A Review of Financial Behavior Research:

Implications for Financial Education

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1. Introduction

1.1 Purpose

The purpose of this paper is to review recent financial behavior research from the last 25 years and earlier that provides helpful information for financial education policies and practices. Although the history of personal finance research can be traced to the beginning of the 20th century, since the 1980s financial behavior research has been active by researchers in consumer science, economics, business, and other fields (Hira, 2009. This multidisciplinary review includes major contributions from related fields and considers two broad research questions:

- What factors are associated with financial behaviors?
- What are the implications of these research findings for financial education policies and practices?

1.2 Financial Education, Financial Behavior, and Well-Being

In 2008, a group of financial education researchers met in a research forum organized by the Financial Literacy and Education Commission and reached a consensus that effective financial education should emphasize the development of desirable financial behaviors (Schuchardt et al., 2009). To develop effective action-oriented financial education programs, we need to better understand how financial behaviors are developed.

The goal of all financial education policies and practices is to help people increase their financial capabilities so that they are willing and able to engage in desirable financial behaviors for improving both their financial well-being and overall well-being. By conducting a comprehensive review of the research literature on financial behavior, we seek to identify key
determinants of desirable financial behaviors and provide suggestions for improving financial education policies and practices.

1.3 The Definition of Financial Behavior

Financial behavior is defined as human behavior that is related to money management (Xiao, 2008). Common financial behaviors include budgeting, spending, borrowing, saving and investing, and risk managing. Researchers in diverse fields categorize financial behaviors in various ways for different purposes, such as positive/negative, optimal/suboptimal, rational/irrational, and risky/non-risky behaviors. Sometimes these definitions are ambiguous and controversial. For example, risky behavior can be defined as a behavior that may result in financial loss in the future. While investing in stocks is commonly viewed as a risky behavior, it may be desirable for some people, such as young adults with long-term payoff horizons and available investment income, but inappropriate for others, such as retirees and low income consumers. Other behavior, such as making credit card payments late, is generally regarded as both risky and undesirable. For convenience of discussion, this paper uses the terms “desirable behavior” and “undesirable behavior” based on recommendations from personal finance experts. In this paper, the terms “behavior” and “decision making” are used interchangeably. A behavior can be viewed as a decision or a series of decisions dependent on contexts, locations, and circumstances. Evidence indicates that desirable financial behavior contributes to financial well-being and general well-being (Kim, Garman, & Sorhaindo, 2003; Xiao, Tang, & Shim, 2009).

1.4 A Framework of Behavior Development

In the literature of financial behavior, many theories from diverse fields are used to study financial behaviors—for example, the theory of planned behavior (Xiao & Wu, 2008). As a
conceptual framework, the Transtheoretical Model of Behavior Change (TTM) (Prochaska et al., 1992) is used for organizing the material and developing implications. Employing a TTM framework is useful because it permits classification of behavioral research along a few general categories and provides comprehensive guidelines for stage-matched interventions to effectively help people modify their behaviors to desirable directions (for example, Block & Keller, 1998). Using the framework of TTM, financial education can be viewed as one of many possible interventions that have potential to help people develop desirable financial behaviors under various circumstances and in various contexts (for example, Xiao, O’Neill et al., 2004; Xiao, Newman et al., 2004).

1.5 Organization of this Paper

This paper is organized as follows: In section 2, we discuss factors contributing to financial behaviors, such as economic resources and class (section 2.1), demographics (section 2.2 on gender and race/ethnicity, section 2.3 on life-cycle stages, and section 2.4 on family and peers), education (section 2.5), psychological factors (section 2.6 on cognition, section 2.7 on emotion, and section 2.8 on psychological bias), and social factors (section 2.9). In section 3, we present implications for financial education policies and practices based on the research review.

2. Factors Contributing to Financial Behaviors

2.1 Economic Resources and Classes

*Individual and household resources.* Economic resources affect arrays of financial behaviors. The dominant life-cycle hypothesis assumes that individuals are perfectly informed and strive to smooth life-cycle consumption by borrowing and saving (Ando & Modigliani, 1963), which is considered a prescriptive model (Hanna & Chen, 2008). To better describe
individual consumer behavior, this model is extended in various ways, including the behavior
dlife-cycle hypothesis that incorporates advances of cognitive psychology (Shefrin & Thaler,
1988). Based on this model, individuals categorize their income in several different mental
accounts and have different propensities to spend from these accounts. This argument has been
supported by several empirical studies. For example, individuals at various income levels have
different propensities to own financial products (Hilgert, Hogarth, & Beverly, 2003) and to save
from different mental accounts (Xiao & Olson, 1993). Their saving motives also differ by
income and wealth, showing a hierarchical pattern (a positive association) (DeVaney, Anong, &
Yang, 2007; Xiao & Noring, 1994). This hierarchical pattern is also shown in terms of household
financial asset shares (Xiao & Anderson, 1997). Financial behaviors of consumers seeking credit
counseling services also display a hierarchical pattern (Xiao, Sorhaindo, & Garman, 2006).

Income level and wealth are generally thought to be related to increased risk taking and
risk tolerance (Cohn et al., 1975; Hallahan et al., 2004; Riley & Chow, 1992) although findings
have occasionally challenged the life-cycle framework (for example, Bernheim, Skinner, &
Weinberg, 2001), especially for Hispanic and African Americans (Fisher & Montalto, 2010).
Family business owners usually have higher than average income and their risk tolerance level is
also higher than those who do not own family businesses (Xiao, Alhabeeb, Hong, & Haynes,
2001).

*Low-income individuals and families.* Financial behaviors of low-income individuals and
families are different from their higher income counterparts since they face a different set of
financial issues, such as financial service access, asset accumulation, homeownership, credit use,
and health insurance access (Garasky, Nielsen, & Fletcher, 2008). Low-income individuals often
reside in high-density, low-to-moderate income (LMI) communities that often display minority
and ethnic enclave characteristics or geographical isolation characteristics (such as rural
communities or tribal areas). Access to affordable financial products and services becomes a
function of limited income (for example, lack of auto ownership) along with geographical-spatial
considerations (for example, limited or nonexistent public transportation and geographical
isolation). Such limitations create barriers to conveniently accessing affordable financial services
for LMI individuals and families. Payday lenders and check-cashing outlets tend to concentrate
in high-density LMI communities (Graves, 2003; Immergluck, 2004; Praeger, 2009). In addition,
LMI communities can be characterized as supplier-driven, cash-oriented economies and markets

Low-income individuals are more likely to be the unbanked (Berry, 2004; Washington,
2006). The bulk of our research on the unbanked has focused mainly on the recently arrived
immigrant or immigrant legacy LMI individuals and families (Perry, 2008; Turner et al., 2003).
As a result, there is a significant gap in our research knowledge into individuals who are
“unbanked” due to poor credit and increasing dissatisfaction with banking experiences (Robles,
2009). For recent immigrants, acculturation in lieu of assimilation as well as language facility
play important roles in consumer behavior and usage of mainstream financial institutions (Ogden
et al., 2004; Perry, 2008). In addition, new research is exploring the role of the host community
context for recently arrived immigrants assimilating as “‘communities’” in lieu of the assumed
“‘individual’” assimilation or acculturation experience (Hatton & Leigh, 2009). We know that in
high-density immigrant and immigrant legacy communities, saving behaviors occur outside of
mainstream financial institutions and often in an extended family or communal context (Chang,
2010; Chung-Hevener, 2006; Robles, 2007, 2009). Research indicates that the unbanked often
seek out businesses that engage in predatory practices and charge excessive fees and prices (Rhine, Greene, & Toussaint-Comeau, 2006).

Started in the 1990s, the anti-poverty policy moved to help low-income individuals and households build assets or wealth (Blank, 2002). Lifting welfare eligibility limits on the value of a vehicle resulted in higher probabilities of low-income individuals and families owning a car (Sullivan, 2006), which is important because it provides access to employment opportunities (Garasky, Fletcher, & Jensen, 2006) and affordable financial services that are rarely located in inner cities or LMI communities (Graves, 2003; Praeger, 2009). Partially under the rubric of asset building, government intensified efforts to promote low-income homeownership in the early to mid-2000s prior to the housing crisis (Belsky, Retsinas, & Duda, 2005). However, the targeting of subprime financial products in LMI communities—and specifically, communities of color—has exacerbated the wealth divide and created uncertainty surrounding future nuclear family homeownership opportunities. The continuing high national unemployment rate has contributed to a return to 1930s-style intergenerational households with adult children moving in with elder parents in order to protect assets and minimize depletion of savings (PEW Research Center, 2010; U.S. Census Bureau, 2010). Recent lump-sum tax refund research indicates that LMI families do display future-oriented financial behaviors and asset building resiliency focused on children’s educational expenditures and family communal mobility aspirations (Garcia, 2009; Robles, 2010).

Sherraden (1991) proposed an institutional saving theory that promoted individual development accounts (IDA) to help low-income consumers save. More than 40 states have initiated some type of IDA policy (Greenberg & Patel, 2006). Longitudinal research suggests that IDA participants have significant variations in saving patterns (Han & Sherraden, 2009).
Research also indicates that experiential knowledge contributes to cognitive ease and familiarity with financial services and products even for limited income individuals and households (Tescher et al., 2007).

2.2 Gender and Race/Ethnicity

Gender differences are found in financial perceptions, behaviors, and satisfactions (Hira & Mugenda, 2000). Gender has also received considerable attention as a demographic variable related to risk taking. While some exceptions arise, a considerable stream of research suggests that women are more risk averse than men in financial situations (for example, Bajtelsmit, Bernasek, & Jianakoplos, 1999; Cohen & Einav, 2007; Grable, et al., 2006; Halek & Eisenhauer, 2001; Hallahan, et al., 2004; Powell & Ansic, 1997). The general tendency for greater risk aversion among females has been observed as early as childhood (Hargreaves & Davies, 1996; Kass, 1964). Symptoms of risk aversion have been evident at the collegiate level as well, as female students generally take fewer quantitative classes and select financially oriented majors less often than men (Krishnan, Bathala, Bhattacha, & Ritchey, 1999; Pritchard, Potter, & Saccucci, 2004). Female collegians also display higher levels of intimidation and lower levels of financial market knowledge than their male counterparts (Chen & Volpe, 2002; Ford & Kent, 2009). Gender differences are found in investment behaviors such as portfolio diversification as well (Hira & Loibl, 2008).

Gender also has been linked to differences in children’s financial socialization processes. Female youths are more likely to receive consumer-oriented training from parents (Allen, 2008) and to describe parents as more approachable in financial conversations (Allen, et al., 2002). In recently arrived immigrant families, children and youth often serve as interpreters and translators during consumption transactions in mainstream markets (Robles, 2007). This early transactional
experience often serves as an introduction to financial services and product knowledge. Additional research on gender differences regarding emotions and risky behaviors is presented in section 2.7.

As with gender, financial behaviors differ in racial/ethnic groups. In several review papers summarizing research on the financial behaviors of African Americans (Bowen, 2008), Hispanic Americans (Watchravesringkan, 2008; Robles, 2009), and Asian Americans (Yao, 2008), research identified racial/ethnical differences in money attitudes, spending, credit, and saving behaviors. Recently, consumer culture and marketing messages in the United States have produced a significant change in Americans’ attitudes towards debt and financial frugality (Peñaloza & Barnhart, 2010).

Compared to Caucasians, Hispanic Americans have different attitudes about money, rating lower in quality and retention/time dimensions of a money attitude scale (Medina, Saegert, & Gresham, 1996). African Americans and Hispanics devote larger shares of their expenditure bundles to visible goods (clothing, jewelry, and cars) than do comparable whites. These differences exist among virtually all subpopulations, are relatively constant over time, and are economically large (Charles, Hurst, & Roussanov, 2009). Compared to non-Hispanic white households, Hispanic households allocate significantly more of their budget to food at home, shelter, and apparel and significantly less to food away from home, entertainment, education, health care, and tobacco (Fan & Zuiker, 1998). An assessment of the disaggregated apparel category indicates that Hispanics spend more for children’s clothing than any other apparel item. African American households, compared to Asian, Caucasian, and Hispanic Americans, have statistically significantly different budget allocation patterns in more than half of the 13
expenditure categories (Fan & Lewis, 1999). Asian Americans spend more on education (Fan, 1997) and housing (Fontes & Fan, 2006) compared to other racial/ethnical groups.

Hispanic Americans are more likely to hold retail store and gas credit cards than non-Hispanic whites (Medina & Chau, 1998). Race is a factor in mortgage borrowing behavior (Iwarere & Williams, 2003) and discriminatory lending practices (Immergluck, 2004). The subprime lending boom increased the ability of many Americans to get credit to purchase a house—with significant wealth erosion consequences in LMI communities given the current foreclosure crisis (Laderman & Reid, 2008). Using an innovative new dataset, researchers have found that the possibility that subprime lending did serve as a positive supply shock for credit in locations with higher unemployment rates and minority residents (Haughwout, et al., 2009).

The disparity in wealth in the United States between African Americans and whites has long been recognized. Such allocation variances could be due to differences in preferences, education, access to financial markets, historical legislation, segregation policies, or other factors (Lui, et al., 2006; Straight, 2002). One factor in the disparity is that inheritances raise the rate of wealth accumulation of whites relative to that of African Americans (Gittleman & Wolff, 2004). Minority households are less likely to hold stock investments than white households and also are more sensitive to stock market movements (Hanna & Lindamood, 2008). Hispanics’ financial portfolios tend to be smaller and grow at a slower rate than those of white families (Plath & Stevenson, 2005; Stevenson & Plath, 2006). Although African Americans are less likely to own stocks than whites, once ownership is accounted for, there is no difference in the portfolio allocation to risky assets (Gutter & Fontes, 2006).

Many racial/ethnical families experience daily economic activities within the context of multiple characteristics (for example, being low-income and ethno-racial and female) as well as
multiple identities, such as mother, daughter, sister, consumer, worker, etc. (Kalsem, 2006; Thornton & White-Means, 2000; Watson, 2006). In formulating financial counseling programs and education campaigns, our task is to acknowledge this reality, to understand the dynamics of converging characteristics (gender and race/ethnicity and class) that create particular and unique circumstances shaping demand-side behaviors in communities with limited supplier-oriented financial services and product choices (Viramontez Anguiano & Trask, 2009). Moreover, when addressing ethno-racial and cultural intersections, research studies indicate that acculturation into mainstream financial behaviors and markets are nonlinear occurrences and do not follow a particular chronological timeline (Kalsem, 2006; Nickols et al., 2009; Peñaloza, 1995; Perry, 2008; Stayman & Deshpande, 1989; Xu et al., 2004).

2.3 Life-Cycle Stages

In addition to class, gender, and race/ethnicity, age differences are shown in financial attitudes, beliefs, and behaviors (Hira, 1997). Household holding of financial assets differ by various life-cycle stages (Xiao, 1996). Age also relates to risk tolerance with risky behavior and risk tolerance generally thought to decrease with age (for example, Hallahan, et al., 2004; Jianakoplos & Bemasek, 2006; Wood & Zaichkowsky, 2004), although this finding is by no means universal (for example, Cohen & Einav, 2007; Riley & Chow, 1992). Risk taking also has been found to generally decrease when individuals move from single to married status (Hallahan et al., 2004). Some findings, however, suggest married households take more risk (for example, Grable, 2000; Schooley & Worden, 1999).

Young adults. The biannual Jump$tart Survey of Financial Literacy Among High School students is a widely cited national resource for tracking the financial literacy of high school students over time (Mandell, 2008). While questions have been raised about the Jump$tart
survey’s reliability and validity (Lucey, 2005), the general and accepted conclusion is that high school students lack financial literacy. College students are another group that shows a lack of financial understanding, especially on developing desirable credit behaviors (for example Hayhoe, et al., 2000; Lyons, 2008; Xiao, Noring, & Anderson, 1995).

**Tax time.** Tax time provides one of the most compelling opportunities for providing financial education to low-income wage earners. Spader, Ratcliffe, and Stegman (2005) identified several barriers to saving tax refunds, however, including economic hardship and self-control problems, consistent with prior studies of the use of tax refunds among Earned Income Tax Credit (EITC) recipients (for example, Smeeding, Ross, Phillips, & O’Connor, 2000). Research shows that getting tax filers to take action is challenging, and only a small minority will participate in savings or other programs (Beverly, Romich, & Tescher, 2003; Zinsmeyer & Flacke, 2007). Duflo, Gale, Liebman, Orszag, and Saez (2006) found that just 14 percent of clients at a tax-preparation site deposited money into a retirement account even when some were offered a match for the savings.

**Homeownership.** Purchasing a home is a key teachable moment in the life cycle that drives savings and especially credit behavior. Mortgages represented almost 90 percent of an average household’s total debt obligations in 2004 (Crook & Hochguertel, 2007). Consistent with Americans’ overall lack of financial literacy, several studies conclude that many home buyers are ill-informed about the terms of their mortgages (Campbell, 2006; Stango & Zinman, 2006). In addition, many consumers lack an understanding of basic personal finance concepts including compound interest, risk, and return (Bucks & Pence, 2008; Campbell, 2006). Borrowers who fail to fully process and understand their mortgage terms may take out higher-cost mortgages than they otherwise would qualify for (Lax, Manti, Raca, & Zorn, 2004).
Retirement. Although the decision to save for retirement occurs (or should occur) throughout one’s working years, for many households intentions to begin saving for retirement and realized actions deviate significantly (Laibson, Repetto, & Tobacman, 1998). In the University of Michigan’s Health and Retirement Study’s module on financial literacy and planning, Lusardi and Mitchell (2006) found that only 56 percent of respondents answered questions about compound interest and inflation correctly. Workers exhibit bias in holding their own company’s stocks (Lai & Xiao, 2010) and some do not take advantage of defined contribution retirement saving plans offered by their employers (Xiao, 1997).

2.4 Parents and Peers

Financial socialization is the process by which individuals acquire and develop knowledge, beliefs, behaviors, and norms that influence their subsequent financial practices (Danes, 1994; Rettig & Mortenson, 1986). Two major agents of financial socialization—parental socialization and financial education—influence financial behaviors (Shim, Xiao, Barber, & Lyons, 2009).

Parents influence children’s and adolescents’ norms and values—such as thrift, saving, and materialism—that affect financial behaviors. Children learn thrift (Anderson & Newitte, 2005; Bernheim, Garret, & Maki, 2001) and financial prudence (Hibbert, Beutler, & Martin, 2004). Parents also influence children’s motivation (Beutler & Dickson, 2008), time preference, delay of gratification (Webley & Nyhus, 2006; Webley & Young, 2006), and future orientation (Webley & Nyhus, 2006). Time preference, the ability to delay gratification (Hausman, 1979; Lawrance, 1991), time horizon/time orientation (Fisher & Montalto, 2009), and motivation (Mandell & Klein, 2007) are associated with positive financial behaviors.
Financial socialization often begins in the social learning process that takes place in families. Children may emulate the behaviors their parent(s) demonstrate in their financial practices and make similar financial decisions due to modeling and observation (Mandrik et al., 2005). Consequently, children observe and select certain parental models for imitation and tend to some financial practices over others (Allen, 2008).

Communication between parents and children about money and finances is one key process in children becoming financially literate. Parents can teach and shape the consumer-related values and behaviors of their children through dialogue about finances, products, advertisements, consumption, and purchases (Bakir et al., 2006). For example, parental communication about television advertisements influences children’s consumer-related behaviors (Ozmete, 2009).

Children may also learn financial practices through other interactions with parents. Parents may socialize and educate children about finances by providing allowances, which likely promote the development of monetary competence (Abramovitch, Freedman, & Pliner, 1991). Providing an allowance can convey a parent’s confidence in the child’s financial responsibility in his or her use of the allowance (for example, spending and saving).

Parental monitoring includes use of rules, expectations, and consequences to control, manage, and influence children’s behavior (Hastings, Utendale, & Sullivan, 2007). Monitoring is associated with the socialization goals parents have for their children (Hastings & Grusec, 1998). For example, parental monitoring of everyday routines is important for defining the roles and responsibilities of children, and their internalization of family values, standards, and expectations (Laible & Thompson, 2007).
Parenting aspects, such as warmth and monitoring, influence other key psychological traits such as time preference and future orientation. Seginer, Vermulst, and Shoyer (2004) found that parenting styles affect future-related behaviors such as career and marriage. Also, permissive parenting—the lack of monitoring and rules—is linked to a lack of ability to delay gratification (Mauro & Harris, 2000). Furthermore, the absence of monitoring and guidance by parents can inhibit children’s ability to internalize financially prudent behaviors and contribute to the development of financial anxiety and problematic attitudes towards money (Beutler & Dickson, 2008). Similarly, parents’ inability to provide warmth and comfort during difficult financial periods could also facilitate the development of financial anxiety among children (Kim et al., 2010). Such financial anxiety and negative attitudes have been linked to compulsive buying and credit card misuse (Joiereman, Kees, & Sprott, 2010).

Other parental factors such as income, wealth, education, and race are associated with the financial socialization process. Parents with more financial resources can provide more resources that increase human, social, and financial capital for the developing child (Conger & Dogan, 2007) and provide more access to financial institutions and opportunities to experience financial services (Johnson & Sherreden, 2007). Additionally, individuals with higher education are more likely to teach the value of thrift to their children, although they may not necessarily tend to save more (Anderson & Newitte, 2005). Another finding is that financial anxiety and negative attitudes can be created and transferred from one generation to the next (Beutler & Dickson, 2008; Hibbert, Beutler, & Martin, 2004).

Limited research has been conducted about peer influence in financial socialization. Erskine et al. (2006) found that the identification of peer groups influenced the savings of young people. Martin and Oliva (2001) pointed to the importance of peer pressure regarding financial
habits as it affects children, particularly teenagers. Peers often influence the spending and consumption of children and adolescents, which may become the most common sources of friction between parents and children. For money matters, evidence shows that parental effects are greater than peer effects (Xiao, Barber, & Shim, 2008).

2.5 Effects of Financial Education

Researchers have found positive effects of education on financial behaviors. Schooling is positively associated with financial behaviors such as savings, financial market participation (Bertaut & Starr-McCluer, 2001; Cole & Shastry, 2009), and portfolio management (Campbell, 2006). Education increases individuals’ ability to acquire and process information to practice positive financial behaviors. Most researchers have found that financial knowledge is strongly associated with financial behaviors (Chen and Volpe, 1998; Cude, et al., 2006; Higert, Hogarth, & Beverly, 2003; Mandell, 2004; Peng, et al., 2007; Tennyson & Nguyen, 2001; Xiao, Tang, Serido, & Shim, 2009), but a few studies did not find such evidence (Borden, et al., 2008; Jones, 2005). Those with higher levels of financial knowledge are more likely to practice positive financial behaviors, such as credit card management and basic money managements.

A number of studies have documented positive effects of formal financial education on financial behaviors (Danes, Huddleston-Casas, & Boyce, 1999; Peng, Bartholomae, Fox & Cravener, 2007). While financial literacy has been found to be associated with measurable financial behavior (Lusardi, 2008; Mandell, 2004; Robb & Sharpe, 2009), the effects of financial education on financial behaviors have had mixed results. Mandell (2006), on the other hand, found no evidence of the effect of high school financial literacy programs on the financial behaviors of high school students. Danes (2004) found that high school students who had financial education reported positive behavioral changes from before class and three months after
class. Using a sample of college students, Mandell (2009) found financial management or personal finance courses had significant positive effects on financial behavior, but not on financial literacy. Shim et al. (2009) found that formal education in personal finance was positively related to the perception of subjective knowledge, which subsequently influences financial behavior in college students.

A number of other studies have documented positive effects of financial education on financial behaviors for adults, such as workplace financial education or community-based education (Bayer, Bernheim, & Sholz, 2008; Garman et al., 1999; Haynes-Bordas, Kiss, & Yilmazer, 2008; Kim, 2007; Lyons, Chang & Scherpf, 2005). Sherraden and Boshara (2008) found positive effects of financial education on savings with IDA program participants. Other studies have found similar positive effects of financial education (Spader, Ratcliffe, Montoya, & Skillern, 2009). Workplace financial education has been effective in changing financial behavior (Garman et al., 1999; Kim, 2007). In addition, Clark and d’Ambrosio (2003) have found effects of financial education on financial behavior such as goal setting and expectation. Lusardi and Mitchell (2006) found that retirement seminars have a positive wealth effect, but mainly for those of lower socioeconomic status. Studies have found that education does produce an intention to change behaviors—but retention of behaviors or follow-through was not significant (Choi, Laibson, Madrian, & Metrick, 2006; Madrian & Shea, 2001). Workplace financial education increases financial literacy and contributes to workplace satisfaction (Hira & Loibl, 2005).

Despite the value of financial education in changing the financial behavior of adults, rigorous evaluation of comprehensive financial education using random assignment has not been used widely and long-term benefits of financial education on financial behavior have not been
well-substantiated. Bernheim and Garrett (2001) found respondents who attended high school in states that mandated teaching of personal finance tended to save more in middle age, while Cole and Shastry (2009) found no significant effects of state-mandated financial education on investment behavior.

2.6 Cognition

Past studies have identified cognitive factors associated with variations in financial literacy and behavior. One cognitive factor highly correlated with financial literacy and behavior is numeracy—the ability to reason with numbers and other mathematical concepts. For instance, Benjamin, Brown, and Shapiro (2006) found that mathematical ability is highly related to acting patiently (that is, being able to focus on the long-term implications of financial decisions and act accordingly).

Studies have found questions assessing numeracy, numerical reasoning, and word recall to be strongly predictive of total asset holdings (for example, McArdle, Smith, & Willis, 2009). Christelis, Jappelli, and Padula (2008) link numeracy, verbal fluency, and memory to stockownership. Cole, Shastry, and Kartini (2009) found that cognitive ability is associated with financial market participation.

Recognizing that cognitive abilities decline in old age, some studies have examined the impact of this decline on financial behavior. For instance, Korniotis and Kumar (2007) measure whether the financial experience that comes with age is outweighed by the cognitive decline in old age. They found that, although older investors have acquired more knowledge of investing relative to their younger peers, they are less capable of applying this knowledge and therefore have worse investment skill. Agarwal et al. (2009) found that individuals’ financial sophistication follows a U-shaped course over the life cycle. Financial sophistication increases
until middle age (the authors estimate age 53 as the peak) and then declines as one’s cognitive ability begins to deteriorate. While research exists on the decision-making capabilities of people with intellectual disabilities, few studies have examined financial decision making among this population with two exceptions (Marson et al., 2000; Suto et al., 2005).

Ameriks, Caplin, and Leahy (2003) developed a theory of the “propensity to plan” to explain differences in financial planning and wealth accumulation. They found that individuals with a high propensity to plan create more detailed budgets and regard budgeting as a tool for controlling their spending. Meier and Sprenger (2007) show that individuals who discount the future are less likely to participate in a financial education program than individuals who are more future-oriented. Thus, voluntary financial education programs likely attract highly motivated individuals who are already more likely to be financially successful than their more present-oriented peers.

Cognitive aspects of financial literacy remain a rich area of study. The endogeneity of financial literacy and general cognitive capacity make it difficult to isolate the effects of financial knowledge. The issue of self-control and time preference also makes distilling the mechanisms of information challenging to study. Some aspects of financial behavior may be an inherited characteristic (De Neve, et al., 2009) while others are state specific. A particular focus is on the ability of people to use mathematics in making financial choices, especially errors in making time-value of money calculations (Stango & Zinman, 2008).

Children’s cognitive development also may impact financial socialization. Cognitive learning theory attempts to explain the child’s development in terms of thinking processes, memory, language, and other mental skills. Cognitive ability, such as numeracy, have been linked to time preference (Gruber, 2001), financial literacy (Caunt, 2001; Lusardi, 2008; Lusardi
et al., 2010), and investment (Cole et al., 2009; Christelis, Japelli, & Padula, 2006). Christelis et al. (2006) found that cognitive ability is associated with stock ownership. However, these studies used measures of cognitive skills—acquired skills often influenced by cultural and other socioeconomic backgrounds—rather than cognitive ability. A child’s age impacts the ability to learn and understand the concept of money in different ways as well (Danes & Dunrud, 1993). Time preferences, the ability to delay gratification, and a child’s degree of patience are associated with financial behaviors such as spending and savings for the future (Gruber, 2001; Joireman, Kees, & Sprott, 2010). Webley and Nyhus (2006) found that time preference patterns are firmly established at adolescence through childhood learning and socialization. They further discover that time preferences are passed down through the generations, although the exact reasons for such a trend remains unexplained. Age and cognitive ability, such as IQ, are also linked to time preferences.

2.7 Emotion

Emotions may influence financial risk seeking among men and women. The literature on gender differences in the processing of emotions, value of emotions, intensity of emotions, emotional regulation, and emotional appraisal, is used to support the premise that emotional asymmetry among men and women may be a viable explanation for why women take fewer financial risks than men.

Emotional agency. A behavior qualifies as risky whenever two things are true: (1) the behavior in question could lead to more than one outcome, and (2) some of these outcomes are undesirable or even dangerous (Furby & Beyth-Maron, 1992). In a meta-analysis of 150 studies, Byrnes et al. (1999) found men to be more risk seeking than women in 14 out of 16 types of risky behaviors (especially in taking physical risks).
Two theories, sensation-seeking (Zuckerman, 1990) and risk-as-value (Kelling, Zirkes, & Myerowitz, 1976) identify why men may have higher preferences for risky options: (1) naturally lower levels of arousal in men, and (2) a socially instilled belief that risk taking is a highly valued masculine tendency.

A lower baseline for arousal among men may explain why men are drawn to emotions that are high in arousal. Emotions vary along two main dimensions, arousal (low/high) and valence (positive/negative). Agency theory indicates that men and women value different emotions (Dube & Morgan, 1996; Scherer, 1984). Due to their close association with control, power, anger, joy, and happiness have been consistently linked with high agency, whereas warmth, sadness, empathy, fear, and anxiety are associated with vulnerability, and are low in agency (Scherer, 1984). Agency concerns are more relevant to men since they are driven by mastery goals and are socialized to express high agency emotions (Kring & Gordon, 1998). The result is that men are likely to discount the salience of weak emotions such as anxiety and sadness and empathy by distracting themselves, typically through physical activity (Kring & Gordon, 1998). By contrast, women are socialized to ignore agency concerns and thus are more likely to use a wider range of emotions than men, including emotions that imply weakness, dependency or vulnerability such as sadness and fear (Broverman et al., 1972; Dube & Morgan, 1996; Meyers-Levy & Maheswaran, 1991; Wagner, Bruck, & Winterbotham, 1993).

Emotional intensity. Another explanation for gender differences in risky behaviors may result from different probabilities and severities of negative outcomes. Women perceive more risk and are less likely to engage in risky behaviors than men in a variety of broad domains, including finances (Weber, Blais, & Betz, 2002). To test the reasons underlying the greater propensity for men to take more risks than women, Harris, Jenkins, & Glaser (2006) separated
the probability of negative outcomes, severity of potential negative outcomes, and expected enjoyment from the risky activities. They argue that women may not evaluate the probability of negative outcomes differently than men—they simply may realize that they would be more emotionally upset or harmed by the negative consequences. Consistent with their hypothesis, they found that women have greater perceived likelihood of negative outcomes and lesser expectation of enjoyment, and this mediates their lower propensity towards risky behaviors in domains such as gambling and health (Harris, Jenkins, & Glaser, 2006).

The literature on emotions supports the view that women will engage in more emotional appraisal than men, and weigh negative emotions more than positive emotions. Although men and women report equal intensity of emotions (Kring & Gordon, 1998), self-reports indicate that women have more frequent (Feldbam et al., 1998) and intense emotional experiences than men (Birnbaum, Nasonchuk & Croll, 1980; Fujita, Diener, & Sandvik, 1991), and place greater value on their emotional states (Dube & Morgan, 1998). The result may be that women employ more emotion-focused coping and decision making than men (Baker & Berenbaum, 2007).

It may be difficult for women to ignore their emotions in financial decision making because they feel emotions more intensely than men. Emotional intensity (how intensively people respond to an emotion stimulus) is response intensity to a given level of emotion-provoking stimulation (Larsen & Diener, 1987). Other than pride, women feel all emotions more intensely than men (Brebner, 2002). Emotional intensity may explain the seemingly contradictory findings that women report more unhappiness than men, but are equally happy (Fujita, Diener, & Sandvik, 1991). According to this view, women are more emotionally intense than men, allowing them to experience both more joy and more sorrow. Men on the other hand, are more reluctant than women to admit that they have a problem and seek help for it.
**Processing of emotions.** The literature on gender differences in processing style also provides indirect support for a higher risk profile among men than women. Women are more involved audiences as evidenced by their tendency to engage in more detailed information-processing strategies than men (Meyers-Levy & Maheswaran, 1988; Meyers-Levy & Sternthal, 1991). Thus, risk profiles among women may be lower than risk profiles among men because they are more likely to engage in a more detailed cost-benefit analysis. Consistent with this view, female managers are more risk-averse, follow less extreme and more consistent investment styles, and trade less than male managers (Niessen & Ruenzi, 2007). Women not only process information in more detail than men, but they are more likely to use emotions as inputs for financial decisions (Beck, 1967, 1976; Larsen, Diener, & Cropanzano, 1987).

**Emotional appraisal.** Why don’t women seek financial rewards like men? One possible explanation is that their probabilities for investment success is lower than men as also may be their enjoyment in playing the investment “game” (Harris, Jenkins, & Glaser, 2006), which it implies that women may not be as motivated to invest because they don’t think they will succeed and because it is not as enjoyable to them as it is to men.

The emotion appraisal literature provides insights on how a combination of emotions may help predict risk aversion among women. According to the emotional-appraisal literature, people examine their feelings to guide their preferences and actions. Each emotion, defined by its accompanying appraisal, guides its own innate action tendency (Frijda, Kuipers, & Schure, 1989; Passyn & Sujan, 2006; Roseman, Wiest, & Swartz, 1994; Smith, et al., 1993). The emotional appraisals and action tendency associated with fear, especially high levels of fear, is likely to be safety and flight away from the danger. Meanwhile, the emotional appraisals and action tendencies associated with anxiety are uncertainty and need for control of the events leading up
to a potential threat (Raghunathan & Corfman, 2004; Raghunathan, Pham, & Corfman, 2006; Rapee et al., 1996; Smith & Lazarus, 1993). Compared to fear, anxiety also is a self-directed emotion (Miceli & Castelfranchi, 2005).

Sadness is appraised in a different manner than fear and anxiety. In contrast to anxiety, which prompts a desire for certainty, the appraisal for sadness is loss and the seeking of rewards. To test this premise, Raghunathan and his colleagues (Raghunathan and Corfman, 2004, 2006; Raghunathan and Pham, 1999; Raghunathan, Pham, and Corfman, 2006) compare risk-seeking among sad, fearful, and anxious participants who vary on appraisals of loss and uncertainty. They found that, as compared to anxious participants, those who are sad seek to overcome loss by trading off certainty for rewards. By contrast, anxious participants prefer the more certain option. Compared to men, women are more likely to acknowledge and use sadness to guide their actions, but they may not engage in financial actions because the results may not be viewed as rewards. Anxiety about decisions may signal a need for control to reduce uncertainty (Raghunathan, Pham, & Corfman, 2006).

Emotional dependence. It is commonly acknowledged that women are more sensitive to the needs and opinions of others than men. Emotional self-relatedness refers to the degree to which specific emotions vary in the extent to which they follow from, and also foster or reinforce, an independent versus interdependent self (Agarwal, Aaker, & Menon, 2007; Lee, Aaker, & Gardner, 2000). In contrast to other-focused emotions such as empathy, self-focused emotions such as happiness and sadness, tend to be associated with an individual’s internal state or attributes, to the exclusion of others (Lee, Aaker, & Gardner, 2000). Since men are more self-focused than women, women express more concern with interpersonal relationships and greater empathy for others’ emotional experiences than men (Eagly & Wood, 1991). These studies may
explain why women are more anxious about carrying debt for family expenses than men (Lusardi, Keller, & Keller, 2008). These results also are consistent with studies showing women are more emotionally secure when they work with a financial advisor (Allianz Life Insurance, 2006; Lyons et al., 2007).

2.8 Psychological Bias

Economic and financial decision makers are classically viewed as rational actors. However, due to human limits in information processing and sense making, rationality is limited to some degree (March & Simon, 1958). We know, therefore, that some economic and financial actors make cognitive errors and behave in less than fully rational manners (Ariely, 2009; Thaler, 1985). How people perceive and process their social world can also influence decisions (Bazerman & Tenbrunsel, 1998). Moreover, decision-making processes include an emotional component that can have a significant influence on economic transactions (Lerner, Small, & Loewenstein, 2004). Although they constitute a mechanism for constraining and directing attention (Levenson, 1999; Matthews & Wells, 1994), feelings can be counterproductive in financial contexts in which the influence of emotions on decision-making processes is high—for example, when information becomes voluminous and complex (Shiv & Fedorikhin, 1999) and when extreme events occur such as stock market bubbles and crashes (Shiller, 2002). The field of behavioral economics seeks to more accurately frame economic and financial actions given the “defects” in human wiring that hamper rationality.

Prospect theory (Kahneman & Tversky, 1979) challenges the tenets of classic utility theory and offers an alternative model for decision making under conditions of risk. According to prospect theory, decision makers tend to underweight prospective outcomes perceived as less certain relative to outcomes that are deemed more certain. This promotes a “negativity bias,” or
a *risk aversion* in choices involving gains and *risk seeking* in choices involving losses. Behavior also tends to be influenced by the reference point of a choice, a phenomenon known as framing or anchoring (Tversky & Kahneman, 1974). For example, when determining the disposition of an investment position (that is, buy, sell, or hold), individuals often pay more attention to the asset’s current price relative to the acquisition price rather than focusing on forward-looking analysis (Zhang & Semmler, 2008). An important implication of prospect theory is that decision makers are prone to act based on changes in wealth rather than on wealth levels, and are more sensitive to losses than to gains (Dacey & Zielonka, 2008; Kahneman & Tversky, 1979). Beyond investing, prospect theory has been applied to a variety of financial decision-making situations ranging from personal accounting systems to resource allocation (Thaler, 1985) to the payment of taxes (Dhami & al-Nowaihi, 2007).

A robust finding in psychology is that people are generally overconfident (Thaler, 1999). Individuals tend to overestimate their knowledge and abilities, while underweighting some types of information and overweighting others (Odean, 1998; Stone, 1994). When presented with new information, people generally emphasize the importance of information that confirms their personal beliefs while discounting information that may falsify those beliefs (Klayman & Ha, 1987; Koehler, 1991). In a related manner, people tend to attribute events that confirm the validity of their actions to high ability, and events that disconfirm actions to randomness or sabotage (Bem, 1965; Miller & Ross, 1975). Researchers studying the influence of such “attribution bias” on financial market behavior have found that overconfidence relates to a wide range of phenomena, including elevated trading frequencies, reduced levels of diversification, and extreme reactions surrounding news events (Daniel, Hirshliefer, & Subrahymaman, 1998;

2.9 Cultures, Media, Moral Hazard, and Socionomics

Studies of culture and consumer financial behavior can be examined on both an inter-cultural and intra-cultural basis. Findings generally suggest that people from countries with more collectivistic cultures possess lower risk tolerance than more individualistic cultures (for example, Bontempo, Bottom, & Weber, 1997; Keh & Sun, 2008). Cultural differences also result in differences in saving motives as shown in a study comparing American and Chinese behaviors (Xiao & Fan, 2002).

Culture and society can also exert endogenous influence on personal financial behavior. Because financial markets are complex social phenomena (Peters, 2003), proficient financial decision making requires deep-seated intelligence unlikely to be obtained from codified sources alone (Leonard & Swap, 2005). In complex environments, decision-making skills are influenced by social mechanisms in which individuals learn by observing the behavior of others (Bandura, 1977, 1986; Rosenthal & Zimmerman, 1978). The role of social learning in shaping personal financial decisions remains largely untapped. For instance, sources of financial information, such as coursework (Krishnan et al., 1999; Pritchard et al., 2004) and media news streams (McClune, 2009), may emit societal cues that portray markets as difficult to successfully navigate (for example, Lim, 2004), thereby evoking perceptions of threat and avoidance behavior. On the other hand, some information sources, perhaps combined with facilitating technology, might channel social learning mechanisms in a positive manner that promotes knowledge and skill development (Ford, Kent, & Devoto, 2007; Moy, 1995).
Moral hazard is defined as the tendency to take more risk when it is perceived that losses incurred as a consequence of risky behavior will be covered by someone else. The term’s insurance industry origins (Baker, 1996) are not surprising, since moral hazard can be viewed as a condition that is activated when behavioral outcomes have been insured or subsidized to some degree. One stream of moral hazard research relevant to personal finance uses individuals as the primary unit of analysis, and examines various financial decisions that are subject to moral hazard influence. For example, conditions of moral hazard may discourage diligence when searching for financial services, such as bank accounts, that have been guaranteed or insured (for example, Cartwright & Campbell, 2003; Dionne, 1981). Consumers might also take on more debt if they anticipate that bankruptcy laws will permit discharge of liabilities in the event of financial hardship (Grochulski, 2010). In highly insured sectors such as automotive and health care, consumption of services may be higher and behavior riskier when insured (Hoyt, Mustard, & Powell, 2006; Koc, 2005; Stanciole, 2008).

A developing thread of behavioral research that may inform the field of personal finance concerns the notion of socionomics. The primary thesis of socionomics is that collective levels of optimism or pessimism in society, referred to as social mood (Prechter, 1999) or background mood (Loewenstein et al., 2001), influence decisions made in complex social environments such as financial markets. Social mood can be viewed as grounded in the concept of emotional contagion (Olson, 2006). Social comparison theory (Festinger, 1954; Schacter, 1959) suggests that affiliating with others produces pressure to establish a common social reality that includes a shared emotional state. The result is a tendency to “catch” the emotions of others via an unintentional, largely unconscious process (Hatfield, Cacioppo, & Rapson, 1993).
The primary behavioral expression of social mood in financial markets is unconscious herding (Prechter, 2001). Simply put, herding is following the crowd—a collection of individuals pursuing the same signal in a mostly unconscious manner. In financial markets, herding drives groups of investors to trade in the same direction with persistence, resulting in auto-correlated trends in prices followed by trend reversals (Nofsinger & Sias, 1999). Prechter & Parker (2007) argue that herding pervades financial markets because of the motivational dynamics of financial behavior. In utilitarian markets in which goods and services are owned for production, pleasure, or consumption purposes, economic calculations based on the laws of supply and demand drive decision making. In financial markets, however, financial goods (that is, investments) are primarily owned in order to be sold at higher prices to others. The basis for success is knowing how others will value the investments in the future, something that cannot be known with certainty and is not particularly amenable to economic calculation. Faced with uncertainty about the future valuations of others, financial decision makers tend to follow the buying and selling signals generated by the herd. Because general levels of optimism and pessimism may be reflected in herding impulses throughout society, financial markets have been proposed as coincident indicators of social mood (Nofsinger, 2005).

Several remedial strategies might mitigate the negative effects of bounded rationality and emotion on financial decision making. Introducing “devil’s advocates” or other means of dissent into decision-making processes provides alternate viewpoints and stimulates original thought (Nemeth, Connell, Rogers, & Brown, 2001). In addition, reducing reliance on popular information outlets might encourage unique and novel behavior (Weick, 1976) rather than impulsive herding. Automating saving and investment processes (for example, Thaler &
Benartzi, 2004) also has been proposed to reduce emotional influences on financial decision making.

3. Implications for Financial Education

3.1 Implications for Financial Education Policies

• Action-oriented financial education should be promoted at the national level. To develop effective national strategies, research needs to be conducted to assess the educational needs of various socioeconomic populations regarding key financial behaviors such as credit management and saving for retirement in terms of their behavior development stages and education focuses such as awareness and action.

• We need to reassess our individual financial education outreach campaigns to include a more encompassing perspective that seeks to provide financial information as a “whole-family” initiative. As researchers, our focus on the financial behaviors of individuals is inadequate to fully understand the current intergenerational household formation that appears to be escalating as a result of the current financial crises. As adult children move back into elder parents’ households—three to four generations living under one roof in order to safeguard asset accumulation, minimize financial losses, and maximize economic security—may become the new “normal.”

• We need to focus on key teachable moments during which public policy can have an effect such as entrance or exit from Unemployment Insurance, Food Stamps, Supplemental Security Income, or other income support programs.

• We need to identify areas of content versus skills that need to be learned and practiced, as well as certain points in the life course when expert counsel should be required. There
may be a role for policies to prevent very challenging financial products from being available for some consumers. In other cases, support, training, and counseling may be provided along with various financial products.

- We need to integrate risk management concepts more sufficiently into the financial literacy domain. Empirically, we observe significant numbers of consumers taking what may be insufficient financial risk (for example, being unbanked, no risk market participation) while others assume seemingly excessive risk (for example, high debt and leverage, large risk market allocations). Absent the capacity for effective risk management, individuals are less likely to achieve desirable financial security.

- National financial education strategies should consider moral hazard. It is easy, for instance, to doubt the credibility of government-sponsored financial literacy initiatives when the financial behavior of government policymakers themselves can be construed as reckless. A “do as I say, not as I do” situation appears to be present. The financial behavior of policymakers also could foster conditions of moral hazard. It seems plausible, for instance, that some people fail to recognize the need for financial education because they think the government will cover their losses in the event of poor decisions. If interventions such as interest rate manipulations, economic stimulus packages, and bank account insurance increase risky behavior among sophisticated market participants, there is reason to believe moral hazard touches the domain of personal financial decisions as well.

3.2 Implications for Financial Education Practices

- Financial education should encourage individuals to engage in desirable financial behaviors. Behavior development has several stages according to the Transtheoretical
Model of Behavior Change (TTM). To use education as an effective intervention tool, the focus of the education should correspond to various behavior change stages to achieve optimal results (Figure 1).

- While behavioral mechanisms are useful such as the requirement to opt out of rather than opt into a defined contribution retirement plan, mechanisms are not enough. People also need knowledge to manage contributions as well as how to tap resources as retirement approaches.

- The model of education needs to be examined in a cumulative fashion over the life course, including the mode of delivery. One-time workshops may have little effect on promoting desirable financial behaviors while multi-year interventions may do.

- There is strong interplay between products and behavior. The availability of simple, easy to manage transaction accounts, loans and savings vehicles can reduce complexity and minimize the harm for low functionally financial literate consumers.

- Financial education should include risk-management concepts. For educators, this might mean developing observational learning platforms where students can learn vicariously about effective and ineffective risk management strategies—thus reducing the costly “tuition” paid when making hands on financial mistakes.

- Financial education should address needs of diverse populations. Multiple identities; intersectionalities of gender, racio-ethnicity, and class; multi-lingualism and multi-culturalism remain part of America’s immigrant history and increasingly define our collective present. If our financial education practices do not account for the variation in our diverse communities with respect to individual behaviors oriented towards family
economic security, we will have missed a significant opportunity to bring education approaches that deliver proficient, durable skills in the complex social context of real-life markets.

- Financial educators should provide multiple teaching approaches based on theory and research-based practice. Developing skills for navigating complex social systems requires deep-seated intelligence unlikely to be obtained from classrooms alone. Social learning, in which individuals learn by observing the behavior of others in action, provides one mechanism for developing sophisticated, hard-to-teach skills. In the context of financial education, observational learning offers the added benefit of reducing the cost of poor financial decisions inevitably made when developing first-hand experience. Research has probed the value of web-based vicarious learning platforms that permit students to observe the behavior of financial experts in action. Exposure to such platforms can improve financial market knowledge and decision-making skills.

- Financial educators may use different teaching strategies for women and men. When it comes to protecting themselves via financial planning, women face a double whammy because they have high threat appraisal (high anxiety and fear) and low self-efficacy/confidence in their ability to do so. By contrast, men may be overconfident because they have low threat appraisal and high self-efficacy.

- Financial education needs to start early when individuals not only acquire financial knowledge and skills from families but develop social and psychological traits that influence future financial attitudes and behaviors at early stage of their lives. Without the intervention of other socialization agents such as schools and workplaces, gaps in financial behavior will be wider for those who do not have opportunities for appropriate
financial socialization process from family at young age. Figure 1 Action-Oriented Education
Figure 1 Action-Oriented Education, Adapted from Prochaska et al. (1992)

<table>
<thead>
<tr>
<th>Stage of Behavior Change</th>
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<tr>
<td>Precontemplation</td>
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<td>Contemplation</td>
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<tr>
<td>Preparation</td>
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<td>Action</td>
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<tr>
<td>Maintenance</td>
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**Notes:**

The above chart is adopted from Prochaska et al. (1992). Some terms are modified to fit the purpose of financial education.

1. **Cognition:** Education focuses on awareness of the importance of the behavior by providing knowledge and skills. This and the following two interventions are more effective for moving people from pre-contemplation to contemplation.

2. **Emotion:** Education focuses on awareness by arousing emotions.

3. **Social responsibility:** Education focuses on awareness by stressing the social impact of a behavior change.

4. **Self-image:** Education focuses on the new self-image to move people from contemplation to preparation.

5. **Commitment:** Education focuses on personal commitment to move people from preparation to action.

6. **Relationship:** Education focuses on using family and close relationships to facilitate behavior change. This and the following three interventions are effective to move people from action to maintenance.

7. **Reward:** Education focuses on nonfinancial awards for desirable behavior change.

8. **Substitute:** Education focuses on establishing desirable substitute behavior for behavior change.

9. **Stimulus:** Education focuses on removing/adding stimuli to facilitate behavior change.

10. **Education support:** Provides various forms of education support to facilitate behavior change. This intervention is effective for all stages.
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