

# Fast Food and Financial Impatience: A Socioecological Approach

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We investigated whether the prevalence of fast-food restaurants in the social ecology are associated with greater financial impatience at the national, neighborhood, and individual level. Study 1 shows that the proliferation of fast-food restaurants over the past 3 decades in the developed world was associated with a historic shift in financial impatience, as manifested in precipitously declining household savings rates. Study 2 finds that households saved less when living in neighborhoods with a higher concentration of fast-food restaurants relative to full-service restaurants. With a direct measure of individuals' delay discounting preferences, Study 3 confirms that a higher concentration of fast-food restaurants within one's neighborhood is associated with greater financial impatience. In line with a causal relationship, Study 4 reveals that recalling a recent fast-food, as opposed to full-service, dining experience at restaurants within the same neighborhood induced greater delay discounting, which was mediated behaviorally by how quickly participants completed the recall task itself. Finally, Study 5 demonstrates that pedestrians walking down the same urban street exhibited greater delay discounting in their choice of financial reward if they were surveyed in front of a fast-food restaurant, compared to a full-service restaurant. Collectively, these data indicate a link between the prevalence of fast food and financial impatience across multiple levels of analysis, and suggest the plausibility of fast food having a reinforcing effect on financial impatience. The present investigation highlights how the pervasiveness of organizational cues in the everyday social ecology can have a far-ranging influence.

**Keywords:** fast food, social ecology, impatience, time discounting, saving

One of the most consequential and vexing puzzles of the last several decades has been the widespread decline in personal saving across the developed world. Maital and Maital (1994) documented that personal saving as a percentage of income has been in decline in almost all the developed economies that make up the Organisation for Economic Co-operation and Development (OECD) since the 1970s—a trend that has persisted into the new millennium (Harvey, 2004; Hüfner & Koske, 2010). In the United States, personal saving as a percentage of disposable income has declined from 10% to just below zero over the past 25 years (Bernanke, 2006, p. 70). Highlighting the seriousness of the issue, Thaler and Sunstein (2008) observed that “in 2005 the personal savings rate for Americans was negative for the first time since 1932 and 1933—the Great Depression years” (p. 103). It seems that people are spending like there is no tomorrow.

The tendency to prefer the instant gratification of spending now over the delayed reward of compound interest is more broadly referred to as delay discounting, an intertemporal preference for the present or, more familiarly, as impatience (Frederick, Loewenstein, & O'Donoghue, 2002). Consistently, studies demonstrate a “pervasive devaluation of the future” by decision makers (Ainslie & Haslam, 1992, p. 59). The economist Samuelson (1937) was the first to begin theorizing about this tendency using a “discounted utility model,” which assumed that the future was discounted at a constant rate (see also Fishburn & Rubinstein, 1982). The weight of later experimental evidence modified this theory, showing that both humans and animals use a higher discount rate for events closer in time than for those further away (Ainslie, 1975, 1992, 2001; Frederick et al., 2002; Green & Myerson, 2004; Mazur, 1985, 1997; Strotz, 1955).

This change in the discount rate with time can best be described by a hyperbolic function, and it helps to explain why most people agree that saving money is a desirable objective that they nevertheless struggle to achieve. When asked to choose between \$1 in 1 year and \$3 in 1 year and 1 day, for example, most people are insensitive to the 24-hr delay and would choose the larger offer; when asked to choose between \$1 today and \$3 tomorrow, however, a more sizable portion of people would choose the smaller but immediate offer. Brain imaging evidence suggests that time-variable delay discounting is the result of competition between two neural systems involved in intertemporal decision making (McClure, Laibson, Loewenstein, & Cohen, 2004). Decisions with immediate consequences activate an older, more visceral “hot” system within the brain that makes decisions on the basis of emotions (Loewenstein, 1996; Metcalfe & Mischel, 1999), whereas decisions involving more temporally remote conse-

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quences involve a cortical, more cognitive “cool” system, which is more logical in its decision making. As a result, although a larger future reward by means of compound interest on today’s savings is appealing, it is often insufficient to outweigh individuals’ instant gratification from consuming today. Thus, even in times of economic prosperity, roughly 70% of Americans admitted that they could and should save more money than they actually do (Farkas & Johnson, 1997).

The approach to understanding delay discounting in both psychology and economics tends to focus on stable individual differences. For instance, individual differences in the capacity to delay gratification have been observed in children as young as 4 years of age and shown to predict important consequences decades later in life (Ayduk et al., 2000; Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriguez, 1989, 1992). More importantly, individual differences in both adolescent and adults’ delay discounting preferences predict long-term life outcomes (e.g., obesity and savings rates) better than many other individual differences, such as sex, age, and cognitive abilities (Chabris, Laibson, Morris, Schuldt, & Taubinsky, 2008; Sutter, Kocher, Glätzle-Rützler, & Trautmann, 2013). Indeed, individual differences in delay discounting preferences have been directly linked to personal saving and spending behavior (Meier & Sprenger, 2010, 2012; Nyhus & Webley, 2001; Webley & Nyhus, 2006) and predict heterogeneity in household saving (Angeletos, Laibson, Repetto, Tobacman, & Weinberg, 2001). For example, Klawitter, Anderson, and Gugerty (2012) recently found that, controlling for a wide set of demographic characteristics, delay discount rates were the best predictor of between-household heterogeneity in financial behavior and significantly predicted a family’s tendency to save within a matched saving program.

Although psychologists and economists have traditionally emphasized stable individual differences in the study of delay discounting, the dramatic decline in saving over the past 3 decades begs the question: Are people becoming more impatient over time? This article offers a socioecological perspective for understanding changes in financial impatience over the last several decades. Rather than assume that individual differences relevant to saving behavior are static, we focus on systematic societal shifts and the proliferation of primes in the social ecology as one mechanism that is poised to influence individual differences in financial impatience and hence shed some light on the dramatic shift in saving behavior. Specifically, we explore the possibility that the proliferation of fast-food restaurants may have contributed to increasing financial impatience in the developed world.

### Fast Food and Impatience

Food is fundamental to human beings (Rozin, 1999), and how we eat carries significant symbolic and cultural meaning (Douglas, 1972). Traditionally, eating involves preparation of food and communal dining. It is more than just the consumption of food, but a collective, ritualistic event where community members bond and communicate with one another. The idea of fast food, however, downplays the preparatory and communal aspects of eating, and rather focuses on maximizing its efficiency—filling the stomach as quickly as possible.

First introduced with hotdog and hamburger food stands in the early 1900s, fast food is now a multi-billion-dollar industry, with

brand recognition in children as young as 4 years of age (Arredondo, Castaneda, Elder, Slymen, & Dozier, 2009), and the golden arches of McDonald’s ranks as one of the most recognized symbols worldwide (Schlosser, 2001). Fast food has become arguably the ultimate symbol of time efficiency and instant gratification. Fast-food restaurants are designed and structured to save time in delivering food. Although typical fast foods such as fries and burgers are no different from other calorie-dense foods, they are selected for the ease and speed of preparation. Compared to full-service restaurants, fast-food establishments resemble more of an assembly line where employees assemble highly standardized, precooked ingredients rather than prepare fresh ingredients. Instead of serving food to the table, fast-food restaurants typically have customers lining up in front of the cashier or open drive-thru windows where drivers can get food on the go without leaving their cars (Schlosser, 2001). The principle of time efficiency has been ingrained into the core of fast-food companies and threads together every aspect of organizational design and performance evaluation.

Although the birth and expansion of the fast-food industry may have been driven in part by the increasing time demands of modern society, due to changes in both work (e.g., irregular schedules in service and office jobs) and family structure (e.g., dual-career and single-parent families), its proliferation has undoubtedly legitimized and popularized the logic of time efficiency. Indeed, the goals, logic, and structures of fast-food organizations have become part of the larger institutional environment that shape the forms and designs of other organizations (Friedland & Alford, 1991; Meyer & Rowan, 1977). For instance, the rigorous standardization and assembly-line procedures pioneered by the fast-food industry have been widely adopted across the service sector. Companies such as FedEx and Jiffy Lube are premised on the delivery of service as quickly as possible (i.e., expedited shipping and instant oil change, respectively). Thus, fast food has not only transformed our eating habits, but also fostered a general culture that extols the value of time and its efficient use (Ritzer, 2011).

However, there is a flip side to the principle of time efficiency. Although the goal of saving time may improve the efficiency of work, it may also instigate a sense of impatience depending on the nature of the situations and activities: Hustling on the way to a meeting is time efficient, whereas doing the same activity while on a stroll in the park is impatient. The proliferation of fast food has increasingly legitimized the pursuit of time efficiency such that even organizations and social activities that were previously unconcerned with time have started to adopt the principle of time efficiency. In journalism, for instance, what is often called “McNugget news,” rapid-fire sound bites and paragraph-length articles, sacrifices context for a superficial sense of being up-to-date. In publishing, minute-long bedtime stories help busy parents fulfill their obligations without spending too much quality time with their children (Honoré, 2004). Time efficiency and impatience are two sides of the social influences of fast food; by restructuring organizations and consumer experiences around time efficiency, fast food may have improved society’s efficiency, but also instigated a culture of impatience that emphasizes getting what we want now.

Thus, the prevalence of fast-food restaurants constitutes a significant feature of the social ecology that may in turn affect the mind and behavior of individuals (Oishi & Graham, 2010). Indeed, recent research in behavioral priming has demonstrated that simply

being exposed to fast-food symbols induces people to behave more impatiently. [Zhong and DeVoe \(2010\)](#) found that even unconscious exposure to fast-food symbols increased reading speed while under no time constraint and that thinking about eating fast-food increased preferences for time-saving products when there were many other product dimensions to consider. Critical to the present investigation, Zhong and DeVoe also found that mere exposure to fast-food logos exacerbated the tendency to discount future monetary gain, leading people to state a preference for a smaller immediate gain over larger future gain. It appears that being reminded of fast food, even at an unconscious level, leads people to make choices that reflect greater impatience.

These findings were interpreted as the automatic activation of relevant goals embedded in fast-food brands. Previous studies have found that goals and corresponding social behaviors can be primed by other naturally occurring environmental cues. For example, people who saw an image of a library automatically spoke at a lower volume ([Aarts & Dijksterhuis, 2003](#)), and the presence of a business briefcase in a room led individuals to behave more competitively ([Kay, Wheeler, Bargh, & Ross, 2004](#)). In these cases, environmental cues such as a library image activated the goal of keeping quiet and the automatic pursuit of such a goal (i.e., speaking at a lower volume). Such goal activation and pursuit require no conscious awareness or regulation ([Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001](#)). Recently, it has been demonstrated that brands can similarly activate implicit goals with observable effects on behavior. Given that companies invest so heavily in developing, expanding and preserving their brands, it is to be expected that incidental brand exposure affects consumers' brand and product choices ([Chartrand, Huber, Shiv, & Tanner, 2008](#); [Ferraro, Bettman, & Chartrand, 2009](#)). However, it has also been demonstrated that brands' automatic influence can extend beyond purchasing decisions. For instance, a subliminal prime of the Apple logo can activate a goal to be creative that leads participants to perform more creatively as compared to a prime of the IBM logo ([Fitzsimons, Chartrand, & Fitzsimons, 2008](#)). Given that fast-food brands embody the goal of facilitating instant gratification, greater exposure to fast-food restaurants in the everyday environment may automatically induce greater impatience that can directly influence delay discount preferences, which may in turn manifest themselves in distinct domains such as saving behavior.

### A Socioecological Approach

As with choosing sooner smaller rewards over larger later rewards, succumbing to the instant gratification of spending now and forgoing the benefit of compound interest is a behavioral manifestation of impatience. If fast-food symbols indeed induce impatience, would their proliferation in our society lead to greater financial impatience and less saving in our society? To answer this question, we turn to a socioecological approach, which acknowledges that the mind and behavior of individuals are reflective not only of an individual's personality, but also the social and physical environments that constitute habitat ([Oishi & Graham, 2010](#)). The emphasis of the socioecological approach on reciprocal relationships is reminiscent of [Bandura's \(1986\)](#) reciprocal determinism and is crucial for understanding the proposed role of fast food on cultural shifts in impatience over time: The proliferation of the fast-food industry is undeniably driven by demand that may derive

in part from an increased sense of time pressure from modern life, but the presence of fast-food restaurants in the everyday environment may also constitute primes that can in turn influence individuals' impatience.

When considering priming as one potential mechanism through which the social ecology can influence individuals' behavior in everyday life, two of the most relevant aspects of a prime are its influence potential and the distribution of these primes in the environment. Regarding influence potential, it should be recognized that not all primes within a given social ecology are equally poised to influence the mind and behavior of individuals. An important task for behavioral priming is to understand the influence of primes in the stimulus-rich environment of daily experience, where people are continually bombarded with a potpourri of stimuli ([Bargh, 2006](#)). Recent research has documented exciting findings of exposure to primes in natural, stimulus-rich environments influencing people's real-world choices (e.g., [Berger & Fitzsimons, 2008](#); [Berger, Meredith, & Wheeler, 2008](#); [Gailliot, Stillman, Schmeichel, Manner, & Plant, 2008](#)). For instance, [Gailliot et al. \(2008\)](#) found that being near a cemetery increased the likelihood that an individual would help a stranger in a wheelchair. This example nicely illustrates [Bargh's \(2006\)](#) proposal that goal-relevant natural primes are more likely to influence individuals' minds and behavior. Survival goals are potent and virtually universal motivators, such that even embedded within environments saturated with unrelated stimuli, naturally occurring mortality salience primes can exert significant influence. Hunger avoidance is another particularly salient goal that people viscerally experience multiple times each day, making fast-food stimuli potentially powerful motivational primes associated with this fundamental goal. Additionally, basic goals that everyone shares are perhaps the most likely to produce primes with effects across different levels of analysis because of their universal relevance. In this sense, fast-food primes seem well poised to exert influence within the social ecology because of their association with basic and recurring goals.

Among primes that have substantial potential to exert behavioral influence, their distribution within a given social ecology is another determinant of their impact because of recency and frequency effects. Importantly, a greater concentration of primes can be an indicator of both the preferences of the inhabitants in a social ecology and the likelihood and frequency of individuals' exposure to them. In order to understand the influence of exposure to primes on day-to-day human behavior, it is critical to examine how changes in the concentration of primes within and between social ecologies relate to behavior. The ubiquity of fast food in modern society makes it an especially important prime to consider from a socioecological perspective ([Ritzer, 2011](#); [Schlosser, 2001](#)). Critically, there is substantial variation in the concentration of fast-food primes in the social ecology over time and place that may be able to explain variance in mind and behavior. An essential advantage of the socioecological approach is to use such naturally occurring variation at different levels of analysis to gain greater purchase on causality ([Kesebir, Oishi, & Spellman, 2010](#)). To the extent that fast food is an influential prime within stimulus-rich environments, it is logical to predict that the greater the concentration of fast-food restaurants in the social ecology, the more likely they will be to affect financial impatience. The priming mechanism of exposure implies that variance in the prevalence of

fast-food restaurants over time and place should predict indicators of financial impatience across levels of analysis.

One important behavioral manifestation of financial impatience is saving, and thus, we predicted that national or regional variations in the prevalence of fast-food restaurants would exhibit an association with changes in saving behavior when static preferences were held constant. Moreover, we further hypothesized that directly measuring individuals' financial impatience by eliciting their delay discounting preference would similarly be associated with variations in the prevalence of fast-food restaurants within the local social ecology. Importantly, if fast food exerts at least some causal influence on financial impatience, we hypothesized that experimentally manipulating the salience of fast-food restaurants drawn from the same local social ecology should induce changes in individuals' delay discounting preferences.

### Overview

To test whether the prevalence of fast-food restaurants in the social ecology was associated with greater financial impatience, we adopted a multimethod approach. In Study 1 we examined the relationship between the proliferation of fast-food restaurants over the past 3 decades in developed nations and household savings rates during the same period, controlling for a wide range of dynamic, and all constant, variables. In Study 2 we analyzed the association between household saving and neighborhood fast-food restaurant concentrations, relative to full-service restaurants, within the United States over time, controlling for static household preferences and other relevant control variables. In Study 3 we directly analyzed individual delay discounting preferences as a function of neighborhood variations in the concentration of fast-food to full-service restaurants cross-sectionally. Finally, to test whether fast food plays a causal reinforcing role on financial impatience, in Studies 4 and 5 we elicited delay discounting preferences immediately after experimentally manipulating the salience of recent fast-food restaurant experiences compared to full-service chain restaurants experiences drawn from the same neighborhood and mere exposure to a fast-food establishment compared to full-service chain restaurant on the same urban street.

### Study 1

Although the slide in household saving has garnered substantial attention among economists, explanations invoking changes at the level of national and global economies have so far proved inadequate (for reviews, see Börsch-Supan, 2001; Guidolin & La Jeunesse, 2007). For example, the life-cycle theory of saving, which posits that people save while of working age and dissave at retirement (Modigliani & Brumberg, 1954), may explain some saving variance in rapidly aging societies like Japan (Chen, Imrohoroglu, & Imrohoroglu, 2007), but in general the rate of demographic change is too slow to explain the recent decline in saving. Increasing access to credit for people at all levels of socioeconomic status is another popular explanation (Parker, 2000), but it fails to address the fact that rising debt levels make up only a fraction of the drop in savings rates (Lusardi, Skinner, & Venti, 2001; Wilcox, 2008). Still other accounts have pointed to significant capital gains in stock markets and real estate over this period, which have compared favorably to low real interest rates,

thereby encouraging people to invest their money in uninsured securities and property rather than save it (Juster, Lupton, Smith, & Stafford, 2006). The constant decline in household saving, however, has not fluctuated with the boom and bust cycle of the markets (Parker, 2000); empirical evidence for this association is supportive in some developed countries but not others, including the United States (Salotti, 2010), and, more critically, roughly half the populations concerned do not invest in securities and only slightly more own housing properties (Guidolin & La Jeunesse, 2007; Lusardi et al., 2001). Finally, Wilcox (2008) is a recent proponent of the argument that rising income inequality may reduce saving because people need to spend more of their income conspicuously in order to maintain their status relative to wealthier members of society. Empirical evidence for the link between rising income inequality and declining savings is at best mixed (Leigh & Posso, 2009), however, and certain countries experiencing declines in household saving have actually seen a reduction in income inequality over the same time (Organisation for Economic Co-operation and Development, 2008).

Importantly, the decline in household saving is not restricted to a specific segment of the population (e.g., members of the baby boomer generation), nor does it occur disproportionately in different parts of the income distribution (Bosworth, Burtless, & Sabelhaus, 1991; Guidolin & La Jeunesse, 2007; Lusardi et al., 2001). Thus, Parker (2000) surmised that the prime candidates for explaining the rise in consumption and decline in saving were "factors that increase the effective discount rate" (p. 363) of consumers, driving them to increasingly prefer consumption in the present over consumption in the future. Although there are no moncausal explanations for the decline in savings in the United States over the last several decades, economic factors alone have not been sufficient to fully account for the decline (Börsch-Supan, 2001; Guidolin & La Jeunesse, 2007) without appealing to "a shift in the preferences of the typical household" (Parker, 2000, p. 363).

To some degree the decline in savings rates appears to be a function of changes in people's revealed preferences for saving. If fast-food restaurants either reflect or reinforce financial impatience, then we should observe that as fast-food restaurants proliferate at the national level, they will be associated with corresponding changes in the aggregate national household savings rate. Although among developed nations there are significant differences in cultural and economic factors, our hypothesis is that over time greater concentrations of fast-food restaurants within a country will be associated with increased financial impatience and, thus, a change in saving behavior, after controlling for these static differences between countries.

As McDonald's is the most globally prominent fast-food restaurant franchise (Schlosser, 2001), we used yearly variation in the number of McDonald's restaurants per capita across a range of developed nations as a common proxy at the national level for the proliferation of fast-food restaurants. We hypothesized that increases in the number of McDonald's restaurants per capita would be associated with decreased household savings rates over time. Furthermore, we test this hypothesis using a fixed-effects panel regression analysis along with a wide variety of time-varying covariates to minimize third-variable problems in estimating the relationship between the proliferation of fast-food restaurants and household savings rates over time. Importantly, by formally analyzing this relationship using fixed effects for country that holds

constant static preferences, we are able to infer changes in preferences for financial impatience from changes in saving behavior.

## Method

We obtained information on the number of McDonald's restaurants in OECD countries from the annual reports provided by the company for the 30-year period from 1978 until 2008. To match these data with a common metric for yearly variation in household savings rates (i.e., household net savings as a percentage of disposable income), we limited our examination to 30 developed countries from the OECD database. Since several of the annual reports failed to provide the number of restaurants by country and OECD did not have household savings rates for all the periods for each country we examined, the final data set had 384 observations for analysis: Australia (25), Austria (11), Belgium (11), Canada (27), Chile (10), Czech Republic (11), Denmark (11), Estonia (10), Finland (22), France (27), Germany (11), Greece (7), Hungary (11), Ireland (7), Italy (15), Japan (10), South Korea (9), the Netherlands (15), New Zealand (11), Norway (12), Poland (10), Portugal (11), Slovak Republic (11), Slovenia (8), Spain (9), Sweden (11), Switzerland (10), United Kingdom (11), and United States (29).

Annual population estimates for each observation were obtained from the OECD database and were used to construct a measure of McDonald's restaurants per capita. Several time-varying covariates were also considered in our analysis. From the OECD database, we were able to obtain the annual gross domestic product (GDP) per capita in U.S. dollars as measure of variations in wealth (per 100,000 people), and the ratio of those 65 and older to the working age population (years 20–64) in each country as a measure of demographic shifts. Additionally, we controlled for inflation using the annualized consumer price indices from various editions of the International Monetary Fund's International Financial Statistics Yearbook. As a measure of credit card penetration, we divided the number of credit cards in issue each year by annual OECD estimates of each country's population. For all countries in the data set, other than Slovenia, the number of credit cards in issue between 1998 and 2008 were available through Euromonitor International's Global Market Information Database. We were also able to obtain earlier data on the number of credit cards in issue for Australia (1994–2008; Reserve Bank of Australia), Canada (1978–2008; Canadian Bankers' Association), the United Kingdom (1990–2008; British Bankers' Association), and the United States (1980–2008; Nilson Report) from various sources. For the years in which the Euromonitor data overlap the data from these various sources, the average correlation between the data sets was very high ( $r = .97, p < .001$ ), so we amalgamated them into one credit-cards-per-capita variable, in which all but one country has data between 1998 and 2008 and Australia, Canada, the United Kingdom, and the United States have data for additional years.<sup>1</sup> Finally, to consider fluctuations in income inequality over time as an alternative time-varying factor, we examined the degree of income inequality as measured by the Gini Index, percentage points range from 0% (*completely equal income*) to 100% (*completely unequal*) from the WIID2 database maintained by the United Nations World Institute for Development Economics Research (<http://www.wider.unu.edu/wiid/wiid.htm>).<sup>2</sup>

## Results

**Table 1** lists the 30 OECD countries with the average number of McDonald's restaurants per capita (per 100,000 people), household net savings as a percentage of disposable income, and the number of annual observations these averages were based upon. In the last column, the McDonald's per capita correlation with saving is reported for each country separately. Within the national context, we find that 73% of correlations between McDonald's per capita and household saving were negative, suggesting that the proliferation of fast-food restaurants over time was associated with concurrent declines in household saving for the vast majority of OECD countries. Additionally, none of the correlations in the positive direction were significant. Although each of these correlations is likely to be overdetermined by country-specific factors, across the periods for which we have data, the number of McDonald's restaurants per capita was negatively correlated with household savings rates,  $r(382) = -.18, p < .001$ . Though suggestive, a correlational analysis ignores the nonindependence of repeated observations from the same countries. Therefore, to account for this nonindependence, we conducted a fixed-effects regression, which controls for all time-invariant factors, including any static country-level preferences for saving.

On average, as the number of McDonald's restaurants per capita increased, it was associated with lower household savings rates, coefficient =  $-3.50, SE = 0.21, t(357) = -17.06, p < .001$ . Although a fixed-effects analysis does control for any possible static confounds between countries (e.g., cross-cultural differences in saving behavior), it does not control for factors that vary over time (e.g., increasing credit card ownership and demographic shifts). Next we entered in national-level time-varying covariates that are likely to account for changes in the household savings rates over time.

To demonstrate that changes in the concentration of McDonald's restaurants at the national level over the past 30 years account for additional variance in household savings rates over and above some of the most relevant macroeconomic variables that have been proposed as partial explanations of declining saving behavior, we entered the following annual covariates into our fixed-effects model: ratio of old age to working age population, number of credit cards per capita, GDP per capita, and Gini coefficient. In addition, because under certain circumstances economic theory predicts that inflation will be associated with increased saving behavior (Juster & Wachtel, 1972, p. 767), changes in inflation over time were added to our analysis as a covariate.

<sup>1</sup> Consistent with the high correlation, using the Euromonitor over data from the additional sources for years with overlapping data did not change the results of any of our analyses.

<sup>2</sup> While there are serious trade-offs in terms of the extensiveness of coverage across countries over time and the degree of comparability of Gini Index values, the WIID2 database is by far the most extensive for employing a country-specific fixed-effects analysis (Leigh, 2007). Using the Luxembourg Income Study (LIS) that features highly comparable estimates of income distribution at the cost of reduction in sample size did not substantively change the results. Specifically, controlling for LIS Gini Index as a covariate, we still observed that McDonald's restaurants per capita was a significant predictor of household savings rates, coefficient =  $-3.96, SE = 0.70, t(40) = -5.69, p < .001$ .

Table 1  
*Average McDonald's per Capita and Household Savings Rate by Organisation for Economic Co-operation and Development Country in Study 1*

Country	McDonald's per capita <sup>a</sup>	SD	Savings rate <sup>b</sup>	SD	Observations <sup>c</sup>	r
Australia	2.09	1.23	6.24	5.44	25	-.92*
Austria	1.84	0.27	9.73	1.26	11	.14
Belgium	0.56	0.03	12.08	1.33	11	.44
Canada	2.78	1.12	10.33	5.86	27	-.96*
Chile	0.41	0.09	7.09	0.44	10	-.21
Czech Republic	0.63	0.12	3.73	1.82	11	-.19
Denmark	1.59	0.15	0.54	2.52	11	-.19
Estonia	0.47	0.08	-6.22	4.06	10	-.88*
Finland	0.94	0.76	1.33	2.68	22	-.38†
France	0.73	0.75	11.62	2.16	27	.12
Germany	1.42	0.21	10.20	0.62	11	.37
Greece	0.48	0.03	-7.33	0.67	7	-.35
Hungary	0.81	0.14	7.42	3.42	11	-.95*
Ireland	1.72	0.03	5.04	1.78	7	.16
Italy	0.40	0.25	13.05	5.12	15	-.96*
Japan	2.79	0.44	5.97	3.06	10	-.81*
Korea, Republic of	0.61	0.11	5.27	2.98	9	-.05
Netherlands, the	1.10	0.38	10.01	3.89	15	-.96*
New Zealand	1.96	1.15	-0.06	3.31	11	-.89*
Norway	1.15	0.42	4.89	3.42	12	.03
Poland	0.48	0.12	9.08	2.06	10	-.69*
Portugal	0.98	0.25	2.73	2.16	11	-.62*
Russian Federation	0.09	0.02	12.48	0.58	5	-.40
Slovak Republic	0.25	0.08	3.31	2.76	11	-.95*
Slovenia	0.79	0.04	9.44	1.55	8	-.25
Spain	0.80	0.05	5.18	0.88	9	-.43
Sweden	2.49	0.37	7.87	2.31	11	.25
Switzerland	1.75	0.28	10.86	1.14	10	-.15
United Kingdom	1.88	0.30	-0.55	2.94	11	-.70*
United States	3.64	0.92	5.96	3.51	29	-.94*
Average	1.25	0.34	5.91	2.52	12.93	-.18*

<sup>a</sup> Number of restaurants per 100,000 people. <sup>b</sup> Household net savings as a percentage of disposable income. <sup>c</sup> Number of complete observations for both McDonald's per capita and savings rate by country.

†  $p < .10$ . \*  $p < .05$ .

It is worth noting that when the above covariates were entered individually into the country fixed-effects model, each exhibited a significant association with household savings rates. Thus, there is reason to consider each of these covariates as a potential third variable in assessing the association of McDonald's per capita on household savings rates. Importantly, McDonald's per capita remained a significant negative predictor of household saving when entered into the fixed-effects regression model with any one of these time-varying factors individually (all  $ps < .001$ ). To consider all these time-varying factors together, so that each might function as a contributing third variable, we conducted the fixed-effects regression entering in each of these different covariates simultaneously.

In the full model, we observed that inflation was positively associated with household saving, coefficient = 0.16,  $SE = 0.08$ ,  $t(161) = 1.94$ ,  $p = .05$ ; credit cards per capita was negatively but no longer significantly associated with saving, coefficient = -1.74,  $SE = 1.86$ ,  $t(161) = -0.94$ ,  $p = .35$ ; and the ratio of those 65 and older to working-age adults was marginally negatively related to saving, coefficient = -1.71,  $SE = 1.00$ ,  $t(161) = -1.71$ ,  $p = .09$ . Moreover, GDP per capita (per 100,000 people), coefficient = -0.84,  $SE = 3.35$ ,  $t(161) = -0.25$ ,  $p = .80$ , and

income inequality, coefficient = -0.05,  $SE = 0.07$ ,  $t(161) = -0.95$ ,  $p = .52$ , were no longer significant predictors of household saving in the full model. Critically, in this full model, McDonald's per capita remained a robust predictor of household saving, coefficient = -2.61,  $SE = 0.90$ ,  $t(161) = -2.91$ ,  $p = .004$ . Thus, we observed evidence across 30 OECD countries that the proliferation of fast food was on average associated with a corresponding lower propensity for households to save their disposable income at the aggregate national level.

Of course in addition to these theoretically relevant covariates predicted by previous research, many other time-varying factors may contribute to this association, so caution is warranted in interpreting these results. However, as a final robustness check we simultaneously entered in fixed effects for both year and country in predicting household savings rates. Adding in these time fixed effects holds constant unobserved effects that vary across time (e.g., yearly fluctuations in the global economy in general that influenced household savings rates for all these OECD countries). The model including fixed effects for both country and year simultaneously still showed a significant effect for McDonald's restaurants per capita on household savings rates, coefficient = -2.11,  $SE = 0.64$ ,  $t(328) = -3.33$ ,  $p = .001$ .

## Discussion

The results of this study showed that the proliferation of fast-food restaurants at the national level—not just in the United States, but on average across 30 OECD countries—was associated with a lower propensity for households to save their disposable income. The association between McDonald's restaurants per capita with household savings rates at the macrolevel appeared to be fairly robust and was not accounted for by time-varying variables such as GDP per capita, demographic shifts in age, credit card penetration, the degree of income inequality, or any general yearly fluctuations in the global economy. Although additional cultural and economic factors (e.g., the rate of taxation and savings subsidies) that influence these variables across the different institutional settings in our analysis may remain, it is important to highlight the power of a fixed-effects analysis over a cross-sectional analysis in terms of addressing time-invariant cultural and economic explanations (see [Gujarati & Porter, 2009](#), for an overview). Alternative explanations must appeal to dynamic cultural, institutional, and/or economic factors that are associated with both McDonald's per capita and household savings rates that remained unspecified in our model. Most importantly, the present findings allow an initial inference that we are observing changes in population-level financial impatience as a function of the prevalence of fast food in the social ecology.

That said, the proliferation of fast-food restaurants may still be associated with other time-varying determinants of household savings rates that we cannot control. Obviously, McDonald restaurants do not open randomly; presumably, they open new restaurants in countries where they expect demand for fast food to be strong ([Currie, DellaVigna, Moretti, & Pathania, 2010](#)). Perhaps McDonald's specifically, or fast-food companies more generally, anticipates changes in a country's financial impatience when deciding when and where to open more restaurants. In such a case, we would still have good evidence that financial impatience was changing, but it would be unclear whether the proliferation of fast-food restaurants was merely an epiphenomenal indicator of changes in financial impatience or whether their presence acted to further reinforce financial impatience. Although the relationships in this study were at best suggestive, they were nevertheless highly consistent with our theoretical perspective.

Although the developed countries represent a diverse set of cultural and economic factors, our proxy for the proliferation of fast-food restaurants utilized variation in a single corporate franchise. Of course a measure that captures a broader spectrum of fast-food restaurants, as well as their concentration relative to full-service restaurants, would be a more robust demonstration. In our next two studies, we borrow an operationalization of fast-food restaurant concentration from the epidemiological study of obesity (e.g., [Mehta & Chang, 2008](#)): the ratio of fast-food restaurants relative to full-service restaurants within a neighborhood. More importantly, if the prevalence of fast-food restaurants reinforces financial impatience, we would expect to observe such relationships in finer grained levels of analysis both within nations and within households over time. We conducted our next study to test the hypothesis that households that live in neighborhoods with a greater concentration of fast-food restaurants exhibit lower household savings rates, as further

evidence of changes in financial impatience being driven by the social ecology.

## Study 2

If declines in household savings rates are indeed influenced by the proliferation of fast-food restaurants at the national level, then there should be parallel within-nation differences, such that households living in neighborhoods with higher concentrations of fast-food restaurants exhibit lower levels of saving. In Study 2 we test this hypothesis by examining within-household variation in saving behavior over time as a function of neighborhood variations in the concentration of fast-food restaurants within the United States, controlling for static household preferences as well as several other potentially confounding dynamic variables.

Of course in all nonexperimental studies, reverse causality is a threat to internal validity that should be addressed. In this particular data set, for instance, it is possible that associations between neighborhood fast-food restaurant concentrations and household savings rates could emerge if financial preferences drove households to locate in particular neighborhoods or if fast-food restaurants tended to open in neighborhoods inhabited by financially impatient residents. To obtain stronger evidence of the directionality of the predicted association, it is critical to control for stable household preferences to account for such potential selection effects. Although previous approaches have attempted to address the issue of selection effects by employing a wide set of covariates (e.g., [Mehta & Chang, 2008](#)), we approached this issue by using five waves of panel data to conduct a fixed-effects analysis. This approach allows us to examine changes within households' saving behavior over a substantial period as a function of the concentration of fast-food restaurants at the neighborhood level. Critically, by controlling for static household preferences, we are poised to make inferences regarding how financial impatience changes as a function of the evolving social ecology, thereby reducing the potential for reverse causation due to selection effects ([Gujarati & Porter, 2009](#)).

## Method

The data used in this study were drawn from the Panel Study of Income Dynamics (PSID). Begun in the 1960s, the PSID gathers longitudinal information on a nationally representative sample of households and the new households that subsequently emerged from the original sample. Since 1997 the basic PSID survey has been conducted biennially, and starting in 1999 the identical wealth questions have been included in each of the five waves included in our analysis (1999, 2001, 2003, 2005, and 2007).

In panel surveys, household saving can be measured as the between-wave differences in household wealth, adjusted for any capital gains or losses or net transfers into the household ([Juster, Smith, & Stafford, 1999](#)). Thus, we used the summary variable for household wealth calculated by PSID across different asset types net of debt value plus value of home equity for each panel wave with fixed effects for household. This allowed us to observe between-wave differences in household wealth as the dependent measure of changes in household saving. Importantly, we control for the total household income for the previous tax year (i.e., year prior to the panel wave assessment of saving) that comprises both

taxable and transfer income. Taxable income includes realized capital gains, but not unrealized capital gains. In addition to controlling for the potential inputs for household saving obtained from work, this variable controls for savings stemming from transfer income (Bosworth & Anders, 2008; Juster et al., 1999). Using this variable as a covariate allowed us to predict between-wave differences in household wealth adjusting for total household income that includes any capital gains or losses and net transfers into the household, thus resulting in a clearer measure of household saving behavior. Importantly, this accounts for the household's financial situation for a given year in estimating the effects of regional variation in the concentration of fast-food restaurants.

We measured neighborhood variation in the concentration of fast-food restaurants at the ZIP code level, which is substantially more proximal than at the national, state, or county level (Larson, Story, & Nelson, 2009). The independent variable of neighborhood variation in fast-food restaurant concentration was added to the data set by linking secured PSID household data with publicly available restaurant data from the economic census that was released in 1997 and 2002.<sup>3</sup> Specifically, we used the North American Industry Classification System (NAICS) for the number of fast-food restaurants (NAICS code 722211) and full-service restaurants (NAICS code 722110) in each ZIP code. Due to longitudinal variance in fast-food restaurant concentrations at the ZIP code level, however, explicitly modeling any nesting of observations within the same ZIP code is not possible given current statistical techniques of which the authors are aware. Nevertheless, nonindependence of observations due to such nesting is of minimal concern in this data set; given the nationally representative sample's small size, relative to the more than 42,000 ZIP codes across the United States, a negligible number of household respondents reported residing in the same ZIP code.

Consistent with prior obesity research on the concentration of fast-food restaurants (e.g., Mehta & Chang, 2008), we used the ratio of fast-food restaurants to full-service restaurants within a household's neighborhood (i.e., ZIP code). Thus, a higher ratio indicated a higher concentration of fast-food restaurants relative to full-service restaurants in a household's local social ecology. Importantly, this ratio measure adjusts for the relative presence of other restaurants in a neighborhood, which is likely to be a good proxy for characteristics of a neighborhood that may be correlated with the presence of fast-food restaurants and with factors that may contribute to saving, such as urbanicity (Currie et al., 2010). Further, previous research has found that appetitive stimuli such as calorie-dense food can activate the impulsive hot system that induces financial impatience (Li, 2008). Because full-service restaurants represent other food-service-related stimuli within the social ecology, this ratio measure helps to isolate the unique components of fast food that may be associated with changes in financial impatience. As opposed to using a simple count of fast-food restaurants in a ZIP code, which might indicate the prevalence of appetitive food stimuli in a household's neighborhood, the ratio measure helps to tease apart the "fast" service provided uniquely by fast-food restaurants as the predictor of financial impatience. Restaurant counts from the 1997 economic census were linked with household ZIP code for the 1999 and 2001 waves of the PSID, and counts from the 2002 economic census were linked with 2003, 2005, and 2007 waves of the PSID. The

fast-food concentration ratio across ZIP codes ranged from 0 to 30, with mean ratio of 0.88 ( $SD = 1.04$ ).

Additionally, we controlled for the population of the ZIP code and the household median income of the ZIP code, both taken from the 2000 U.S. decennial census. Although data from the 2000 decennial census do not allow us to capture variation across the 1997 and 2002 periods, they provide the best available measure at the ZIP code level of population ( $M = 12,050.13$ ,  $SD = 14,241.26$ ) and median income ( $M = 41,772.05$ ,  $SD = 16,695.41$ ). In line with prior work examining the ratio of fast-food restaurants (Mehta & Chang, 2008), we logarithmically transformed the other predictor variables and the outcome variable in order to produce more normal distributions and reduce the effect of outliers.<sup>4</sup> The resulting full model analyzed was based on 14,094 observations from 6,805 households.

## Results

As our initial examination of whether the concentration of fast-food restaurants in the local social ecology is associated with diminished household saving, controlling for static household preferences, we first conducted a fixed-effects panel regression predicting household wealth with total household income in the previous tax year as a covariate and concentration of fast-food restaurants as our central independent variable. Greater household income in the previous tax year was strongly associated with greater household saving, coefficient = 1.13,  $SE = 0.02$ ,  $t(7287) = 48.83$ ,  $p < .001$ . Consistent with our hypothesis, a higher concentration of fast-food restaurants was negatively associated with household saving, coefficient = -0.13,  $SE = 0.02$ ,  $t(7287) = -7.99$ ,  $p < .001$ .

Although the economic census provided detailed information regarding the concentration of fast-food restaurants by ZIP code for 1997 and 2002, it does not provide estimates of the median income nor population by ZIP code. To conduct our full model, we obtained the estimates of the median income and population for ZIP codes from the 2000 U.S. census. Although this measure does not capture the time variation in the concentration of fast-food restaurants we have from the economic census (i.e., changes between 1997 and 2002), it does give us a sense for differences between ZIP codes.<sup>5</sup> Table 2 reports the results of the full model. Importantly, when household income, median neighborhood in-

<sup>3</sup> The economic census suppresses the release of data for low-population ZIP codes.

<sup>4</sup> Analyzing the concentration of fast-food restaurants as separate predictors of household saving resulted in two significant main effects that did not substantively change our conclusions. Specifically, the raw number of fast-food restaurants was negatively associated with household saving, coefficient = -0.016,  $SE = 0.002$ ,  $t(7551) = -7.10$ ,  $p < .001$ , whereas the raw number of full-service restaurants was positively associated with household saving, coefficient = 0.010,  $SE = 0.002$ ,  $t(7551) = 4.87$ ,  $p < .001$ . Additionally, the full model conducted without the variables logged, indicated statistically weaker but similar and statistically significant results that did not differ substantial from the logged model. Specifically, the concentration of fast-food restaurants in the model without logging the variables was coefficient = -15406.32,  $SE = 5756.50$ ,  $t(9565) = -2.68$ ,  $p = .007$ .

<sup>5</sup> It is possible to obtain yearly population estimates from different sources (e.g., the American Community Survey), but these population estimates were only broken down by county and not by ZIP code, which would be a much more distal predictor than at the ZIP code level.

Table 2  
*Fixed-Effects Regression Predicting Savings in Study 2*

Predictor	Coefficient	SE
Fast-food concentration <sup>a</sup>	-0.07*	0.02
Population (log) <sup>b</sup>	-0.20*	0.02
Median income (log) <sup>b</sup>	1.02*	0.06
Income (log) <sup>c</sup>	0.99*	0.02
Constant	-8.41*	0.63
Fixed-effects $R^2$	.63	
Adjusted $R^2$	.29	

Note. Values indicate coefficients and standard errors from fixed-effects regression. Positive values indicate greater savings. Based on 14,094 observations from 6,805 households.

<sup>a</sup> Based on 1997 and 2002 economic census ZIP code. <sup>b</sup> Based on 2000 U.S. decennial census ZIP code. <sup>c</sup> Based on Panel Study of Income Dynamics wave household respondents.

\*  $p < .05$ .

come, and neighborhood population were entered into the fixed-effects equation, the concentration of fast-food restaurants remained a significant predictor of household saving, coefficient = -0.07,  $SE = 0.02$ ,  $t(7285) = -4.24$ ,  $p < .001$ .

## Discussion

After controlling for stable household preferences, the findings of this study indicate that variation in the concentration of fast-food restaurants in the local social ecology predicts changes in household saving over time. On average, households reported greater reductions in saving behavior between 1999 and 2007 when their day-to-day living environment had a higher concentration of fast-food restaurants. By using a fixed-effects analysis, we were able to methodologically rule out the possibility that this association was the product of stable preferences that caused households to select into neighborhoods with various levels of fast-food restaurant concentration, or alternatively, that fast-food restaurants are more likely to locate in neighborhoods with higher concentrations of impatient people. Importantly, by controlling for static household preferences, the changes we observe in saving behavior during this 8-year period are consistent with the hypothesized changes in household financial impatience preferences as a function of fast-food concentration within the social ecology.

The results of this study add substantially to the empirical findings of Study 1. Study 1 simply showed that at the national level the proliferation of fast-food restaurants over time was associated with decreased household savings rates. Although it was clear that preferences for saving were changing over this period, it remained unclear whether fast-food restaurants had a reinforcing role in the shifts toward financial impatience. In the present study, we were able to more precisely link changes of the concentration of fast-food restaurants in the local neighborhood with changes in household saving. By using a fixed-effects model that controlled for all static household characteristics, we observed evidence that increases in the concentration of fast-food restaurants in the local social ecology were associated with decreases in household saving over time, which is consistent with the hypothesis that household financial preferences become more impatient as a product of increasing fast-food concentration within the social ecology. Moreover, our ratio measure of fast-food concentration took into

account the relative prevalence of food-service-related stimuli within each neighborhood (i.e., baseline level of restaurants within a ZIP code). Thus, this finding supports our contention that fast-food restaurants represent more than just appetitive stimuli that activate the impulsive hot system (Li, 2008), and instead predict financial impatience because of their association with impatience and instant gratification.

Nevertheless, the potential for a spurious relationship persists because fast-food chains are unlikely to open restaurants randomly (Currie et al., 2010). Importantly, the concentration of fast-food restaurants may still be associated with other determinants of household saving that were not controlled for in the analysis. What we were able to observe in this study, however, is the changes in saving behavior as a function of the concentration of fast-food restaurants in a household's local social ecology.

In our first two studies, we tested our hypothesis that exposure to fast-food restaurants in the social ecology affects individual preferences for balancing current and future economic benefit by observing actual saving behavior. We used changes in objective saving behavior in order to infer changes in underlying financial preferences. Indeed, saving behavior was a meaningful outcome variable for us to examine precisely because economic theory views the rate at which individuals discount future costs and benefits as a critical factor undergirding saving behavior, even though actual saving behavior is influenced and constrained by a variety of additional factors. Additionally, the longitudinal nature of these data sets on saving behavior allowed us to examine changes in intertemporal financial preferences over extended periods, as manifest in an ecologically valid and critically important outcome variable.

However, since saving behavior may be constrained by a variety of factors that might trump preferences at any given time (e.g., changes in nondiscretionary expenses), a more proximate test of whether the concentration of fast-food restaurants is associated with greater financial impatience is to directly measure delay discounting preferences, so that the trade-offs between time and money are transparent and identical for all respondents. Therefore, in our next study we examine individuals' delay discounting preference as a more direct test of whether exposure to fast-food restaurants affects financial impatience. Specifically, we measured delay discounting as a monthly discount factor using standard experimental methods (e.g., Weber et al., 2007) that have recently been shown to predict important financial outcomes (Meier & Sprenger, 2010, 2012).

## Study 3

In the previous studies, we infer increasing financial impatience from declining household saving over time rather than measure intertemporal financial preferences directly. If it is indeed the underlying delay discounting preferences that are affected by more frequent exposure to fast-food restaurants, we would expect that the concentration of fast-food relative to full-service restaurants in the local social ecology would be associated with a steeper discounting of delayed monetary rewards at the individual level. By measuring responses to a hypothetical question that highlights the trade-offs inherent to saving money but is free of the real-world constraints that might affect saving decisions at any given moment, we could examine intertemporal financial preferences separately

from many other confounds. Moreover, by demonstrating that respondents who live in neighborhoods with higher fast-food concentrations exhibit steeper delay discounting preferences, we could provide additional insight and evidence into respondents' financial impatience. In this study, we sought to directly test whether local variations in the concentration of fast-food restaurants are associated with variations in delay discounting preferences in a nationally representative sample.

## Method

The data used in this study were drawn from the 2006 wave of the National Longitudinal Survey of Youth (NLSY79), a longitudinal survey conducted by the U.S. Bureau of Labor Statistics (BLS) that followed 12,686 individuals from 1979 to 2010. The respondents were between 14 and 22 years of age in 1979, and were interviewed annually until 1994 and biennially thereafter. The full sample consists of 6,111 randomly selected individuals, 5,295 minority and economically disadvantaged youths, and 1,280 military youths. Given the complex sampling design of the NLSY79 (Center for Human Resource Research), we used the sample correction weights provided by the BLS in order to correct for oversampling, resulting in effective sample sizes (and hence degrees of freedom) that are substantially smaller than the achieved sample size reported above.

As we are focusing on delay discounting specifically in this study, we used the only wave (2006) that includes a measure of monthly delay discounting preferences. Specifically, we analyzed participants' responses to the following question as our dependent variable:

Suppose you have won a prize of \$1000, which you can claim immediately. However, you can choose to wait one month to claim the prize. If you do wait, you will receive more than \$1000. What is the smallest amount of money in addition to the \$1000 you would have to receive one month from now to convince you to wait rather than claim the prize now?

We used the amount respondents' specified to calculate their monthly discount factor by dividing 1,000 by 1,000 plus the additional amount specified to wait 1 month to receive the prize. Thus, a delay discount factor of 1 reflects total patience, and values lower than 1 reflect successively greater impatience. Participants' monthly delay discount rate ranged from .001 to 1, and we deleted observations that were lower than 3 standard deviations below the mean.

Although the complete list of survey variables for all the waves is publicly available online from the BLS ([www.bls.gov/nls/nlsy79.htm](http://www.bls.gov/nls/nlsy79.htm)), the geocode data are kept secure to maintain the confidentiality of respondents. Through a review process, we were able to analyze these secure data at the BLS office in Washington, D.C. We merged the NLSY79 respondent data with the secured geocode data for home address ZIP code with the ratio of fast-food restaurants to full-service restaurants from the 2002 economic census used in the previous study.<sup>6</sup> Importantly, we sought to control for individuals' economic circumstances using both total net family income reported in the 2006 wave and a more extensive financial assessment of total family net worth conducted in the 2004 wave (not collected in 2006 due to budget cuts). Additionally, we controlled for education with a continuous variable of the

number of years of education and for ethnicity by including dummy variables for African American and Hispanic, with White, non-Hispanic as the reference category. Since the survey followed the same respondents who were between 18 and 22 years of age in 1979 (i.e., 45–49 in 2006), age was to a great degree held constant in our cross-sectional analysis. As with the previous study, we controlled for the population and median income of participants' ZIP code (log transformed) from the 2000 U.S. decennial census.<sup>7</sup>

## Results and Discussion

**Table 3** reports the means, standard errors, and intercorrelations of the relevant study variables. As predicted, we observed that the concentration of fast-food restaurants was negatively correlated with greater preferences to discount a monthly delay,  $\beta = -.07$ ,  $t(3646) = -3.91$ ,  $p < .001$ .

**Table 4** reports the full model, after controlling for both the relevant ZIP code-level and individual-level characteristics. Consistent with our hypothesis, the concentration of fast-food restaurants continued to have a significant negative association with delay discount preferences,  $\beta = -.04$ ,  $t(2935) = -2.12$ ,  $p = .034$ . Thus, in a distinct cross-sectional sample using a direct measure of financial impatience at the individual level, we were able to conceptually replicate the findings of Studies 1 and 2. Importantly, we were able to control for an extensive set of economic variables at the individual and neighborhood level, suggesting that fast-food concentration in the local social ecology predicts explicitly elicited delay discounting rates over and above a broad spectrum of relevant economic factors. Despite our deployment of covariates, however, the conclusions of this study are vulnerable to potential third-variable problems given the cross-sectional design. Although we controlled for the population and median income of respondents' ZIP code, the concentration of fast food in a neighborhood may be associated with a wide variety of different characteristics that might also be associated with more financially impatient preferences. The only way to definitively rule out such third-variable alternatives is to employ an experimental design. Therefore, in our next study we methodologically approached this issue in a way that was directly linked to our operationalization of fast-food restaurant concentration in the previous two studies, but did so in a manner that held constant neighborhood characteristics as part of the study design and allowed for stronger causal inferences.

<sup>6</sup> Again, analyzing the concentration of fast-food restaurants as separate predictors of delay discounting resulted in two significant main effects that did not substantively change our conclusions. Specifically, the raw number of fast-food restaurants was negatively associated with delay discounting,  $\beta = -.07$ ,  $t(3703) = -2.70$ ,  $p = .007$ , whereas the raw number of full-service restaurants was positively associated with delay discounting,  $\beta = .07$ ,  $t(3703) = 2.47$ ,  $p = .013$ .

<sup>7</sup> When a wider set of control variables in the NYLS79 were entered into the model in addition to those specified in the main analysis (i.e., age, gender, marital status, education, income, and work hours), the main effect was not substantively changed. Specifically, concentration of fast-food was still negatively associated with delay discounting,  $\beta = -.04$ ,  $t(2935) = -1.13$ ,  $p = .03$ . For parsimony's sake, we do not discuss these additional covariates further.

Table 3  
*Means, Standard Deviations, and Intercorrelations in Study 3*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Fast-food concentration	1.36	1.34	—								
2. Population (log)	4.32	0.37	.24*	—							
3. Median income (log)	4.63	0.15	-.11*	.09*	—						
4. Household income (log)	4.75	0.40	-.08*	.03*	.39*	—					
5. Household net worth (log)	4.87	0.81	-.10*	-.04*	.37*	.56*	—				
6. Years of education	13.57	2.53	-.03*	.05*	.28*	.38*	.35*	—			
7. African American	0.25	0.43	.25*	.12*	-.22*	-.20*	-.26*	-.05*	—		
8. Hispanic	0.19	0.39	-.02	.18*	-.09*	-.06*	-.08*	-.16*	-.28*	—	
9. Delay discount rate	0.75	0.22	-.08*	-.06*	.15*	.15*	.18*	.15*	-.17*	-.09*	—

Note. Raw unweighted values.

\*  $p < .05$ .

#### Study 4

Although the previous archival analyses substantiated the plausibility of a link between the concentration of fast-food restaurants in the local social ecology and changes in financial impatience, they cannot be used to infer a definitive causal relationship. No matter how many variables we control for, such analyses still leave open the potential for third variables that could explain these associations. In particular, neighborhoods can vary on many dimensions that might be correlated with both the concentration of fast-food restaurants and financial impatience. Therefore, in the next study we sought to directly manipulate the salience of meal experiences in either fast-food or full-service restaurants located within the same neighborhood.

Specifically, we examined whether asking individuals to recall a recent dining experience within a fast-food or full-service chain restaurant located in the same neighborhood could cause a shift in financial impatience. If it is the case that greater exposure to fast-food restaurants relative to full-service restaurants has a causal effect on financial impatience, then recalling meal experiences in fast-food restaurants should induce more financial impatience than recalling meal experiences in full-service restaurants. The use of

full-service chain restaurants as the comparison condition in this experiment also allowed us to precisely test our hypothesis that exposure to fast-food restaurants affects financial impatience as distinct from appetitive stimuli (Li, 2008). A significant difference across conditions in this experiment would thus support the findings of the previous surveys by confirming whether the salience of fast-food restaurant experiences represents a unique feature of the social ecology, capable of contributing to recent societal shifts in financial impatience because it embodies the goal of instant gratification.

Our experimental approach extends Zhong and DeVoe (2010) in a number of important ways. First, whereas Zhong and DeVoe primarily relied on minimum exposure to logos of popular fast-food restaurants, in this study we randomly assigned participants to recall a recent experience eating at a fast-food restaurant or full-service chain restaurant from the same neighborhood, which functions to hold constant the characteristics of the neighborhood associated with these memories as well as familiarity with the restaurants in question. Second, in this experiment we also sought to show that behavioral manifestations of impatience descriptively mediate the effect of fast-food salience on financial impatience. We examined whether time spent completing the task of recalling the dining experience—a behavioral indicator of impatience—played a mediating role in explaining differences in delay discounting preferences across experimental conditions. Finally, whereas the delay discounting measure of financial impatience in Zhong and DeVoe involved a hypothetical delay of 1 week, in this study we used an incentivized delay of 1 month, which is widely used in the economics literature and predicts important financial outcomes reflective of impatience such as credit card debt and credit scores (Meier & Sprenger, 2010, 2012).

#### Method

**Participants.** Members from a paid university research pool in Canada were solicited to participate in an online survey about consumer preferences in exchange for being entered into a drawing to receive an Amazon.com gift certificate of up to \$80. One hundred and eighty participants (130 female, 50 male) completed the survey, and 13.9% indicated they held a terminal degree. As we had used this pool for studies that are unrelated to financial impatience but nevertheless involve fast food, at the study's conclusion we asked participants whether they remembered complet-

Table 4  
*Ordinary Least Squares Regression Predicting Delay Discount Rate in Study 3*

Predictor	$\beta$
Fast-food concentration <sup>a</sup>	-.04*
Population (log) <sup>b</sup>	.00
Median income (log) <sup>b</sup>	.03
Household income (log) <sup>c</sup>	-.01
Household net worth (log) <sup>c</sup>	.09*
Years of education <sup>c</sup>	.09*
African American <sup>c</sup>	-.09*
Hispanic <sup>c</sup>	-.06*
<i>R</i> <sup>2</sup>	.07

Note. Values indicate standardized coefficients from ordinary least squares regression. Positive values indicate greater financial patience. Based on an effective sample size of 2,935 using 2006 cross-sectional sample weights from an achieved sample size of 4,829 observations.

<sup>a</sup> Based on 2002 economic census ZIP code. <sup>b</sup> Based on 2000 U.S. decennial census ZIP code. <sup>c</sup> Based on National Longitudinal Study of Youth 1979 respondent data.

\*  $p < .05$ .

ing any similar online study and excluded those responding in the affirmative ( $n = 19$ ), leaving a final sample of 161.

**Manipulation.** We a priori identified six fast-food restaurants and six full-service chain restaurants within the same local neighborhood—that is, same forward station area postal region defined by “M5S” (Bathurst Street to Bay Street and Bloor Street to College Street in the city of Toronto, Canada). Participants were told that a colleague in the marketing department would like to learn more about how people remember recent consumer experiences. Participants were given the graphic logos of six different establishments in the vicinity of the university and asked to indicate the one that they had visited most recently. Participants were given the option to write in a food establishment if they had never visited any of the six displayed.<sup>8</sup> After selecting a food establishment, participants were asked to describe their most recent meal experience at the food establishment in a vivid and detailed manner. Specifically, participants were asked as part of a memory recall task: “Please describe in detail your most recent meal experience at \_\_\_\_\_. Try to be as vivid and detailed as you can in your description. This will help us understand how these kinds of experiences are remembered.” The manipulation consisted of randomly assigning participants to recall a meal experience either from a list of six fast-food establishments ( $n = 79$ ) in the local neighborhood (KFC, McDonald’s, Burger King, Wendy’s, Subway, and Taco Bell) or from a list of six full-service chain restaurants ( $n = 82$ ) in the local neighborhood (Gabby’s, Over Easy, Pho Hung, Spring Rolls, St. Louis Bar and Grill, and Swiss Chalet).

### Measures.

**Task completion speed.** General action speed is one of the core components used to measure impatience and time urgency. The Speed and Impatience scale used to measure Type A behavior (Jenkins, Zyzanski, & Rosenman, 1979), for example, asks people to retrospectively report how quickly they eat, walk, and process things in general. Similarly, measures of time urgency typically use prior behavior to measure the construct (e.g., Landy, Rastegary, Thayer, & Colvin, 1991; Wright, McCurdy, & Rogoll, 1992). The retrospective reporting of prior behaviors in these measures does not make them appropriate for experimental manipulation, and therefore, they were not administered in this study. Following recent work on behavioral indicators of impatience (DeVoe & Pfeffer, 2011; Zhong & DeVoe, 2010) and based upon our theorizing that impatience activated by fast food would prompt individuals to attempt to complete subsequent tasks more quickly, we measured the time it took participants to complete the recall task.

To control for individual differences in typing speed, participants at the very beginning of the study were asked to type a 72-word paragraph describing the rules of baseball into a textbox. Immediately after this task, participants engaged in the recall task. To construct the behavioral indicator of impatience, we divided the time spent recalling the meal experience ( $M = 166.98$  s,  $SD = 159.13$ ) by the time needed to complete the typing task ( $M = 92.74$  s,  $SD = 48.34$ ).<sup>9</sup> Additionally, we considered the number of words written as another indicator of participants’ impatience to complete the task as quickly as possible. Both of these measures indicate the extent to which participants succinctly and efficiently completed the task of recalling their meal experience. By more briefly summarizing the experience they were recalling, participants were able

to complete this task more quickly, so that they could finish participating in the study sooner and move on to other things. Thus, the speed with which participants completed this task nicely illustrates the goal of time efficiency that fast food embodies. Given the positive skew of both the task completion speed and word count data, we logarithmically transformed both variables in order to produce a more normal distribution and reduce the effect of outliers.

**Financial impatience.** We measured delay discounting as a monthly discount factor using standard experimental methods (e.g., Weber et al., 2007), which has recently been shown to predict important financial outcomes related to impatience (Meier & Sprenger, 2010, 2012). Participants encountered six decisions where they chose between progressively smaller payouts that day and a larger payout 1 month later (\$75 today vs. \$80 in a month; \$70, \$65, \$60, \$50, and \$40). Economists typically insist that such financial decisions be incentivized, and to this end participants were advised that three randomly selected participants would receive one of their choices as an Amazon.com gift card via e-mail on the specified time line. As with the previous study, we converted responses into monthly delay discount factor where 1 reflects total patience and values lower than 1 reflect successively more impatience. The delay discounting responses ranged from .50 to 1 ( $M = .93$ ,  $SD = .10$ ).<sup>10</sup>

**Recalled monetary and temporal dimensions of the restaurant experience.** After the dependent variable, we asked participants about the price of the meal (in Canadian dollars) and length of the meal (in minutes) they had described earlier. First, participants estimated how much their meal had cost: “About how much did you spend on your meal (only include one person’s meal in this estimate)—\$\_\_\_\_\_. Second, participants estimated the duration of three core aspects of the meal experience (i.e., ordering, service, and eating). Specifically, participants estimated each of the following in terms of minutes: “About how long did you wait to place your order?” “About how long did it take you to get your food after you ordered?” and “About how long did it take you to finish your meal once you started to eat it?” Duration responses were inter-

<sup>8</sup> To see whether there were any detectable differences across our dependent variables, we created a dummy variable for clicking the other option (1 = indicated other) and observed that it was uncorrelated with delay discount rates ( $r = .02$ , ns), log of task completion speed ( $r = .04$ , ns), and log word count ( $r = .07$ , ns). This lack of difference eased our concerns that allowing for this other option might have systematically affected the results. As a sensitivity analysis to confirm this, we conducted the main analysis of covariance analysis on monthly delay discount preferences excluding participants who indicated other and observed a comparable main effect across condition with those in the fast-food restaurant condition having a lower delay discount rate ( $M = 0.91$ ,  $SD = 0.11$ ) than those in the full-service chain restaurant condition ( $M = 0.95$ ,  $SD = 0.06$ ),  $F(1, 141) = 7.74$ ,  $p = .006$ . Moreover, the dummy variable for indicating other was uncorrelated with the dependent variables (all  $ps > .35$ ).

<sup>9</sup> Importantly, if we use prior typing time as a covariate, we get the similar results. The correlation between condition and the log of total time spent recalling the meal experience without adjusting for individual differences in speed was  $-.17$  ( $p = .036$ ).

<sup>10</sup> We included a hypothetical scenario from Griskevicius, Tybur, Ackerman, Delton, and Robertson (2012, p. 74) on saving or borrowing in anticipating one’s first job after college prior to the main incentivized financial impatience measure. Perhaps because of its hypothetical nature, we did not observe any differences across condition on the Griskevicius et al. scenario ( $ps < .80$ ), and thus, do not discuss it further.

correlated with each other ( $\alpha = .61$ ), and we added them together to create a measure of the experience's duration. Together these measures allowed us to evaluate whether monetary or temporal dimensions of participants' recalled meal experience were related to their elicited financial impatience.

## Results

**Table 5** reports the means, standard deviations, and intercorrelations of the main study variables. As expected from random assignment, there was no relationship between condition and age. However, we observed marginal to significant differences across conditions for all other variables, most critically on financial impatience. Importantly, financial impatience was significantly related to condition, time spent recalling, and number of words typed in the recall. Recalled monetary and temporal dimensions of the restaurant experience were uncorrelated with financial impatience. Consistent with prior research, age was significantly associated with financial impatience (Green, Myerson, & Ostaszewski, 1999) as well as marginally related to task completion speed and significantly related to the number of words written in the recall task. Therefore, we next examined the differences across condition more systematically by conducting a series of one-way analyses of covariance controlling for age. Importantly, participants randomly assigned to recall a fast-food restaurant experience discounted delayed rewards significantly more ( $M = .9054$ ,  $SD = .1152$ ) than their counterparts assigned to recall a full-service chain restaurant experience ( $M = .9444$ ,  $SD = .0828$ ),  $F(1, 157) = 6.42$ ,  $p = .012$ ,  $\eta_p^2 = .039$ . These results conceptually replicated those of Zhong and DeVoe (2010) and provided causal evidence that the salience of experiences associated with fast-food dining in one's local social ecology affects financial impatience.

Moreover, if recalling fast-food dining experiences activates a generalized sense of impatience, then participants in that condition would want to complete the task as quickly as possible, spending less time on the task and writing fewer words. To test this we conducted a one-way analysis of covariance controlling for age on both indicators of behavioral impatience. Participants randomly assigned to recall a time they ate at a fast-food restaurant sped through the task significantly faster ( $M = 0.06$ ,  $SD = 0.46$ ) compared to participants assigned to recall a time they ate at a full-service chain restaurant ( $M = 0.22$ ,  $SD = 0.40$ ),  $F(1, 157) = 6.06$ ,  $p = .015$ ,  $\eta_p^2 = .037$ . Furthermore, participants randomly assigned to recall a time they ate at a fast-food restaurant wrote marginally fewer words ( $M = 1.58$ ,  $SD = 0.49$ ) than their coun-

terparts assigned to recall a time they ate at a full-service chain restaurant ( $M = 1.72$ ,  $SD = 0.44$ ),  $F(1, 155) = 3.76$ ,  $p = .054$ ,  $\eta_p^2 = .024$ .

It is possible that the differences across condition in task completion speed or words written might be due to the impoverished experience of eating fast food—in general social contact in full-service restaurants tends to be richer than that in fast-food restaurants. However, it is worth noting that task completion speed and words written were empirically unrelated to participants' self-report of objectively how long the meal took. More importantly, this alternative explanation cannot account for the finding that both recall time and words written were significantly correlated with the measure of financial impatience (see **Table 5**). We conducted mediational analyses to test whether these potential behavioral manifestations of impatience descriptively mediated the effect of condition on financial impatience.

Since the difference between the two conditions in word count was only marginally significant, we only considered task completion speed as a descriptive mediator in explaining participants' delay discount preferences. Following Baron and Kenny (1986), we first regressed financial impatience on experimental condition (fast food = 1) and then on task completion speed. The standardized regression coefficient paths for the mediation analysis are reported in **Figure 1**.

The effect of condition on financial impatience was initially significant,  $\beta = -.19$ ,  $t(159) = -2.40$ ,  $p = .018$ , and became marginally significant when task completion speed was entered,  $\beta = -.14$ ,  $t(158) = -1.86$ ,  $p = .065$ . The association between task completion speed and financial impatience was also highly significant,  $\beta = .22$ ,  $t(158) = 2.81$ ,  $p = .006$ . These results suggest that the effect of experimental condition on time preference was mediated by a general sense of impatience as indicated by the time participants spent on the recall task ( $z = -1.95$ ,  $p = .05$ ). In addition, the 95% bias-corrected confidence interval for the indirect effect based on 5,000 bootstrapped samples as per Preacher and Hayes (2008) excluded zero [-.0259, -.0008], suggesting a significant indirect effect.

## Discussion

Results of this experiment showed that participants randomly assigned to recall a fast-food restaurant experience exhibited greater financial impatience than those recalling a full-service restaurant experience from the same neighborhood. The design of this experiment implicitly held constant the different associations

**Table 5**  
*Means, Standard Deviations, and Intercorrelations in Study 4*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Condition <sup>a</sup>	0.49	0.50	—						
2. Task completion speed (log)	0.14	0.43	-.19*	—					
3. Number of words in recall (log)	1.65	0.47	-.15†	.76*	—				
4. Discount rate	0.93	0.10	-.19*	.25*	.30*	—			
5. Price of meal (Canadian \$)	10.97	12.04	-.20*	-.04	-.12	-.03	—		
6. Length of meal (minutes)	32.28	24.03	-.47*	.02	.02	-.01	.36**	—	
7. Age (years)	22.97	4.77	-.01	-.20*	-.20*	-.20*	.02	.02	—

<sup>a</sup> 1 = fast food.

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

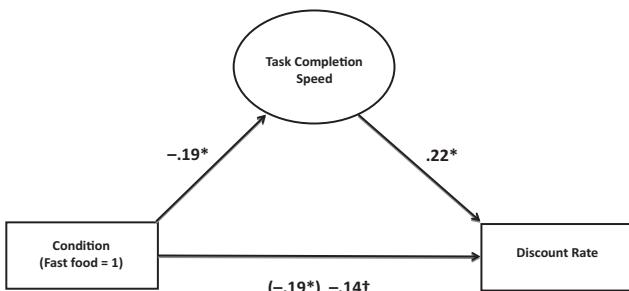


Figure 1. Standardized regression coefficient paths for the mediation analysis in Experiment 4. <sup>†</sup>  $p < .10$ . <sup>\*</sup>  $p < .05$ .

respondents might have with the characteristics of the neighborhood where the restaurants were located. By randomly assigning participants to conditions, we have strong evidence that the salience of experience with fast-food restaurants in one's socioecological environment can play a causal role in increasing financial impatience. Furthermore, the finding that the effect of fast-food restaurant experience was mediated by a general sense of impatience, manifested in the time participants spent completing the task, was highly consistent with prior findings of [Zhong and DeVoe \(2010\)](#). Although neither the task completion speed nor words written were ideal mediating measures because of their connection to the independent variable, the finding that task completion speed was significantly correlated with financial impatience but not with the length of the meal suggests that they reflect more impatience rather than merely the impoverishment of fast-food restaurant experiences. Additionally, it is worth noting that the recalled monetary and time dimensions of the restaurant experience showed that even when we sought out comparable fast-food and inexpensive full-service chain restaurants, experiences within each category can still differ significantly across many dimensions (e.g., price and time). Therefore, in the final study we conducted a more stringent test of the proposed phenomenon that did not require actual experience with the restaurants, but only walking by them in the ecologically valid context of a busy urban street.

### Study 5

Although the previous study provided causal evidence that recalling experiences with fast-food restaurants, as compared to full-service restaurants, can induce greater financial impatience, in this study we sought to offer a more ecologically valid test of the proposed phenomenon within people's everyday social environment. Specifically, we examined whether the mere exposure of walking past a fast-food restaurant versus a full-service restaurant on a busy urban street was sufficient to trigger greater financial impatience. To accomplish this, we conducted a field experiment modeled off a paradigm used in the terror management literature ([Pyszczynski et al., 1996](#)), where pedestrians walking down the same urban street in the same direction were stopped for a brief survey in front of a full-service restaurant or a fast-food restaurant. Importantly, these pedestrians were simply walking by and not going into the restaurants, and hence any effect we observe can only be explained by the mere exposure to fast-food restaurant

rather than some selection mechanism whereby people who eat at fast-food restaurants were somehow different from those who eat at full-service restaurants. Pedestrians who agreed to participate were asked to choose between a smaller financial reward sooner and a larger reward later.

### Method

**Participants.** Forty-seven participants (51.1% were male), ranging in age from 15 to 78 ( $M = 35.20$ ,  $SD = 15.05$ ), agreed to participate and complete a brief survey in downtown Toronto, Canada (population approximately 2.5 million).

**Procedure and setting.** Participants were randomly assigned to be interviewed in front of an Over Easy chain restaurant ( $n = 25$ ) or in front of a McDonald's fast-food restaurant ( $n = 22$ ) when they were observed walking on a trajectory that would take them past the McDonald's (always in the same eastern direction). The McDonald's fast-food restaurant was situated between two buildings and was not visible unless standing directly in front of it. Importantly, no individuals entering or exiting either of the restaurants were solicited to participate.

To avoid breakfast and lunch traffic, we ran the study during a weekday in the late morning (10–11:30 a.m.;  $n = 21$ ) and the midafternoon (2–3:30 p.m.;  $n = 26$ ). Individuals walking alone were stopped at the appropriate location by two female experimenters and asked to participate in a brief survey. In the fast-food restaurant condition, the experimenters positioned themselves so that the participant faced the fast-food restaurant during the interview. In the full-service diner condition, the experimenters positioned themselves so that participants similarly faced an inexpensive diner during the interview. Participants read and signed a consent form stating they would receive at least a \$5 gift certificate to an online retailer via e-mail for participating in the study.

Participants were then presented with a choice of whether to receive a \$5 gift certificate to an online retailer to be e-mailed to them "tomorrow" (coded 0) or to receive a \$5.25 gift certificate to the same retailer to be e-mailed to them "one week from tomorrow" (coded 1). This single choice between two intertemporal options reveals an upper or lower bound discount rate ([Frederick et al., 2002](#)). Additionally, the elicitation method with only one dichotomous choice helps to minimize the role that speeding through the choice—observed in the recall responses in the previous study—might affect participants' responses. Participants' dichotomous choice constituted the main dependent variable of the study. At the end of the survey, participants responded to a brief demographic questionnaire and then provided an e-mail address in order to receive their payment.

### Results and Discussion

[Table 6](#) reports the means, standard deviations, and intercorrelations of the study variables. Although location was not significantly correlated with choosing the small immediate option ( $r = -.20$ ,  $ns$ ), it was in the predicted direction and similar in magnitude to the association we observed between recalling fast-food restaurant experiences and delay discount preference in the previous study ( $r = -.19$ ,  $p = .018$ ). Given that the design varied not only location of where participants filled out the survey but also the time of day, we formally analyzed the data using binary logistic

Table 6  
*Means, Standard Deviations, and Intercorrelations in Study 5*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Location <sup>a</sup>	0.47	0.50	—			
2. Time of day <sup>b</sup>	0.55	0.50	.07	—		
3. Choice <sup>c</sup>	0.49	0.51	-.20	.11	—	
4. Age (years)	35.20	15.05	.14	-.05	.25	—

<sup>a</sup> 1 = fast food. <sup>b</sup> 1 = afternoon. <sup>c</sup> 1 = larger delayed.

regression with dummy variables for location (0 = full-service restaurant, 1 = fast-food restaurant) and time of day (0 = morning, 1 = afternoon) as predictors of participants' dichotomous choice of larger reward 1 week from tomorrow (coded 1) versus smaller reward tomorrow (coded 0). In line with the previous study's analyses, we controlled for age.

The binary logistic regression presented in Table 7 reports the full model predicting participants' choice where negative coefficients indicate a greater probability of choosing the lower immediate payoff option. Results showed a nonsignificant trend for people in the morning to be more likely to take the larger delayed reward (coefficient = 1.12, *SE* = 0.73, *z* = 1.55, *p* = .12). Consistent with both the prior literature and data from the previous study, there was a significant tendency for older participants to take the larger delayed reward (coefficient = 0.05, *SE* = 0.02, *z* = 1.98, *p* = .05). Critical to the hypothesis, participants in front of the fast-food restaurant were significantly more likely to choose the smaller immediate reward as compared to those in front of the sit-down diner (coefficient = -1.55, *SE* = 0.75, *z* = -2.08, *p* = .037).

Participants whose preferences were elicited in front of a fast-food restaurant were more likely to exhibit greater financial impatience by choosing a smaller, immediate financial reward over a larger, delayed financial reward. Using a field experiment in the stimulus-rich context of a busy urban street, we demonstrated that mere exposure to fast-food restaurants within the everyday social ecology can induce greater financial impatience.

## General Discussion

Adequately saving for the future is crucial to the well-being of individuals and society as a whole. Recently, there have been important advances to boost saving behavior by leveraging basic psychological tendencies (e.g., default options, automatic enrollment; Thaler & Sunstein, 2008). Although these proposals provide useful recommendations for improving personal saving, they have not grappled with the root issue of why financial preferences for saving have declined over the last several decades. Our article adopts a socioecological approach that offers a novel perspective for understanding the historic changes in financial impatience across the developed world over the last quarter century. On the basis of previous research showing that mere exposure to fast-food symbols induces people to be more impatient (Zhong & Devoe, 2010), we theorized that the proliferation of fast-food restaurants in the everyday social ecology would be associated with greater financial impatience at multiple levels of analysis.

We began our analyses by examining changes in household savings rates over time controlling for static preferences across 30

OECD countries as a function of the changes in the proliferation of fast-food restaurants. Using McDonald's per capita as a proxy for fast food's prevalence at the national level, in Study 1 we showed that macrolevel increases in the prevalence of fast-food restaurants were associated with decreases in household saving, suggesting increases in financial impatience over time. The use of fixed effects to control for static country differences as well as the inclusion of time-varying macrocovariates attested to the robustness of this phenomenon over a long period.

Taking a similar approach by examining within-country variation in the proliferation of fast-food restaurants in the local social ecology, in Study 2 we examined changes in household saving over time as a function of the concentration of fast-food restaurants relative to full-service restaurants in the local neighborhood (ZIP code), controlling for static differences in household preferences. Again, a fixed-effects analysis revealed that, on average, higher concentrations of fast-food restaurants in a household's local social ecology were associated with declining household saving. The demonstration that local variations in the prevalence of fast-food restaurants are associated with decreases in household saving further suggests a relationship between financial impatience and the social ecology that cannot be attributed to merely individual selection effects.

Although the first two studies inferred changes in financial impatience through changes in saving behavior, Study 3 conceptually replicated these findings by directly measuring monthly delay discount preferences at the individual level. In line with our theorizing, individuals living in neighborhoods with a higher concentration of fast-food restaurants on average expressed greater financial impatience—preferring small immediate financial rewards over larger later financial rewards—even when important economic and individual characteristics were held constant.

Building off Study 3's use of elicited delay discounting as a direct measure of financial impatience, our final two studies established stronger causal evidence that the greater salience of recent fast-food restaurant experiences compared to full-service restaurant experiences was sufficient to induce changes in individual financial impatience. Specifically, in Study 4 we showed that participants who recalled a recent fast-food dining experience exhibited greater financial impatience, as measured by monthly delay discounting preferences, than their counterparts who recalled a recent dining experience at a full-service chain restaurant from

Table 7  
*Predicting Financial Choice as a Function of Location in Study 5*

Predictor	Coefficient	<i>SE</i>
Location (1 = fast food)	-1.56*	0.75
Time (1 = afternoon)	1.13	0.73
Age	0.05*	0.03
Constant	1.48	1.00
Pseudo- <i>R</i> <sup>2</sup>	.15	
Log-likelihood	-25.15	
Log-likelihood <i>χ</i> <sup>2</sup>	9.10*	

Note. Values indicate coefficients and standard errors from binary logistic regression. Positive values indicate greater likelihood of choosing the financially patient option. Based upon 43 observations for this model.

\* *p* < .05.

the same neighborhood. Furthermore, these differences across condition were descriptively mediated by how quickly participants completed the recall task itself. The fact that task completion speed—a distinct behavioral manifestation of impatience—explained variation in financial impatience across conditions was additional evidence that recalling fast-food dining experiences instigated a more generalized impatience in participants that caused them to prefer immediate financial reward. Finally, in Study 5 we further established the ecological validity of this phenomenon by examining variations in pedestrians' likelihood of making an impatient financial decision involving real rewards while standing before either a fast-food or full-service restaurant on the same busy street. Results showed that participants whose financial preferences were elicited in front of a fast-food restaurant tended to choose a smaller but more immediate option over the larger, more delayed option as compared to those whose preferences were elicited in front of a full-service diner.

### Limitations

Across the five studies reported here, we have established a robust link between the proliferation of fast food and increased financial impatience across different levels of analysis. Moreover, all of our evidence is consistent with the plausibility of a causal interpretation of this relationship, such that fast-food restaurants within the social ecology can function to activate greater financial impatience. Nevertheless, caution in interpreting these results is warranted, and it is important to highlight the limitations of each study. Of greatest concern is the possibility that we have observed spurious relationships. Importantly, the potential for a spurious relationship in Study 1 would most likely have to be different from those in Study 2 or Study 3, unless it is argued that the same third variable is operating across national, neighborhood, and individual levels of analysis. It is worth noting that the data analyzed in our first three studies predated the global financial crisis. Obviously, the trends we have identified in the current studies will be profoundly influenced by such an economic downturn. Amidst such a degree of turbulence, it may be difficult to observe the same level of relationships in more contemporary data. As data from this period of turbulence, as well as data from an economic rebound, become available, we will be able to address this issue empirically.

In our final two studies, we sought to definitively address the issue of whether fast-food restaurants can causally induce greater financial impatience and provide better evidence for the microfoundations of the proposed socioecological mechanism. In Study 4 we drew upon individuals' recent experiences of dining at fast-food restaurants as compared to full-service restaurants within the same neighborhood to conduct an experiment where we could observe the causal effect of fast food on financial impatience. In line with the idea that exposure to fast food can induce financial impatience through instigating generalized impatience (Zhong & DeVoe, 2010), we observed that participants randomly assigned to recall a fast-food restaurant experience completed the task more quickly compared to their counterparts recalling a full-service restaurant experience. Further, this behavioral indicator of impatience descriptively mediated the effect of fast food on financial impatience. Although less time spent recalling fast-food restaurant experiences could have been due to those experiences being more impoverished, the observation that time spent completing the task

was uncorrelated with the recalled duration of the meal, and also mediated participants' delay discounting preferences, allows for a clearer interpretation of these findings within the context of our theoretical model. In Study 5 we provided stronger ecological validity of our proposed phenomenon by demonstrating that pedestrians walking on the same urban street tended to be more impatient in front of a fast-food restaurant as compared to a full-service restaurant.

Although all the studies in this article have their respective flaws, the complementarity of high external validity from multiple secondary data sources and high internal validity from original experimental studies provides greater confidence that there is a robust association between the proliferation of fast-food restaurants and financial impatience across different levels of analysis. Although the growth of the fast-food industry is likely itself a manifestation of greater impatience in society, these studies collectively suggest that the proliferation of fast food also serves to further reinforce the culture of impatience.

### Implications and Future Directions

The present findings have important implications for the study of individual differences in delay discounting, behavioral priming, and social ecology. In light of the existing literature in both economics and psychology that conceptualizes delay discounting preferences primarily as a stable individual difference, a socioecological perspective may help to illuminate how those individual differences may change over time. For instance, recent work has shown that the genetic component of delay discounting preferences explains approximately one third of the variance of saving and body mass index, with parental effects being strong for individuals in their 20s but decaying to zero by middle age (Cronqvist & Siegel, 2011). Using a socioecological approach, we have identified a set of chronic everyday situational cues (Oishi & Graham, 2010) that help explain how individual differences in financial impatience evolve, especially as it relates to the historic decline in saving behavior over time.

Although recent research has begun to examine the influence of priming outside the laboratory, we believe that future research can benefit greatly from mutual exchanges between priming and socioecological scholars. In addition to priming being a key potential mechanism through which the social ecology can affect behavior, the socioecological approach emphasizes the potential for reciprocal effects that offer a more dynamic conceptualization of how primes function in everyday life. Explicitly considering individuals' socioecological habitats adds an even greater level of dynamism: Individuals choose to inhabit socioecological contexts that can cue certain behavior, but it is also the case that individuals can be frequently exposed to such cues in an unbidden fashion—presumably the main purpose behind of fast-food logos and advertising. An important implication of the present findings is that although where we choose to live may reflect our underlying preferences, the cues in that socioecological environment can in turn directly influence those very same preferences. In the recent discussion concerning choice architecture (Thaler & Sunstein, 2008), fast-food symbols and primes in one's domestic and work environment more generally merit inclusion in this conversation regarding how to nudge individuals' behavior toward encouraging greater saving.

Although prior work on fast-food restaurants has narrowly examined its associations with health outcomes, the present findings on impatience may also have important implications for the traditional study of fast food and obesity. Although our theoretical focus has been on financial impatience, it is worth noting that the economics literature has conceptually linked delay discounting preferences to other behavioral outcomes that have exhibited similar changes over the last several decades. Given the nature of immediate gratification over longer term benefits, many have examined the relationship between financial impatience and obesity. Komlos, Smith, and Bogin (2004) suggested that changes in delay discounting preferences over time may account for the rise of obesity. Specifically, they argued that "individuals with high rates of time preference will consume more high-calorie foods and nonphysically active leisure pursuits at the expense of lower levels of health and utility in the future" (p. 216). To offer evidence for this proposition, they examined the relationship between obesity and the savings rate and debt-to-income ratio in the United States, and also showed that developed countries with low savings rates have higher obesity rates. Similarly, Smith, Bogin, and Bishai (2005) have linked saving to body mass index. Although these researchers were unable to directly measure delay discount preferences, Courtemanche, Heutel, and McAlvanah (2011) used the same delay discount measure we used in Study 3 and found a significant correlation between financial impatience and obesity.

A large epidemiological literature has focused on documenting how neighborhood concentrations of fast-food restaurants are associated with obesity (e.g., Mehta & Chang, 2008). Much of the presumed underlying mechanism for such an association lies in the high-caloric food that fast-food restaurants make available in the environment. However, the present work suggests it may not be availability of high-caloric food alone but exposure to fast-food symbols that may also change the psychology of impatience with regard to dietary and exercise choices. Indeed, the present work suggests that the mere exposure to fast-food symbols may induce greater delay discounting preferences with potential consequences for eating and exercising behavior. Empirically, such a perspective suggests that the concentration of fast-food restaurants in the local environment might predict body mass index and obesity rates, holding constant the amount of food consumed at fast-food restaurants specifically. Future research into the study of obesity may benefit from attending to social ecology and the psychology of impatience.

## Conclusion

Although there may be little doubt that people in developed nations have exhibited greater financial impatience over time, economic factors alone have failed to fully account for the historic decline in saving over the last several decades. Additionally, psychology's contribution to understanding saving has been overwhelmingly focused on individual differences and static psychological tendencies that cannot speak directly to the sea change in saving behavior during the past 3 decades.

Following Staw and Sutton's (1992) call to use microexperimental findings to understand macrolevel phenomenon, we have introduced a novel perspective on the historic financial impatience manifest in contemporary society. The program of research presented here is an example of using the socioecological approach to

identify a multilevel phenomenon and successively drill down to identify the plausibility of priming as a psychologically causal mechanism. We believe that the proliferation of fast food is a plausible contributory factor to the increasing financial impatience in modern society. Obviously, additional work must be done to further evaluate the validity of this hypothesis. Nevertheless, we believe that the scholarly dialogue over preferences for saving has much to gain from an approach that takes seriously the distribution of organizational cues and their change over time in the social ecology.

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