

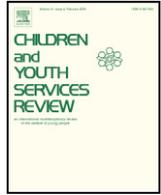


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# Predicting savings and mental accounting among adolescents: The case of college

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## ABSTRACT

In this study we examine predictors of adolescents' savings account ownership and use of mental accounting with a nationally representative, longitudinal sample of 744 adolescents ages 12 to 15 using Panel Study of Income Dynamics and Child Development Supplement data. We find sizable savings gaps along class lines. Further, findings suggest adolescents are more likely to have savings and use mental accounting when their parents have higher levels of education and have savings for them. Given that parents' education level and parents' savings for their child are directly related to adolescents' own savings, we suggest that traditional banking markets may not be able to equalize the advantage provided by having savings as an adolescent.

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## 1. Introduction

We consider two types of savings in this study. The first type of savings is adolescents' savings account, which refers to any savings held in a deposit account at a local bank that pays interest and can be used for any purpose. Money in this type of savings account is one of the more liquid investments outside of cash that one can make.

The second type of savings investigated in this study is adolescents' mental accounting for college, which refers to adolescents' self-report of any money in their savings account that is designated for college. The concept of mental accounting comes from behavioral economics and was originally proposed by Thaler (1985). Thaler (1985) suggests that people think about and categorize money in different ways to prioritize and monitor their spending. Evidence for mental accounting among adults is extensive (e.g., Thaler, 2004; Xiao, 1995; Xiao & Noring, 1994; Xiao & Olson, 1993). However, only one known study examines mental accounting among adolescents (Webley & Plaisier, 1998). Webley and Plaisier (1998) find little evidence that adolescents prior to ages 11 or 12 use mental accounting; however, they do find evidence of mental accounting among 11 and 12 year olds. Like adults, adolescents ages 11 to 12 may treat money differently depending on the mental account from which the money is coming. The proxy for mental accounting used in this study is defined as whether or not adolescents report saving any of their money for college in savings accounts at a

local bank. In this way, adolescents' report regarding the prioritization of money in their savings account for college examines what may be the consequences of mental accounting.

## 2. Theory and research on adolescent savings

Economic socialization theory is the predominate paradigm for explaining adolescents' savings, which emphasizes the role the family plays in whether or not adolescents develop a habit of saving. This perspective builds on the commonly held belief that the family is considered one of the key institutions in which adolescent development takes place (e.g., Bronfenbrenner, 1979). Adolescents develop an understanding of the economic and financial world through observation and modeling of their parents' behaviors (e.g., Moschis, 1987). Adolescents develop skills and strategies related to saving (for example, to restrict their own spending) through parental guidance and self-reflection (Webley, 2005). From this perspective adolescents' savings is almost always connected to a larger social unit or family. Given this, saving for adolescents is centrally tied up with the nature of relationships in the family, and is often a matter of negotiating with parents (Sonuga-Barke & Webley, 1993; Webley, Levine, & Lewis, 1991). Even when opening their own bank or savings account, adolescents are often supported by parents or other family members, and parents will frequently provide the money that is designated for saving (Sonuga-Barke & Webley, 1993).

A contextual developmental approach to economic socialization theory also takes into account adolescents' social backgrounds (such as family income, parents' education, and employment) as well as adolescents' characteristics. From this perspective, social background has an indirect influence on the development of adolescents' human

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capital through the context of the family (Ashby, Schoon, & Webley, 2011). With regards to adolescents' characteristics, economic socialization theory emphasizes future orientation and self-knowledge (Webley, 2005). In the next section, we review research in order to provide some insight into variables that are related to or attempt to predict adolescents' saving, including those that are representative of social background and adolescents' characteristics.

### 2.1. Review of research on predictors of adolescents' savings

Existing research that attempts to predict adolescents' savings focuses on adolescent characteristics (Belk, Rice, & Harvey, 1985; Doss, Marlowe, & Godwin, 1995; Friedline, 2012; Friedline & Elliott, 2011; Friedline, Elliott, & Nam, 2011; Furnham, 1999; Kim, LaTaillade, & Kim, 2011; Leiser & Ganin, 1996; Mandell, 2005; Mason, Nam, Clancy, Kim, & Loke, 2010; Pritchard, Myers, & Cassidy, 1989; Warnarr & Van Praag, 1997) and parent and household characteristics (Friedline, 2012; Friedline & Elliott, 2011; Friedline et al., 2011; Mason et al., 2010).

#### 2.1.1. Adolescents' characteristics

Leiser and Ganin (1996) use a cross-sectional sample of 171 Israeli adolescents ages 14 to 18. Using bivariate tests, they find that adolescents save more often when they attend academic compared to vocational schools and participate in discussions about finances compared to those who do not (Leiser & Ganin, 1996). Moreover, they find that males save significantly more than females. Furnham (1999) uses two-way ANOVAs and logistic regressions to analyze survey responses of a cross-sectional sample of 250 British adolescents ages 11 to 16. Controlling for adolescents' demographic characteristics like age and gender, Furnham (1999) finds that saving is related to the amount of money adolescents report receiving, spending, and saving during the previous week. In a cross-sectional study of 1,619 employed high school seniors, Pritchard et al. (1989) use Pearson's correlations and Somer's *d* and find that adolescents' race, gender, and high school grades are significantly related to savings. Furthermore, psychological variables, like internal locus of control, future orientation, and being considered a hard worker are significantly related to savings (Pritchard et al., 1989). However, researchers tend to use bivariate analyses and cross-sectional samples without controlling for parent or household characteristics, overlooking potentially relevant explanations of adolescents' savings.

#### 2.1.2. Parent and household characteristics

As might be expected, adolescents' savings is constrained by parent and household characteristics. Researchers find that parents' characteristics, such as marital status (Friedline, 2012; Mason et al., 2010), education level (Mason et al., 2010; Warnarr & Van Praag, 1997), employment status (Warnarr & Van Praag, 1997), and parents' savings for their child (Friedline, 2012; Friedline et al., 2011; Pritchard et al., 1989) are significantly related to adolescents' savings. Mason et al. (2010), for example, use a sample ( $N = 1,171$ ) ages one to 23 who participated in the SEED savings program and find that parents' education level, combined marital and working status, and home ownership significantly predict adolescents' savings. Friedline, Elliott, and Nam (2011) use a sample ( $N = 1,003$ ) ages 17 to 23 from the PSID and find that adolescents are more likely to have savings when parents have higher levels of education. Furthermore, they find that household net worth and parents' savings for their child significantly predicts savings at ages 17 to 23 (Friedline et al., 2011).

## 3. Theory and research on adolescents' mental accounting

In addition to savings account ownership, this study also asks, "What are the predictors for whether or not adolescents use mental accounting?" Mental accounting has been conceptualized as the process of dividing money into different categories for the purpose of

monitoring spending (Thaler, 1985). Here, mental accounting refers to an internal, mental process; however, there are conceptual differences between mental accounting as defined by Thaler (1985) and other behavioral economists and the definition of mental accounting used in this study. As mentioned, we define mental accounting as adolescents' self-report of money in their savings account that is designated for college. Adolescents' designation of money in their savings accounts for college may be the *result* of mental accounting. In this regard, our study tests the potential presence of mental accounting rather than testing mental accounting directly.

We suggest that adolescents may use mental accounting for reasons beyond simply monitoring their spending. The actual process of creating categories—such as by designating some of their savings for college—may have benefits independent of whether or not adolescents are able to use these categories to monitor spending. In other words, the amount of savings designated for college may matter less than the process of designating savings for college (e.g., Elliott, 2009; Elliott, Destin, & Friedline, 2011). The categorization process might be a way to help make adolescents' abstract conceptions of the self salient (i.e., causes of things that matter).

Identity-Based Motivation (IBM) theorists suggest that three principal components explain the relationship between conceptions of the self, such as a college-bound identity, and motivation, while lending significant attention to how context (social and cultural identities) drives the process. The three core principles include (1) identity salience, (2) congruence with group identity, and (3) interpretation of difficulty. These principles have been found to be important predictors of adolescents' school behaviors (Oyserman & Destin, 2010). We suggest that identity salience may be particularly important for understanding the potential independent effects of the categorization process associated with mental accounting among adolescents.

Although the term 'identity' can be invoked to refer to a diverse array of concepts, IBM focuses on the aspects of identity that directly influence behavioral choices. Abstract conceptions of the self are most likely to guide everyday behaviors when they are salient. From an IBM perspective, identities are salient when they are (1) on the mind and (2) linked to detailed strategies. We suggest when an adolescent mentally divides money into different pots (e.g., designates money for school purposes, like college), it is evidence that a particular identity (e.g., college-bound) is on an adolescent's mind and they have identified saving as a strategy for resolving difficulties related to the identity. Accordingly, adolescents who use mental accounting (i.e., designated money for college) are more likely to sustain ongoing self-regulatory behavior (i.e., sustained engagement in school).

To explain how this might work, we draw on the idea that people view college as a commodity to be bought and sold (Cayton, 2007). We propose that designating savings for college (i.e., mental accounting) gives adolescents a sense of power with regards to college and therefore they begin to act as though they have a right to attend college. In other words, they *expect* to attend. This sense of power comes from their faith in the rules and regulations governing capitalist economic markets that are designed to protect the individual's right to buy and own property. As a result, they are more inclined to take control over their educational experience if they have mentally designated savings for college. This feeling of power may manifest itself in many different ways. For example, adolescents who feel empowered may feel more comfortable about asking teachers, counselors, and school administrators for information about their education or financial aid. They may also be more likely to take college prep classes, the SAT/ACT or apply to 4-year colleges instead of 2-year colleges. In this manner, mental accounting empowers adolescents to participate in, negotiate with, influence, control, and hold accountable the schools they attend.

Moreover, we suggest that these benefits may occur even if there are very few tangible signs that adolescents are effectively monitoring their spending. That is, behavioral changes can occur even if adolescents are not saving a lot of money for college (e.g., Elliott, 2009). It

may be enough to create mental accounts for college and expect to be able to save enough money for college sometime in the future. For adolescents, particularly young adolescents, mental accounting might not have to be linked to changes in spending behavior in order for it to have a positive effect on their behavior in other areas, such as school. Mental accounting for young adolescents might be more about making salient aspects of the identity that they see as important, such as being college-bound.

### 3.1. Research on college mental accounts among adolescents

We find three studies that examine the relationship between adolescents' report of designating a portion of their money in a savings account for school purposes like college and their college progress (i.e., currently attending or already graduated; Elliott & Beverly, 2011a; Elliott, Constance-Huggins, & Song, 2011; Elliott & Nam, 2011). In study one, Elliott and Beverly (2011a) find that mental accounting for college is positively associated with college progress. In study two, Elliott, Constance-Huggins et al. (2011) examine whether effects vary by income level. To do this, the study authors use separate samples of low-to-moderate-income (below \$50,000;  $N = 495$ ) and high-income (\$50,000 or more;  $N = 508$ ) adolescents. They find that mental accounting for college among low-to-moderate-income adolescents is associated with college progress, but not among high-income adolescents. The study authors suggest that this non-significance may support the proposition that mental accounting for college no longer matters above a certain income threshold. That is, above this threshold, income might be high enough that adolescents cannot reasonably doubt that they will be unable to afford college. In study three, Elliott and Nam (2011) examine whether effects vary by race. They use separate samples of Black ( $N = 469$ ) and White ( $N = 534$ ) adolescents. Findings indicated that mental accounting for college has a positive association with college progress among both Black and White adolescents.

### 3.2. Research on adolescents' savings and college expectations

We find four studies that examine the relationship between mental accounting for college and adolescents' college expectations (i.e., college-bound identity; Elliott, 2009; Elliott & Beverly, 2011a; Elliott, Choi, Destin, & Kim, 2011; Elliott, Kim, Jung, & Zhan, 2010). Elliott (2009) finds that mental accounting is a significant predictor of adolescents' math scores when adolescents' college expectations are not included in the model. Second, the study author finds that mental accounting for college is a significant predictor of adolescents' expectations. Third, expectations significantly predict math scores when mental accounting is not included in the model. Finally, when expectations and mental accounting for college are included in the same model, the relationship remains significant but the effect is reduced. According to the Baron and Kenny (1986) method of testing mediation, this suggests that adolescents' expectations act as a partial mediator between mental accounting for college and adolescents' math scores. Bootstrapping and Sobel's test are also used to further test whether indirect effects occur. Both methods confirm that mental accounts have indirect effects on math scores that occur through adolescents' college expectations. Elliott (2009) examines the relationship between the amount of savings adolescents have designated in their mental accounts and math achievement, finding that amount is not significant. Elliott and Beverly (2011a) also examine the relationship between mental accounting for college and adolescents' college expectations. According to the Baron and Kenny method, they find that college expectations partially mediate the relationship between mental accounts and college progress. Bootstrapping confirms this finding.

Elliott, Kim, Jung, and Zhan (2010) use PSID/CDS data ( $N = 1,063$ ) to test whether mediation effects vary by race (White/Black). Separate samples of White ( $N = 576$ ) and Black ( $N = 487$ ) adolescents are analyzed. Using Structural Equation Modeling (SEM) and bootstrapping,

the study authors find that mental accounting for college is significantly related to expectations for both White and Black adolescents. In the case of math, they find that mental accounts have indirect effects through college expectations for White adolescents only (i.e., expectations mediate the relationship between mental accounts and math achievement). In the case of reading, they find that there are no indirect effects regardless of race.

If mental accounts are important predictors of adolescents' outcomes, it is important to learn more about factors that predict which adolescents are most likely to form mental accounts. Similarly, it is important to learn more about adolescents' savings. In addition to mental accounts, adolescents' savings have been shown to be an important predictor of adolescents' educational outcomes (Elliott & Beverly, 2011b). However, relatively little is known about predictors of adolescents' savings or mental accounts. It might not be savings or mental accounts that explain adolescents' outcomes at all. Instead, it might be adolescents', parents', households', and/or economic characteristics that explain adolescents' outcomes. That is, for example, smarter adolescents, and adolescents with parents with more education and higher incomes may be more likely to open an account or use mental accounting in the first place. If this is the case, other factors may explain adolescents' outcomes rather than savings or mental accounting.

Existing research primarily tests adolescents' savings at the bivariate level with cross-sectional data and does not consider adolescents' mental accounts. In this study, we examine predictors of adolescents' savings—defined as savings accounts at a local bank and college mental accounts—using a multivariate longitudinal research design. We also use propensity score analysis (PSA) to help further account for potential selection bias that may occur in observational studies. PSA allows researchers to balance potential observed bias between those adolescents, for example, who are exposed to having savings and those who are not based on known covariates (Rosenbaum & Rubin, 1983). Adopting the economic socialization theory of adolescent savings for this study, we estimate propensity scores and balance the sample based on parents' savings for their child.

## 4. Method

### 4.1. Data

This study used longitudinal data from the Panel Study of Income Dynamics (PSID) and its Child Development Supplement (CDS). The PSID is a nationally representative longitudinal survey of U.S. individuals and families that began in 1968. The PSID collects data on such things as employment, income and assets. Our independent variables related to children, parents, and households were taken from 1997, 2001, and 2002 PSID data.

The CDS was administered to 3,563 PSID respondents in 1997 to collect a wide range of data on parents and their children, age birth to 12 years. Questions covered a broad range of developmental outcomes across the domains of health, psychological well-being, social relationships, cognitive development, achievement, motivation, and education. Follow-up surveys were administered in 2002 and 2007. Of the 3563 interviews from the 1997 CDS, a remaining 1676 were eligible for follow-up interviews for the 2007 CDS and 1506 interviews were completed, which represented a response rate of 90% (Institute for Social Research, 2010).

For this study, independent variables for children (ages 7 to 11) were taken from the 2002 CDS and dependent variables were taken from the 2007 CDS when they were adolescents (ages 12 to 15). The two data sets were linked using PSID and CDS map files containing family and personal ID numbers. The linked data sets provided a rich opportunity for analyses in which data collected at one point in time (2002 or earlier) could be used to predict outcomes at a later point in time (2007) and stable background characteristics could be used as covariates. Because the PSID initially oversampled low-

income families, both the descriptive and multivariate analyses were weighted using the observed weight variable from the 2007 CDS as recommended by the CDS-III User Guide (Institute for Social Research, 2010). In addition to allowing the data to become representative of the general population, the 2007 CDS weight variable adjusts for attrition between the 1997 CDS and the 2007 CDS and reduces the influence of extreme weight values on sample estimates (Institute for Social Research, 2010).

#### 4.2. Study sample

The sample in this study was restricted to Black and White adolescents due to the small numbers of other racial groups that existed in the CDS. Only adolescents between the ages of 12 and 15 in 2007 were included in the sample. Ages 12 to 15 were chosen because we were interested in the critical time period when it is believed that adolescents begin to use mental accounting (Webley & Plaisier, 1998). Notably, 12 years is the same age at which the PSID begins asking children questions regarding their saving and spending habits.

The final weighted sample of 744 adolescents (prior to PSA) included 618 (83%) Whites and 126 (17%) Blacks. Children's age in 2002 ranged from 7 to 11 ( $M=9.07$ ,  $SD=1.19$ ) and their age as adolescents in 2007 ranged from 12 to 15 ( $M=13.99$ ,  $SD=1.15$ ). There were slightly more males (54%) than females (46%). Children had a mean academic achievement score of 218 points ( $M=218.64$ ,  $SD=30.46$ ). Household size ranged from 2 to 11 ( $M=4.22$ ,  $SD=1.13$ ). The average head of household had at least some post-secondary education ( $M=13.44$ ,  $SD=2.28$ ) and the majority (80%) expected their children to obtain some college education, as well. Seventy-five percent of heads of households were married and 70% owned their own home. Approximately 30% of households had low incomes (less than \$33,377) and 48% had moderate incomes (between \$33,377 and \$84,016). Approximately 19% of households had zero or negative net worth (at or less than \$0) and 31% had moderate net worth (between \$0 and \$10,000). Other sample characteristics are summarized in Table 1.

#### 4.3. Variable descriptions

In this section, we provide information on how variables are measured. Both categorical and continuous variables were used in the analysis. The multiple years of data provide an opportunity to test variables longitudinally to determine whether a variable collected at an earlier point in time predicts an outcome or variable at a later point in time with the same group of participants, for example, between childhood and adolescence.

##### 4.3.1. Outcome variables

**4.3.1.1. Savings account.** Adolescents ages 12 to 15 were asked whether or not they had a savings or bank account in their name. This was a dichotomous variable with response options including, yes and no. Data for this variable was drawn from the 2007 CDS.

**4.3.1.2. Mental accounting for college.** If adolescents ages 12 to 15 responded positively to having a savings account, they were asked if any of the money in these accounts was designated specifically for school purposes, like paying for college. This was a dichotomous variable with response options including, yes and no. Mental accounting for college, therefore, was representative of money within the same savings account, but adolescents used mental accounting to designate a portion of this money for college. Data for this variable was drawn from the 2007 CDS.

##### 4.3.2. Control variables

There were thirteen control variables: children's race, gender, self-efficacy, self-esteem, and academic achievement; head's marital status,

**Table 1**  
Sample characteristics.

	Unadjusted (N = 744)	Nearest neighbor match (N = 440)	ATT weight (N = 744)			
	(%)	(%)	(%)			
<b>Children's characteristics</b>						
<b>Race</b>						
White	83	83	67			
Black	17	17	33			
<b>Gender</b>						
Male	54	52	56			
Female	46	48	44			
<b>Head/household characteristics</b>						
<b>Marital status</b>						
Married	75	71	73			
Not married	25	29	27			
<b>Educational expectations</b>						
Some college	80	78	84			
No college	20	22	16			
<b>Household income</b>						
Low (<\$33,377)	30	35	27			
Moderate (\$33,377–\$84,016)	48	55	49			
High (≥\$84,016)	22	10	24			
<b>Asset variables</b>						
<b>Home ownership</b>						
Owned home	70	65	72			
No owned home	30	35	28			
<b>Net worth</b>						
Zero and negative (≤\$0)	19	22	15			
Moderate (\$0–\$10,000)	31	39	33			
High (≥\$84,016)	50	39	52			
<b>Parents' savings for their child</b>						
Savings	58	46	52			
No savings	42	54	48			
<b>Savings account</b>						
Savings account	56	48	55			
No savings account	44	52	45			
<b>Mental savings for college</b>						
Savings mentally designated for college	54	47	53			
No savings mentally designated for college	46	53	47			
	M	SD	M	SD	M	SD
<b>Children's characteristics</b>						
Self-efficacy	3.18	.58	3.17	.58	3.21	.57
Self-esteem	3.47	.42	3.46	.43	3.49	.44
Academic achievement	218.64	30.46	217.02	30.83	215.90	30.82
<b>Head/household characteristics</b>						
Education level	13.44	2.28	13.07	2.16	13.69	2.21
Household size	4.22	1.13	4.19	1.22	4.16	1.12

Source. Weighted data from the Panel Study of Income Dynamics (PSID) and Child Development Supplement (CDS).

Note. Descriptive information presented for imputed data.

educational level, and parents' educational expectations; and household size, household income, home ownership, household net worth, and parents' savings for child. Children's race was a dichotomous variable including Blacks and Whites and was available from the 1997 wave of the PSID. Gender included males and females and was downloaded from the 2002 wave of the CDS. Household size was a continuous variable, ranging from 1 to 11, that counted the number of people living in a household and was taken from the 2001 wave of the PSID. Head's marital status was dichotomized into married and not married and was downloaded from the 2001 wave of the PSID.

**4.3.2.1. Self-efficacy.** The Pearlin Self-Efficacy Scale was a continuous variable drawn from the 2002 wave of the CDS. According to Mainieri (2006), the children's self-efficacy scale measures the amount of control adolescents perceive they have over their life in

the PSID/CDS (for more information, see [Pearlin, Lieberman, Menaghan, & Mullan, 1981](#)).

**4.3.2.2. Self-esteem.** The Rosenberg Self-Esteem Scale was taken from the 2002 wave of the CDS and was used to determine children's degree of satisfaction, or self-concept, toward oneself ([Mainieri, 2006](#); for more information see, [Pearlin et al., 1981](#)).

**4.3.2.3. Academic achievement.** This was a continuous variable based on children's composite scores of Woodcock Johnson (WJ-R) Tests of Achievement, including Letter-Word Identification and Applied Problems. Letter-Word Identification and Applied Problems scores served as proxies for reading and math achievement, respectively. Standardized scores were downloaded from the 2002 wave of the CDS.

**4.3.2.4. Education level.** Head of household's education level was a continuous variable ranging from 1 to 16 and was taken from the 2003 wave of the PSID. Each number of head of household's education level represented a year of completed schooling. For example, a head of household who had 12 years of education was considered to have graduated from high school. Head of household's education level was broken down into three categories for descriptive purposes, including heads of households who had completed high school or less, had some college, or had four years of college or more.

**4.3.2.5. Parents' educational expectations.** This was a categorical variable drawn from the 2002 wave of the CDS. Parents were asked how much schooling they expected their child(ren) to complete, with response options ranging from (a) 11th grade or less, (b) graduate from high school, (c) post-high school vocational training, (d) some college, (e) graduate from a two-year college, (f) graduate from a four-year college, (g) earn a master's degree, or (h) earn a MD, LAW, PhD or other doctoral degree. Responses were collapsed into two categories (a through c and d through h).

**4.3.2.6. Household income.** This variable was a continuous variable downloaded from the 1993, 1997, 1999, 2001 and 2003 waves of the PSID that summed total household income from the previous tax year for every individual in the household, including taxable, social security, and other income. Price levels from 1993, 1997, 1999, and 2001 were first inflated to 2003 price levels using the Consumer Price Index (CPI) and then the values were averaged across the five time points. The continuous variable is then broken down into three categories based upon the current population report by the U.S. Census Bureau for 2002 ([De Navas-Walt, Cleveland, & Webster, 2002](#)). The U.S. Census reports aggregate income in 2002 dollars received by each fifth, which includes \$17,916, \$33,377, \$53,162, \$84,016, and \$150,002. These categories presented by the U.S. Census were collapsed into three for the purposes of this paper in order to increase the sample sizes within each group. These levels included low income (<\$33,377), moderate income ( $\geq$ \$33,377 < \$84,016), and high income ( $\geq$ \$84,016).

**4.3.2.7. Home ownership.** This variable asked the head of household whether or not they owned the home or residence in which they lived. The response categories were dichotomized with response options including, yes and no. Data for this variable was extracted from the 2001 wave of the PSID.

**4.3.2.8. Household net worth.** This was a continuous variable downloaded from the 1994, 1999, 2001, and 2003 waves from the PSID that summed all assets, including savings, stocks and bonds, business investments, real estate and other assets, and subtracts all debts, including credit cards, loans, and other debts. Price levels from 1994, 1999, and 2001 were first inflated to 2003 price levels and then the values were averaged across the four time points. The continuous form of net

worth was transformed into a three-level categorical variable, which included zero and negative net worth (<\$0), moderate net worth ( $\geq$ \$0 and  $\leq$ \$10,000), and high net worth (>\$10,000). The three categories were similar in construction to its use by [Nam and Huang \(2009\)](#). The categorical variable was used instead of the natural log transformation that would have set all negative values to zero. In this case, that would have affected 19% of the sample. Of note is that the net worth variable excluded home equity and home ownership was accounted for in a separate variable. This allowed the opportunity to test the relationship between home ownership and children's savings separate from other more easily liquidated assets.

**4.3.2.9. Parents' savings for their child.** Heads of households were asked whether they or another caregiver had any savings in a bank account put aside for their children separate from other types of savings. In a separate question, parents or caregivers were asked whether or not they had any savings set aside for their child's future schooling, such as college, that is separate from other types of savings. These two questions were combined to create a dichotomous variable: parents with savings for their child and parents without savings for their child. Parents' savings for their child was used in PSA to create balanced samples, a procedure described in greater detail below. This variable was drawn from the 2002 wave of the CDS.

#### 4.4. Analysis plan

This study examined predictors of two outcome variables: savings accounts and mental accounting for college. There were several steps in the analysis plan to analyze the results for these outcomes. The first step was to analyze missing data to determine whether multiple imputation was appropriate for estimating and completing missing data. The second step was to conduct PSA using parents with and without savings for their child to model treatment/control conditions. The third step was to analyze the samples using logistic regression. Data analysis steps were conducted using PASW Statistics (SPSS; version 18) and STATA (version 11).

##### 4.4.1. Missing data

Missing data among the variables might result in limitations regarding generalizability of the findings and a reduction in power ([Rubin, 1976, 1987](#)). Multiple imputation has been recognized as a preferred method for estimating and completing missing data ([Little & Rubin, 2002](#)). [Little and Rubin \(2002\)](#) recommend using multiple imputation when variables have less than 20% missing. The following percentages of variables in this study were missing: 11% savings account, 13% mental accounting for college, 0% children's race, 0% children's gender, 17% children's self-efficacy, 17% children's self-esteem, 17% children's academic achievement, 1% head of household's marital status, 17% head of household's education level, 7% parents' educational expectations, 18% household size, 14% household income, 1% home ownership, 4% net worth, and 7% parents' savings for their child. Given that all missing data was below 20% and data was missing at random, multiple imputation could be used. The Markov Chain Monte Carlo (MCMC) method created five imputed data sets with no missing data ([Saunders et al., 2006](#); [Schafer & Graham, 2002](#)). The results were then pooled across the five imputed data sets to reduce bias in the estimates ([Saunders et al., 2006](#)).

##### 4.4.2. Propensity score analysis

Propensity score analysis is commonly used in education, economics, and medical disciplines ([Guo & Fraser, 2010](#)); however, this methodology may also be valuable to research conducted in social science disciplines that use observational data. Propensity score analysis can be used as a more rigorous approach to test effects of a dichotomous variable (in this case, parents' savings for their child) with observational and longitudinal data. The PSA conducted in this study included both

matching and weighting cases to create new samples and to perform covariate balance checks (D'Agostino, 1998). Matching typically reduces the sample size due to the inability to match all treated and non-treated observations (Guo & Fraser, 2010; Rosenbaum, 2002; Rosenbaum & Rubin, 1985), potentially resulting in a loss of a statistical power for estimating the treatment effect on the outcomes. Propensity score weighting was used as a non-sample-reducing alternative to selection bias.

**4.4.2.1. Propensity score estimation.** Logistic regressions were performed within each imputed data set to estimate the propensity scores (i.e., the predicted probability of having parents with savings for their child). Parents' savings was chosen to estimate propensity scores and balance the sample based on an economic socialization theory discussed in the introduction. Balancing the sample using parents' savings for their child meant that children's observable personal characteristics, like academic achievement, would be similar whether or not their parents had savings for them.

Prior to estimating the propensity scores, bivariate tests were conducted to determine covariates affecting selection bias. The results of these tests, which can be found in Table 2 in Section 5.1, revealed significant differences among covariates and were used in the logistic regression equation to estimate the propensity scores (Rosenbaum, 2002; Rosenbaum & Rubin, 1983). The variables used to estimate the propensity scores included academic achievement, marital status, education level, educational expectations, household income, home ownership, and household net worth. In addition to significant differences among covariates on parents' savings, theory also suggests these variables may be related to parents' savings. Generalized boosted regression was also performed as an alternative to estimating propensity scores; however, the sample was not adequately balanced after generalized boosted regression. Therefore, propensity scores were estimated using logistic regression. Propensity scores were estimated with and without the recommended weight variable from the 2007 CDS. The results of estimations with and without the 2007 CDS weight variable were compared and found to be similar, almost identical. Given the similarities, propensity scores were estimated without the 2007 CDS weight variable.

**4.4.2.2. Nearest neighbor with caliper match.** After estimating the propensity scores, nearest neighbor matching with caliper was performed (Cochran & Rubin, 1973). Children of parents with and without savings for them were randomly ordered. Then a child whose parents had savings for them was selected and matched with a child whose parents did not have savings for them using the closest propensity score within the region of caliper (Guo & Fraser, 2010). The caliper size was equal to 0.25 times the standard deviation of the obtained propensity score. Propensity scores ranged from 0.12 to 0.87. Among children whose parents had savings for them, 4% had propensity scores below 0.2 and 0% had propensity scores above 0.8. Among children whose parents did not have savings for them, approximately 3% had propensity scores below 0.2 and 11% had propensity scores above 0.8. A visual inspection of the density distribution of propensity scores showed potentially insufficient overlap after nearest neighbor with caliper match, suggesting non-compliance with the common support condition.

**4.4.2.3. Average treatment-effect-for-the-treated (ATT) weight.** The estimated propensity scores were also used to compute the average treatment-effect-for-the-treated (ATT; i.e., the effect when considering only children whose parents had savings for them) sampling weight for each imputed dataset. The ATT weight estimated 1 for a child whose parents had savings for them and  $p/(1-p)$  for a child whose parents did not have savings for them, where  $p$  equals the propensity score. Propensity scores ranged from 0.08 to 0.90. Among children whose parents did not have savings for them, approximately

3% had propensity scores below 0.2 and 17% had propensity scores above 0.8. Among children whose parents had savings for them, less than 5% had propensity scores below 0.2 and 15% had propensity scores above 0.8. A visual inspection of the density distribution of propensity scores showed overlap after applying the ATT weight, indicating compliance with the common support condition.

**4.4.2.4. Covariate balance checks.** Balance checks were conducted to determine the ability of the PSA to balance relevant covariates. Balance checks were necessary to determine whether PSA adjusted for observed bias (Barth, Guo, & McCrae, 2008; D'Agostino, 1998; Guo, Barth, & Gibbons, 2006; Guo & Fraser, 2010). For the sample matched using nearest neighbor with caliper, balance checks were performed using  $\chi^2$  difference tests for categorical variables and two-tailed, independent samples  $t$ -tests for continuous variables. The absolute mean standardized differences were conducted using Cohen's  $d$  (D'Agostino, 1998; Haviland, Nagin, & Rosenbaum, 2007). For the sample using the ATT weight, balance checks were performed using weighted simple regression and weighted simple logistic regression (Guo & Fraser, 2010).

#### 4.4.3. Logistic regression

Following the steps taken to balance the data, logistic regressions were used to predict savings accounts and mental accounting for college. The *xi: mim* commands in STATA were used to perform logistic regressions across the five imputed data sets. Results are presented in Tables 3 and 4. Findings at a significance level of  $p < .05$  are noted in the tables (Tables 4 and 5).

## 5. Results

### 5.1. Bivariate results from covariate balance checks

Results from the balance checks are presented in Table 2. In the unadjusted sample, many of the covariates showed significant group differences between children whose parents had savings for them and children whose parents did not have savings for them. Once the nearest neighbor with caliper match was conducted, most group differences were no longer significant. Following the ATT weight, group differences on all covariates were no longer significant. The results are reported for the logistic regressions using the ATT weight given that the sample was not reduced and appeared successfully balanced.

### 5.2. Descriptive results

Descriptive results are presented in Tables 1 and 3. In the ATT weight sample (Table 3, columns 5 and 6), 55% of adolescents had savings accounts and 53% had mental accounting for college in 2007. Gaps in savings existed by demographic characteristics. For example, the Black/White savings account percentage point gap was 22% with more Whites (63%) having savings accounts compared to Blacks (41%). A similar Black/White gap existed with regards to mental accounting for college—20%. There were also notable gaps by household characteristics. The largest percentage point gap was between high income compared to low income households for both savings accounts and mental accounting for college. In the case of savings accounts, a greater percentage of adolescents from high income households had savings (72%) compared to low income households (42%)—a 30% gap. There was a 31% gap in mental accounting for college between high income (72%) and low income (41%) households (Table 3).

### 5.3. Logistic regression results for adolescents' savings account ownership in 2007

The results predicting savings accounts in 2007 using the ATT weight are presented in Table 4, Model 3. There was a significant

**Table 2**  
Covariate balance checks by parents' savings for their child.

	Unadjusted (N = 744)				Nearest neighbor match (N = 440)				ATT weight (N = 744)			
	Savings account (%)		No savings account (%)		Savings account (%)		No savings account (%)		Savings account (%)		No savings account (%)	
			Comparisons				Comparisons				Comparisons	
			Bivariate test ( $\chi^2$ or t-test)	X  Std. diff.			Bivariate test ( $\chi^2$ or t-test)	X  Std. diff.			$\beta$	Robust SE
Race			39.87***	.37			.81	.81			-.15	.19
White	91	73			81	84			66	69		
Black	9	27			19	16			34	31		
Gender			1.03	1.13			.27	.92			.08	.20
Male	55	52			51	53			59	55		
Female	45	48			49	47			41	45		
Self-efficacy	3.21	3.13	-1.92	.14	3.16	3.18	.38	.04	3.22	3.20	.08	.16
Self-esteem	3.48	3.45	-0.88	.07	3.47	3.45	-.41	.04	3.49	3.49	-.02	.22
Academic achievement	222.16	213.81	-3.73***	.27	217.00	216.98	.02	.00	215.60	216.22	-.00	.00
Head's marital status			39.79***	2.87			3.10	.71			-.03	.19
Married	83	63			67	74			72	73		
Not married	17	37			33	26			28	27		
Head's education level	13.98	12.71	-7.83***	.58	12.93	13.19	1.21	.21	13.60	13.77	-.03	.05
Educational expectations			30.92***	2.86			.89	.84			-.12	.21
Some college	87	70			76	79			84	85		
No college	13	30			24	21			16	15		
Household size	4.26	4.17	-.95	.08	4.15	4.24	.73	.07	4.08	4.23	-.12	.08
Household income			86.65***				21.48***					
Low (<\$33,377)	18	48			38	32			28	26		
Moderate (\$33,377–\$84,016)	52	41		.30	59	52		1.05	51	47	.04	.19
High ( $\geq$ \$84,016)	30	11		.14	3	16		.63	21	27	-.27	.28
Home ownership			52.57***	3.27			3.36	.70			-.01	.18
Owns home	80	55			61	69			71	72		
Does not own home	20	45			39	31			29	28		
Net worth			54.44***				11.33***					
Zero and negative ( $\leq$ \$0)	12	27			23	20			15	15		
Moderate (\$0–\$10,000)	27	38		.63	46	33		.83	32	33	.05	.24
High ( $>$ \$10,000)	61	35		.26	31	47		1.74	53	52	.09	.25
N	431	313			194	226			378	366		

Source. Weighted data from the Panel Study of Income Dynamics and Child Development Supplement (CDS). Data imputed using multiple imputations.

Note. Low income and negative net worth were used as the reference groups for the balance checks for the ATT weighted regressions. ATT = the average treatment effect for the treated using the weight of 1 for parents with savings and  $p/(1-p)$  for parents without savings for their child.  $\beta$  = regression coefficients. Robust SE = robust standard error. |X| Std. diff. = absolute mean standardized difference. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

prediction by the predictor variables in Model 3 [ $\beta = -3.07$ ,  $SE = 1.54$ ,  $p = .05$ , McFadden's (Pseudo)  $R^2 = .18$ ]. Significant predictors included head of household's education level and parents' savings for their child. For every additional year of head of household's education level, there was a 25% increase in the odds of having savings accounts ( $OR = 1.25$ ,  $p < .001$ ). Children whose parents had savings for them were over two and half times more likely to have savings accounts as adolescents ( $OR = 2.56$ ,  $p < .001$ ).

#### 5.4. Logistic regression results for adolescents' use of mental accounting for college in 2007

The results predicting adolescents' mental accounts in 2007 using the ATT weight are presented in Table 5, Model 6. There was not a significant prediction by the predictor variables in Model 6 [ $\beta = -1.30$ ,  $SE = 1.38$ ,  $p = .35$ , McFadden's (Pseudo)  $R^2 = .27$ ]. Significant predictors included head of household's education level and parents' savings for their child. For every additional year of head of household's education level, there was a 12% increase in the odds of using mental accounts ( $OR = 1.12$ ,  $p < .05$ ). Children whose parents had savings for them were over two times more likely to use mental accounting adolescents ( $OR = 2.18$ ,  $p < .001$ ).

## 6. Discussion

The first part of this study focused on predicting savings account ownership among adolescents ages 12 to 15. Research suggests that adolescents who have a savings account have better educational outcomes than if they do not (e.g., Elliott & Beverly, 2011b). Descriptive

results from this study suggest that a little more than half of all adolescents have savings accounts. This is consistent with previous studies (e.g., Furnham, 1999; Mandell, 2008; Pritchard et al., 1989) and is in line with findings suggesting that adolescents begin to consistently use a bank account to save their money by age 12 (e.g., Otto, Schots, Westerman, & Webley, 2006; Webley et al., 1991). Since the PSID first begins to ask adolescents questions about their savings at age 12, we are unable to determine in this study whether adolescents begin to save in childhood. It is also worth noting that when the data are disaggregated, the percentage of accounts owned by low-income and Black adolescents is far less than aggregate data suggest.

As discussed in the Introduction, the dominant theory of adolescents' savings—economic socialization theory—proposes that parents are the primary facilitators of adolescents' savings. We find evidence to support this. When the cumulative data are disaggregated, notable gaps exist by household financial resources, such as parents' savings for their child as well as household's income, net worth, and home ownership. Moreover, we find that head of household's education level and parents' savings for their child are significant predictors of whether or not adolescents own an account. This is consistent with previous research (Pritchard et al., 1989; Webley & Nyhus, 2006). However, this study builds on previous research by using a sample of U.S. children and adolescents, a larger sample size, longitudinal data, and PSA techniques.

Notably, we find that household income is not significant. Findings from previous research that tests the relationship between household income and adolescents' savings accounts are mixed. Mason et al. (2010) find that household income is not significant; however, there are differences between our study and theirs. For example,

**Table 3**

Percent of adolescents with savings accounts and their use of mental accounting for college by children's and head/household characteristics and asset variables.

	Unadjusted (N = 744)		Nearest neighbor match (N = 440)		ATT weight (N = 744)	
	% with savings accounts	% with mental accounting for college	% with savings accounts	% with mental accounting for college	% with savings accounts	% with mental accounting for college
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Full sample	56%	54%	48%	47%	55%	53%
Children's characteristics						
White	61	58	50	48	63	59
Black	32	35	38	41	41	39
Male	55	54	43	44	53	60
Female	58	55	52	50	59	57
Above average self-efficacy	57	52	49	46	56	52
Below average self-efficacy	56	54	46	48	55	54
Above average self-esteem	58	56	45	51	56	54
Below average self-esteem	54	51	50	42	55	51
Above average academic achievement	64	58	42	47	61	55
Below average academic achievement	48	50	52	46	50	51
Head/household characteristics						
Married head	63	60	51	49	61	58
Unmarried head	37	36	39	41	41	38
Head has four-year degree or more	75	69	72	60	76	66
Head has some college	56	57	42	45	51	51
Head has high school degree or less	41	43	41	43	43	44
Expects some college education	62	59	50	49	59	56
Expects no college education	35	36	39	39	38	39
More than four household members	56	57	45	45	55	56
Four household members or less	56	53	49	48	56	52
Low-income	35	35	38	38	42	41
Moderate income	59	57	52	50	55	50
High-income	78	76	59	62	72	72
Asset variables						
Owns home	64	61	51	49	61	57
Does not own home	37	38	41	42	44	42
Zero and negative net worth	46	39	50	42	52	46
Moderate net worth	42	42	40	42	44	43
High net worth	69	67	53	55	64	61
Parents' savings for their child	70	67	55	54	65	60
No parents' savings for their child	37	37	40	41	46	45

Source. Weighted data from the Panel Study of Income Dynamics (PSID) and Child Development Supplement (CDS). Descriptive information presented for imputed data. Note. Information is reported using row percentages.

Mason et al. (2010) use a monthly household income variable whereas we use an annual measure of household income averaged over several years and categorized into low, moderate, and high levels. Moreover, Mason et al. (2010) examine the amount of money saved among participants in a savings program as opposed to account ownership. Conversely, Webley and Nyhus (2006) find that household income is significant. However, there are a number of important differences between our study and Webley and Nyhus's (2006) study. Webley and Nyhus (2006) examine the amount of money saved with a sample of Dutch adolescents between ages 16 and 21, whereas we examine account ownership with a sample of U.S. adolescents 12 to 15.

We also find evidence that head of household's education level is significantly related to owning a savings account. This finding is consistent with previous research (Friedline, 2012; Friedline et al., 2011; Mason et al., 2010; Pritchard et al., 1989). Further, none of the variables representing children's characteristics as are significant in this study. Characteristics such as self-efficacy, self-esteem, and academic achievement are not significant after balancing the sample between parents with and without savings for their child. This suggests that among the variables included in this study and holding all else constant, parents' and households' characteristics predict adolescents' savings and not children's characteristics. While previous research finds significant associations between measures of academic achievement and savings (Kim et al., 2011; Leiser & Ganin, 1996; Pritchard et al., 1989), these studies do not use longitudinal data or PSA. More research is needed to determine when and how academic achievement matters for adolescents' savings.

### 6.1. Adolescents' mental accounting—case of college savings

In addition to savings account ownership, we also examine factors that predict whether or not adolescents use mental accounting. In this study, adolescents who designate a portion of their savings at a local bank for school purposes like college are classified as using mental accounting. Descriptive results indicate that many adolescents (53% in the ATT weight sample) use mental accounting. While little research has been conducted on adolescents' mental accounting, this is consistent with suggestions from existing developmental theory and research. For instance, Webley and Plaisier (1998) find little evidence that adolescents prior to ages 11 and 12 use mental accounting; however, they do find evidence of mental accounting among adolescents ages 11 to 12. Further, it is during this stage of development that adolescents begin to use the bank as a temptation-inhibiting strategy (Sonuga-Barke & Webley, 1993).

When the descriptive results are disaggregated, gaps in mental accounting are observed in the case of household financial resources such as parents' savings for their child and household's income, net worth, and home ownership. This is not surprising. Previous research suggests that adolescents are likely to develop more complicated understandings of saving depending on the types of socio-economic environments to which they are exposed (Jahoda, 1981; Ng, 1983). From this, we might assume that low income adolescents who have less exposure to formal banking institutions and the different kinds of savings accounts available would be less likely to use mental accounting. From this perspective, it is less about the ability of low income adolescents

**Table 4**  
Logistic regression predicting adolescents' savings account ownership in 2007.

	Unadjusted			Model 2 Nearest neighbor match			Model 3 ATT weight		
	$\beta$	SE	OR	$\beta$	SE	OR	$\beta$	SE	OR
Children's characteristics									
White	.15	.31	–	.20	.29	–	.45	.28	–
Male	–.22	.23	–	–.26	.21	–	–.30	.21	–
Self-efficacy	–.33	.26	–	–.02	.22	–	–.18	.24	–
Self-esteem	–.13	.36	–	–.29	.30	–	–.16	.34	–
Academic achievement	.01	.01	–	.00	.01	–	.00	.01	–
Head/household characteristics									
Married	.18	.34	–	.23	.30	–	.18	.28	–
Head's education level	.21	.06	–	.18	.06**	1.20	.22	.06***	1.25
Expects some college	.24	.29	–	.32	.29	–	.34	.24	–
Household size	–.16	.12	–	–.07	.10	–	–.12	.11	–
Moderate income (\$33,377–\$84,016)	.25	.31	–	.04	.26	–	.05	.24	–
High-income ( $\geq$ \$84,016)	.64	.40	–	.19	.46	–	.39	.38	–
Asset variables									
Owns home	.49	.29	–	.26	.29	–	.30	.25	–
Moderate net worth (\$0–\$10,000)	–.24	.34	–	–.10	.30	–	–.11	.29	–
High net worth ( $>$ \$10,000)	.00	.35	–	.10	.36	–	.02	.34	–
Parents have savings for their child	.92	.26***	2.51	.73	.21***	2.08	.94	.21***	2.56
McFadden's (Pseudo) $R^2$			.16			.10			.18
N			744			440			744

Source. Weighted data from the Panel Study of Income Dynamics and Child Development Supplement (CDS). Data imputed using multiple imputations.  
 Note.  $\beta$  = regression coefficients. SE = standard error. OR = odds ratio. ATT = the average treatment effect for the treated using the weight of 1 for parents with savings and  $p/(1-p)$  for parents without savings for their child.  
 \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

to use mental accounting than it is about the types of socio-economic environments in which they grow up.

Multivariate findings also suggest that adolescents whose parents have savings for them as children and are more educated are more likely to employ mental accounting techniques. Consistent with our findings, Pritchard et al. (1989) find that parents' college savings (whether or not they started saving for their children's college education) is significantly related to adolescents' savings for post-high school education expenses. Also similar to our findings, Pritchard et al. (1989)

find a significant relationship between parents' education level and adolescents' savings for post-high school expenses.

6.2. Limitations

The results of this study should be considered in light of several methodological limitations. The results of the nearest neighbor with caliper match appeared less successful in producing reliable results when compared to the ATT weight. The differences in results could

**Table 5**  
Logistic regression predicting adolescents' use of mental accounting for college in 2007.

	Model 4 Unadjusted			Model 5 Nearest neighbor match			Model 6 ATT weight		
	$\beta$	SE	OR	$\beta$	SE	OR	$\beta$	SE	OR
Children's characteristics									
White	.01	.29	–	.33	.24	–	.46	.24	–
Male	–.07	.26	–	–.09	.24	–	–.30	.23	–
Self-efficacy	–.49	.23*	.61	–.23	.24	–	–.34	.23	–
Self-esteem	.15	.30	–	–.18	.29	–	.06	.32	–
Academic achievement	–.00	.00	–	–.00	.00	–	–.00	.00	–
Head/household characteristics									
Married	.19	.33	–	.11	.29	–	.23	.27	–
Head's education level	.10	.05	–	.10	.06	–	.11	.06*	1.12
Expects some college	.49	.30	–	.43	.30	–	.43	.27	–
Household size	.02	.12	–	.06	.11	–	.04	.12	–
Moderate income (\$33,377–\$84,016)	.32	.29	–	–.02	.24	–	–.02	.24	–
High-income ( $\geq$ \$84,016)	.74	.42	–	.61	.50	–	.66	.41	–
Asset variables									
Owns home	.25	.31	–	.23	.25	–	.19	.23	–
Moderate net worth (\$0–\$10,000)	.11	.32	–	–.03	.30	–	.02	.28	–
High net worth ( $>$ \$10,000)	.52	.32	–	.18	.30	–	.18	.30	–
Parents have savings for their child	.80	.24***	2.23	.69	.21***	1.99	.78	.21***	2.18
McFadden's (Pseudo) $R^2$			.34			.39			.27
N			744			440			744

Source. Weighted data from the Panel Study of Income Dynamics and Child Development Supplement (CDS). Data imputed using multiple imputations.  
 Note.  $\beta$  = regression coefficients. SE = standard error. OR = odds ratio. ATT = the average treatment effect for the treated using the weight of 1 for parents with savings and  $p/(1-p)$  for parents without savings for their child.  
 \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

be due to the reduction in sample size that takes place when matching children of parents with and without savings accounts (D'Agostino, 1998; Dehejia & Wahba, 2002). This is a plausible explanation given that a majority of the covariates were used to perform the matching, thus limiting the available matches. Moreover, the size of the imbalance between children of parents with and without savings for them may have been too large for the matching method applied, as nearest neighbor with caliper match resulted in a 41% reduction to a sample size of 440.

One benefit of using the ATT weight was that there was not a reduction in sample size because the propensity scores were used as weights to balance the sample. However, propensity score weighting may increase random error in the estimates due to endogeneity and specification of the propensity score estimation equation (Freedman & Berk, 2008). In some cases, propensity score weighting has been found to exaggerate endogeneity (Freedman & Berk, 2008). Moreover, parents' savings for their child may be endogenous if assignment into the two groups correlated with unobserved covariates that impact adolescents' savings. Relatively few studies examine predictors of adolescents' savings and it is likely that we do not yet know all of the relevant or important predictors. As a result, unobserved heterogeneity may be introduced due to unknowingly omitting relevant or important predictors from this study. More research is needed that predicts adolescents' savings.

Another limitation is possible error due to leaving out potentially important observable predictors such as adolescents' future orientation. Previous research suggests that future orientation may be an important predictor of whether or not adolescents save or not (Webley & Nyhus, 2006). However, the PSID and its supplements do not ask children questions related to their future orientation until age 12. Timing of asking questions about future orientation in the PSID and its supplements is consistent with commonly held beliefs about children's cognitive development (e.g., Muss, 1996; Shanahan, 2000). Therefore, we were unable to control for future orientation in this study. However, research also suggests that age differences in future orientation exist up until middle adolescence (Steinberg et al., 2009). Given this, it may not be a stable predictor of savings or mental account among the young adolescence examined in this study.

An additional limitation has to do with the time from which children's characteristics were measured. Characteristics like self-efficacy and self-esteem were measured in 2002 (between ages 7 and 11). However, research on the self suggests that characteristics such as these may not become stable until later adolescence or early young adulthood (Bandura, 1997; Caspi, Roberts, & Shiner, 2005; Erikson, 1995; Roberts, Walton, & Viechtbauer, 2006). Unfortunately, the CDS only measures characteristics every five years, so we were only able to control for these characteristics between ages 7 and 11, potentially during an age range in which these characteristics were in early developmental stages.

Another potential limitation is the measurement of parents' savings for their child and adolescents' savings. One might argue that these variables are the same or similar—conceptually and literally. That is, parents' savings for their child and adolescents' savings accounts may be one in the same. We believe there are at least two reasons why these two variables might be considered distinct. First, adolescents and parents in the PSID / CDS respond to separate self-reported questions about their savings. That is, adolescents are asked directly whether or not they have a savings account at a bank in their own name. Second, while adolescents' savings and parents' savings for their child/adolescent are significantly correlated, they are not highly correlated ( $r = .35$ ), suggesting that the accounts may be distinct. However, the limitation remains that parents may have opened savings accounts for their children in 2002 and passed along the account to them as adolescents in 2007, something that was not possible to test.

Final limitations have to do with the operationalization of adolescents' savings and mental accounting. Both variables are dichotomous and present perhaps a limited view of adolescents' savings and mental accounting. While research suggests that savings account ownership may relate to improved educational outcomes over and above savings amount (e.g., Elliott, 2009; Elliott, Destin et al., 2011), variables measuring adolescents' savings amount in the CDS/PSID data has high percentages of missing (upwards of 60%) and the amounts saved are small. Therefore, we were unable to include a continuous measure of adolescents' savings amount as an outcome. In addition, we use a proxy for adolescents' mental accounts—designating a portion of savings for college. Adolescents' designation of savings for college may be an artifact of the mental accounting process; however, this is unknown. Moreover, this operationalization tests a specific kind of mental account—designating savings for college—and did not test the more general mental accounting process.

### 6.3. Implications

Among children's characteristics (such as self-efficacy, self-esteem, or academic achievement) that are included in this study, none have a statistically significant relationship with whether adolescents own savings accounts or use mental accounting. With regards to previous research that finds a significant relationship between adolescents' savings and their educational outcomes (e.g., Elliott, 2009; Elliott & Beverly, 2011a-b; Elliott & Nam, 2011), the most notable of these characteristics to be non-significant may be academic achievement. Previous research finds direct relationships between academic achievement and savings (e.g., Friedline et al., 2011) and vice versa (e.g., Elliott, Jung, & Friedline, 2010). The non-significant findings in this study give support to the idea that adolescents' savings may have independent effects on their educational outcomes that cannot be fully explained by differences in academic achievement. That is, adolescents may come to have savings accounts based on parents' and household characteristics and it is these characteristics—not adolescents' academic achievement—that have effects on educational outcomes through adolescents' savings.

This study also finds that adolescents have savings accounts in a local bank as well as use mental accounting when their parents have savings on their behalf and when their parents have more education. One interpretation is that findings provide support for the economic socialization theory of saving, which emphasizes the role parents play in the development of adolescents' understanding of saving. An alternative interpretation, what Elliott, Rifenburg, Webley, and Friedline (2012) refer to as an institutional interpretation, suggests that the acquisition of financial knowledge and resources are strongly influenced by structural failures related to social class. From this perspective, the economic socialization theory of saving only tells us *who* is more likely not to have savings, not *why* they do not have savings in the first place. Adolescents with less educated parents and parents who do not have savings for them are less likely to be exposed to financial institutions at a young age and therefore less likely to use mental accounting for college. So, it should not be surprising when our regressions show that these adolescents are less likely to have savings or use mental accounting. It potentially speaks to a bigger issue, the legacy in America that some adolescents are blocked from owning assets due to structural failings.

Along these lines, one implication is that the traditional banking market may not be able to equally distribute advantage that having savings as an adolescent provides. From this perspective, at least in part, educational advantage is the amount of control an adolescent has over educational resources due to owning assets. Educational advantage gained from owning savings is likely to lead to greater success in school (e.g., Friedline, 2012). Greater success in school translates into increased likelihood of later economic success (Wilson,

1987), including higher income and earnings (King & Bannon, 2002), more stable employment (Topel, 1993), more stable family support (Axinn & Arland, 1992), and higher wealth (Oliver & Shapiro, 1995; Shapiro, 2004). In addition to educational advantage, parents may also transfer a financial advantage to their children. This may also have potential implications for adolescents' mobility in adulthood. Previous research finds that adolescents who have savings of their own are more likely to have savings as young adults (Friedline, Elliott, et al., 2011) and even into middle adulthood (Ashby et al., 2011).

## 7. Conclusion

It might be suggested that encouraging more adolescents to save and build assets may require institutions other than the family to be taken into consideration. When talking about institutions within the applied social science context, Sherraden and Barr (2005) state that they can be thought of as—"interventions, designed to alter behaviors and outcomes for individuals" (p. 8). From this perspective, adolescents' savings programs are a type of institution. Child Development Accounts (CDAs) have been proposed as a potentially novel and promising savings program meant to promote adolescents' savings and asset accumulation (Boshara, 2003; Goldberg, 2005; Sherraden, 1991). While no national CDA policy has been adopted in the United States, a number of legislative proposals have been developed, such as America Saving for Personal Investment, Retirement, and Education (ASPIRE) Act, Young Savers Accounts, 401Kids Accounts, Baby Bonds, and Portable Lifelong Universal Savings Accounts (Cramer, 2010). These policies have champions from across the political spectrum. The ASPIRE Act is probably the most recognizable of the proposals. ASPIRE would create "Lifelong Savings Accounts" for every newborn, with an initial \$500 deposit, along with opportunities for financial education. Children living in households with incomes below the national median would be eligible for an additional contribution of up to \$500 at birth and a savings incentive of \$500 per year in matching funds for amounts saved in accounts. When account holders turn 18, they would be permitted to make tax-free withdrawals for costs associated with post-secondary education, first-time home purchase, and retirement security (Cramer & Newville, 2009). In the long run, these institutions may materialize in different forms, meaning that institutions to promote adolescents' savings may emerge at the community or national levels. Additional research is needed to determine the institution(s) best able to promote adolescents' savings.

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