User relevance assessment of personal finance information: What is the role of cognitive abilities?

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ABSTRACT
For most people, financial well-being is in large part driven by their ability to make informed judgments about varying personal finance topics. With the over-abundance of information available online, it can be a daunting process to effectively evaluate and identify the most relevant information for one's specific financial needs. There are many factors involved in evaluating online information and one that is not well understood is the role that cognitive abilities play in the human relevance assessment process. This research seeks to investigate the relationship of certain cognitive abilities with users' assessment of relevance and users' relevance strategies for searching and selecting documents related to personal finance information tasks. It expands upon previously published research that found effects of specific cognitive abilities on search behaviors and perceptions of mental workload by adults searching the open Web. This extended abstract presents a summary of the motivation, background, description and design of a laboratory study which will ultimately serve as the empirical research for my doctoral dissertation.

Categories and Subject Descriptors
H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval—selection process

General Terms
Experimentation, Human Factors, Financial Literacy

Keywords
Human relevance assessment, cognitive abilities, relevance assessment, relevance, personal finance, financial literacy, user study, search behavior, workload, individual differences

1. INTRODUCTION
It has long been recognized that important aspects of financial well-being are driven by a person's ability to make informed judgments about wealth accumulation and debt management. This is particularly true in the United States, where the burden of major financial decisions related to education, housing, and retirement increasingly shifts to the individual consumer. While there is no shortage of information about personal finance topics available through digital libraries of reputable organizations, the financial landscape of modern life has become so complex that it is increasingly difficult for many individuals to sort through the morass of data and finance information in order to make the best, informed choices for themselves and their families. Add to that the wealth of new information from the growing alternative financial services (AFS) industry (e.g., payday lending, rent-to-own leasing, subprime home lending) and the potential for consumers to become overwhelmed and make suboptimal choices is high.

One way for the information and library science (ILS) community to help address this challenge is to apply our knowledge of human information interaction behavior to this domain. Understanding the user is of paramount importance in the design of useful information systems. By applying research techniques to the domain of personal finance information, ILS researchers can gain insights about user behaviors that can be used to create a clearer, easier to understand financial landscape for consumers.

Research about financial behavior from sociology and business provides evidence of differences across types of consumers by categories such as age and gender but there is scarce information about individual differences. A promising area of ILS research on individual differences that can be applied to the domain of personal finance is human cognitive abilities. Cognitive abilities are comprised of higher mental functions such as reasoning, remembering, understanding and problem solving [13]. Variations in cognitive abilities may impact relevance assessments and lead to insights for designing interfaces or literacy instruction that are tailored to individual users' cognitive strengths.

The proposed dissertation research will investigate the impact that different levels of cognitive abilities have on assessing relevant documents in tasks related to personal finance topics.

2. BACKGROUND
This section provides a synopsis of theoretical grounding for the three main concepts of the dissertation study: cognitive abilities, relevance assessment, and personal finance. Existing empirical research is also described in each section.

2.1 Cognitive Abilities
Cognitive abilities have primarily been investigated in information science under the umbrella of individual differences research. While a great deal of research has studied how individual differences, such as gender and cognitive style affect search behavior, fewer studies have focused on cognitive abilities. For example, Ford, Miller, & Moss [23] focused on cognitive *style* (among other differences such as prior knowledge, Internet perceptions, age, and gender). In their work they defined cognitive styles in three ways: wholist-analyst bias, verbalizer-imager bias and cognitive complexity. They found that participants with verbalizer styles exhibited poor retrieval performance whereas those participants with imager styles demonstrated strong retrieval performance. Another study of individual differences was that of

JCDL 2015, June 21, 2015, Knoxville, TN, USA.

Palmquist and Kim [37], in which the researchers looked at predictive indicators of web search performance that were related to cognitive style (field dependent and field independent). They found that cognitive style had a strong influence on novice online searchers, but not as much effect on people who had experience with online database searching. In another study, Borgman [7] sought to understand search performance differences based on end-users' academic disciplines. She found strong relationships of technical aptitudes and IR performance to academic orientation and also of personality and IR performance to academic orientation.

In general, the individual differences research shows that these types of variations impact user behavior and success. However, less is known specifically about how cognitive abilities impact human relevance assessments. Cognitive abilities are comprised of higher mental functions such as reasoning, remembering, understanding and problem solving. They are considered individual traits that remain relatively stable over the lifespan. Three-Stratum Theory [13] is the theoretical basis for the measurement of cognitive abilities in this study. The theory was developed by psychometrician John A. Carroll through a decades-long research program in which he re-analyzed datasets from more than 460 correlational studies of cognitive abilities. It depicts the factor-analytic structure of human intelligence as a hierarchical model of cognitive abilities belonging to three strata.

Three Stratum Theory and the psychometric approach to establishing cognitive ability levels of individuals is uniquely useful for studying individual differences in information search and retrieval. By using an approach based on a factored method, it is possible to select and test only those attributes of ability that are believed to be most important to specific activities of information search and relevance assessment. For example, while some abilities may be more important in relevance assessment, others may be more important in selecting search results, while others may be most important in multi-session search. This method of understanding abilities can allow for testing of specific kinds of abilities which then be applied to different kinds of interfaces.

Research on information searching and cognitive abilities is limited. Similarly focused studies on human relevance assessment are also few in number. The paucity of research in these areas is, of course, a dominant driver for the dissertation. The primary mental abilities that have been studied in the context of information searching or relevance assessment are perceptual speed, visualization, various types of memory, and various types of reasoning. These abilities impact different intellectual processes under different search and assessment circumstances. What follows is a brief summary from the dissertation literature review of existing ILS research related to the relationship of cognitive abilities with information searching or relevance assessment.

2.1.1 Perceptual Speed Ability

Perceptual speed determines a person's ability to efficiently view and identify differences and similarities, patterns, and anomalies when conducting tasks involving symbols and figures [13]. It draws on the ability to scan information effectively, make choices for response and is said to be related to automatic mental processes [20]. Perceptual speed has been found to play a role in search time and relevance assessment [1], learning while searching [4, 5], search interactions and perception of workload [9].

Perceptual speed impacts search time when assessing relevance. Al-Maskari and Sanderson [1] studied perceptual speed of participants (N=56) searching TREC topics in an information retrieval system and found that while both the high and low scoring participants found the same number of total relevant documents and indicated the same levels of satisfaction with their searching, the participants with higher scores of perceptual speed took less time to find the first relevant document.

Perceptual speed plays a role in learning during search activities. Allen [4, 5] studied perceptual speed and spatial scanning of university students (N=80) searching a small bibliographic database. Participants with higher score perceptual speed viewed more records and printed more records except when using a word map. The visual aid of the map helped the participants with low perceptual speed to view more records. A similar phenomenon occurred in a multi- versus single-window display condition; use of the multiwindow display increased learning for lower score perceptual speed participants, whereas it impaired learning for higher score perceptual speed participants. Participants with higher score spatial scanning showed more learning in single window display. Regarding spatial scanning, participants with higher score spatial scanning viewed more records and printed more records and the use of word map increased vocabulary learning for lower score spatial scanning participants.

Participants with stronger perceptual speed abilities exhibited advantages in information searching in recent research of the current author and her colleagues [9]. Perceptual speed had the strongest effect on search behavior and workload in this study of adults (N=21) from the local community. Participants in the high perceptual speed group exhibited more search activity (more queries, longer queries, more clicks, more page visits, and more page visits per query) and also experienced lower levels of workload across all dimensions.

2.1.2 Visualization Ability

Visualization is often called "spatial ability" and consists of complex cognitive processes that are not necessarily invoked just because the material is presented in a pictorial format. People with strong visualization ability are able to form sophisticated internal models of space and dimension even in the absence of explicit visual cues [11, 43]. The limited number of studies in this area focused on information searching and aspects of time.

Visualization ability was found to have an impact on system usage and preference. Zhang [44] interviewed university students (N=19) searching for specific health-related information on the health information system, MedlinePlus, and found that participants with higher visualization found the system easier to learn, easier to use, and were more likely to indicate they would use it again in the future. In [38] people with higher visualization abilities navigated faster and were more successful in retrieving information and researchers also found effects on accuracy and task response time. Chen and Czerwinski [15] studied visualization ability in a small user study (N=11) and found that it was positively associated with recall in tasks that required participants to navigate a database of semantically-organized collection of conference papers. Downing, Moore and Brown [17] investigated the relationship between visualization and domain expertise. They studied search behavior on tasks using the FirstSearch online reference access system. Among their findings, the authors found a main effect for visualization ability and time-to-first-article in which participants who scored higher on visualization averaged two minutes to find the first article versus those with lower visualization ability, who took three minutes to find the first article. In addition, the effect of visualization was stronger for the participants with no domain expertise (e.g., for the biology students when searching the business

topics or the business students when searching the biology topics) than for those with domain expertise.

2.1.3 Types of Memory Ability

Various types of memory ability have been studied by researchers. Associative memory is defined as the ability to recall one part of a previously learned but otherwise unrelated pair of items when the other part of the pair is presented [21]. This kind of memory is also called intermediate-term memory. Memory span, also called working memory, can be defined as the ability to recall a number of distinct elements for immediate reproduction, whereas visual memory is the kind of memory that enables a person to properly remember sequences of information [18].

MacFarlane, Albrair, Marshall, and Buchanan [35] studied working memory of university students (N=16) and found that the number of documents marked irrelevant was significantly correlated with working memory. Participants with low working memory marked fewer documents irrelevant than participants with high working memory.

Gwizdka [26] studied working memory and verbal closure of participants searching a collection of travel and sightseeing-related websites. Interaction effect sizes were large and indicated that verbal closure interacted with the user interface conditions (for list interface) and memory span interacted with the task types (for complex tasks). There were significant differences between the participants with high and low memory span scores on the complex tasks. On complex tasks, participants with low memory span scores issued an average of 3.5 queries, while participants with high memory span scored issued an average of eight queries (more than twice as many). Participants with high memory span were more efficient on simple tasks than participants with low memory span. Participants with high memory span also performed better than participants with low memory span on the more complex tasks.

Chen [14] studied associative memory and visual memory of university students (N=10) and found a strong positive correlation between associative memory and search performance such that participants with higher associative memory scores saved more abstracts than those with lower associative memory scores.

We also investigated associative memory but the findings were inconclusive [9]. Of several interpretations for this finding, including the small sample size (N=21), one interesting possibility relates to the specific form of memory tested. Associative memory calls upon memory resources for performing longer length tasks. It may be that single Web search tasks were too brief to invoke demands for intermediate term memory resources. It seems likely that associative memory would come into play once tasks pass a certain cognitive threshold for the user. In that case, complex relevance assessment tasks would be more likely to instigate this threshold, at least for some participants, than single search engine search tasks.

2.1.4 Types of Reasoning Ability

The types of reasoning investigated in information behavior studies fall into two categories: general reasoning and logical reasoning.

In an effort to understand the kinds of difficulty people have in expressing database queries, Greene et al., [24] chose measures of general and logical reasoning "for their possible relation to the ability to recognize, order, and express logical operations." [p. 308]. The results of their regression analysis indicated that reasoning was an important predictor for difficulty when expressing queries in the SQL database language. Participants with higher reasoning abilities had less difficulty expressing queries and took less time to complete them.

Allen investigated the influence of four cognitive abilities on search performance and effectiveness of a periodical index on a CD-ROM [2, 3]. The focus of this study was to understand the influence of cognitive abilities on the user's performance of the search task on an index built from the Periodical Guide to Literature. He measured logical reasoning, perceptual speed, spatial scanning, and verbal comprehension of university student participants (N=50). In the experiment, after reading a stimulus article about the influence of television violence on aggression in young children, participants were asked to search a periodical index to find articles related to the topic of the stimulus article, as if they were going to be writing a college term paper. Participants with lower logical reasoning included twice as many non-relevant citations in their selections as the participants with higher logical reasoning. Not only did participants with lower logical reasoning include more non-relevant citations in their selections, but they also were less selective with citations, judging 25% more of the citations they viewed as relevant versus the participants with higher logical reasoning. Participants with higher perceptual speed achieved higher precision. Participants with lower spatial scanning used more low-frequency keywords than those with higher spatial scanning, which meant they searched less efficiently than the participants with higher level abilities. Overall then, he found that perceptual speed influenced the quality of the searches and logical reasoning, spatial scanning, and verbal comprehension influenced search tactics.

2.2 Relevance Assessment

The body of research about relevance is very large. A thorough review of existing studies for the dissertation literature review is currently in progress. There are some general points about relevance outlined here, however, that can serve as a basic guide for the reader to understand my approach to the relevance concept.

In their analysis of the relevance literature spanning the prior thirty years, Schamber et al. [41] described relevance as a multidimensional, cognitive and dynamic concept that is a complex but systematic, measurable phenomenon. Saracevic [40] identified five main types of relevance: system, topical, cognitive, situational and motivational. The research for this dissertation is most closely aligned with the concepts of cognitive relevance and situational relevance.

Cognitive relevance refers to a relevance concept in which the user plays an active role in making relevance judgments. The user's perception of relevance is impacted by his or her knowledge state, conceptual frameworks, and internal representations [19]. Thus, relevance is dependent on the user's cognitive processes and changing knowledge and needs regarding information based on the current context [28]. This kind of relevance is also referred to as pertinence [8]. In the case of personal finance, the nature and extent of a person's information needs and knowledge is dynamic across multiple dimensions (e.g., time horizon, actual versus desired/required cash flows, changing tax laws, etc.) throughout the person's lifetime, causing the person's perceptions of relevance to change as well.

Situational relevance was defined by Saracevic [40] as the "relation between the situation, task, or problem at hand, and texts retrieved by a system or in the file of a system, or even in existence. Usefulness in decision making, appropriateness of information in resolution of a problem, reduction of uncertainty, and the like" (p. 216). It is also referred to as utility [8]. In addition to including Saracevic's analytical view and the foundational work by

Schamber [41], Borlund [8] further refined the concept of situational relevance to reflect a multi-dimensional, dynamic nature which depends on the user's perception and judgment of information in relationship to his or her information need and individual context. As noted by Borlund, cognitive and situational relevance are similar to each other in that they are both context-dependent and dynamic and as such, can be hard to distinguish in practice [8].

As mentioned earlier, a more thorough review of existing studies of relevance assessment is currently underway. One example of a study related to the dissertation research is by Scholer et al. [42], which may be used as a general model for the structure of my study. Scholer et al. [42] studied how users assessed the relevance of documents to understand the impact of threshold priming and need for cognition (NFC) on users' relevance decisions, their levels of assessor agreement, and stability of their conceptions of relevance over time. Their belief was that users developed mental relevance models as they read through a document of the documents' relevance to the topic. Users develop 'relevance thresholds' that reflect an internal calibration of the current document based on some external variable. The first variable they considered was threshold priming, or placement of documents in specific ordering. Users' relevance calibration in the case of threshold priming occurred based on the documents already assessed by the person. In other words, depending on the relevance level of the previous documents, assessors will have a higher or lower threshold for relevance. In the case of assessors who encountered long sequences of non-relevant documents, Scholer at al. [42] hypothesized that these assessors would develop low thresholds for relevance, such that they would assess subsequent documents at higher relevance levels than other assessors. The opposite would then be true for assessors who viewed many relevant documents in succession; they would develop higher thresholds for relevance that would result lower relevance assessments overall in comparison to other assessors.

The second variable they considered was an individual differences variable known as need for cognition (NFC). In the case of NFC, the researchers were interested in understanding how NFC influenced relevance behaviors. They found that the assessors with high NFC had higher levels of agreements with expert assessors than assessors with low NFC. Their findings suggest individual differences may be a useful screening tool for recruiting relevance assessors.

2.3 Personal Finance Studies

Personal finance decisions are often more complex than they may seem at first. Consider the case of deciding whether to purchase a washer and dryer on credit. When purchasing on credit, a person needs to understand the sources and types of credit available as well as the repayment terms. This information will lead to further evaluation of the duration of the payments, cost of the credit (i.e., principal plus interest plus fees) and the impact of the new indebtedness on the person's future budget and credit needs.

People develop complex mental strategies for evaluating financial information [39]. Yet not everyone makes the best decisions. Some people are more likely to engage in suboptimal financial behaviors, such as those who are financially distressed (especially older financially distressed people) [31], serving the military [12], or suffering from low self esteem [36].

Various studies have suggested that those with lower cognitive abilities fare worse in personal finance endeavors [10, 25, 33]. In an analysis of survey data of German households from 2007, 2008, and 2009, Bucher-Koenen et al. [10] reported that respondents with lower cognitive abilities were more likely to have sold off assets and realized actual losses than those with higher cognitive abilities. Grinblatt et al. [25] found that investors with higher IQ performed better in the stock market because they were more adept at trading stocks and mitigating transaction costs, in a study of male Finnish investors on the Helsinki Exchange. Using specific investment trading behaviors as a proxy for cognitive abilities, Kuo et al. [33] found a positive correlation between cognitive ability and investment performance in the Taiwanese futures and options markets. As the result of rounding buy and sell order pricing to the nearest 10's digit (versus using actual pricing in basis points), investors with lower cognitive abilities underperformed investors with higher cognitive abilities on average by 3.9 basis points within a trading day, over a five year period. The financial losses of that difference meant about 85,255 Taiwanese dollars (about $2700 USD in 2015) annually per investor.

3. PRELIMINARY RESEARCH

3.1 Research Results So Far

In a recent study [9], the current author and her colleagues examined the ways users' cognitive abilities affected their search behaviors and perceptions of workload while conducting search tasks of varying complexity. Twenty-one adults from the general public completed this study. The researchers assessed participants' associative memory, perceptual speed, and visualization abilities and also measured mental workload. Participants' searches were logged with a client-side toolbar. To evaluate the relationship between cognitive ability, task complexity and workload, we conducted three separate mixed factor ANOVAs corresponding to each of the abilities. The researchers found significant differences in search behaviors for users with lower versus higher perceptual speed abilities. Participants with lower perceptual speed ability entered fewer queries and spent more time looking at search results. They also reported larger amounts of workload than those with higher perceptual speed ability. This suggests that perceptual speed may play a key role in helping someone determine what information is relevant for accomplishing a specific task. The results suggested three important trends: (1) associative memory ability had no significant effect on search behavior and workload, (2) visualization ability had a significant effect on search behavior, but not workload, and (3) perceptual speed had a significant effect on search behavior *and* workload.

3.2 Research Motivation and Questions

My dissertation study seeks to add to the body of knowledge about cognitive abilities and information behavior. In some cases, the research provides updated knowledge: in the case of studies mentioned in [2-5], while the insights gained about learning vocabulary, using multiwindow displays, documents viewed and relevance assessments were useful toward development of new interfaces and features in the 1990's, the technology and interface designs used are long out of date and thus, the findings cannot be generalized to current technology and interfaces. In other cases, the research advances other work such as studies mentioned in [1, 9, 17, 35], toward the goal of developing a robust body of research about the impact of cognitive abilities on relevance assessment that can be applied in more general, large-scale environments.

The studies dealing with personal finance information provide evidence of a link between lower cognitive abilities and negative financial outcomes, however none of those studies investigated the potential information that may have lead to poorer performance by individuals with lower cognitive abilities. By studying the relevance strategies and decisions of individuals, my research seeks

to develop knowledge about people with lower abilities that can be used to develop interventions, interface designs, and instruction that can mitigate some of the consequences of lower cognitive abilities in assessing personal financial information.

In addition, existing research studies in personal finance information are analyses of large survey data or financial market transaction datasets, usually outside the U.S. To my knowledge there has not been research conducted investigating this individual difference through user experiments in laboratory settings. Thus, my research stands to make a unique contribution by investigating cognitive abilities of individual users in the U.S. and their relevance behavior related to personal finance information.

The main questions for this dissertation concern users' relevance assessments and strategies, experiences of mental workload, and behaviors as they evaluate documents related to personal finance topics. The questions are as follows:

- What is the relationship between users' cognitive abilities and their relevance assessment behaviors when evaluating online documents about personal finance topics? Do people with lower levels of specific cognitive abilities have lower relevance thresholds?

- What is the relationship between users' cognitive abilities and their individual strategies for assessing document relevance when evaluating online documents about personal finance topics?

- What do eye gaze behaviors indicate about users' relevance assessment and strategy behaviors when evaluating online documents about personal finance topics?

- How does mental workload vary across individuals with differing levels of cognitive abilities during relevance assessment when evaluating online documents about personal finance topics?

4. RESEARCH METHOD

The main purpose of this research is to understand how cognitive abilities influence the ways users go about the process of identifying relevant information in personal finance tasks; that is, how they select information documents, read through the text, and specify to what degree they hold the information in front of them relevant for solving the task need.

At the doctoral consortium, I am most interested in gaining insights and ideas on the research design and measurements. Of course, I welcome valuable guidance on all facets of my research, but design and measurement are my primary focus. In the next sections I indicate specific items I hold as open question marks in my mind.

4.1 Experimental Design

The study will be a lab experiment conducted in the Interactive Information Systems Lab at the University of North Carolina. Participants will be recruited from the general adult population in Chapel Hill/Carrboro, North Carolina as well as the professional and work staff population at UNC using typical recruitment techniques such as posting fliers, emailing announcements, and encouraging word-of-mouth communications. A formal power analysis will be conducted to determine the appropriate sample size; a current rough estimate is about 36 participants.

The study will most likely consist of single, 60 – 90 minute sessions for each participant. After reviewing consent materials, participants will be asked to fill out a demographics and information self-efficacy questionnaire. Outstanding questions I am currently investigating are whether I should administer an accepted financial literacy test such as found in [34]; and if I do administer the financial literacy test then my question is whether I should administer the test before or after the relevance tasks.

After filling out the questionnaires and possible financial literacy test, participants will then take several paper-and-pencil cognitive ability tests from [21]. The tests are timed and last approximately 30 minutes total.

While the focus of the study is about relevance assessment, I am still considering the possibility of incorporating information searching into the design as well. There are advantages and disadvantage of adding this to the study and I would be very interested in feedback from the more experienced researchers at JCDL about this idea.

Regarding the relevance component, relevance tasks have not yet been determined, however they will likely be similar to those in [42], using personal finance information topics as the content (e.g., use of credit cards, debt consolidation, saving for a summer vacation, personal taxes, acquiring a home loan, investing an inheritance, etc.). Topics and documents will be gathered from reputable, non-commercial financial literacy websites such as www.360financialliteracy.org (run by the American Institute of CPAs), www.consumer.ftc.gov (run by the Federal Trade Commission), and www.mymoney.gov (run by the Federal Deposit Insurance Commission). An experimental system will be pre-populated with documents from the sources just mentioned and users will be asked to read a certain number of documents and grade each document according to its relevance to a given personal finance information scenario. The total number of scenarios that each participant will be given is currently under consideration.

Participants' eye gaze patterns will be gathered using eye tracking. They will also complete a self-report workload questionnaire [27] after the tasks. This measure was used in previous research with good success.

4.2 Measures

4.2.1 Cognitive abilities

A review of the literature revealed that the cognitive abilities (as defined in [21]) most commonly measured related to information searching and relevance assessment are (in order of frequency of use): perceptual speed, visualization, visual memory, logical reasoning, and associative memory. I am currently planning to test participants' levels of perceptual speed and associative memory abilities, and possibly logical reasoning ability also.

The cognitive tests will be scored according to standard scoring procedures for these tests provided by the manual for the kit [22] and guidance from individual at Educational Testing Service (ETS), the publisher of the kit and manual.

4.2.2 Mental workload

In previous work [9], participants with lower levels of perceptual speed experienced greater mental workload during search tasks but there were no significant differences for associative memory ability, which we attributed to the brief length of the tasks. It is expected that the relevance assessment tasks will not only be longer in time duration and will also generally demand greater cognitive resources from the participants. The additional cognitive demands may invoke sufficient mental workload to reveal differences for all the measured abilities, but in particular to shed light on whether associative memory is one of the important abilities impacting

information behavior. Mental workload will be measured using the NASA-TLX self-report questionnaire of mental workload [27].

4.2.3 Attention (eye gaze behaviors)

Cognitive processes are reflected in eye movements [30]. Eye tracking techniques collect eye movement data by measuring the direction and locus of eye fixations, the number of eye fixations, and the duration of eye gazes. Eye movements have been linked to mental attention [30], search performance [29], and mental workload [16, 32]. The interpretation of eye movement data can give researchers valuable information about where, how, how long, and when users look at specific areas on document pages. I intend to capture all of the gaze behaviors that can be tracked by the equipment used. At a minimum, this would include eye position information and tracking of gaze fixations/saccades.

4.2.4 Stimulated recall

In order to understand participants' strategies for assessing relevance, a stimulated recall interview will be conducted after one of the tasks. There are several purposes for using stimulated recall, including that it may help uncover information about the user's most important criteria for assessing relevance, which, as found in [6], may not necessarily be the criteria most frequently identified through eye tracking and other methods. It would be useful during the Doctoral Consortium to discuss ideas for this protocol.

4.2.5 Financial literacy

In order to avoid specification error of the independent variables, I am currently investigating whether certain financial literacy skills (e.g., the ability to quickly calculate compound interest in one's head) would correlate with relevance assessments of personal finance information topics. If this seems to be a reasonable assumption, a financial literacy test will need to be incorporated into the study design.

5. EXPECTED FINDINGS & CONTRIBUTIONS

By applying knowledge and research techniques from information science to the domain of personal finance information I hope a number of key findings will emerge:

1. There will be significant differences in the relevance assessment decisions for participants with higher level abilities compared those with lower level abilities, such that people with higher abilities will be more accurate in their relevance assessments (i.e., accurately identify relevant and non-relevant documents).
2. Strategies for developing relevance assessments will be different across the higher and lower ability groups; participants with higher abilities will demonstrate more thorough, effective strategies, whereas participants with lower abilities may demonstrate less effective strategies (such as using mental heuristics to compensate for the mental challenge of the tasks)
3. Specific abilities will have their greatest influence at different points during the relevance task. For example, perceptual speed will likely have the greatest impact on the relevance/non-relevance decisions, such that participants with lower perceptual speed will exhibit lower relevance thresholds than those with higher abilities.
4. Associative memory, which was inconclusive in previous research, will show significant differences in this research because the longer-term, more intellectually demanding tasks of assessing personal finance information will invoke this type of intermediate term memory
5. Financial literacy will be related to relevance threshold such that more financially literate participants will exhibit higher thresholds for relevance. The relationship between financial literacy and relevance assessment and the relationship between cognitive abilities and relevance assessment are independent from each other.
6. The combination of eye tracking and cognitive abilities tests pinpoint places and spaces during relevance assessment when the lower cognitive ability users diverge from the higher cognitive ability users.

On a broader scale, I hope that my research can provide critical insights about cognitive aspects of user behaviors that can be used to create clearer, easier to understand financial information portals and interfaces for consumers.

6. MOTIVATION TO ATTEND JCDL DC

I am a fourth-year doctoral student currently in the process of preparing for my comprehensive examination. I have conducted a significant literature search related to my topic and recently published a research study related to my dissertation topic [9]. I plan to conduct my dissertation data collection in Summer 2016 and defend my final dissertation shortly thereafter. The timing of the JCDL Doctoral Consortium, therefore, is perfect for my research timeline. Given my timeline, it is also important to point out that this may be the last opportunity I will have to attend the JCDL Doctoral Consortium. Equally important as the timing of my work is the content of the JCDL Conference, that is, the fact that the JCDL Conference content is more related to my area of research than many other conferences.

I have been fortunate to attend a number of conferences and begin developing my professional research network of university faculty, industry professionals, and student-peers. A number of those people with whom I have professionally connected will be attending JCDL and I hope that attending the Doctoral Consortium and larger conference will enable me to continue strengthening my connections with them. Attending the JCDL Doctoral Consortium in 2015 represents a unique opportunity for me to build on my existing network and establish new connections, toward the goal of ultimately securing a tenure-track faculty position at a large research university.

The aspects of the dissertation study about which guidance and advice would be most useful are components related to the research design and measures. Of course, these are just main considerations; guidance on all matters related to the dissertation are welcome. I believe there is a great deal that I can learn from the experts at the consortium as well as my peers; I also look forward to sharing my own knowledge freely in whatever capacities it may benefit others.

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