College Information Design and Delivery -
Insights from the Cognitive Information Processing Literature

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Introduction

In today's knowledge economy, postsecondary education is an essential pathway to individual economic success. Postsecondary education is now key to increases in individual earnings over the life course, a critical factor influencing economic mobility (Carnevale, Rose, & Cheah, 2011). The United States economy relies on a college-educated populace, as postsecondary education attainment is associated with lower unemployment, higher job satisfaction and economic mobility, and better health (Baum, Ma, & Payea, 2013). International competitiveness is at stake as well, in part because the United States has fallen behind many other developed countries in terms of our citizens' postsecondary attainment (Lee, Edwards, Menson, & Rawls, 2011; OECD, 2014).

Unfortunately, just as postsecondary attainment has never been more important, it has also become much more expensive for students and their families. Tuition increases far outpace the rate of inflation; increases in the cost of medical care, food, and housing; and increases in family income (Callan, 2008). To illustrate, average net prices at public institutions in the United States, where the majority of students attend school (National Center for Education Statistics, 2014), increased by about 30 percent in the ten years between 2004-05 and 2014-15 (The College Board, 2014, p. 23).

Deciding how to pay for college carries long-lasting consequences for many. Between student loans, grants, scholarships, and 529 savings plans, just to name a few, there are a plethora of options that students and their families might utilize to pay for college. Unfortunately, many of these options are complicated and confusing to the average consumer (see, e.g., Bettinger, Long, Oreopolous, & Sanbonmatsu, 2009; Davis, 2002; Dynarski & Scott-Clayton, 2006; Perna, 2006; Ziskin, Fischer, Torres, Pellicciotti, & Player-Sanders, 2014).

In response to this overwhelming array of options, researchers and policymakers alike have called for more information for potential/current students and their families (see, e.g., ACSFA, 2008; ACSFA, 2005; Long, 2010). In particular, they have recommended that financial aid information should be provided in a manner that is simple, easy to understand, and relevant to students' and their families' actual decision-making processes.

Some efforts have been made to expand access to information, such as the development of independent/private tools and the Department of Education's creation of College Scorecards and the Financial Aid Shopping Sheet. Despite this, we have not gone far enough in designing systems and process to provide information about higher education to adequately equip students and families to make wise and informed decisions.

To illustrate, despite the plethora of information that is available, many students are still not receiving sufficient information about financial aid. Young Invincibles found that more than two-thirds of student loan borrowers misunderstood or were surprised by some aspect of their student loans (Whitsett, 2012). In addition, a Young Invincibles survey found that nearly half of all federal financial aid recipients either received

inaccurate information about their aid or did not remember receiving any information (Whitsett & O'Sullivan, 2012). The stakes are high: the federal government commits over a hundred billion dollars in guaranteed loans and aid to students each year, and postsecondary financing decisions can have a grave impact on individuals' financial futures. More work needs to be done to ensure that students and families do not make these consequential decisions without transparent and pertinent information.

However, simply providing this information will likely fail to inform students in their decision-making. For instance, researchers at the Institute for Higher Education Policy have identified the importance of providing counseling in tandem with information, noting that "[data] alone do not change student behavior; people do" (see, e.g., Voight, Long, Hueslman, & Engle, 2014). Others have noted ways in which information should be presented to facilitate uptake amongst students, including making important information visually prominent and ensuring that the available options are easy to compare (See, e.g., Cheng, Asher, Abernathy, Cochrane, & Thompson, 2012). Given that these recommendations merely scratch the surface, how do we comprehensively improve the delivery of higher education information to assist students and families in their decision-making?

One approach, so far unexplored in the postsecondary education context, is to glean insight from the consumer information processing literature. That is: what can we learn from the peer-reviewed literature in finance, marketing, and consumer research?[1] This valuable body of work explores how consumers search for and process information, and how they make sense of specific information related to different types of financial decisions. While this type of research has not yet been conducted specifically with regard to student financial aid and/or student loans, research about other long-term financial decisions is well-suited to inform our understanding of how people think about higher education financing. We focus on financial decisions that are analogous to higher education decisions in that they are infrequent, expensive, and impact the consumers' long-term financial well-being.

This review covers:

- Consumers' propensity to search for information regarding consequential financial decisions;
- How consumers process information once they have obtained it; and
- How differences in consumer characteristics such as socioeconomic status or education level have an impact on information search and processing behaviors.

Integrated throughout the review are findings about consumers' understanding of specific aspects of common financial products such as mortgages, which the review brings to bear on consumers' understanding of financial aid. Throughout the paper, we also provide recommendations to policymakers and practitioners with regard to how best to deliver financial aid information to students and their families.

Information Search

Information Search Basics

Reforming how financial aid information is designed and delivered requires a deeper understanding of how

1This review focuses mainly upon studies that have been published in peer-reviewed journals. To find relevant articles, we performed systematic search of academic databases. We also have included select studies appearing in the "grey literature," such as working papers or reports published on the Internet.

students and their families search for information about how they will finance college. Information search is defined as "the degree of attention, perception, and effort directed toward obtaining…data or information related to the specific purchase under consideration" (Beatty & Smith, 1987, p. 85). Consumers engage in either internal (i.e., searching their memories for relevant information) or external information search (i.e., turning to third-party sources for information) (see, e.g., Beales, Mazis, Salop, & Staelin, 1981). This discussion focuses on external search since in making decisions about financial aid, we would not expect first-time students to have experience with or memories about the borrowing or grant process.

In a seminal paper on consumer information search, Stigler (1961) explains that time is the main cost consumers incur when searching for information. He hypothesizes that there is a relationship between the price of the item being purchased and the amount of search expended: as price increases, so too will search efforts, and thus the time spent searching. When considering options to finance higher education, one would presumably expend a great deal of search effort given that college tuition and fees are increasingly expensive. However, willingness to search is finite because it "requires time and energy. At some point, the time and energy required for further search outweigh any expected gains from additional information" (Elliehausen, 2006).

Under ideal circumstances, we could safely assume that consumers actively engage in external information search behavior up to the point of diminishing returns. After all, in the classical economic view of consumer behavior, consumers are rational maximizers who, perhaps through extensive external search efforts, have perfect information with which to make economic decisions. But as we will explain, there are many examples in the literature demonstrating that Stigler's hypothesized scenario is oftentimes not realized, which suggests that consumers are not spending the time necessary to gather quality information to guide their college financing decisions.

Unfortunately, although information resources are available to students and their families, too often there is little or no outreach to promote their availability. This lack of outreach limits consumers' ability to take advantage of this information – if they are not engaging in information search, and information is not being presented to them by reliable sources, they may be fundamentally unaware of its existence. Here again, we see that in this case, the classical economic assumption that consumers operate in a world where they have access to perfect information is a strong and oftentimes inaccurate one.

We emphasize that the above is not meant to imply that consumers fail to search extensively for information because they are lazy or unmotivated. Rather, a wide variety of factors, including environmental differences (e.g., culture, social class, and family) and individual differences in the consumers' personality, attitudes, and available resources influence information search (Blackwell, Miniard, & Engel, 2006, pp. 74-75 & pp. 86-87). In addition, when consumers do search for information, it is likely complicated by the confusing landscape of databases and information tools.[2]

If we provide individuals with information, and they use it to make decisions because the information is (a) useful and (b) presented in a manner that is easy to understand and/or tailored to match their individual capabilities, then we propose that those individuals will be empowered to use that information to make good decisions.

2 Young Invincibles conducted dozens of focus groups with students during which we asked participants about their usage of the available college search tools. Initial results demonstrate that students are inconsistently aware of the availability of these tools, oftentimes confused about the meaning of search results, and skeptical about the tools' reliability and authoritativeness.

Specific Information Search Examples

The literature provides many specific examples of how consumers search for information when making decisions about expensive purchases. We have reviewed the literature on information search for different types of products, namely for expensive, infrequent purchases and for different types of financial products. As we noted above, these types of purchases/decisions are comparable to the average higher education financing decision because they are also infrequent and costly.

This literature stands in contrast to research focusing on smaller purchases of consumer-packaged goods such as groceries or toiletries. After all, "[f]or most consumers, there is an enormous difference between choosing a brand of mayonnaise and buying an automobile" (Bettman, Johnson, & Payne, 1991, p. 53). Making decisions about small purchases is routine and generally has few consequences, while for more important decisions such as those surrounding financing college, the consequences are greater and longer lasting.

To begin, consumers shopping for furniture and home appliances infrequently search for information thoroughly (Claxton, Fry, & Portis, 1974). Other studies have found that when shopping for expensive investments such as durable goods (e.g., household appliances) or apartments, consumers often perform limited searches for information (see, e.g., Newman & Staelin, 1972; Staelin & Payne, 1976; Claxton et al., 1974; Katona & Mueller, 1955). The same patterns are observed when considering information searches for professional services (Frieden & Goldsmith, 1989; Elliott, 1994).

These trends also hold with regard to high-stakes financial decisions such as those surrounding student aid and higher education finance. As Chang & Hanna (1992) note, searches for consumer services (such as financial services related to higher education financing) are much different in nature than information searches regarding simpler consumer goods. Indeed, several studies show that even when making weighty financial decisions, many consumers engage in little research.

In one study about decision-making regarding credit cards and other consumer loans, over 80 percent of respondents reported that they did not engage in information search prior to making a decision (Chang & Hanna, 1992). Similarly, in studies about information search during the mortgage decision-making process, researchers have found that many consumers either perform no research (Lee & Hogarth, 2000; Lee & Hogarth, 1995), or consult only one source when they do (Duncan, 1999; ICF Macro, 2010).

Our own analysis of data from the 2010 Survey of Consumer Finances ("SCF"), an annual survey of a representative sample of US families, corroborates these findings. When asked how much information search they engage in when making decisions about borrowing and credit, about 60 percent of respondents said that they engaged in almost no searching or only moderate amounts of searching[3]; the corresponding number for investment and savings decisions is approximately 64 percent. About the same proportions of respondents in each group reported that they used just one or two information sources in making such decisions.

Information Search Benefits the Consumer

When making high-stakes financial decisions, the literature also suggests that when consumers do engage in thorough information search, they tend to benefit. As Chang & Hanna (1992) discuss, the benefits of infor-

3 Respondents are asked, "On a scale of one to five, where one is almost no searching, three is moderate searching, and five is a great deal of searching, where would [you/your family] be on the scale?"

mation search with regard to credit products include consumers' receiving lower interest rates and finance charges, as well as exhibiting "better money management, greater savings and convenience from using appropriate credit, and gains in financial knowledge and experience from the information search process" (p. 209). Lee & Hogarth (2000) provide one concrete example of these benefits: they found in their study of mortgage refinancing that borrowers who spent more time on information search ended up with mortgages that had lower APRs, on average, than those who spent less time researching their decision.

Information Search Summary and Recommendations

The literature clearly demonstrates that more often than not, consumers are unlikely to perform extensive information search for various types of high-stakes decisions, despite the fact that engaging in this information search is likely beneficial.[4] Instead, the literature suggests that they use mental heuristics and biases in an effort to efficiently make higher education decisions. Although mental heuristics are generally beneficial to consumers (see. e.g., Luan, Schooler, & Gigerenzer, 2011; Katsikopoulos, Schooler, & Hertwig, 2010), when they are overapplied they can lead to mistakes. Though we do not have concrete evidence demonstrating that heuristics are being overapplied with regard to higher education financing, the evidence suggests that this is likely.

Along these lines, one shortcoming of the literature is that it does not delve into the reasons why consumers do or do not research these financial decisions – these are merely descriptive studies, not causal research. It is clear that more research is necessary to better understand the factors contributing to consumers' information search behaviors, or lack thereof. Until this gap in the literature is filled, statements about why consumers do not investigate their options more thoroughly are purely speculative.

Our first broad recommendation, then, is that researchers seriously ask what motivates students and their families to research their higher education financing options. Conversely, we also need to investigate factors that discourage them from doing so. We need to understand both motivating and discouraging factors in order to effectively provide information.

For our **second broad category of recommendations**, we suggest several general measures that information providers may take in order to impart knowledge to consumers:

1. **Steps must be taken to motivate consumers to actively engage in information search about financial aid.** If consumers are convinced that the costs of information search will yield benefits such as making better choices with regard to higher education financing, they may be more likely to engage in information search. The benefits must be communicated to consumers in a manner that is compelling and salient.

2. **Efforts must be made to put financial aid information directly into the hands of students and their families.** Even if the benefits of engaging in financial aid information search are clear, some students/families may still lack the knowledge, resources, or networks that are necessary to effectively obtain information. Getting information directly to consumers eliminates these and other barriers that may prevent students/families from obtaining the information that they need. Outreach and organizing are necessary to achieve this goal.

4 We note that due to the increased prevalence of the Internet, the nature of information search behavior may have been altered since the publication of the articles included in our review. Our searches for studies regarding Internet search behavior yielded many examples of consumers searching for very specific information (i.e., health-related searches) that may not generalize to financial aid information search.

3. We recommend **stronger involvement by government agencies, advocacy and community organizations, and media outlets in disseminating information to consumers** (see, e.g., Johansen, 2013; Lee & Cho, 2005). If reputable organizations endorse these efforts, stakeholders may be more inclined to take up information search.

4. **Add value by using information intermediaries such as college counselors to disseminate information to students/families.** Research has suggested that information intermediaries increase consumers' amount of search (Lee & Cho, 2005). This underscores the importance of ensuring that counselors and other financial aid professionals are available and able to disseminate relevant, personalized information to students and their families.

Information Processing

Information Processing Basics

Relevant information about financial decision-making often fails to reach consumers. Assuming that we are indeed able to deliver relevant information to the population(s) of interest by following the recommendations described above, what other challenges might we face?

To begin, it is important to understand the cognitive aspects of information processing, i.e., how the brain actually gathers and processes information regarding consumers' decision-making. As Bertrand, Karlan, Mullainathin, Shafir, & Zinman (2005) note, while classical economics presumes that consumers are rational, a psychological perspective "emphasizes the importance of context and cognitive limitations" (p. 3). Indeed, consumers are oftentimes provided with imperfect or incomplete information, and their interpretation of this information can be distorted both by the context in which it is presented and their own cognitive limitations.

Despite this, information is often presented to consumers without consideration of the cognitive effort that they actually must expend in order to use that information. Though information consumption seems like a simple task, it is actually comprised of a series of complex cognitive tasks that, taken together, can in fact be rather laborious and burdensome for consumers. As McGuire (1976) and Mazis & Staelin (1982) explain, information processing is comprised of at least five steps:

1. **Exposure:** Data comes into contact with the consumer. This is driven by the habits and social environment of the person which determine the type of information to which (s)he is exposed[5];

2. **Attention:** The consumer selects certain information for further processing;

3. **Comprehension:** The consumer assigns meaning to the information conveyed;

4. **Retention/Retrieval:** The consumer stores information in memory for later use in decision-making; and

5. **Decision-making:** The consumer synthesizes information that is stored in memory or that is available at the point of making the decision.

5 For a discussion of habitus as it relates to college-related behaviors, including financial aid decision-making, see, e.g., Perna (2006).

Though we present these stages separately and in sequence, in reality they are neither discrete nor necessarily chronological. Consumers may move back and forth between stages (Biehal, 1983), and as Mazis & Staelin (1982) note, "the distinctions between them are not always clear" (p. 3).

There are several factors that make understanding information processing from a psychological perspective more complex. First, these information-processing steps occur through the filter of the consumer's mind, which (a) limits the amount of information that the consumer pays attention to, (b) potentially distorts information to fit with the consumer's existing perceptions or expectations, and (c) limits the amount of information that is ultimately stored in memory (Elliehausen, 2006). Second, as Hwang & Lin (1999) explain, "information retrieval…is generally considered a combination of science and art" (p. 217) and is thus difficult to study and understand.

With these caveats in mind, below we turn to reviewing specific examples of studies in which researchers have investigated how consumers process information.

Information Processing Bottlenecks

Because information processing consists of numerous steps, there are several different places along the way where "bottlenecks," or factors which prevent information from reaching consumers, may occur (Mazis & Staelin, 1982, p. 3). Along these lines, many studies have investigated specific conditions that contribute to bottlenecks' occurrence. Below, we organize these studies into subsections and present findings from the relevant research for each category. We note at the outset that although bottlenecks may occur in isolation, they may also converge/combine to affect consumers' information takeup.

The importance of context - In general, the context in which information is presented is critical to how consumers actually make decisions. This is perhaps best illustrated by a randomized experiment where the context of a loan offer was experimentally manipulated to determine which, if any, conditions had an impact on loan uptake (Bertrand et al., 2005). The authors manipulated four different dimensions of the loan offer: (1) the description of the offer in terms of the loan's interest rate, monthly payment, and the amount of other information provided; (2) a comparison of the interest rate to other competitors' rates; (3) "subtle features" such as the gender or race of the person in a photograph included on the offer; and (4) "suggestion effects" caused by placing suggestive telephone calls to potential borrowers prior to their receiving the loan offer.

The outcome measure in this study was the loan take-up rate, or the rate at which respondents actually took out the loan being offered. The research yielded a number of findings, namely that variability in the four factors described above generally had an impact on the take-up rate of the loan (i.e., the test group rate of loan take-up was either higher or lower, depending on the manipulation, than the control group rate). To provide just one example, the researchers placed a "suggestive" phone call to a subset of borrowers asking them whether or not they intended to take out a cash loan in the following months. The mere suggestion of taking out a loan increased the loan uptake for this subset of consumers by a statistically significant margin.

More importantly, the researchers found that the psychological manipulations had a greater impact on loan decisions about suboptimal loan products, i.e., those with higher interest rates. In other words, the context of information was a bottleneck because it had a negative impact on the cognitive steps that consumers took to process the information correctly. Summarizing their findings, the authors of this study conclude that "psychological effects are very context sensitive and may require experimentation to pin down" (Bertrand et al.,

2005, p. 31). It is particularly troubling that context may in fact lead consumers to make suboptimal financial decisions.

Other researchers have also found even subtle differences in information context can have a marked impact on consumers' decision-making. To illustrate, one study demonstrated that consumers who were presented information in a difficult-to-read font were less likely to make a decision than those who received a standard font (Novemsky, Dhar, Schwarz, & Simonson, 2007). The subtle inclusion of the difficult-to-read font had a negative impact on consumers' preference fluency (i.e., the subjective feeling of ease or difficulty associated with making a decision). Taken together, these two illustrative studies suggest that information providers need to be mindful of seemingly minor tweaks to the context in which information is presented.

Tyranny of choice - One of the most common mistakes that information providers make is to overload the consumer with information. While these efforts are well intentioned, the literature clearly demonstrates that as far as information goes, "more is not always better" (Hwang & Lin, 1999, p. 217). More specifically, numerous researchers have shown that consumers' decision-making effectiveness decreases with increases in the quantity or redundancy of information that is available (Botti & Iyengar, 2006; Bertrand et al., 2005; Gourville & Soman, 2005; Iyengar & Lepper, 2000; Hwang & Lin, 1999; Keller & Staelin, 1987; Lee & Lee, 2004; Malhotra, 1982). As related research has demonstrated, this may be because consumers' desire to and satisfaction in searching decreases as the number of attributes increases (see, e.g., Griffin & Broniarczyk, 2010). Indeed, including too many alternatives from which to choose may actually make it less likely that consumers will make any choice at all (Dhar, 1997).

This phenomenon has been observed in a wide variety of contexts. For example, one study demonstrated that when consumers were presented with a numerous different types of the same product (i.e., various types of jellies or chocolates), they were less satisfied with their decisions about which they should choose than when they were presented with a smaller array (Iyengar & Lepper, 2000). In the medical setting, doctors have been shown to be less likely to prescribe a certain medication when they must choose between it and an alternative (Redelmeier & Shafir, 1995). Finally, in the higher education context, Judith Scott-Clayton (2011) explains that an overabundance of choice in the community college setting (e.g., with regard to choice of major/program, how many/which courses to take) may overwhelm and discourage certain students from persisting in and succeeding at earning a credential.

While the examples provided above are informative, their findings may not apply directly to information processing with regard to the higher education financing context. Fortunately, there are also a few finance-related examples that hit closer to the mark. One such study illustrated that as the number of investment fund options for a company 401(k) plan increased, participation in the plan decreased (Sethi-Iyengar, Huberman, & Jiang, 2004). In addition, several researchers found that by simplifying the mandatory documentation of mortgage loan terms, consumers generally improved their comprehension of the terms (Lacko & Pappalardo, 2007; ICF Macro, 2009). In one of these studies, such simplification involved combining all information into one three-page form, removing required information that was unimportant and/or confusing, and presenting the information "in easy-to-understand language and in an easy-to-use format" (Lacko & Pappalardo, 2007, p. 42).

Order effects – In addition to the literature that we have described above about the quantity of information to present to consumers, there is also a diverse line of research on how information is ordered that is applicable to consumer financial decision-making. In this section, we provide a few examples of research that has demonstrated consumers' sensitivity to order effects. We note that although these studies investigate information search, we have included them in the information processing section because they are a bottleneck

preventing information from reaching consumers.

To begin, the order in which we present options to consumers may alter the amount of information search in which they engage. A study about hotel selection found that when attributes were presented in declining order (best to worst), consumers searched through more options than when the options were presented in improving order (Diehl & Zauberman, 2005). A second study in the medical context indicates that the presentation order of a list of symptoms had a significant effect on participants' perceived risk of cancer (Kwan, et al, 2012). More specifically, participants who saw a list that presented common cancer symptoms consecutively were more likely to believe they were at-risk for cancer than those who saw a list of common symptoms interspersed with rare symptoms. A third study concerns sequential choice sets, starting with a smaller number of attributes and gradually building up to more extensive lists. This research demonstrates that this approach primes consumers to be more actively engaged in analyzing the larger lists (Levav, Reinholtz, & Lin, 2012).

These findings suggest that even subtle modifications to the ordering of information can have an impact on consumers' perceptions. We therefore note that context is very important in determining consumers' engagement in information search. More research is needed to determine the circumstances under which consumers are primed to search more or less extensively.

Ambiguity - Another common mistake causing bottlenecks in information processing is providing consumers with ambiguous information. In their review of the literature on ambiguity, Frisch & Baron (1988) note that ambiguity is "the subjective experience of missing information relevant to a prediction" (p. 152). This may mean that the relevant information is actually not present, or that it is present but not clear enough for respondents to use in their prediction or decision.

The literature has shown that when faced with ambiguous information, consumers tend to discount it, or not accord it much weight. In one study, for example, the researchers presented respondents with ambiguous market information regarding a hypothetical business decision. One group of respondents received precise information about the amount of sunk costs, another group received no sunk cost information, and a third group received an ambiguous range that such costs might fall into. The researchers found that the group given ambiguous information made decisions similar to those who had not received any sunk cost information (Van Dijk & Zeelenberg, 2003). Because the groups receiving ambiguous information and no information came to similar conclusions, the findings suggest that the ambiguous information leads to the same outcomes as no information at all.

Apples and oranges - A third example of a bottleneck occurs when consumers are presented with information that is not "alignable" – that is, they are given options with attributes that do not match up. Bar-Gill (2008) explains this phenomenon in terms of the subprime mortgage market: choosing a subprime mortgage is difficult for consumers because they must evaluate numerous contracts, each featuring their own set of prices and rules for when the different prices are applicable (p. 1,106). This task would be complex enough if the competing contracts had alignable terms, but the complexity is increased substantially given that it is not possible to compare "apples to apples" across contracts.

One way this bottleneck can occur is if there is an attribute listed for one option, but that attribute is missing for the comparison option. Returning to our subprime mortgage example, this might occur if information on the terms of the introductory period were explicated clearly in one contract, but absent or unclear in another comparison contract. Under these circumstances, consumers exhibit different choice behavior than if the information provided had been complete (Kivetz & Simonson, 2000; Gourville & Soman, 2005). More specif-

ically, they give greater weight to the "common" information and discount the attributes where no comparison is available (i.e., where there is missing information).

Other research has demonstrated that presenting consumers with nonalignable information causes them to expend more search effort and ultimately to report lower satisfaction with the outcome of their search process. For example, Griffin & Broniarczyk (2010) presented participants with various profiles of computers that had alignable and nonalignable information. The participants viewing computer profiles with nonalignable information reported that they were less satisfied[6] with their choice of machine.

Format of numeric information - Another information bottleneck can occur when consumers are presented with numeric information in a format that is difficult for them to process. To illustrate, consumers have difficulty with the concept of APR, or annual percent interest rate, for various consumer credit products. We draw from this portion of the literature because it is relevant to students/families' ability to process interest rate information with regard to student loan products.[7]

In general, as Ranyard & Craig (1993) explain, consumers have a difficult time processing information presented in percentage terms:

> *"There is a tendency in the everyday economic world to assume that providing percentage rate measures, such as inflation or interest rates, will enable citizens to develop an adequate understanding of the economic changes that affect them. However, percentage rates are quite complex concepts, particularly when they involve compounding at frequent intervals, and/or when they change quickly" (p. 333).*

The consensus across many studies is that while consumers think that APR is an important piece of information in making credit decisions (Lee & Hogarth, 1999; Durkin 2002; Durkin 2006), they nonetheless have a difficult time understanding the concept of APR (Ranyard & Craig, 1995; Buch, Rhoda, & Talaga, 2002; ICF Macro, 2009; Martin, 2010). Further, many consumers who have already opened various types of credit accounts are unable to report accurately the APR on their existing loan(s) (see, e.g., Brandt, Day, & Deutscher, 1975; Lacko & Pappalardo, 2007).

Findings from other studies suggest that consumers have a much easier time interpreting and processing absolute dollar amounts than amounts represented by a percentage rate. To illustrate, a number of studies suggest that consumers have a better understanding of dollar finance charges than they do of APR (see, e.g., Durkin, 1975; Kinsey & McAllister, 1981; Yard, 2004; Elliehausen, 2006; Lawrence & Elliehausen, 2008).

Quality of information - Effective information can also be conceptualized as high-quality, a broad phrase we use to describe information that is parsimonious, unambiguous, and relevant to the target audience. For example, in one study, the researchers operationalized "quality" as the attributes in a set of job characteristics that respondents rated as most important to them (Keller & Staelin, 1987). When these respondents were presented with a choice task containing the job attributes that they had rated as most important, they were more likely to say that the information environment was useful.

Similar studies have been conducted in the mortgage industry, which is closely analogous to student finan-

6 Satisfaction was measured using a scale constructed of three items. These items asked participants how happy they were with their choice, how satisfied they expected to be with the chosen product, and whether or not they felt disappointed with their choice.

7 We note that APR is a different concept than interest rate since the APR captures the total interest and fees associated with a loan over a one-year time period.

cial aid in that a mortgage is an expensive and infrequent investment. Lacko & Pappalardo (2007) conducted an experiment where they presented two groups of respondents with different mortgage information disclosure forms: either (1) the standard "Truth in Lending Act" ("TILA") disclosure, or (2) a revised prototype designed to ease the information provision process. The prototype design was informed by a survey of respondents aimed at determining which characteristics of mortgages were important to them.[8]

In qualitative interviews, respondents noted that in comparison to the TILA form, the revised prototype form had improved "clarity, readability, appearance, organization, and usefulness" (Lacko & Pappalardo, p. 38). Presenting consumers with the revised prototype led to markedly better outcomes in consumers' understanding of many aspects of their mortgages. For instance, when comparing quantitative results testing the revised form against the TILA form, the researchers found that borrowers were 38 percent more likely to correctly identify the amount of the loan, and 11 percent more likely to correctly identify the monthly payment amount (Lacko & Pappalardo, ES-10).

Taken together, these studies suggest that by taking measures to improve the quality of information presented to consumers, we can indeed improve outcomes in terms of consumers' understanding of complex financial concepts.

Information Processing Summary and Recommendations

Taking all of this together, it is clear that it is not enough to simply provide information about financial aid to students and their families. As Bertrand et al. (2005) note, "[t]he framing of any initiative, program, or product can be just as important as the actual terms of the offer" (p. 31). Importantly, the authors also caution that it will not be easy to incorporate our knowledge of psychological processes into models of information delivery because consumers' reactions to different presentations of information are highly context-dependent (Bertrand et al., 2005, pp. 31-32). It is clear that careful thought and consideration must be given so that information is framed in a way that makes it accessible and useful to consumers.

We offer the following suggestions on how to frame information in a way that is congruent with the psychological aspects of information processing:

1. Do not overload students and their families with large quantities of information or redundant information about financial aid.

a. **Pare down the number of attributes for each type of financial aid that is presented to consumers.** It is cognitively taxing for people to evaluate a large number of alternatives at one time, and providing too much information can lead to decreased information search.

b. **Use common techniques such as aggregation and summarization to keep the number of information dimensions (both diversity and repetitiveness) to a minimum** (Hwang & Lin, 1999). We note that more detailed, disaggregated information should still be provided as a resource for those who are interested in a more in-depth treatment of the topic.

c. **Use small tables of information instead of large tables of in an effort to facilitate consumers' decision-making process** (Bertrand et al., 2005).

d. **Modify information displays** (i.e., simplify existing displays or create new, consumer-friendly displays). This may help consumers process information more effectively and accurately.

8 ICF Macro (2009) followed a similar strategy in their study of mortgage disclosure form comprehension.

2. Provide unambiguous and complete information.

3. Present financial aid options with alignable characteristics – e.g., present the same characteristics for each loan type.

4. Provide relevant financial information in both dollar terms and percentage terms.

a. **Situate financial statistics such as dollar amounts and interest rates in the appropriate context to facilitate students' and their families' processing of the information.**

5. **Ground financial aid information in the psychological literature so that students/families are able to understand, properly interpret, and put to use the information that is delivered.** As Mazis & Staelin (1982) note, psychological principles such as those we have just described are rarely used in public policy development. We encourage researchers to conduct studies to determine what this would look like in practice.

6. **Gather feedback from the relevant consumer groups to inform efforts to improve information quality.** The Lacko & Pappalardo (2007) study, which gathered detailed qualitative information directly from mortgage shoppers, suggests that this is critical.

7. **Conduct specifically-tailored experiments to determine the context(s) in which students and their families are best able to take up information about financial aid.** One limitation of the research presented above is that it was not conducted specifically with regard to financial aid. It is therefore possible that the findings described are at least in part dependent upon the context of the experiment. As Bertrand et al. (2005) suggest, it is therefore necessary to conduct experiments tailored to financial aid and designed to determine the methods of financial aid information provision that are most effective.

Subgroup Differences in Information Search and Processing

Numerous factors impede the typical consumer's ability to process information presented to them, but different subsets of consumers likely react differently to those factors. In the section that follows, we explore whether consumer information search and processing capabilities vary by several important demographic characteristics; namely, educational attainment, the related concept of financial literacy, and socioeconomic status as measured by household income.

Educational attainment

It is clearly documented that there are vast disparities in educational attainment in the United States in terms of demographic characteristics such as race and socioeconomic status (see. e,g., Matthews, 2014). These disparities begin early and stubbornly persist through high school and postsecondary education. The cumulative impact is that there are certain groups in the United States – namely, people of color and those in lower income brackets – who, on average, experience suboptimal educational outcomes when compared to their richer white peers (see, e.g., Matthews, 2014; O'Sullivan, Mugglestone, & Allison, 2014).

Systematic disparities in educational attainment are pertinent to this review to the extent that information search and processing also vary systematically by educational attainment. As Newman & Staelin (1972) note, education "represents ability and interest in seeking and evaluating information" (p. 252). If students'

and their families' ability to search for and process information related to financing higher education is mediated by their own educational attainment, we run the risk of situating individuals in a system where those most in need of information are least able to access and understand it.

Unfortunately, our review of the literature suggests that this is the situation we are facing. In general, studies have shown that consumers with higher levels of education are more likely to engage in more extensive information search (see, e.g.,. Katona & Mueller, 1955; Newman & Staelin, 1972; Claxton, Fry, & Portis, 1974; Chang & Hanna, 1992; Schmidt & Spreng, 1996; Lee & Cho, 2005). To take just one example, Chang & Hanna (1992) found a strong positive relationship between consumers' education level and their probability of external credit information search (pp. 220-221). As these authors put it, "consumers with higher education have better knowledge and capacity to acquire and process more complicated credit information. Therefore, higher educated consumers are more efficient and will obtain more benefit from search than less educated ones" (Chang & Hanna, 1992, p. 220-221). This suggests a widening of information gaps at a time when we are seeking to reduce them.

Indeed, our SCF analysis of more recent (2010) data demonstrates that there are vast disparities in information search behavior by levels of educational attainment. Nearly half, or 45 percent, of those with less than a high school education reported that they engaged in almost no information search for decisions related to both borrowing and savings/investment.[9] In comparison, only about 20 percent of those with graduate degrees reported the same amount of information search involvement.

Though the consumer information literature with regard to education is focused on information search specifically, logic follows that those with less education are also to some degree less able to efficiently and effectively process and understand information. This is particularly true with regard to complex topics such as those related to student financial aid, including federal and private student loans, grants, and scholarships. As we describe below, this may be due to the fact that those with lower education also tend to score lower on measures of financial literacy and capability.

Financial literacy

Related to educational attainment is the concept of financial literacy, which Vitt et al. (2000) define as:

> *... the ability to read, analyze, manage and communicate about the personal financial conditions that affect material well-being. It includes the ability to discern financial choices, discuss money and financial issues without (or despite) discomfort, plan for the future, and respond competently to life events that affect everyday financial decisions, including events in the general economy (p. 2).*

We cite this particular definition of financial literacy because it encompasses not only financial knowledge, but also the capability to put that knowledge into action in shaping one's financial decisions (i.e., financial capability).

The subject of financial literacy in the United States has energized the academic community as of late. Indeed, researchers cite a "sense of public urgency over the level of financial literacy in the population" as a

9 We note that this may be confounded by the relationship between educational attainment and salary/earnings. That is, less educational attainment is associated with a lower likelihood of having income to save, and thus fewer opportunities to engage in information search.

consequence of the "changing economic climate in which individuals now shoulder greater personal financial responsibility in the face of increasingly complicated financial products" (Hastings, Madrian, & Skimmyhorn, 2012, p. 4). This urgency is also likely driven by the relatively low levels of financial literacy in the United States: in a survey of high school students, the Jump$tart Coalition for Financial Literacy found that only about 50 percent of students passed a financial literacy test (Mandell, 2008). [10],[11]

Financial literacy varies dramatically by various demographic factors. Results from the 2012 National Financial Capability Study, for instance, demonstrate clearly that while levels of financial literacy are low among the population as a whole, they are particularly low amongst people who are younger, lower-income, and have lower levels of educational attainment (FINRA, 2013). The Jump$tart survey also provides evidence of this phenomenon: while 38 percent of students in the highest income bracket passed the financial literacy test, only 15 percent of those in the lowest bracket did (Mandell, 2008a, p. 14). Jump$tart reported similar results for students whose parents are in the highest and lowest education categories. Moreover, whites were more than twice as likely to pass as compared to individuals of color – 7 percent of whites passed, as compared to less than 2.5 percent for Black and Hispanic students.

The literature contains only a minimal amount of research investigating whether financial literacy is related to consumers' ability to search for and process information. For instance, in one study about consumers' purchases of major household appliances, the researchers investigated whether various types of consumer education – including a formal course, workshops, and printed consumer education materials – had an impact on information search behaviors. They found that consumers who had received formal consumer education spent a longer time searching for information than those who did not (Fast, Vosburgh, & Frisbee, 1989).

There is some evidence to suggest, however, that although consumers with financial education may spend more time searching than those without, they are no better at processing that information. To illustrate, the results of the Jump$tart survey indicate that high school students who had taken a full-year course in money management/personal finance were no more likely to pass the test than students who had not taken such a course (Mandell, 2008, p. 18).[12] Encouragingly, though, the survey also found that college students, who presumably had more financial experience, did much better on the test.

Income

Given that education and income are highly correlated, these findings also suggest that low-income segments of the population are unlikely to engage in extensive information search. As Day (1976) notes, "[l]ow-income buyers, who have the greatest need for protection or assistance in making more informed choices, are more likely to lack the characteristics that will allow them to take advantage of the information" (p. 49). These consumers may be unaware of the benefits of comparative shopping, may lack the knowledge necessary to select the "best buy," and, in addition, "often lack the freedom to go outside their local community" to shop or search for information (Day, 1976, p. 49).

Returning to our analysis of the 2010 SCF data, we found evidence that amount of search for information

10 The financial literacy test was a 50-question assessment that contained items on a broad range of topics including loans, credit cards, and retirement income (Mandell, 2008b).
11 This lack of financial knowledge is actually a global problem, as low levels have been recorded in many other developed countries in addition to the United States (see, e.g., Atkinson & Messy, 2012).
12 We note that one criticism of the literature on financial education is that causality is inherently difficult to pin down. For a review of this literature, see Hastings, Madrian, & Skimmyhorn (2012).

regarding financial decision-making increases with income. To illustrate, when asked about their amount of information search regarding credit and borrowing decisions, 30 percent of respondents in the lowest income quartile reported that they engage in more than a moderate amount of information search; the corresponding percentage for those in the top income quartile is 53 percent. Our findings were similar regarding savings and investment decisions: those in the lowest income quartile were much more likely to only rely upon one or two sources of information as compared to those in the highest income quartile (70 and 45 percent, respectively).

Indeed, several studies identify a positive correlation between income level and amount of information search (see, e.g., Katona & Mueller, 1955; Claxton et al. 1974; Capon & Burke, 1980). Others have found that the relationship between income and information search is curvilinear, with low- and high-income consumers being less likely to engage in information search than middle-income consumers (see, e.g., Chang & Hanna, 1992). The literature demonstrates that low- to moderate-income individuals tend to have a more difficult time with information processing in general (Capon & Burke, 1980), and specifically with regard to financial information (Chang & Hanna, 1992), than do high-income individuals.

One study directly relevant to student financial aid found low-income urban high school students, while having access to computers and the Internet, "lack[ed] the knowledge and support needed to navigate the financial aid resources available online" (Venegas, 2006, p. 1652). This suggests that this subgroup of students had difficulty with the financial aid process because they were missing the financial literacy knowledge needed to navigate the process.

Subgroup Trends Summary and Recommendations

The literature clearly demonstrates that individuals with lower educational attainment, financial literacy, and/or income levels are at a disadvantage with regard to their information search and processing capacity. As Newman (1977) notes in his review of the literature, "[a]ll statistics on prepurchase [information] search show that some consumers do much more investigating than others" (p. 84). The consequence is that "the strata of the population that may have the greatest need for information are the least likely to look for it" (Katona & Mueller, 1955, p. 56).

These findings are disconcerting because differing levels of capability with regard to information search and processing are directly related to college access and equality. That is, if the populations described above have a harder time with finding and understanding information related to financing higher education, it may preclude them from pursuing higher education and aggravate the already persistent inequalities in college access that are prevalent in the United States. We therefore offer the following recommendations for how best to deliver information on financial aid to these populations:

1. We recommend **specifically tailoring information to its target audience.** Consumers' information search and processing capabilities vary dramatically, and this should be researched and taken into account when determining what information to provide and how best to provide it.

2. **Make special efforts to disseminate information to students/families with lower educational attainment and lower-income to ensure an even playing field.** Information search behavior varies by level of educational attainment/financial literacy and income.

a. **Conduct more qualitative and quantitative research on what type(s) of financial information, and in what form(s), would be most helpful for low-income and less-educated populations.** The literature has documented the systematic differences in information processing that exist in these populations, but we have little knowledge of what type of information would better assist them with higher education decision-making.

3. **Account for the level of educational attainment of the students' parents.** This is particularly true for first-generation students, many of whom have parents who did not complete post-secondary education.

4. **Increase the financial literacy of students and their families** so that they are able to make informed, beneficial decisions about funding postsecondary education. This is particularly true for low-income populations, who are more likely to have lower financial literacy. This can be achieved via various potential mechanisms including formal financial literacy training programs.

Summary and Discussion

Overall, our review demonstrates that students and families have different information search and processing skills. While not all of the studies reviewed are directly linked to financial aid or financial decisions more generally, they still offer valuable lessons about the cognitive processes behind information search and processing. By extension, they also provide valuable guidance as to (a) how to structure future information delivery efforts and (b) modify existing ones.

As we suggested in this paper's opening section, however, providing information is only one piece of the larger puzzle. It is clear that information alone will not answer the question of how best to assist students and their families with making higher education financing decisions. As Kozup & Hogarth (2008) put it, "[i]nformation,…education, and advice need to work hand in hand with policy and substantive consumer protections" to "ensure financial security at a societal level" (p. 133). More specifically:

> *"financial decision making can be improved by providing decision makers with better quality information presented in a non-complex fashion, an institutional environment conducive to good decisions, an incentive structure that internalize (sic) externalities involved in financial aid decision making, and financial education that will facilitate making the best use of the information at hand within a specific decision-making environment" (Altman, 2012, p. 677).*

Providing clear, simple, and specifically-tailored information will equip students and families with information to make better choices, but various other efforts must be made to ensure equity in access to higher education.

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