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The intergenerational transmission of obesity: The role of time preferences and self-control

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ABSTRACT

Previous research has found that impatient time preferences and self-control problems (present bias) are related to increased obesity risk. However, scant evidence exists pertaining to whether parents' impatience and self-control problems impact the obesity status of their children, too. Accordingly, we explore this study question among a large national sample of US adults and their children. Study results confirm previous findings indicating that intertemporal preferences are related to adults' obesity status. Moreover, these results extend the literature by finding that children of impatient or present-biased parents have a significantly higher likelihood of being obese, too. Specifically, parents' low levels of patience and present bias were each independently related to a five-percentage point increase in the likelihood of obesity of their children. These findings were more pronounced when all children were combined in analyses and for the first child; however, they varied for the second and third child. Thus, findings suggest that parents' time preferences and self-control problems likely affect not only their own weight status but that of their children.

1. Introduction

Obesity has been a growing problem in the United States (US) and worldwide over the past several decades. In the US, among adults aged 20 years and above, there has been a 2.8-fold increase in the prevalence of obesity from 13.4% in the 1960s to 37.7% in 2013–2014 (Centers for Disease Control and Prevention, 2017a; Flegal et al., 2016; National Institute of Diabetes and Digestive and Kidney Diseases, 2015). Furthermore, 17.0% of US children and adolescents between the ages of 2 and 19 years were defined as obese in 2011–2014 (Ogden et al., 2016). The high prevalence of obesity has resulted in increased rates of chronic diseases, such as cardiovascular disease, type 2 diabetes, and certain cancers (Centers for Disease Control and Prevention, 2017b). In fact, obesity in the US has been found to account for 21% of health care costs (Cawley and Meyerhoefer, 2012). Finkelstein et al. (2012) estimated that by 2030, 51% of the US population will be obese, which calls for improved cost-containment efforts through preventive medicine programs that encourage physical activity and healthful eating, which in turn, lower health care costs and increase productivity.

The sedentary lifestyle and poor diet resulting in today's obesity epidemic, is unsurprising given the current "obesogenic" environment which consists of automated energy "saving" machinery (e.g., use of cars instead of bikes) and the abundance of palatable unhealthful foods that surround us at home, at school, and on the job. Behavioral economists acknowledge that individuals often take the path of least resistance (status quo bias) and place a disproportionate emphasis on immediate gratification (e.g., watching a favorite TV show) rather than future benefits, such as reducing obesity risk through exercise (Loewenstein et al., 2007). The decision to be physically active or prepare a healthful

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meal at home is costly in terms of energy and time at present, whereas the benefits, such as obesity prevention, are in the distant future and often not salient. Thus, individuals who place a larger emphasis on the 'here and now' (i.e., myopic), are less likely to engage in healthful behaviors, including preparing nutritious meals and exercising (de Oliveira et al., 2016; Leonard et al., 2013). These decisions, in turn, lead to higher obesity rates among those who are impatient.

In contrast, individuals who are more future oriented, that is, are willing to delay the immediate gratification of 'want' behaviors for future benefits are regarded as having more patient time preferences. Intertemporal preferences have been shown in numerous studies to be linked with dietary habits and obesity (Borghans and Golsteyn, 2006; Schlam et al., 2013; Sutter et al., 2013; Zhang and Rashad, 2008). For example, Zhang and Rashad (2008) observed a relationship between time preferences and the body mass index (BMI) among adults, while Sutter et al. (2013) observed this same relationship among children. Notably, a study by Schlam et al. (2013) observed that preschoolers' ability to delay gratification was significantly associated with reduced obesity risk 30 years later.

Whereas abundant evidence exists pertaining to the relationship between time preferences and obesity, more recent studies have focused on the effects of inconsistent time preferences and health outcomes. While time preferences could be consistent over time, they often are not, particularly when faced with temptation. For example, one may decide not to eat ice cream tomorrow, only to indulge the next day when watching a TV commercial featuring a family enjoying a banana split; this exposure evokes (or primes) a 'hot' state which could change preferences and behaviors (Loewenstein, 1996). Loewenstein refers to this as a 'hot-cold' empathy gap, where individuals find it difficult in a 'cold' (or calm) state to anticipate the impact of emotions on the preferences and behaviors of their 'future selves' (Loewenstein, 2005). This phenomenon often leads to inconsistent time preferences (or self-control problems) when temptation arises. However, only relatively recently have studies begun to examine the relationship between inconsistent time preferences and obesity. For example, Courtemanche et al. (2015) found that both consistent and inconsistent time preferences are associated with obesity. Similarly, Kang and Ikeda (2016) found that severe obesity is associated with both inconsistent time preferences and impatient time preferences.

Thus, in the current endeavor, beyond examining the (in) consistent time preferences- obesity relationship, we extend the literature by exploring whether parents' self-control problems have a "spill-over" effect onto their children in the form of increased obesity risk. While previous research has documented intergenerational pathways between parents' and children's obesity (Black et al., 2016; Li et al., 2009; Pachucki et al., 2014; Whitaker et al., 2010), the intergenerational effects of parents' self-control problems on children's obesity has yet to be empirically explored. With regard to the intergenerational transmission of obesity, this phenomenon could occur directly, such as through genetic mechanisms or via a shared household environment that affects the weight status of both parents and children (Classen and Thompson, 2016). It could also occur indirectly where parents model unhealthy behaviors to their children (Moore et al., 1991).

This indirect and direct relationship is likely tied to parents' intertemporal decision making and their children's health behaviors and outcomes. While this relationship has yet to be examined with obesity as an outcome, it has been investigated with smoking as the dependent variable in a small number of studies. For example, Brown and van der Pol (Brown and van der Pol, 2014), examined the relationship between a proxy of parents' patience (financial planning horizon) and the smoking practices of their young-adult children. Notably, they observed that children of impatient mothers who were smokers had an increased likelihood to smoke themselves. Their study, however, did not include a measure of inconsistent time preferences (indicative of self-control problems) and focused on older children/adolescents rather than a wider age range of children in our study (2–17 years old). Further, a study by Hübler and Kucher (2016) found that parents' (both father and mother) patience was significantly related to a lower propensity of their children being current smokers. However, only the father's self-control problems were associated with smoking risk.

To fill this gap in the literature, in the current study, we focus on how parents' time-consistent and inconsistent choices are related to the obesity of their children. We first examine this relationship among all children, and then assess whether it differs among the first and second and third child. We utilize individual-level data from a national sample in the US, the Family Health Habits Survey (FHHS). These data are cross-sectional and as a result a temporal and causal relationship cannot be established. Thus, findings should be considered descriptive, and longitudinal research on this topic is needed. Nonetheless, due to scant evidence on this topic, the current study fills an important gap in the health economics literature.

2. Background

Standard microeconomic theory assumes that individuals make intertemporal choices rationally by maximizing the sum of all future expected utilities, weighing both the present and future costs and benefits of their choices. In doing so, individuals discount future utility relative to present utility. The traditional discounting function is the exponential function, where the discounting from any time period to the subsequent period is constant at factor δ (Samuelson, 1937). In this model, at time $t = 0$ one's utility is: $U = \sum_{t=0}^{T} \delta^t u_t$. The model essentially reduces the intertemporal choice to one that is independent of time. The present is more important than the future (by factor δ); preferences are time-consistent.

More recent models, however, acknowledge time-inconsistent decision making. A quasi-hyperbolic discount model is a case in point regarding time-inconsistent preferences. In this model, as with the standard exponential discounting model, the future periods are discounted at a constant rate (δ). However, for the discounting in the present period, this model introduces parameter β to account for self-control problems and the effects of temptations. Specifically, in this model the discounting from the current period to the subsequent period is $\beta\delta$ (Laibson, 1997). At time $t = 0$, the utility function exhibits the following form: $U = u_0 + \beta \sum_{t=1}^{T} \delta^t u_t$. The standard model and the quasi-hyperbolic discount model are the same at $\beta = 1$, while $\beta < 1$ indicates that individuals are present biased (self-control problem), and $\beta > 1$ refers to one being future biased.

The standard exponential model has been used to explore relationships between patience, health behaviors and obesity, as previously mentioned. Specifically, more patient preferences among adults, measured by questions about choices between immediate and delayed hypothetical monetary rewards, have been related to lower BMI (Chabris et al., 2008). Using real monetary payoffs to measure patience, resulted in similar findings among adolescents (Sutter et al., 2013). In comparison, studies utilizing the quasi-hyperbolic model, have found that inconsistent preferences are related to more tobacco use (Gruber and Koszegi, 2004), alcohol misuse (Richards and Hamilton, 2012), and unhealthy dietary intake among Supplemental Nutrition Assistance Program