



THE ECONOMICS OF MULTITASKING

Edited by
Charlene M. Kalenkoski
& Gigi Foster



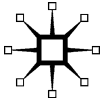
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The editors dedicate this book to their families.

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Acronyms

ABS	Australian Bureau of Statistics
ADD	Attention deficit disorder
ADHD	Attention deficit and hyperactivity disorder
ATUS	American Time Use Survey
BLS	Bureau of Labor Statistics
BMI	Body mass index
BPI	Behavior Problem Index
CDC	Centers for Disease Control
CDS	Child Development Supplement
EHM	Eating & Health Module
FE	Fixed effects
FL	Fractional logit model
GSS	General Social Survey
HOME-SF	Home Observation for Measurement of the Environment–Short Form
NIPAs	National Income and Product Accounts
OLS	Ordinary least squares
PSG	Problem-solving groups
PSID	Panel Study of Income Dynamics
SEIFA	Socio-Economic Index For Area
SES	Socioeconomic Status
SMSA	Standard Metropolitan Statistical Area
SPC	Statistical process control
TQM	Total quality management
TUS	Time Use Survey
WJ-R	Woodcock-Johnson Revised Tests of Basic Achievement

Chapter 1

Introduction: The Economics of Multitasking

Charlene M. Kalenkoski and Gigi Foster

Multitasking is an inevitable part of everyday life. Perhaps it is most evident in the context of child care, where adults frequently look after children while also doing other things such as cooking or cleaning. Yet, far more broadly, most people in modern societies are engaged in simultaneous activities for a large fraction of their waking hours—the layperson’s definition of multitasking.

Although economists have examined multitasking to some extent in the context of work activities within the firm, they have rarely recognized or modeled the decisions of individuals to multitask in other contexts—especially in the home—or the consequences of these decisions for personal, family, or societal welfare. Therefore, while for conceptual completeness we do include one chapter on the multitasking of market work, a major goal of this volume is to illustrate the economic relevance of multitasking outside of the usual focus on market-work activities. The authors represented here approach multitasking in terms of both theory and empirical evidence, drawing the latter from a range of surveys, countries, and years. The included chapters show how multitasking can be incorporated into standard economic models of household production, what sort of data are needed to test the implications of these models, and how the multitasking of different sorts of activities in different contexts is associated with phenomena that economists care about. The volume concludes with a call for more theoretical and empirical research into how best to conceptualize, accommodate, and understand multitasking in economics.

What Is Multitasking?

Multitasking is not a new concept in social science. It has long been acknowledged as a meaningful phenomenon in psychology, particularly in the literature relating to cognitive control and task switching (as reviewed in Monsell 2003).

The very term “task switching” implicitly provides a working definition of multitasking. According to this implicit definition, multitasking occurs when a person attends in quick succession to multiple tasks across which he or she must mentally “switch” because the tasks cannot be performed using a single type of neural program. By this definition, looking after two children with similar temperaments is arguably a poor example of multitasking, even though more than one child is involved, because the effort required to look after each child is so similar that no significant neural switching is required. In contrast, driving a car through a snowstorm and having an argument with one’s partner require different types of neural effort: stressful driving requires conscious concentration and anticipation of others’ actions on the road, while arguing with a partner requires emotional involvement and expressive effort. To perform both at the same time thus means using one’s conscious mind in two very different ways.

With this latter sort of example in mind, the standard premise in the psychological literature—which is built upon repeated experimental findings (e.g., Rogers and Monsell 1995; Rubinstein, Meyer, and Evans 2001; Kiesel et al. 2010)—is that all multitasking is costly because something is lost when a brain switches between tasks. An economist would respond that for people to engage in multitasking, which they are observed to do regularly, the benefit from doing so must outweigh the cost. That is, if we see people choosing to multitask, then by revealed preference it must be that more “output” is expected to be obtained from multitasking than is expected to be lost. How might this be the case?

First, switching costs, even if they do exist, may be low if at least one of the tasks can run somewhat on autopilot. For example, a simple household meal that has been prepared numerous times before can be prepared almost mechanically without much thought while speaking with a customer-service representative on the phone. Familiarity with the activity being performed may mean that the individual actions that are required can be directed unconsciously or semiconsciously, leaving the conscious mind free to discuss matters with the customer-service representative. Thus, the cost of multitasking in this setting is low but the benefit is high: the meal is served and the problem is

resolved with the customer-service agent in less time than it would have taken to perform the two activities sequentially. The situation would be quite different if one were trying out a new recipe or preparing something complex or delicate that required focused effort from the conscious mind.

A second reason that the benefits of multitasking may outweigh the costs is that some activities are complementary to one another. For example, joint meal preparation may make time shared by a supervising parent and his child more pleasant for both, while also making meal preparation more interesting and enjoyable. The end result may be a happier child, a happier parent, and a cooked meal that they both can enjoy. If the ultimate “output” of a household’s time-allocation decisions is conceived as the personal utility gained from the production of household commodities, as is assumed to be the case in standard economic household production models (e.g., Rosenzweig and Schultz 1983; McGrattan, Rogerson, and Wright 1997; Rapoport, Sofer, and Solaz 2011), then the multitasking of complementary household tasks can produce more output than performing them sequentially.

Finally, multitasking can provide a means to exploit more of an individual’s potential in what would otherwise be a situation of excess capacity. Even the most-well-organized person inevitably will find herself occasionally in a situation where she could be more productive but is unable to be because of unavoidable constraints. A good example of this is commuting: driving to work, once it becomes routine and semiautomated, is often boring and thus wasteful of the mental resources of the driver. Listening to an audiobook, listening to music, or conversing with a carpooler while driving—all examples of multitasking that better utilize brainpower—may enhance utility.

The full cost-benefit profile of multitasking—both individual and social—has not been mapped yet. Indeed, the economic analysis of the multitasking of nonmarket-work activities is only in its infancy. The decision to multitask outside of the workplace has rarely been modeled, and the ramifications of multitasking for productivity and well-being, both in and out of the workplace, are just beginning to be explored. This volume begins to unpack and explore the economic nature of multitasking.

Contents of This Volume

Chapters 2 through 8 in this volume include both theoretical and empirical approaches to understanding the economic decisions to

multitask nonmarket-work activities. Chapters 2 and 3 confront head-on the problem of theoretically modeling multitasked time. In chapter 2, Raúl Sanchis briefly reviews the history of household production models in economics, which ignore the multitasking of household production time, and offers a general theoretical framework to capture multitasking. In chapter 3, we, the coeditors of this volume, present a parametric model of the multitasking of housework and child care whose parameters are estimated through the use of a custom-designed experiment, with a particular focus on estimating differences in these parameters by gender.

Chapters 4 through 8 then present empirical examinations of the multitasking of nonmarket-work activities. In chapter 4, Lyn Craig and Judith Brown use data from the Australian Time Use Survey to examine the prevalence, extent, and timing of multitasking in home production, comparing parents to nonparents and men to women. The ensuing two chapters examine the phenomenon of multitasking in the context of children's development. In chapter 5, Agne Suziedelyte analyzes the effects that the multitasking of leisure has on children's noncognitive skills, using data from the US Panel Study of Income Dynamics. In chapter 6, Sabrina Pabilonia uses that same data set to investigate the prevalence and patterns of television watching and other media use during children's homework time. In chapter 7, Karen Hamrick uses data from the American Time Use Survey to describe Americans' multitasked eating patterns and examine how they are related to individuals' body mass index and health status. In Chapter 8, Jay Stewart and Dorinda Allard delve into the issues associated with measuring multitasking in a time-use survey, examining the quality of data on multitasked child care time that are collected in the American Time Use Survey.

Chapter 9 presents a study of multitasking in the setting of the workplace, a more traditional focus of labor economists. In this chapter, Parama Chaudhury examines the long-run effects of the multitasking of market work on individuals' returns to experience. Chapter 9 departs from the prior chapters in its focus on the multitasking of market work rather than nonmarket work and its explicit consideration of broad trends in multitasking that lie outside the control of an individual worker but retains the emphasis found in prior chapters on the causes and correlates of multitasking for individuals, rather than for firms or other organizations.

The volume concludes with chapter 10, where we, the coeditors, discuss the material presented in the volume and identify areas ripe for future research in terms of theory, data, and analytical methods.

A better understanding of multitasking is required for economists to understand the causes and consequences of the time-allocation decisions of individuals. This volume offers an initial conceptual framework and some empirical evidence to help advance that understanding.

References

- Kiesel, Andrea, Marco Steinhauser, Mike Wendt, Michael Falkenstein, Kerstin Jost, Amdrea M. Philipp, and Iring Koch (2010). "Control and Interference in Task Switching—A Review." *Psychological Bulletin* 136 (5): 849–874.
- McGrattan, Ellen R., Richard Rogerson, and Randall Wright (1997). "An Equilibrium Model of the Business Cycle with Household Production and Fiscal Policy." *International Economic Review* 38 (2): 267–290.
- Monsell, Stephen (2003). "Task Switching." *Trends in Cognitive Science* 7 (3): 134–140.
- Rapoport, Benoît, Catherine Sofer, and Anne Solaz (2011). "Household Production in a Collective Model: Some New Results." *Journal of Population Economics* 24 (1): 23–45.
- Rogers, R., and S. Monsell (1995). "The Costs of a Predictable Switch between Simple Cognitive Tasks." *Journal of Experimental Psychology: General* 124:207–231.
- Rosenzweig, Mark R., and T. Paul Schultz (1983). "Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight." *Journal of Political Economy* 91 (5): 723–746.
- Rubinstein, J. S., D. E. Meyer, and J. E. Evans (2001). "Executive Control of Cognitive Processes in Task Switching." *Journal of Experimental Psychology: Human Perception and Performance* 27:763–797.

Chapter 2

Economic Theories about the Allocation of Time: Review and an Extension for Multitasking

Raúl G. Sanchis

Introduction

Before the 1960s, economic theory poorly addressed questions about the allocation of time.¹ However, in the 1960s and 1970s some economists worked on new ways to model time use. Becker (1965), in his well-known contribution “A Theory of the Allocation of Time,” argued that consumers maximize their utility by choosing commodities that are produced with market goods and time by a consumer facing both budget and time constraints. DeSerpa (1971) and Evans (1972) further attempted to improve time allocation models² by including extra constraints in their models; both DeSerpa’s and Evans’s models can be shown to be particular cases of Becker’s model by just redefining commodities in Becker’s model and keeping the new suggested constraints.

Pollak and Wachter (1975) were the first to critique Becker’s model rigorously. They discussed some problems with time-use models, especially the one proposed by Becker (1965). Gronau (1977) used a very simple theoretical model to provide interesting insights and interpretations of real situations supported by empirical information; however, this model just considered one commodity and some of the main problems pointed out by Pollak and Wachter (1975) are avoided in that setting. Further research in the area of time-use modeling can be found in Juster and Stafford’s (1991) survey paper

that provided an up-to-date account of both theoretical and empirical research on the matter; concretely, for our purpose, Juster and Stafford interestingly reviewed inter-temporal models that include time use, which are a theoretical improvement. Little research on time use has employed dynamic models in microeconomics; however, one exception is that of Fischer's (2001) analysis of procrastination using time inputs as a key variable in a dynamic context.

Mainstream Time-Use Models in Microeconomics

This section illustrates how classic microeconomic models incorporate time use as a choice variable. Economic theory has produced a well-known textbook model, frequently used in labor economics among other areas.³ This type of model, often known as the labor-leisure model, includes the use of time as a choice variable and can be presented as follows:

$$\begin{aligned} \max_{x, T_j} \quad & U = U(x, T_j), \\ \text{s.t.} \quad & px \leq w(T - T_j), \end{aligned} \tag{2.1}$$

where the total available time T can be allocated to leisure time, T_j , or to labor time, $T - T_j$; w is the wage per unit of labor time; U is the utility function; x is consumption; and p is the price of a unit of consumption.

The solution to this maximization problem is obtained by the usual analysis of optimal choices and, in essence, treats leisure time as an extra good that, in practice, is as if it were purchased in the market at the wage rate.

A simplified version of the benchmark model by Becker (1965) is as follows. The main innovation is the introduction of what Becker calls commodities, which determine utility; such commodities are either tangible (homemade products) or intangible outputs (homemade services or the satisfaction of personal needs) produced with the inputs of time and market products. Consider two commodities (Z_1 and Z_2), where Z_1 is produced with household production time (a vector \vec{T}_1) and goods (a vector \vec{x}_1) and Z_2 is produced with more household production time (a vector \vec{T}_2) and maybe some different goods (a vector \vec{x}_2). An individual works at a wage w for the remaining time in order to purchase goods \vec{x}_1 and \vec{x}_2 and may additionally have nonlabor income