ij}, \quad (1)
 \end{aligned}$$

where Y = time pressure, i = an assessment, j = an individual, and e = Level 1 error (i.e., unique effect associated with assessment i). The vectors of coefficients in the Level 1 equation then served as criterion measures in the Level 2 regression equation,

$$\pi_{kj} = \beta_{k0} + r_{kj}, \quad (2)$$

where k is the Level 1 coefficient, β_{k0} is the constant representing the value of β_{kj} , and r is Level 2 error (i.e., unique effect associated with individual j). We allowed the intercept, β_{0j} , to vary randomly around its overall mean and fixed the other coefficients β_{kj} , $k = 1, \dots, 8$, to be constant.

The gamma coefficients, standard errors, and t ratios associated with each predictor are presented in Table 2.

Although our model accounts for the specific variance attributable to the individual, we explicitly evaluated how gender might affect the experience of time pressure as a grand-mean-centered predictor at Level 2. Results showed that the dummy variable for gender predicting the initial level of time pressure was statistically significant, coefficient = $-.243512$, $SE = .017373$, $t(32,635) = 14.02$, $p < .001$, indicating that men on average experienced less time pressure than women. Each of the variables entered into Level 1 of the model was a statistically significant predictor of time pressure. In terms of job variables, the number of hours worked at all jobs was positively associated with the experience of time

pressure, coefficient = $.007257$, $SE = .000462$, $t(32,635) = 15.71$, $p < .001$, as one would expect. Supervision of other employees at one's job was also positively related to felt time pressure, coefficient = $.035769$, $SE = .009890$, $t(32,635) = 3.62$, $p = .001$, a result that also makes sense. In terms of demographic characteristics, age was negatively associated with time pressure, coefficient = $-.004690$, $SE = .001854$, $t(32,635) = -2.53$, $p = .01$, and obtaining a bachelor's degree or higher was also negatively associated with the experience of time pressure, coefficient = $-.146852$, $SE = .034654$, $t(32,635) = -4.24$, $p < .001$. Although we had no specific prior assumptions about these controls, it is possible that both age (which is highly related to work experience as well as children maturing) and a college degree provide someone with additional resources to deal with work and family demands. Being married was positively associated with greater time pressure, coefficient = $.045660$, $SE = .016804$, $t(32,635) = 2.72$, $p < .01$, as were the hours of housework done per week, coefficient = $.002312$, $SE = .000601$, $t(32,635) = 3.85$, $p < .001$, and also the number of children, coefficient = $.062293$, $SE = .008163$, $t(32,635) = 7.63$, $p < .001$. These latter three results show that time pressure reflects not just hours worked and job responsibilities but also, as one would expect, family and home demands on someone's time.

Even after statistically controlling for individual differences and these covariates, changes in income were a significant positive predictor of feelings of time pressure, coefficient = $.000015$, $SE = .000007$, $t(32,635) = 2.11$, $p < .05$.¹ Although there is considerable disagreement regarding estimates of effect size obtained through multilevel modeling (see Roberts & Monaco, 2006; Snijders & Bosker, 1999), it is important to note that the effect sizes

¹ The test for whether slope of income predicting time pressure varied by gender (i.e., $\beta_{11} \times \text{Income} \times \text{Gender}$) was not significant, coefficient = $.000000$, $SE = .000013$, $t(32,635) = 0.02$, *ns*. This result shows that the positive slope of income on time pressure did not vary by respondents' gender. Although the within/between nature of the model controls for stable person-level characteristics, there may, of course, be other important personality or demographic variables that do moderate the relationship between income and time pressure.

Table 2
Nested Model Predicting Experience of Time Pressure in Study 1 (HILDA)

Predictor	Coefficient	SE	<i>t</i> ratio
Level 1 model			
Initial level, π_0			
β_{00}	3.454001	.008800	392.52*
Income, π_1			
β_{10}	.000015	.000007	2.24*
Hours worked at all jobs, π_2			
β_{20}	.007257	.000462	15.71*
Supervise (1 = supervise), π_3			
β_{30}	.035769	.009890	3.62*
Age, π_4			
β_{40}	-.004690	.001854	-2.53*
Education (1 = bachelor's degree or higher), π_5			
β_{50}	-.146852	.034654	-4.24*
Married, π_6			
β_{60}	.045660	.016804	2.72*
Hours of housework, π_7			
β_{70}	.002312	.000601	3.85*
Number of children, π_8			
β_{80}	.062293	.008163	7.63*
Level 2 model			
Gender (1 = female)			
β_{01}	-.243512	.017373	-14.02*

Note. Values indicate gamma coefficients and standard errors in hierarchical linear model where Level 1 predictors were group-mean-centered and Level 2 predictors were grand-mean-centered on the basis of 32,645 observations nested within 6,331 respondents across waves of HILDA. Positive coefficients indicate greater subjective time pressure. HILDA = Household, Income and Labour Dynamics in Australia survey.

* $p < .05$.

of all the variables in the present model predicting time pressure are small. This is consistent with the fact that sociostructural characteristics typically explain very small amounts of variance in comparison to purely psychological variables such as personality and self-regulation (e.g., Staudinger, Fleeson, & Baltes, 1999). Most relevant to the present investigation is that the direction of the finding for income on time pressure is highly consistent with prior work and our theoretical prediction about the economic value of time.

Having established that higher economic value of time is associated with greater time pressure apart from stable individual differences and some important job characteristics, we next sought to provide more direct causal evidence for this relationship, using study designs where we were able to hold constant all individual and job characteristics through random assignment to experimental conditions that varied the perceived economic value of time.

Study 2

In this study, we had participants engage in a work activity where we could randomly assign the amount of money for which they billed their time during the task. The laboratory setting allowed us to control for the amount of time worked and the content of the work, as well as to create a context where there was no direct financial remuneration for the work or any sort of contingent compensation based on how long or effectively partic-

ipants worked. We wanted a setting where the only thing that varied was the amount of money per minute that the participants used to bill their time. Since the task and the activity of billing time were consistent across conditions and made the presumed value of participants' time salient, we expected that participants who billed their time at a higher monetary value than others would perceive that their time had higher value and, as a consequence, would report experiencing higher levels of time pressure immediately subsequent to the task.

Method

Participants. Sixty-seven undergraduate students (62.7% female) from the University of Toronto, Toronto, Ontario, Canada, were recruited to participate in a 1-hr experiment in exchange for \$10.

Task and procedure. Participants engaged in an expanded version of a consulting task developed by Lee and Tiedens (2001) and modified by DeVoe and Pfeffer (2010), where they made mock personnel decisions for a fictitious company and then communicated these decisions by drafting memos typed on a computer. The content of the task was split between the two distinct subtasks of *personnel decisions* (i.e., who to hire and transfer) and *memo writing* so that there were different activities to account for on the billing sheet. These personnel decisions were made across three different regional offices of the same fictitious company (Chicago, IL; New York City, NY; and Los Angeles, CA). All participants were run at separate computer workstations in a large computer lab. To aid participants in the task, several software applications were opened for all participants: a Word document with stationery headers for typing the task memos, the calculator application in Microsoft Office accessories, and a digital clock (<http://www.onlineclock.org>). Participants were told to spend 30 min on this task and that the remaining part of the study would be filling out several unrelated questionnaires. All subjects received identical payments for participating in the study, and they were given no feedback that indicated they had done better or worse on the task.

Manipulation. Participants were randomly assigned to either a billing at \$1.50 per minute condition or a billing at \$0.15 per minute condition. In both conditions, participants engaged in the identical activity of cataloguing "specifically what you have done and how much each office's budget should be charged for that time every six minutes." All participants filled out a log with four columns: time interval that segmented time into 6-min increments, description of work being billed (personnel decisions or memo writing), time spent for each office (Chicago, New York, or Los Angeles office), and amount charged to each office. On the top of the billing sheet, participants were told to charge either \$1.50 or \$0.15 for each minute. At the completion of the task, all participants filled out a billing summary sheet where they tallied the total time billed to each office, total money charged to each office, and the total time billed/money charged for the session. Participants could not easily see the specifics of what their counterparts were billing (only that they were also working on the consulting task), and all participants received identical verbal directions and treatment from the experimenter, who was masked to condition assignment.

Dependent variable. In examining the relationship between the value of time and time pressure, we needed a measure of time

pressure that could be used in an experimental setting. The single-item measure analyzed by Hamermesh and Lee (2007) asked respondents about prior experiences with time pressure. Similarly, scales that measure time urgency typically use prior behavior to measure the construct (e.g., Landy, Rastegary, Thayer, & Colvin, 1991; Wright, McCurdy, & Rogoll, 1992). Obviously past behaviors cannot be experimentally manipulated, and moreover, we were trying to affect current experiences of time pressure, not the recall of past events.

To measure current experienced time pressure, we generated seven Likert-type statements, using the single item analyzed by Hamermesh and Lee (2007) as a starting point, with the critical difference being that we did not focus on prior frequency of behavior and instead emphasized current feelings of time pressure. To examine whether responses to these items comprised a single factor and to make a preliminary assessment of what affected feelings of time pressure, we conducted a brief survey of an employed adult population recruited from a nationwide database maintained by a leading business school. The pool consisted of participants from all over the country, recruited online via Craigslist and similar sites. The pool contained approximately 7,000 registered participants and represented a large variety of people with different demographic characteristics. Sessions were opened for individuals interested in participating in a survey about their life and work experiences. A total of 205 participants completed the online questionnaire and were entered into a lottery for a \$100 gift certificate to an online retailer. The sample was 35.8% male with an average age of 36.54 years ($SD = 12.13$); 63.9% had a college diploma or higher, and 51.2% indicated they were currently married.

To assess convergent validity, we included the single-item question of time pressure analyzed by Hamermesh and Lee (2007) as well as Spence, Helmreich, and Pred's (1987) five-item subscale for time urgency (Impatience–Irritability) of the Type A personality pattern construct that is a conceptually related construct. To observe whether the content of work was associated with feelings of time pressure, we also included a subscale of House, McMichael, Wells, Kaplan, and Laderman's (1979) Occupational Stress Scale that measures job responsibility.

The measure we developed to assess current experienced time pressure comprised seven items ("I feel pressed for time today," "I feel under time pressure today," "I feel rushed today," "Compared to yesterday, I feel more stressed about my time," "I feel pressed for time," "I feel stressed out," and "I feel like I don't have enough time") all rated on a 1 (*Strongly Disagree*) to 7 (*Strongly Agree*) scale. These seven statements were generated to be face-valid measures of time pressure. To assess how many and what latent factors underlie these data, we conducted an exploratory factor analysis using principal components analysis, which is helpful for understanding how data from multiple items can be combined into useful composites. All items were entered into a principal components analysis with a varimax rotation. Using Cattell's scree plot rule (i.e., large drops in eigenvalues) and Kaiser's rule (i.e., extracting all components with eigenvalues greater than or equal to one), a one-factor structure was deemed the most useful for these data, with the first component having an initial eigenvalue of 5.42 that explained 77.48% of the variance. The next component had an eigenvalue of 0.56, which was well below the conventional cutoff for a unique factor and only explained an additional 7.97% of the

variance. Moreover, the component loadings of each item were all greater than .70, and the internal reliability of these seven items for the sample was quite high (Cronbach's $\alpha = .95$). Most importantly, this composite scale of time pressure was highly correlated with the single-item measure of time pressure used by Hamermesh and Lee (2007; $r = .54, p < .001$), giving us some confidence that the multi-item scale we developed to measure current feelings of time pressure exhibited convergent validity with the original measure based on the frequency of the prior experience of time pressure. With preliminary evidence that this scale of time pressure was a single factor and was related to the item used by Hamermesh and Lee, we next sought to explore its relationship to other constructs.

The composite measure of time pressure was significantly correlated with the Type A (time urgency) personality pattern (Cronbach's $\alpha = .76, r = .20, p = .004$), but the correlation was not large. This result is consistent with our tapping into a psychological perception of time pressure that is at once significantly related to this individual difference but also not redundant with it, which would be expected as there would clearly be varying situational factors affecting experienced time pressure. Also, time pressure was strongly positively correlated with responsibility pressure (Cronbach's $\alpha = .62, r = .49, p < .001$). This correlation suggests that some of the elements of work do contribute to feelings of time pressure and replicates the relationship we observed in the nationally representative Australian survey used in Study 1. In Study 2, we administered the multi-item measure of time pressure we developed, and it again exhibited high reliability (Cronbach's $\alpha = .92$).

Results and Discussion

Participants who billed their time at \$1.50 per minute felt greater time pressure ($M = 5.24, SE = .24$) than those who billed at a rate of \$0.15 per minute ($M = 4.42, SE = .25$), $t(65) = 2.36, p = .02, \eta_p^2 = .079$.² Whereas the effect of the economic value of time on time pressure was small in the panel data, it is important to note that the more direct and highly salient manipulation of the economic value of time in this study resulted in a somewhat larger, medium effect size.

The study showed that people who billed their time at a higher rate experienced more time pressure than those who billed their time at a lower rate, even though both sets of subjects did the identical task for the identical amount of time and worked in circumstances that, in reality, made how much they charged for their time personally irrelevant. Merely having them bill at a higher or lower rate apparently affected the perceived value of their time in ways that made those whose time was more valuable experience greater time pressure. This experiment provides a direct and compelling demonstration of the effect of the value of time on time pressure.

In Study 2, we made the value of time higher or lower by having participants bill their time at different rates. However, the students

² When gender was entered as a covariate in a one-way analysis of covariance, the main effect of condition remained significant, $F(1, 64) = 5.70, p = .02, \eta_p^2 = .082$. Additionally, there was no significant Gender \times Condition interaction ($F < 1$).

participating did not really have their income affected. Given that the perceived value of time was sufficient to produce differences in subjective feelings of time pressure, this raised the question of whether such an explicit notion of time's economic value was necessary or merely sufficient to influence time pressure. Since the experience of time pressure is itself psychologically subjective, it seemed logical that merely manipulating the feelings of being relatively richer or poorer could produce an effect in the same causal direction as actual income and the explicit manipulation of the economic value of time as being higher or lower. Therefore, in the next study, we sought to examine whether or not having people feel financially richer or poorer produced results similar to those in the billing study, another test of how the value of time produced, in this instance, by different feelings of wealth affects the perception of time pressure.

Study 3

Thus far, we have seen that people feel more time pressure when they charge their time at a higher rate and when they earn more money. In our next two studies, we wanted to see the effects of experimentally manipulating the relative level of income on time pressure. The basic argument is that greater wealth, with its associated higher economic value of time, leads to more time pressure because of the heuristic association between value and scarcity. Also, at higher income levels, wasting time or in any way spending time unproductively has a higher implicit cost because time is more valuable.

To explore whether merely feeling high or low in relative wealth can influence feelings of time pressure, we used a manipulation employed in prior research by Nelson and Morrison (2005; for a similar manipulation of relative wealth, see Haisley, Mostafa, & Lowenstein, 2008) that affects people's perceptions of their financial resources as being higher or lower. This is accomplished by shifting the response scale individuals use to indicate their wealth. Random assignment of participants to experimental condition ensures that actual wealth does not differ for people facing different experimental conditions, but the induced psychological sense that an individual's economic value of time as higher or lower does vary. Such a minimal manipulation allowed us to more precisely observe the necessary and sufficient induction of the independent variable on the dependent variable (Prentice & Miller, 1992). Consequently, in this third study, we were able to directly explore the effects of feeling relatively richer or poorer—which prior research has shown simulates the effects of actual income differences (Haisley et al., 2008)—on feelings of time pressure.

Method

Participants. One hundred and twenty-eight undergraduate students at the University of Toronto participated in the study in exchange for \$5.

Manipulation. Participants were randomly assigned to a *feel financially poor* or a *feel financially rich* condition. This was done by having people answer the question "Please check the box below that best represents the total amount of money you personally have in a checking or savings account" and then varying the values of an 11-point response scale that they used in responding. In the feel financially rich condition, the 11-point scale was divided into \$50

increments, from 1 (\$0–\$50) to 11 (*over \$500*). Given the question asked, most undergraduate students are going to indicate that their wealth places them at the highest values of the scale, and therefore, feel that they are wealthier (Nelson & Morrison, 2005). In the feel financially poor condition, participants also had an 11-point scale to use, but in this instance, the scale was in much larger increments, from 1 (\$0–\$500) to 11 (*over \$400,000*). Thus, most undergraduate student respondents are going to indicate that their wealth places them at the lowest values on the scale and therefore feel that they are less wealthy.

Prior research by Nelson and Morrison (2005) is consistent with our intuitions about using the scale and found that most undergraduate students answering the first scale respond with the highest possible scale value, whereas participants confronting the second scale typically use the bottom responses. Furthermore, Nelson and Morrison also showed that these responses affect how people feel and perceive their financial satisfaction. So, when participants respond toward the top of the scale, they feel that they are much financially better off, and conversely, when they respond using the bottom of the scale, they tend to think of themselves as being less financially well off. This response-scale frame of reference effect has been shown to influence many other outcomes, such as how people think about their subjective well-being (Schwarz, 1999). These experimental manipulations that rely on affecting people's perceptions of their relative wealth only work when participants are not aware of their purpose (e.g., Schwarz & Clore, 1983).

Dependent variable. Participants rated their agreement with the same measure of time pressure used in the previous study, which again exhibited high reliability (Cronbach's $\alpha = .89$).

Results and Discussion

As a manipulation check, we examined whether, as expected, participants in the feel financially rich condition used the top values of the response scale while those in the feel financially poor condition used the bottom values of the response scale. As previous studies have found and as we had expected, participants in the feel financially rich condition rated their wealth much higher on the 1–11 scale ($M = 9.05$, $SE = .31$) than those in the feel financially poor condition ($M = 2.07$, $SE = .33$), $t(125) = -15.41$, $p < .001$, $\eta_p^2 = .655$.

The results for the time pressure measure revealed that those participants who were made to feel relatively well off reported feeling greater time pressure ($M = 4.84$, $SE = .16$) than those made to feel less financially well off ($M = 4.38$, $SE = .17$), $t(126) = 1.98$, $p = .05$, $\eta_p^2 = .030$. Given the subtlety of the manipulation, it is not surprising that the effect size was smaller than in the previous study.

These results provide an experimental test of the effect of perceptions of wealth on time pressure. People who were made to feel financially better off reported more time pressure than those who felt financially poorer. Note that this manipulation was the only difference between the two conditions. This provides additional support for Hypothesis 1 and is a conceptual replication of the causal effect of the value of time observed in Study 2, which used billing time at different rates. In this instance, we showed that the effect of the perceived value of time on time pressure could also be obtained by altering how rich or poor people felt. The fact that a variety of different treatments, each conceptually related to

the value of time but empirically distinct, produce similar results provides increased confidence in the robustness of the findings and the conceptual framework on which they are based.

One important limitation of all the studies so far is that they examined only an attitudinal measure of time pressure. In the next study, we used the identical manipulation of feeling richer or poorer to examine a behavioral manifestation of time pressure as an outcome variable.

Study 4

The previous experiments examined the effects of the value of time and feeling richer or poorer on time pressure, conceptualized as an attitude. In Study 4, we wanted to examine if there was an effect of wealth—feeling financially rich or poor—on a behavior that is logically related to feeling pressed for time. In this experiment, we tested whether feeling relatively richer induces impatience as manifested in reading speed. General action speed has been one of the core components of impatience and time urgency measures. The speed and impatience scale used to measure Type A behavior (Jenkins, Zyzanski, & Rosenman, 1979), for example, asks people to report how quickly they eat, walk, and process things in general. In this experiment, we gave participants a short paragraph to read after exposure to the manipulation and measured the time it took them to finish reading.

Measuring time pressure with explicit questions about feeling pressed for time, as we did in the previous studies, was very likely to make participants more aware and self-conscious of their behavior and potentially alter it from what the behavior might otherwise be. Alternatively, collecting the explicit measure of time pressure immediately after the relevant behavior is elicited is also problematic since the behavioral measure we selected (i.e., length of time participants spend reading a short paragraph) produces objective differences in the actual amount of time participants spend in the experiment. Given the importance of obtaining an uncontaminated measure of impatient behavior, we sought to obtain a clear behavioral indicator of impatience immediately subsequent to the manipulation.

Method

Participants. Seventy-five undergraduate students from the University of Toronto volunteered for an online study in exchange for entry into a drawing for \$25.

Materials and procedure. A pretest–posttest design developed to capture behavioral manifestations of impatience was adapted from Zhong and DeVoe (2010). Each page of a Web survey was clearly labeled with a page number indicating precisely how many more parts of the survey were still to be completed before the study was finished (i.e., “Page 1/4”, etc.). This page numbering made it clear to participants when they had reached the final page of the study (“Page 4/4”). Participants first consented to participate in the study, then on the next page were presented with some pretest materials for future studies where they read a short paragraph that was unrelated to personal finances and typed it into a textbox. The time it took for them to finish this task was recorded by the Web program ($M = 34.64$ s, $SD = 18.73$) and later used as a covariate to control for individual differences in typing and reading speed.

Participants then advanced to the next page where they responded to the same feel rich/poor manipulation questions used in the previous study. After answering the question about the amount of money they had in their checking/savings account using the 11-point scale, participants went to the final page of the study (“This is the FINAL part of the study today”) and saw a computer screen containing a 29-word instruction and a 320-word description of the city of Toronto, Ontario, Canada. Participants were asked to read the description and move on to the next screen as soon as they finished that task. The time taken for participants to finish reading the instructions and the description was recorded and used as the dependent variable. No other additional questions were asked, so this was, in fact, the last part of the study. Our intuition was that when participants knew they were done when they moved to the next screen, those who were more impatient because they felt their time was more valuable—because they had experienced the feel financially rich induction—would spend less time reading the paragraph, providing a behavioral indicator of impatience.

Results and Discussion

As in Study 3, the manipulation was successful in that participants in the feel financially rich condition used higher values of the 1–11 scale ($M = 8.50$, $SE = .49$) than those in the feel financially poor condition ($M = 2.37$, $SE = .52$), $t(73) = 72.89$, $p < .001$, $\eta_p^2 = .500$. Participants spent an average of 72.27 s reading the paragraph about the city of Toronto ($SD = 31.02$).

To test whether the exposure to the feel rich/poor manipulation affected the amount of time spent on the final experimental task, we conducted a one-way analysis of covariance on time spent reading by experimental condition, controlling for individual differences in reading/typing speed assessed prior to the experimental manipulation. As expected, our measure of individual differences in speed positively predicted time spent reading the city of Toronto paragraph in the final part of the study, $\beta = .39$, $t(72) = 3.56$, $p = .001$, $\eta_p^2 = .150$. Also as predicted, after controlling for individual differences in reading speed, participants in the feel financially rich condition spent significantly less time reading the paragraph ($M_{\text{adj}} = 64.68$, $SE = 4.92$) than those in the feel financially poor condition ($M_{\text{adj}} = 80.94$, $SE = 4.59$), $\beta = -.26$, $t(72) = -2.38$, $p = .02$, $\eta_p^2 = .073$. The use of the pretest–posttest design that accounted for individual differences in initial reading/typing speed allowed us to detect a medium effect size, which was stronger than what we had observed in the previous study using the same manipulation.

Study 4 replicated the results of the first two experimental studies, this time using an intuitively plausible behavioral outcome utilized in prior research on impatience—how long people spend on a task before self-determining when they are done. As in Study 3, making people feel financially richer or poorer affected their responses, this time not on an attitudinal measure of time pressure but on a behavioral indicator of feeling pressed for time. Thus, we have some evidence that our findings can be extended to behavior in at least one experimental context.

Study 5

In a series of studies, we have shown how the more valuable time is, the greater time pressure people experience. As we noted

in the introduction and as we developed Hypothesis 3, the economic value of time is unlikely to be chronically salient, which suggests that factors that make the economic value of time more salient should strengthen the relationship between the value of time and its perceived scarcity, manifested as felt time pressure. In other words, if it is the case that the greater value of one's time causes time to be seen as more scarce, it follows that we should see the positive relationship between income and time pressure we observed in Study 1 strengthened when the economic value of time is made salient and explicit immediately prior to reporting feelings of time pressure.

In Study 5, we used the paradigm employed by DeVoe and Pfeffer (2007a, 2007b) to experimentally manipulate the salience of the economic value of time by randomly assigning some participants to calculate their approximate hourly wage. Furthermore, if it is the perceived economic value of time that is psychologically relevant, such a manipulation may have similar effects on feelings of time pressure even if it is making one's expected future implicit hourly wage rate salient. We examined Hypothesis 3 across two samples to aid in establishing generalizability. Specifically, we had employed adults randomly assigned to calculate their current implicit hourly wage rate and nonemployed undergraduate students calculate their expected implicit hourly wage rate for the year after they graduated. If it is the perceived economic value of time that affects the income–time pressure relationship, then making the economic value of time more salient should have similar effects whether it is among employed adults using their current hourly wage rate or among full-time students using their expected hourly wage rate.

Method

Participants. Four hundred and twenty-six people responded to an online survey about their time. Two hundred and nine employed adult participants were recruited from the same nationwide database used in the measure development study in exchange for entry into a lottery for a \$25 gift certificate to an online retailer. Within this sample, the average age was 35.55 years ($SD = 11.88$), and 64.1% were women. Two hundred and seventeen full-time students at the University of Toronto also participated in the study in exchange for course credit. Within this sample, the average age was 20.53 years ($SD = 2.94$), and 42.5% were women.

Manipulation. To make the economic value of time salient, some participants were randomly assigned to calculate an hourly wage rate for their time. All study participants from the employed adult sample responded to three questions about their current

situation: (a) how many hours per week they worked on average, (b) how many weeks per year they worked, and (c) how much they earned per year before taxes and other deductions. After completing these three questions, participants assigned to the control condition then proceeded immediately to respond to the time pressure scale.

Participants in the *calculate hourly* condition calculated their approximate hourly wage before filling out the identical measure of time pressure. Participants were told to feel free to use scratch paper or a calculator on their computer in responding. In this experimental condition, people were asked to multiply the number of weeks they worked times the number of hours worked per week to compute the total number of hours they worked in a year. Then, participants were asked to take their total income in the year and divide by the total number of hours they worked. They were then told, "The number you just entered above is your best estimate of your approximate hourly wage (i.e., the amount of money you earn per hour)."

For participants in the full-time student sample, the questions comprising the control and experimental manipulation conditions were slightly modified to refer to their most accurate expectation for their income during the first full year after graduation. Everything else about the experimental procedure was the same as with the employed adult sample. At the end of the calculate hourly condition, the participants were told, "The number you just entered above is your best estimate of your approximate hourly wage after you graduate (i.e., the amount of money you will earn per hour)."

It is important to note that except for the two calculations required to compute an hourly wage, subjects within each condition answered the same questions with regard to income and time worked. In both conditions, total annual income was salient as subjects in both conditions were asked about their actual or expected yearly income.

Dependent variable. We administered the identical multi-item measure of time pressure described in the other experiments (Cronbach's $\alpha = .95$).

Results and Discussion

The descriptive statistics and intercorrelations among the relevant study variables are reported in Table 3.

To test whether the strength of the relationship between income and time pressure significantly varied as a function of condition, we ran a multiple regression including as predictors a dummy variable for sample (0 = employed adult, 1 = student), mean-centered income, a dummy variable for experimental condition

Table 3
Means, Standard Deviations, and Intercorrelations for Study 5

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Time pressure	4.19	1.62	—					
2. Sample (1 = student)	.49	.50	-.25**	—				
3. Income	38,423.81	41,314.90	.10*	-.17**	—			
4. Condition (1 = calculate)	.48	.50	.04	.00	-.09	—		
5. Gender (1 = female)	.54	.50	-.07	.21**	-.03	-.01	—	
6. Age	28.04	11.46	-.23**	.66**	-.07	-.01	.31**	—

* $p \leq .05$. ** $p \leq .01$.

(0 = control, 1 = calculate hourly wage), an interaction term for Mean-Centered Income \times Sample, and an interaction term for Mean-Centered Income \times Experimental Condition. The multiple regression coefficients predicting time pressure are presented in Table 4.

Consistent with Hypothesis 3, the results show that the predicted interaction between income and experimental condition was significant, $\beta = .15$, $t(392) = 2.46$, $p = .01$, $\eta_p^2 = .015$. It is important to note that the absence of a statistically significant Income \times Sample interaction shows that either making actual or expected economic value of time salient did not matter for the results, $\beta = -.02$, $t(392) = -0.37$, $p = .71$, $\eta_p^2 < .001$. This evidence shows the generalizability of the manipulation across the actual versus the expected economic value of time. Additionally, including all second-order interaction terms and the third-order interaction term in a full model revealed no significant three-way interaction between the sample, income, and condition, $\beta = -.002$, $t(392) = -0.03$, $p = .98$, $\eta_p^2 < .001$.

To probe the nature of the statistically significant second-order interaction, we conducted follow-up analyses of the effect of income on time pressure separately by condition. In the control condition, the association between income and time pressure was small and not significant, $\beta = .04$, $t(205) = 0.58$, $p = .56$, $\eta_p^2 = .002$. In the condition where the economic value of time was made salient by calculating the hourly wage, the relationship between income and time pressure was larger and statistically significant, $\beta = .24$, $t(195) = 3.48$, $p = .001$, $\eta_p^2 = .058$. Thus, we observed only a weak, nonsignificant positive association between income and time pressure in the control condition but a moderate effect size when the economic value of time was made salient and explicit to participants.

The results of this study provide a conceptual replication of the results from Hamermesh and Lee (2007) in that income is positively associated with feelings of time pressure. More importantly, by experimentally making the economic value of time more salient, we found that respondents who had either their actual or their expected future hourly wage made salient exhibited a stronger association between income and time pressure. Given that these two samples were quite different, caution is warranted in concluding too much about the similarity in the results. However, the fact

that both actual and expected economic value of time appeared to influence feelings of time pressure in a similar fashion does imply that the salient perception of economic value of time is an important psychological variable. Because the experiment entailed random assignment of people to condition, the possibility that people who had their hourly wage made more salient differed in other, unobservable ways that affected the results is minimized. The results from this final study provide strong causal evidence that the economic value of time affects time pressure when that economic value of time is made psychologically salient and explicit.

General Discussion

The results of both longitudinal survey data and multiple experiments show that a higher perceived value of time induces greater feelings of time pressure. Study 1 analyzed seven waves of panel data and found that, controlling for stable individual differences and a number of time-varying controls, higher income—time that was more valuable—was associated with heightened feelings of time pressure. Study 2 directly manipulated the value of time to be higher or lower by having participants bill their time for doing a task at different rates and showed that people who thought their time was more valuable experienced greater time pressure. Studies 3 and 4 demonstrated that making individuals feel they were relatively richer was sufficient to cause feelings of greater time pressure and also to induce less patient behavior on an experimental task. Finally, Study 5 showed that the positive association between income and time pressure was strengthened when the precise economic value of time was made salient and explicit. The effect sizes across these five studies range from small to medium, but this variation is consistent with the finding that the value of time is more closely linked to perceptions of its scarcity when its economic value is more salient.

In the context of considering alternative theoretical accounts for our results, it is worth commenting on the role of gender in the present studies. Prior literature has documented the consistent finding that adult women experience greater time pressure than their male counterparts (e.g., Hochschild, 1997). Although we replicated this finding of a main effect of gender, we failed to observe any statistically significant interaction effects, suggesting that the causal role of the value of time functions similarly for men and women. In some sense, this is not surprising. The common association between scarcity and value is a decision heuristic that is widely shared, and there is no reason that there would be differential use of this heuristic association between the two concepts depending on someone's gender. Research by Major, McFarlin, and Gagnon (1984) found that women as compared with men were less likely to feel entitled to high compensation for their work. If the value of time was influencing time pressure by causing some individuals to feel more entitled or less benevolent (e.g., Davison & Bing, 2008; Huseman, Hatfield, & Miles, 1985), we might expect that increases in income would differentially influence one gender more than the other. Yet, across all of our studies, we failed to find anything other than a main effect of gender.

In the present article, we have focused on the subjective experience of time pressure and, in one study, a behavioral manifestation of impatience. Future research should evaluate the additional implications of the subjective experience of time pressure. It is worth recalling the classic study of time pressure by Darley and

Table 4
Effect of Income on Time Pressure as a Function of the Salience of Time's Economic Value in Study 5

Predictor	β
Gender	.01
Age	-.15*
Sample (1 = student)	-.12 [†]
Income	.02
Condition (1 = calculate)	.06
Income \times Sample	-.02
Income \times Condition	.15*
Degrees of freedom error	392
R^2	.08**

Note. Values indicate standardized beta coefficients from ordinary least squares regressions. Positive values indicate greater feelings of time pressure.

[†] $p < .10$. * $p < .05$. ** $p < .01$.

Batson (1973). Specifically, they found that inducing hurriedness by giving participants less time to reach their next destination decreased their likelihood of helping when they passed by a person in need. This result was all the more compelling because the sample population was theological seminary students—presumably a group much higher than the average person in the proclivity to engage in prosocial behavior.

It may be that the subjective experience of time pressure, partly affected by the perceived value of one's time, can help explain the likelihood of helping mentor others or other organizational citizenship behaviors that require the investment of time. Moreover, within domains where impatient behavior is suboptimal, such feelings of time pressure may lead to poorer performance or task neglect. Similarly, feelings of time pressure may distract from people's ability to lose themselves in a task, a phenomenon that has been a necessary condition for the experience of flow (Csikszentmihalyi, 1997) that can lead to optimal experiences both at work and in leisure activities.

In conjunction with the previous cross-sectional survey results, the present findings can also help one to better understand variations in time pressure both over time and across national contexts. For instance, there has been interest in why, as reported in national surveys conducted in North America, time pressure seems to have increased in recent decades (Robinson & Godbey, 1997; Zuzanek, 2004) while many observers such as Schor (1991) have commented on how pressed for time Americans appear. These results are puzzling because careful analysis of time use data has shown an increase in the actual amount of free time people have and the number of hours spent at work has not changed that much over the past 5 decades (Aguiar & Hurst, 2007; Robinson & Godbey, 1997). If time pressure is directly related to the higher economic value of time, it may be that rising income over the past several decades within many countries—a phenomenon that makes time appear more valuable—can help explain the so-called modern time bind experience. Additionally, other factors that cause the value of time to vary—such as the amount of money per hour people charge when they account for their time—may also be important for understanding variations in time pressure. Lawyers and consultants, who typically not only bill their time but do so using very high hourly rates, would be expected to feel more time pressure simply as a function of this fact.

Perhaps the most important conclusion from this set of studies is this: Feelings of time pressure are not just a function of individual differences, the quantitative amount of time spent working, or even people's working conditions, although these factors are obviously important. Time pressure is at least partly a result of psychological processes and the perception of time's value. Other factors related to time pressure, such as happiness and life satisfaction, may also be influenced by these same processes. Although income is one factor that contributes to people's perceptions of the value of their time, there are other factors as well, such as how much their employers charge for their time—which may undoubtedly be related to income but are not perfectly correlated with it. Moreover, our experimental manipulations illustrated that income is not itself an absolute quantity, at least in its psychological implications, but people can be made to feel temporarily financially richer or poorer.

All of the foregoing suggests that understanding how wealth affects people's psychological well-being may be less straightfor-

ward than it appears. Specifically, there seems to be an important role for psychological research that explores the determinants of perceived value of time as an important factor affecting how people respond affectively and behaviorally to their environment.

References

- Aguiar, M., & Hurst, E. (2007). Measuring trends in leisure: The allocation of time over five decades. *Quarterly Journal of Economics*, *122*, 969–1006. doi:10.1162/qjec.122.3.969
- Brett, J. M., & Stroh, L. K. (2003). Working 61 plus hours a week: Why do managers do it? *Journal of Applied Psychology*, *88*, 67–78. doi:10.1037/0021-9010.88.1.67
- Brief, A. P., Burke, M. J., George, J. M., Robinson, B. S., & Webster, J. (1988). Should negative affectivity remain an unmeasured variable in the study of job stress? *Journal of Applied Psychology*, *73*, 193–198. doi:10.1037/0021-9010.73.2.193
- Carver, T. N. (1908). The basis of social conflict. *American Journal of Sociology*, *13*, 628–648. doi:10.1086/211621
- Csikszentmihalyi, C. (1997). *Finding flow: The psychology of engagement with everyday life*. New York, NY: Basic Books.
- Dai, X., Wertenbroch, K., & Brendl, C. M. (2008). The value heuristic in judgments of relative frequency. *Psychological Science*, *19*, 18–19. doi:10.1111/j.1467-9280.2008.02039.x
- Darley, J., & Batson, C. D. (1973). "From Jerusalem to Jericho": A study of situational and dispositional variables in helping behavior. *Journal of Personality and Social Psychology*, *27*, 100–108. doi:10.1037/h0034449
- Davison, K. H., & Bing, M. N. (2008). The multidimensionality of the equity sensitivity construct: Integrating separate benevolence and entitlement dimensions for enhanced construct measurement. *Journal of Managerial Issues*, *20*, 131–150.
- DeVoe, S. E., & Pfeffer, J. (2007a). Hourly payment and volunteering: The effect of organizational practices on decisions about time use. *Academy of Management Journal*, *50*, 783–798.
- DeVoe, S. E., & Pfeffer, J. (2007b). When time is money: The effect of hourly payment on the evaluation of time. *Organizational Behavior and Human Decision Processes*, *104*, 1–13. doi:10.1016/j.obhdp.2006.05.003
- DeVoe, S. E., & Pfeffer, J. (2009). When is happiness about how much you earn? The effect of hourly payment on the money–happiness connection. *Personality and Social Psychology Bulletin*, *35*, 1602–1618. doi:10.1177/0146167209346304
- DeVoe, S. E., & Pfeffer, J. (2010). The stingy hour: How the practice of billing time affects volunteering. *Personality and Social Psychology Bulletin*, *36*, 470–483. doi:10.1177/0146167209359699
- Frederick, S., Novemsky, N., Wang, J., Dhar, R., & Nowlis, S. (2009). Opportunity cost neglect. *Journal of Consumer Research*, *36*, 553–561.
- Gilovich, T., Griffin, D. W., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. New York, NY: Cambridge University Press.
- Goodin, R. E., Rice, J. M., Bittman, M., & Saunders, P. (2005). The time-pressure illusion: Discretionary time vs. free time. *Social Indicators Research*, *73*, 43–70. doi:10.1007/s11205-004-4642-9
- Gupta, N., & Beehr, T. A. (1979). Job stress and employee behaviors. *Organizational Behavior and Human Performance*, *23*, 373–387. doi:10.1016/0030-5073(79)90004-7
- Haisley, E., Mostafa, R., & Lowenstein, G. (2008). Subjective relative income and lottery ticket purchases. *Journal of Behavioral Decision Making*, *21*, 283–295. doi:10.1002/bdm.588
- Hamermesh, D. S., & Lee, J. (2007). Stressed out on four continents: Time crunch or yuppie kvetch? *Review of Economics and Statistics*, *89*, 374–383. doi:10.1162/rest.89.2.374
- Hendrix, W. H., Ovalle, N. K., & Troxler, G. (1985). Behavioral and physiological consequences of stress and its antecedent factors. *Journal of Applied Psychology*, *70*, 188–201. doi:10.1037/0021-9010.70.1.188

- Hochschild, A. R. (1997). *The time bind: When work becomes home and home becomes work*. New York, NY: Metropolitan/Holt.
- House, J. S., McMichael, A. J., Wells, J. A., Kaplan, B. H., & Laderman, L. R. (1979). Occupational stress and health among factory workers. *Journal of Health and Social Behavior, 20*, 139–160. doi:10.2307/2136435
- Huseman, R. C., Hatfield, J. D., & Miles, E. W. (1985). Test for individual perceptions of job equity: Some preliminary findings. *Perceptual and Motor Skills, 61*, 1055–1064.
- Jenkins, C. D., Zyzanski, S. J., & Rosenman, R. H. (1979). *Jenkins Activity Survey: Form C*. New York, NY: Psychological Corporation.
- Judge, T. A., & Hurst, C. (2008). How the rich (and happy) get richer (and happier): Relationship of core self-evaluations to trajectories in attaining work success. *Journal of Applied Psychology, 93*, 849–863. doi:10.1037/0021-9010.93.4.849
- Kahneman, D., Krueger, A. B., Schkade, D., Schwarz, N., & Stone, A. A. (2006, June 30). Would you be happier if you were richer? A focusing illusion. *Science, 312*, 1908–1910.
- King, L. A., Hicks, J. A., & Abdelkhalik, J. (2009). Death, life, scarcity, and value: An alternative perspective on the meaning of death. *Psychological Science, 20*, 1459–1462. doi:10.1111/j.1467-9280.2009.02466.x
- Kleiner, S., & Pavalko, E. K. (2010). Clocking in: The organization of work time and health in the United States. *Social Forces, 88*, 1463–1486. doi:10.1353/sof.0.0301
- Kristensen, T. S. (1996). Job stress and cardiovascular disease: A theoretic critical review. *Journal of Occupational Health Psychology, 1*, 246–260. doi:10.1037/1076-8998.1.3.246
- Landy, F. J., Rastegary, H., Thayer, J., & Colvin, C. (1991). Time urgency: The construct and its measurement. *Journal of Applied Psychology, 76*, 644–657. doi:10.1037/0021-9010.76.5.644
- Latack, J. C. (1986). Coping with job stress: Measures and future directions for scale development. *Journal of Applied Psychology, 71*, 377–385. doi:10.1037/0021-9010.71.3.377
- Lee, F., & Tiedens, L. Z. (2001). Who's being served? "Self-serving" attributions in social hierarchies. *Organizational Behavior and Human Decision Process, 84*, 254–287. doi:10.1006/obhd.2000.2925
- Lynn, M. (1992). Scarcity's enhancement of desirability: The role of naïve economic theories. *Basic and Applied Social Psychology, 13*, 67–78. doi:10.1207/s15324834baspl301_6
- Major, B., McFarlin, D. B., & Gagnon, D. (1984). Overworked and underpaid: On the nature of gender differences in personal entitlement. *Journal of Personality and Social Psychology, 47*, 1399–1412. doi:10.1037/0022-3514.47.6.1399
- Menzies, H. (2005). *No time: Stress and the crisis of modern life*. Vancouver, British Columbia, Canada: Douglas and McIntyre.
- Moyle, P. (1995). The role of negative affectivity in the stress process: Tests of alternative models. *Journal of Organizational Behavior, 16*, 647–668. doi:10.1002/job.4030160705
- Nelson, L. D., & Morrison, E. L. (2005). The symptoms of resource scarcity: Judgments of food and finances influence preferences for potential partners. *Psychological Science, 16*, 167–173. doi:10.1111/j.0956-7976.2005.00798.x
- Northcraft, G. B., & Neale, M. A. (1986). Opportunity costs and the framing of resource allocation decisions. *Organizational Behavior and Human Decision Processes, 37*, 348–356.
- Parker, D. F., & DeCotiis, T. A. (1983). Organizational determinants of job stress. *Organizational Behavior and Human Performance, 32*, 160–177. doi:10.1016/0030-5073(83)90145-9
- Perlow, L. A. (1999). The time famine: Towards a sociology of work time. *Administrative Science Quarterly, 44*, 57–81. doi:10.2307/2667031
- Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin, 112*, 160–164. doi:10.1037/0033-2909.112.1.160
- Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. (2004). HLM6 Hierarchical linear and nonlinear modeling [Computer software]. Lincolnwood, IL: Scientific Software International.
- Restegary, H., & Landy, F. (1993). The interaction among time urgency, uncertainty, and time pressure. In O. Svenson and A. J. Maule (Eds.), *Time pressure and stress in human judgment and decision making* (pp. 217–235). New York, NY: Plenum Press.
- Roberts, J. K., & Monaco, J. P. (2006, April). *Effect size measure for two-level multilevel model*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
- Robinson, J. P., & Godbey, G. (1997). *Time for life: The surprising ways Americans use their time*. University Park: Pennsylvania State University Press.
- Schor, J. (1991). *The overworked American*. New York, NY: Basic Books.
- Schwarz, N. (1999). Self reports: How the questions shape the answers. *American Psychologist, 54*, 93–105. doi:10.1037/0003-066X.54.2.93
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*, 513–523. doi:10.1037/0022-3514.45.3.513
- Snijders, T., & Bosker, R. (1999). *Multilevel analysis*. Thousand Oaks, CA: Sage.
- Spence, J. T., Helmreich, R. L., & Pred, R. S. (1987). Impatience versus achievement striving in the Type A pattern: Differential effects on students' health and academic achievement. *Journal of Applied Psychology, 72*, 522–528. doi:10.1037/0021-9010.72.4.522
- Staudinger, U. M., Fleeson, W., & Baltes, P. B. (1999). Predictors of subjective physical health and global well-being: Similarities and differences in the United States and Germany. *Journal of Personality and Social Psychology, 76*, 305–319. doi:10.1037/0022-3514.76.2.305
- Wright, L., McCurdy, S., & Rogoll, G. (1992). The TUPA Scale: A self-report measure for the Type A subcomponent of time urgency and perpetual activation. *Psychological Assessment, 4*, 352–356. doi:10.1037/1040-3590.4.3.352
- Zhong, C. B., & DeVoe, S. E. (2010). You are how you eat: Fast food and impatience. *Psychological Science, 21*, 619–622. doi:10.1177/0956797610366090
- Zuzanek, J. (2004). Work, leisure, time-pressure, and stress. In J. T. Haworth & A. J. Veal (Eds.), *Work and leisure* (pp. 123–144). New York, NY: Routledge.

Received April 11, 2009

Revision received October 14, 2010

Accepted October 19, 2010 ■