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Foundations of Financial Well-Being: Insights into the Role of Executive Function, Financial Socialization, and Experience-Based Learning in Childhood and Youth*

During childhood and youth we build the foundations for financial well-being later in life, acquiring the knowledge, skills, attitudes, and personality traits that enable us to manage our finances as adults. This article reviews literature from consumer science, developmental psychology, and allied fields to gain insight into moments during youthful development when interventions are likely to have greatest impact. We find promising avenues for influence during each developmental life stage. Many present truly novel approaches to financial education—such as focusing on improving executive function in young children (critical despite lacking apparent "financial content"), emphasizing financial attitude development through dual-generation financial modeling for elementary and middle school students and their parents, or intentionally teaching financial heuristics and other practical skills to later adolescents and young adults. Overall, this article proposes a range of innovative strategies to improve financial education, from early childhood through young adulthood.

Financial well-being is a multifaceted concept that transcends both traditional financial literacy and the broader notion of financial capability. According to the Consumer Financial Protection Bureau, financial well-being entails *having control over one's finances day-to-day and month-to-month*, *having the capacity to absorb financial shocks*, *being on track to meet financial goals*, *and having the financial freedom to*

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make choices that allow one to enjoy life (Consumer Financial Protection Bureau 2015). While most individuals hope to attain financial well-being, it eludes many. Differences in access to resources and opportunities are no doubt responsible for much of the variation in financial well-being across consumers, but particular behaviors can improve financial well-being regardless of circumstances. These behaviors include managing resources effectively, planning ahead, and making informed financial decisions.

The existing literature suggests that these behaviors are driven by a diverse set of personal attributes. For example, one must possess basic financial knowledge (Lusardi and Mitchell 2007) as well as financial research and critical thinking skills (Consumer Financial Protection Bureau 2015; OECD Programme for International Student Assessment 2013) to make effective financial decisions. In addition, managing resources requires not only money management skills, like knowing how to create and follow a budget (Atkinson et al. 2007), but also life skills, such as self-control (Moffitt et al. 2011). Naturally, these skills are of little use if they are not put into action, so individuals also benefit from confidence in their financial skills—or "financial self-efficacy" (Danes, Huddleston-Casas, and Boyce 1999)—and a future orientation. These attitudes help consumers see the value in applying their skills rather than simply living day-to-day and, thus, help them translate abilities into behaviors. In short, one must possess a wide range of skills and attitudes in addition to basic financial knowledge in order to achieve financial well-being in adulthood.

Not surprisingly, no financial education program addresses all of these factors, and many focus purely on financial knowledge. Moreover, evidence on the efficacy of interventions that seek to influence subsets of these factors in adults is mixed (see, e.g., Collins and O'Rourke 2010; Fernandes, Lynch, and Netemeyer 2014 for reviews of the existing work). The broad scope of attributes associated with financial well-being, coupled with the observation that many of these drivers begin to develop early in life, suggests that careful consideration of the role of childhood experiences on the development of financial well-being could yield valuable insights.

In this review, we examine the way in which youth between the ages of 3 and 21 develop the attitudes, knowledge, and skills that drive financial well-being in adulthood. By reviewing the developmental psychology, consumer finance, and education literatures, we provide insight into developmentally appropriate foci for financial capability interventions for pre-elementary school children (ages 3–5), elementary and middle school children (ages 6–12), and adolescents and young adults (ages 13–21).

Our synthesis of the literature indicates that executive function development is critical for pre-elementary students, financial socialization is key for elementary and middle school children, and financial skill building is vital for adolescents and young adults. This is not to say, for example, that pre-elementary students and adolescents are not undergoing financial socialization—they most certainly are—but rather, these are the developmental areas of greatest relevance for each age group. In the sections that follow, we discuss each of these developmental areas, the ways in which they relate to financial well-being, and promising pathways for establishing the related attributes among youth.

PRE-ELEMENTARY, AGES 3–5: RAPID NEUROLOGICAL GROWTH AND THE FOUNDATIONS FOR FINANCIAL KNOWLEDGE

Executive Function and Financial Well-being

Achieving high levels of financial well-being in adulthood requires a range of cognitive abilities, including impulse control (e.g., Meier and Sprenger 2011) and future-oriented skills (Lynch et al. 2010) such as the ability to delay gratification and perseverance or "grit" (Duckworth et al. 2007). These abilities are critical to tasks such as setting financial goals and then developing and executing plans or household budgets in service of those goals while confronting challenging circumstances.

The cognitive abilities underlying such tasks—staying focused on long-term goals, and acquiring and processing financial information—are often characterized as "executive function." Executive function allows us to manage the flow of information in our day-to-day lives, keeping mental distractions at bay while we sift through and make use of the knowledge that will bring us closer to our goals in life. Executive function also has been identified as an important contributor to a number of well-being outcomes, from language acquisition and school readiness in early childhood, to health and safety in adolescence and adulthood (Gathercole et al. 2004; Moffitt et al. 2011; Munakata et al. 2013) but the exact role of executive function as a causative factor in well-being-related outcomes is a matter of some debate. For example, environmental factors such as poverty or stress may directly influence both executive function and later life outcomes. At the same time, current research suggests that executive function may be an important mechanism through which external factors such as poverty and stress exert influence (see Blair and Raver 2012). Executive function may be both a mediating factor (e.g., poverty affects executive function, which then affects financial decisions) and a moderating factor (e.g., poverty may

have greater impact on children low in executive function). The effects of executive function may be both general (e.g., children with better executive function abilities do better in school, which supports financial well-being) and specific (e.g., executive function abilities directly influence financial decision making).

Executive Function Development in the First Years of Life

Executive function develops rapidly during the first five years of life, though adult levels are not reached until at least late adolescence. Although much of the development of the prefrontal cortex, where executive function is housed, is under maturational control, unfolding on a genetically programmed schedule, environment and experience also play critical roles (Kolb et al. 2012).

Disaggregating Executive Function: Inhibition, Working Memory, Cognitive Flexibility

It is useful to think of executive function has having three subcomponents: inhibition, working memory, and cognitive flexibility (Miyake et al. 2000). Although this model of executive function components is not without controversy (for discussion see Huizinga, Dolan, and van der Molen 2006), we employ it in this review to facilitate the incorporation of research that indicates subcomponents develop at different rates at different points in a child's life and likely affect separate drivers of financial well-being.

Inhibition is the ability to stay focused on a task in the face of internal and external distractions. Cognitive psychologists who are interested in inhibition as an executive function focus more narrowly on *conscious* inhibition in the face of "dominant, automatic, or prepotent" responses (Miyake et al. 2000, 58). The literature on temperament explores the closely related concept of *inhibitory control* (e.g., Rothbart, Ahadi, and Hershey 1994). *Self-control* is a subcomponent of inhibition in the present context and refers specifically to one's ability to manage *behaviors* in the face of internal and external distractions (Diamond 2013). In this review we use the single term *inhibition*, to refer to this general constellation of processes. Inhibition is clearly important for financial well-being. Inhibition is what helps us stick to our shopping list at the store—ignoring all temptations and distractions. The stronger our inhibition, the greater is our ability to make choices about our reactions and how we manage our emotions (Diamond 2013) and our money. Research indicates that there are innate individual differences in inhibition that can be influenced during executive function's rapid development between the ages of 3 and 5 (Moore, Lemmon, and Skene 2001).

Cognitive flexibility is the ability to come up with different approaches for solving a problem—financial or otherwise (Diamond 2013). It is the mental muscle that supports creativity, and it underlies the ability to adjust behavior in the face of unique challenges. The first years of life are a period of intense cognitive development, yet the exact developmental trajectory of cognitive flexibility is not certain. That is, while cognitive flexibility undergoes rapid development between the ages of 3 and 5 (Carlson 2005; Carlson and Moses 2001), its development may lag behind other cognitive abilities such as inhibitory control and working memory at this age (Davidson et al. 2006).

Working memory is the brain's ability to hold on to and process several pieces of information at once. It is the mind's "scratch pad." Generally, we use working memory when we remember the past and plan for the future (Smith and Jonides 1999; Whitebread and Bingham 2013). Working memory allows integration across experiences: The old experiences are recalled and held in mind together with the new. Working memory is likely central to the work we need to do when confronted with new financial information plus a need to make financial decisions.

Inhibition, cognitive flexibility, and working memory function synergistically, enabling us to gather, process, and creatively apply information in service of our goals—whether those goals are figuring out how to get a cookie from a high counter or developing and executing a retirement savings plan (Collins and Koechlin 2012; Lunt et al. 2012). Indeed, evidence indicates that the three subcomponents of executive function are often employed together in money management-related tasks (Holden et al. 2009; Whitebread and Bingham 2013). For example, working memory and inhibition together make it possible to keep our savings goals at the front of our mind even while considering a seductive purchase; or if our original plans for reaching a savings goal are thwarted, cognitive flexibility allows us think of new ways to achieve them (Holden et al. 2009; Whitebread and Bingham 2013).

Executive function likely is also linked to many of the personal characteristics and skills that drive financial well-being in adulthood. For example, inhibitory control—the temperament trait that supports the ability to delay gratification (Diamond 2013)—is critical to attaining financial goals such as accumulating savings (Holden et al. 2009; Whitebread and Bingham 2013). Conscientiousness, a personality trait associated with good money management skills and wealth (Duckworth et al. 2012; Roberts et al. 2011), has as constituent dimensions many aspects of executive function, including inhibitory control and components of attention regulation (Kern et al. 2009). Thus, although executive function is often

understood as having distinct components, in practice their influences are difficult to separate. Importantly, all are required for financial well-being and all are developing during early childhood.

Linking Executive Function in Childhood and Adulthood

Longitudinal research suggests that executive function early in life is associated with executive function later in life. Using data on self-control—similar to the inhibition component of executive function—from individuals followed from birth through age 32, Moffitt et al. (2011) found that parent and teacher reports of child's self-control between the ages of 3 and 11 is associated with future savings and investment behavior, home and retirement account ownership, and self-reported money and credit management success. This effect held even after controlling for IQ and socioeconomic status (SES); in fact self-control predicted adult outcomes about as well as IQ and SES. The same study found that self-control among 3- to 5-year-olds was linked to adult financial well-being outcomes, though self-control among 6- to 11-year-olds was a stronger predictor.

Executive function development in children ubiquitously supports the skills and information acquisition they need in order to achieve financial well-being in adulthood. Strong executive function enables children to count and manipulate numbers in their minds in order to process financial information and to understand future timing in order to develop age-appropriate financial plans. Strong executive function also enables children to delay gratification in order to be able to save, or to have the creativity to start their own business (Holden et al. 2009; Pathak, Holmes, and Zimmerman 2011). Early acquisition of executive function-related skills facilitates learning more generally, empowering children to develop higher-level financial abilities (e.g., numeracy and math), as well as greatly influencing academic outcomes throughout childhood via mechanisms such as improved attention and study habits (Gathercole et al. 2004).

Influences on Executive Function

What affects the development of executive function? Executive function develops rapidly during early childhood, and research shows that it is shaped by both genetic and environmental factors. Parent–child interaction,[1] physical activity, stress, bilingualism, and home environment can

1. We recognize that for some youth, the parental role is played by other adults (e.g., grandparents, aunts/uncles, or foster parents), and we therefore adopt a broadly inclusive definition of the term "parent" throughout.

all have significant impacts (Best and Miller 2010; Carlson and Meltzoff 2008; Diamond 2012). In addition, a child's basic temperament plays an important role: even at very early ages, some children are more impulsive than others (Shiner and DeYoung 2013).[2]

Researchers are just beginning to explore the potential of executive function-building interventions. The payoff of successful interventions could be large: developing strong executive function early in life may enable people to function effectively and engage in broad learning throughout life—including in specifically finance-related ways. Diamond and Lee (2011) reviewed randomized controlled-trial studies of interventions to improve executive function among 4- to 12-year-olds and found three approaches that had been particularly successful: computerized training specifically designed to improve working memory, traditional martial arts, and add-on school curricula focused on improving executive function. Six-month follow-up studies of some of these interventions suggest that gains may be maintained over time. In other research (Schweinhart and Weikart 1998), children randomly assigned to an experimental condition in which they were responsible for planning, executing, and assessing their learning had better financial, social, and emotional outcomes at age 23.

In a review of the field, Diamond (2013) makes several inferences with respect to executive function interventions:

1. Children with the poorest executive functioning before implementation of interventions showed the greatest improvement.
2. While computerized training improved specifically targeted dimensions of executive function in children, in-person training regimens accomplished more transfer to other dimensions of executive function and to higher-order abilities such as reasoning, problem solving, and planning.
3. Interventions that involved frequent practice of executive function skills (Klingberg et al. 2005), preferably in multiple age-appropriate contexts (e.g., Lillard and Else-Quest 2006), had the greatest impact.
4. Intervention strategies that were developmentally appropriate, such that they became progressively more challenging as children gained skill or matured, were most successful.

Although many are optimistic about these diverse interventions and their outcomes, the potential mechanisms by which the interventions exert their

2. One can also explore the drivers of financial well-being through the lens of temperament and personality traits (see Shiner and DeYoung 2013, for an overview of this literature).

effects on executive function remain poorly understood (Best and Miller 2010).

Executive Function Interventions Versus Interventions That Include Financial Content

Executive function may be an appropriate target of early interventions designed to improve financial well-being in adulthood. Although the links to financial well-being are somewhat indirect, the executive function skills involved in adult financial well-being are precisely the same executive function-related skills that are developing rapidly in young children. Both children and adults need to inhibit responses, shift problem contexts, and exercise working memory. The continuity in executive function stands in contrast to interventions directly focused on explicitly financial content: The kinds of financial problems young children face are very different from the problems they will face as adults.

Although direct financial interventions for young children generally target basic component skills (e.g., identifying coins), there are opportunities to combine executive function and basic financial skills training. Holden et al. (2009) point out that programs can develop children's savings, inhibitory control, and working-memory skills in concert, for example by teaching them strategies for keeping their minds focused on long-term savings goals when faced with an immediate temptation (e.g., asking them to actively visualize the bicycle for which they are saving up whenever they are tempted by the candy aisle near a checkout counter). Thus, in light of the literature describing rapid neurological growth and the development of executive function in early childhood, interventions that combine executive function and basic financial skills training in the pre-elementary years are an optimal approach to building the foundation for financial well-being.

ELEMENTARY AND MIDDLE SCHOOL, AGES 6–12: PARENTAL SOCIALIZATION AND BASIC FINANCIAL SKILL DEVELOPMENT

Economic Socialization: Vigorous Development during Elementary Years

Financial socialization refers to "acquiring and developing values, attitudes, standards, norms, knowledge, and behaviors" (Danes 1994, 128) that provide the context for one's financial practices. As Danes (1994) emphasizes, financial socialization is not simply learning how to successfully manage economic transactions; rather, it encompasses the development of attitudes, values, and standards that will ultimately either support or hinder

financial capability and well-being. Accordingly, our discussion of financial socialization will focus on the development of attitudes and values with a separate discussion of the acquisition of specific financial skills appearing in the section that follows on adolescents and young adults.

Both research and common sense suggest that subjective norms and financial attitudes have an important influence on virtually all aspects of financial well-being (Shim et al. 2009). For example, healthy attitudes about saving and some level of frugality are necessary for skillful money management, positive views on budgeting support financial goal-setting and planning, and a lack of materialism likely leads to an ability to live within one's means.

While the research examining specific financial attitudes in childhood is fairly thin, there is evidence both that young people acquire financial attitudes and that these attitudes impact their behavior. For example, Pliner et al. (1996) found that children whose mothers gave them financial guidance and warmly communicated their economic expectations exhibited positive financial behaviors. Similarly, children whose parents oversaw their spending were more likely to have confidence in their own abilities as money managers (Kim and Chatterjee 2013). In addition, being raised in a financially prudent household as a child has been linked to engaging in fewer negative financial behaviors as an adult (Hibbert, Beutler, and Martin 2004). Finally, Otto (2013) notes that multiple studies have found an indirect link between parental financial socialization and adolescent savings behavior, though connections to adult saving behavior are less clear (Ashby, Schoon, and Webley 2011). During elementary and middle school, children also start to become aware of different brands and make judgments about people based on the particular things they consume (John 1999), suggesting that the early elementary grades may be a developmentally appropriate time to teach children to resist consumer culture. Collectively, this work suggests an association between parental modeling of positive financial behaviors and healthy financial attitudes in children.

Children's attitudes also impact the development of financial well-being indirectly, through their influence on the development of other antecedents. Attitudes concerning self-control are one example of this indirect effect. As discussed above, many existing studies focus on understanding and improving young children's executive function and their associated capacity for self-control. A child who has a strong capacity for self-control may not actually display control if he or she does not think it is important or desirable to do so, however. Similarly, to develop future orientation, children require both executive function skills (which provide the *ability* to focus on the future) and the belief that planning ahead has value (which

provides the *motivation* to do so); thus, attitudes work in conjunction with other antecedents to translate these potentially latent abilities into behaviors that drive financial well-being.

Parent–Child Relationship as a Pathway to Financial Socialization

Financial socialization occurs through many different pathways, including school, media, and peers. Parents and other primary caregivers are, however, the main agents of socialization for elementary and middle school children (see e.g., Beutler and Dickson 2008). Parents' influence on their children's understanding of money management begins early. For example, reviewing the extant literature at that time, Kuhlmann (1983) found that most children already have knowledge and attitudes about their role as consumers before they even start school.

There appears to be general agreement as to the possible means by which parents may influence their children's financial attitudes, values, and behaviors. Not surprisingly, these methods are reflective of social learning theory—namely, learning via the mechanisms of observation and modeling, practice, and cognitive processing (see e.g., Bandura 1986)—applied to an economic context. For example, according to Ward, Wackman, and Wartella (1977), financial socialization of children by parents generally occurs through observation of parents' behavior, through interaction with parents in "consumption situations," and through parent-guided participation in "consumption activities." Allen (2008) proposes a similar but slightly broader set of categories: the modeling of behavior, the setting of rules, and direct communication. Likewise, Shim et al. (2010) highlight the importance of parental teaching, role modeling, and opportunities for practice.

These various means of influence can be further classified into implicit channels (e.g., observation of parents' behaviors) and explicit channels (e.g., direct parental instruction), though in practice there is often some overlap. According to Ward (1974), economic socialization generally occurs implicitly, "through subtle social learning processes," rather than explicitly, "through purposive and systematic parental training" (Ward 1974, 8). Referencing work by others—Deci, Connell, and Ryan (1989) and Moller, Deci, and Ryan (2006)—Whitebread and Bingham (2013) highlight the importance of implicit channels by explaining that children may model financial behaviors they do not understand purely to be more adult-like or to please their parents. This is not to suggest, however, that explicit teaching is not important. Bucciol and Veronesi (2013), among others, found that both implicit and explicit teaching influences children's financial attitudes and behaviors.

Further evidence of the role that parents play in both explicit and implicit financial socialization comes from Hibbert, Beutler, and Martin (2004), who asked college and graduate students questions about what kind of financial behavior was modeled in their homes while they were growing up. They found that being raised in a financially prudent household, where parents saved and paid their bills on time, resulted in less self-reported engagement in negative financial behaviors such as misusing credit cards and making unaffordable purchases, even after controlling for socioeconomic background. Jorgensen and Savla (2010) surveyed college students about their perceived influence of parents on their own financial attitudes and behaviors and found that students who reported discussing financial matters with their parents and learning about managing money from them also reported more healthy financial attitudes. For example, such students strongly agreed with statements like "I feel it is important to understand loan agreements before I sign" (Jorgensen and Savla 2010, 470). Similarly, Smith and Barboza (2013) present results of a survey of university students linking lower debt to greater financial knowledge gained through discussions with parents. In summary, parents' financial socialization practices are influential in the development of their children's financial well-being.

Parenting Style

A large body of evidence demonstrates the importance of parent–child interaction on children's financial development. Most of the theoretical work on parenting styles derives from Baumrind's (1967) work identifying the major dimensions of parenting as disciplinary strategies, communication styles, warmth and nurturance, and expectations about behavior and control. Using these dimensions, she created a typology of four different parenting styles that has framed much discussion since: authoritarian, authoritative, permissive, and uninvolved. Permissive parents are nurturing and communicative, but set few rules, while uninvolved parents are neither nurturing nor rule-oriented. Both authoritative and authoritarian parents are "involved"—they believe in giving their children rules and guidelines to follow—but while authoritative parents are usually willing to discuss these rules with their children and change them as necessary, authoritarian parents expect their rules to be obeyed without question.

Existing work offers support for the conclusion that children of involved parents—those using authoritative or authoritarian parenting styles—who establish age-appropriate rules may be more likely to achieve financial well-being. For example, Soward (2006) documented a positive

relation between authoritative parenting and children's impulse control, and Seginer, Vermulst, and Shoyer (2004) found that a form of authoritative parenting (as perceived by sons and daughters) was associated with a stronger future orientation in a sample of Israeli teenagers. Future orientation has in turn been shown to affect financial behaviors like saving and retirement planning (see Lusardi 1999; Webley and Nyhus 2006). Highly involved parenting has also been linked to a range of other behaviors that have potential impacts on financial outcomes, including cognitive development and motivation to learn (see Whitebread and Bingham 2013 for a discussion). In a study of preschool children, Mauro and Harris (2000) found that an inability to delay gratification was linked to less-involved permissive parenting.

Yet, successfulness of the authoritative (as opposed to authoritarian) parenting style appears to depend in part on cultural factors, as evidenced by literature examining the interaction between race/ethnicity and parenting style on academic achievement. For example, research findings reveal a strong relationship between authoritative parenting and academic achievement for non-Hispanic white students, but the picture is not as clear when it comes to other ethnic groups (Steinberg, Elmen, and Mounts 1989). That is, the evidence is mixed for Hispanic students, with some studies showing a positive relationship between authoritative parenting and academic success (Steinberg et al. 1992) and others suggesting that strictness alone, rather than caring or level of responsiveness (elements of the authoritarian parenting style), predicted academic achievement (Park and Bauer 2002). Neither does authoritative parenting per Baumrind's definition appear to predict school success for African American students (Steinberg et al. 1992). However, a cluster analysis performed by Mandara and Murray (2002) revealed that the authoritative and authoritarian parenting styles within African American families were culturally distinct from non-Hispanic white households. The main difference is that the "authoritative" parents in African American families are less acquiescent and more demanding of children—in short, they are more similar to Baumrind's authoritarian parenting type (Mandara 2006, 211).

In summary, the effects of authoritative parenting style on a child's academic achievement depend, in part, on a family's racial, ethnic, and cultural context. It is therefore important to note that our intent is not to suggest that authoritative parenting is preferred to a less-nurturing authoritarian parenting style. Still, parental monitoring and guidance in the form of established rules and open, two-way communication appear important to children's future financial success.

Allowances and Parental Oversight

As a particular example, the practice of parents paying children an allowance—a common form of parent–child interaction on money—illustrates clearly the ways in which parental teaching and parenting style can interact to facilitate or hinder the development of financial capability. Parents intend to use allowances to teach children money management (Clarke et al. 2005), but there is controversy as to whether or not the provision of an allowance positively contributes toward children's financial capability (Mandell 2013).

This lack of consensus likely not only reflects differences in allowance philosophy (i.e., children *earn* an allowance versus children are *entitled* to an allowance), but also critical differences in the parental communication and guidance that accompany the allowance payments. Bucciol and Veronesi (2013) used retrospective data to show that having received an allowance alone does not change adult savings behaviors. Instead, receiving an allowance combined with parental oversight as to how the money is spent, and parental teaching about budgeting and the necessity of saving, was found to be most effective. That is, the effects of receiving an allowance depended upon parents' financial socialization practices.

Moreover, the existing work further suggests that parental oversight facilitates children's adoption of parents' financial behaviors and encourages positive attitudes toward their own finances. Managing a savings account, which typically requires parental involvement, can contribute to children's ability to understand concepts related to saving and investment (Johnson and Sherraden 2007). Children whose parents monitored their spending were more likely to be banked and to perceive themselves as good money managers (Kim and Chatterjee 2013).

It is important to consider how socioeconomic factors may shape parents' financial socialization practices. For example, Sherraden (2013) points out that if parents lack financial knowledge or experience, they cannot effectively teach or model behaviors for their children and could even teach or model poor or detrimental financial behaviors. Children from low-income families may have fewer opportunities for financial socialization because their parents are less likely to participate in the financial system (Loumidis and Middleton 2000). Along with that issue, Johnson and Sherraden (2007) argue that youth from financially disadvantaged households are disadvantaged first by lacking the experience of dealing with financial institutions, and second by having less experience and practice managing larger sums of money.

In summary, the *quality* of the interaction—no matter whether it occurs implicitly or explicitly, through observation or direct

communication—between parent and child appears to be the driving force in children's financial socialization. With positive parent–child interactions, there are many different paths to the desired outcome of financial well-being. Effective interventions designed to foster the development of financial well-being might include dual-generation approaches that promote positive parent–child interactions generally and with regard to financial matters specifically.

ADOLESCENCE AND YOUNG ADULTHOOD, AGES 13–21: OPPORTUNITY FOR EXPERIENCE-BASED, JUST-IN-TIME FINANICAL EDUCATION

As young people continue to grow, they become increasingly independent and often begin to control more financial resources, perhaps from part-time jobs or receiving larger allowances from parents. As a result, financial decisions become more commonplace and meaningful, but also potentially more risky. As adolescents transition to young adulthood, they often begin to take on their first real financial responsibilities. Some sign leases, become employed, get their first credit cards, or take on student loans. These new opportunities allow youth to develop the knowledge and skills that underlie conscious financial decision making, along with the unconscious financial habits and heuristics that will drive their everyday financial behaviors in adulthood.

Building Financial Knowledge and Skills: Relevant Information Facilitates Learning

As youth begin to learn how to manage resources effectively, plan ahead, and make informed financial decisions—all of which will support financial well-being later on—they rely heavily on their earlier experiences. Ideally, executive function maturation has laid the cognitive foundation for these skills, applied math education has developed the necessary mathematical competency, and the financial socialization process has established the financial attitudes that encourage these positive behaviors. In addition, young people require basic financial knowledge and familiarity with financial products and institutions. Research suggests that individuals are particularly receptive to financial education when it is relevant and delivered immediately before they face a financial decision (Fernandes, Lynch, and Netemeyer 2014). Consequently, the increasing financial independence associated with adolescence and young adulthood presents many valuable opportunities for learning.

Pathways to Developing Conscious Financial Decision Making

There are several means of obtaining the knowledge and abilities that support the development of conscious financial decision-making skills during this period. As in earlier stages, families can play an important role. For example, some parents begin to involve their children in family finances, and more than half believe that 18-year-olds should have their own credit card and checking account (Danes 1994). Likewise, parents can open savings accounts for their children and provide guided practice using these accounts. Friedline, Elliot, and Nam (2011) found that youth who engage in positive financial behaviors, such as saving in a savings account, are more likely to engage in these behaviors in adulthood. Parents continue to have an important influence even as their children enter young adulthood; Shim and Serido (2011) found that parents remain a valued source of financial advice when young adults face high-stakes financial decisions and parents' increasing expectations with respect to responsible money management shape their children's financial behavior.

As discussed above, some parents feel that they lack the financial knowledge or experience required to guide their children. Consequently, many advocates of financial education look to schools to deliver financial education programs, as they reach all students regardless of their personal circumstances. The evidence regarding the efficacy of school-based financial education opportunities is mixed. Many studies report an association between participation in financial education and improved financial knowledge, but the effects tend to be modest and long-term retention is usually untested. For example, Gutter, Copur, and Garrison (2009) compared states that did and did not offer financial education courses and found that students from the former performed better on tests of financial knowledge. Walstad, Rebeck, and MacDonald (2010) found that a DVD-based financial education curriculum led to significant gains in high school students' financial knowledge. Similarly, Harter and Harter (2009) tested the Council for Economic Education's *Financial Fitness for Life* curriculum with tenth graders and found significant gains in knowledge. Finally, an evaluation of the National Endowment for Financial Education's high school financial education curriculum conducted by Danes, Huddleston-Casas, and Boyce (1999) found that students tested significantly higher on financial knowledge questions and even reported some improvement in their financial behaviors three months later. While some of these studies suffer from limitations like small sample sizes or lack of control groups, the results are encouraging with respect to short-term knowledge gains.

There is also evidence suggesting that "just-in-time" financial education courses—those that deliver content closely related to the financial decisions people are presently confronting in their lives—enhance knowledge acquisition (Fernandes, Lynch, and Netemeyer 2014). Walstad, Rebeck, and MacDonald (2010) reported that high school students who already had credit cards—those, in other words, for whom the curriculum was immediately relevant—retained more financial knowledge from a high school course than other students. As noted above, Johnson and Sherraden (2007) assert that financial education programs will be more effective if participants are given access to savings accounts, as this will enable greater experiential learning to take place. This is especially important for low-income families where the parents may not be banked and youth may not otherwise be exposed to mainstream financial institutions. Utilizing data from a survey of college students, Peng et al. (2007) found no relationship between taking a high school financial education course and investment knowledge (measured using a ten-question test), but did find a significant association between self-reported financial experience and investment knowledge. Despite the study's design limitations, it is noteworthy that financial experience mattered more than financial education.

Of course, the primary objective of financial education is not to increase knowledge but to promote positive financial behaviors. The apparent benefits of active engagement with financial services and products imply that experiential learning could offer an effective means of promoting financial well-being. Since Dewey (1925), education research has demonstrated the benefits of learning by doing. This approach seems particularly well suited to financial education given the applied nature of financial decision making. It is not surprising, therefore, that researchers and policymakers have recommended providing young people opportunities to practice and participate in financial decisions, be that at home or in school (see, e.g., Whitebread and Bingham 2013).

Opportunities for reflection are important to the success of experiential programs, as the ability to process the experience and to learn from both good and bad choices is critical (see Kolb 1984 for a general discussion; or Laney 1993 for an application to economics education). Hands-on experiences are also likely to promote feelings of self-efficacy, or confidence in one's ability to manage personal finances—another likely driver of financial well-being in adulthood.

Unfortunately, establishing links between financial education programs and subsequent behavior has proven challenging. Mandell and Klein (2009) found that high school students who took a personal finance course did not appear to engage in better financial behaviors or evaluate

themselves as better savers. Similarly, Cole, Paulson, and Shastry (2014) found no association between state-mandated financial education and long-term asset accumulation or debt repayment. In a rare study that employed randomized controlled trials, Drexler, Fischer, and Schoar (2014) were unable to find a significant relationship between financial principles-based training and the financial management tactics used by entrepreneurs a year later. Hastings, Madrian, and Skimmyhorn (2013) surveyed the literature on financial training and found little evidence of significant effects.

In contrast, a few studies have found positive changes in behaviors. For example, Skimmyhorn (2013) examined the results of the US Army's implementation of a mandatory eight-hour Personal Financial Management course for new soldiers. While taking the course had no impact on credit scores, there was a significant relationship between education and retirement savings a year later. Enrollment and attendance in the course were also associated with lower credit card and loan balances. Similarly, Danes (2004) found that studying financial planning led students to keep track of their personal finances. Students also self-reported increased confidence in making money-related decisions and said their savings behavior had improved—changes still in place at a three-month follow-up. Bruhn et al. (2013) evaluated a high school program in Brazil using a randomized controlled trial involving 20,000 students. The students participated in a highly interactive three-semester course that incorporated exercises that included parental involvement and independent financial research. Participants in the program were more likely to save (and to say they would continue to save), more likely to budget, and more likely to participate in household financial decisions.

Despite these promising results, in a recent meta-analysis Fernandes, Lynch, and Netemeyer (2014) found that only 0.1% of the variance in financial behaviors in the studies they analyzed could be explained by financial literacy programs, and in many cases the effects of successful interventions decayed rapidly over time. Fernandes, Lynch, and Netemeyer (2014) recommend that interventions focus not on teaching specific financial facts, but instead imparting meta-knowledge—an understanding of how to acquire the information needed for financial decisions.

Unconscious Financial Decision Making

The studies discussed above highlight the importance of experiential learning and opportunities for practice. The skills that adolescents and young adults acquire by managing their resources and by engaging

in financial behaviors facilitate development not only of conscious decision-making skills, but also of the unconscious heuristics that are an important complement to those skills. While undoubtedly the ability to make *conscious* financial decisions is critical to achieving financial well-being, most often individuals rely on *unconscious* decision-making strategies to navigate their day-to-day financial lives.

Tversky and Kahneman (1974) coined the term "cognitive heuristics" for the kinds of learned strategies that individuals use to simplify decision making. Cognitive-heuristic development refers to young adults' process of arriving at a standard set of responses to environmental cues regarding present and future conditions—including many that have financial dimensions (Ellis et al. 2011). These stem from the common sense, implicit beliefs about personal finance that are established via financial socialization and become established through repeated practice.

Dual process theory describes the distinction between this type of intuitive, automatic processing, often referred to as "System 1" thinking, and the more logical, rule-based "System 2" thinking. Although some (e.g., Kahneman and Tversky) have suggested that strengthening System 2 thinking is the key to improved decision making, Reyna (2012) argues that "fuzzy (yet advanced) intuition" (i.e., System 1) can be of more value than "superficial verbatim representations of information, which support precise analysis" (i.e., System 2). In other words, someone who has managed a household for a long time will have an easier time adjusting to a change in conditions (e.g., a temporary drop in income) than will someone who knows a lot of explicit rules for budgeting, but has not actually had to live on their own budget. This so-called Fuzzy-Trace Theory and the associated empirical evidence suggests that System 2 provides a stop-gap relied upon by novices who need rules, while experts rely heavily on System 1 intuition gained through extensive practice.

Pathways to Developing Unconscious Financial Intuition and Habits

School-based or other financial curricula that support positive resource-allocation decisions in all aspects of everyday life (money, time, relationships, health, etc.) can help young people develop effective financial habits and heuristics. Importantly, repeated practice helps individuals discern when their intuition may fail them and more conscious, research-based decisions are needed. Whitebread and Bingham's (2013) claim that habits, as opposed to knowledge, formed during youth are highly influential for adult behavior suggests that interventions that promote the development of System 1 financial decision making could have a lasting positive impact. That is, an optimal approach to promoting adult financial

well-being would likely include interventions that provide opportunities to practice and reinforce positive financial habits during adolescence and young adulthood.

CONCLUSION

Financial well-being, as defined by consumers, consists of "having control over one's day-to-day, month-to-month finances, having the capacity to absorb a financial shock, being on track to meet financial goals and having the financial freedom to make the choices that allow one to enjoy life" (Consumer Financial Protection Bureau 2015). The underlying drivers for achieving financial well-being are hypothesized to encompass a varied set of personal traits and skills, including strong future orientation along with the ability to actively seek out and obtain financial knowledge at need.

While most children and youth do not oversee their household's finances, they are continually apprenticing—acquiring the knowledge, habits, attitudes, and personality traits that will play an instrumental role in their own financial well-being later in life. This review seeks to trace the origins of adult financial well-being back to the experiences and psychological, social, and neurological development that occur from childhood through early adulthood. For each of three developmental stages (pre-elementary, elementary to middle school, and adolescence and beyond), we discussed areas of research most relevant to financial well-being. The first area is executive function—the range of mental processes that support planning, organizing, and concentration. The second area, financial socialization, emphasizes the important roles played by social interactions with parents in the formation of financial values, norms, attitudes, and habits. The final area focuses on the development of both conscious and unconscious financial skills and habits.

From this literature review, hypothesized "touch points" emerge for each age group. Touch points refer to the period of time—and ideally an optimal point within it—during childhood or young adulthood when individuals are both developmentally capable of absorbing a particular skill or attitude and open to learning it. In other words, touch points indicate stages when developmentally appropriate interventions are likely to be most effective.

Among pre-elementary students, executive function, which undergirds many of the drivers of financial well-being in adulthood—including future orientation, the ability to delay gratification, and the ability to set goals—develops rapidly. Its growth is strongly influenced by the external environment, especially parenting. Research suggests that executive function can be improved through frequent practice, although the long-term

persistence of such improvements has not been rigorously studied. Given the importance of executive function in adult financial well-being, and its enabling of financial skill development at later stages of childhood, further research that explores the potential for interventions in this age group should be prioritized.

Among elementary and middle school students, parental and other adult guidance in learning basic financial skills and healthy financial attitudes and habits is key. As children's understanding of money matures, they are able to learn about savings, frugality, and financial planning, often by observing the behaviors modeled by parents and other adults. Perhaps not surprisingly, research suggests that active parental engagement around financial issues, including communicating the importance of saving and providing opportunities for youth to practice making simple financial decisions, is highly beneficial.

Among adolescents and young adults, increases in financial independence provide many opportunities for financial learning. Experience-based, practical, education programs that teach financial research skills and heuristics for money management show promise, although more research is needed to firmly establish the value and longer-term impacts of these interventions.

Throughout, the role played by parents in children's financial development warrants additional emphasis. The research reviewed here clearly establishes the critical importance of parents in fostering financial well-being for youth of all ages—not simply elementary and middle school children. Even very young children absorb financial values by watching their parents and other adults, and can benefit from discussions of wants versus needs and from practice delaying gratification. Likewise, parental modeling and monitoring remain influential into early adulthood, and parents can help teens and young adults by providing guidance and opportunities for supervised engagement with the financial system.

This review also generates a variety of hypotheses regarding specific steps that could improve children and youth's chances of achieving financial well-being in adulthood. The existing work suggests that parents should be encouraged not only to give their children access to resources to make spending and saving decisions, but also to talk with their children about those decisions. Likewise, parents could encourage their children to set savings goals and to develop other positive financial habits. At school, simple budgeting exercises, role-playing, or computer simulations all have the potential to improve outcomes, as do activities that improve critical thinking and research skills. In all cases, research suggests that the key is providing opportunities for practice that are developmentally appropriate

and include time for reflection. Through repeated practice that is supported by parents or other adults, children can develop positive financial habits related to skillful money management, goal-setting, and financial research. They can also acquire a crucial sense of self-efficacy, another driver of financial well-being in adulthood.

In summary, the literature suggests promising avenues for intervention within each major age category. In many cases these represent truly novel approaches to financial education—focusing on executive function improvements, despite their limited apparent "financial content," for young children; emphasizing dual-generation financial modeling and learning for elementary and middle school students and their parents; intentionally teaching heuristics and applied financial research skills in later adolescence and beyond. Experience-based learning is already being increasingly incorporated into financial education for young adults, but this review suggests that even greater emphasis in this area would be beneficial.

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