

David A. Iberkleid. Entrepreneurial Attitudes Towards Social Design Patterns. A Master's Paper for the M.S. in I.S. degree. July, 2010. 74 pages. Advisor: Barbara Wildemuth

This paper assumes different types of people prefer different online experiences and proposes a research study to determine whether there is a match between competing user interface design patterns and individual differences. In this study, subjects responded to two online questionnaires: social design pattern preference and entrepreneurial attitude orientation. First they answered the Entrepreneur Attitude Orientation (EAO) questionnaire consisting of 75 questions and four subscales: Achievement, Innovation, Personal Control, and Self-Esteem. Second, they answered a social design pattern questionnaire. The data was then used to examine correlations between entrepreneurial attitude orientation and design pattern preferences. No statistically significant relationships were found. However, one intriguing U-shaped pattern emerged between an EAO subscale (Personal Control) and social design pattern preference.

Headings:

Cognition/Surveys

Web Sites/Design

Design Patterns

Entrepreneurial Attitude

Social Networks

Individual Differences

ENTREPRENEURIAL ATTITUDES TOWARDS SOCIAL DESIGN PATTERNS

by

David A. Iberkleid

A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Information Science.

Chapel Hill, North Carolina
July 2010

Approved by

Dr. Barbara M. Wildemuth

TABLE OF CONTENTS

| | |
|--|---------|
| LIST OF FIGURES... | page 2 |
| ACKNOWLEDGEMENTS... | page 3 |
| INTRODUCTION... | page 4 |
| LITERATURE REVIEW... | page 12 |
| METHODS... | page 21 |
| RESULTS... | page 33 |
| DISCUSSION... | page 39 |
| CONCLUSION... | page 43 |
| REFERENCES... | page 45 |
| APPENDICES... | page 49 |
| Appendix A: Yahoo! Social Design Patterns... | page 50 |
| Appendix B: Entrepreneurial Attitude Orientation (EAO) Scale with subscales and attitude components identified... | page 52 |
| Appendix C: Email Invitations... | page 56 |
| Appendix D: Consent Form... | page 62 |
| Appendix E: Survey Questions... | page 63 |
| Appendix F: EAO Scoring... | page 68 |
| Appendix E: SDPQ Scoring... | page 69 |

LIST OF FIGURES

Figure 1: The 10-point rating scale used in the EAO questionnaire

Figure 2: SPDQ (preference) Distribution

LIST OF TABLES

Table 2: Highest Education Levels Achieved

Table 3: EAO Scores by Subscale

Table 4: Correlations between EAO Subscales and Design Pattern Preferences

Table 5: Groupings Based on EAO Subscale Scores

Table 6: Preference Scores for Each EAO Subscale Grouping

ACKNOWLEDGEMENTS

I would like to thank my advisor, Barbara Wildemuth, for her remarkable dedication and for her willingness to guide me through this project; Diane Kelly and Laura Sheble for helping me polish my research plan; Chiyoung Oh, Ketan Palshikar, and Jessica Weber for their honest feedback and thorough proof reading; and Odum Institute's Jessica Pearlman at the for all her outstanding help. I would also like to thank my parents, Wolf and Regina Iberkleid, and my dear Laura Joseph for their support. This study would have not been possible without the time all the participants took to fill out the survey – thank you!

INTRODUCTION

Two converging stories motivate this study. One is the story of the experienced web user and the other is the story of the online start-up on a shoe-string. Both are oriented toward improving the design of web applications for a particular audience.

The Story of the Experienced Web User

Imagine a user, Ulysses, who has been using the web for 15 years. Throughout this time, Ulysses has fed the cloud—the aggregate of all websites and web databases—a long series of discrete data, filling out a number of political polls, rating movies, and sharing information with others. The cloud has come to “know” Ulysses quite well, and continues to learn about him as time goes by. Should all this data be centralized, collaborating cloud services could calculate how similar Ulysses is to other users. Based on the behavior exhibited by others like him, such a calculation could better advise web designers about Ulysses’ preferences, and better guide advertisers about Ulysses’ next click.

As the web expands and its online user-base grows, information about users increases and their digital identities become ever more representative of their non-digital selves. Very basic content analysis of email, blogging, and microblogging is already being used to target ads. However, deeper and meaningful analysis of content such as

book reviews on Amazon.com or blog entries requires human assistance and thus requires more resources to carry it out.

Such an approach does not present a significant economic advantage over the time-intensive immersion into a foreign niche culture that characterizes ethnographic research. Design teams use ethnographic research to gain a deep understanding of a particular setting and to create personas and scenarios that depict that setting. However, as users' digital identities grow, the burden on designers to create these research products should lessen or at least be less costly. A cheaper alternative is to generate statistical analyses of discrete data (such as traces of web user behaviors). The prevalence of online questionnaires like personality tests can be added to and enlighten the analysis of online behavior data. Given the advantages in efficiency and affordability of pairing questionnaires and automatically-captured data on user behavior, there is good reason to believe that low-budget design teams would prefer computational analysis of such data instead of costly, real-life ethnographic research or content analysis of naturalistic online text. The proposed approach may not provide as rich a description of a user as the unstructured interviews and direct observation more often used in ethnographic research. However, it may be more feasible to apply on a broad scale.

The Story of the Online Start-Up

Consider the common case where a group of developers wants to design a service for a specific audience. Such is the case of a new company, Original Projects, Inc. (OP). OP is in the process of designing a social networking site for people that are willing and able to champion new projects. In effect, OP is designing a site for innovative

entrepreneurs. The design team has many intuitive ideas but limited resources. Like most companies, OP will require more resources (time and effort) to draft and iterate their design. This process is the well-known life cycle of website building.

Being that developers at such companies want to serve the needs of a particular group of users, they are likely to employ User-Centered Design (UCD). UCD is an approach to interactive systems development that stresses, among other things, an early focus on users, their active involvement in the design process, and their feedback. In this case, the target group of users is likely to have previously interacted with the web, leaving traces of those interactions. If developers could access this vast amount of data about their target audience's online behavior, their UCD process could be well under way even before a single user is asked for any amount of feedback.

MyType¹, for instance, offers online quizzes that test for individual differences and currently boasts nearly 5,000 Facebook fans. If there is a link between users' online preferences and their individual differences, web designers could use the data collected by such companies to create personas. This study set out to find such a link. It focused on entrepreneurial attitude as an individual characteristic. A hypothetical design question was used: what emerging design in social interaction do highly entrepreneurial individuals prefer? Through subsequent data analysis, this study then rated user interface design patterns based on how likely they are to be attractive to future OP customers: innovative entrepreneurs. Overall, this study aims find out if a recommendation can be made to OP's design team, should a link be found between attitude and preference using only online testing.

¹ Find more about MyType at <http://mytype.com/>

Defining Entrepreneur

Because there are several traits associated with entrepreneurship, a collection of themes is often used to illustrate what is meant by entrepreneurship. The creators of the Entrepreneurial Attitude Orientation (EAO) scale were aware of recurring themes in definitions of entrepreneurs, such as innovation, organization creation, creating value, profit or nonprofit, growth, uniqueness, and owner-manager. However, they chose to focus on just two, organization creation and innovation, as representative characteristics because they did not need an exhaustive list but rather a small number of traits that could effectively predict entrepreneurship. The final definition they chose and to which this study adheres is simple.

“The operational definition of a start-up entrepreneur used here was an individual who has started more than one business, the last one being within five years, using some type of innovation.” (Robinson, Stimpson, Huefner, & Hunt, 1991)

For the purpose of this study, high scores on the EAO will be understood as an indication of high entrepreneurial potential among subjects.

Defining Design Patterns

Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, often referred to as the Gang of Four in the software engineering community², defined a DP to be a "description of communicating objects and classes that are customized to solve a general design

² See the website of Cunningham & Cunningham, Inc. for more information on the origin of

“Gang of Four” at <http://c2.com/cgi/wiki?GangOfFour>

problem in a particular context" (Gamma et al., 1995, p. 3). For example, Yahoo! documented an "invite" design pattern. It is one of many design patterns for "social engagement." It comes into play when a user is prompted to invite all or some of his/her contacts to try a service. Consider the case when the prompt appears as soon as the user has signed-up for the service—before even trying it. In reaction to this prompt, one can imagine a range of user behavior from ignoring it to impulsively inviting all of one's contacts. This decision seems largely based on how one values online privacy, personal information, and ultimately, friendship and acquaintances. These values could be the result of habit, error, or potentially, personality or attitude. If the design team could anticipate the behavioral tendencies of its audience, it could better deploy such a pattern, placing it, perhaps, at a point in the sign-up or usage process where it will be ignored by the least number of users.

There are several user interface DP inventories available online, such as Welie.com, UI-Patterns, and Yahoo!, to name a few. Welie.com, Patterns in Interaction Design, is maintained by Martijn van Welie, a Dutch Interaction Designer and Senior Consultant at Philips Design with a Ph.D. in HCI. UI-Patterns.com is championed by Danish web developer Anders Toxboe. More than documenting patterns, he has also tracked the rationale behind their solutions and some code examples. The Yahoo! Design Pattern Library is maintained within the Yahoo! Developer's Network and currently contains 59 patterns.

Study Purpose and Context

This study focused on entrepreneurial attitude among its subjects because OP targets an audience of innovative entrepreneurs. The EAO scale is one instrument thought to predict their behavior but there are others that, for example, assess creativity (Cropley, 2000), like the 24-item Basadur Preference Scale (Basadur & Hausdorf, 1996), which could also have been used in this study.

While it is focused on the needs of OP, there are many more companies/sites this study could impact. Many companies are now trying to attract entrepreneurs and offering services to them. These services help entrepreneurs work on their projects and show those projects to investors. According to Jeffrey Sohl, director of the Center for Venture Research at the University of New Hampshire, there are an estimated 260,500 active start-up investors in the United States (Sohl, 2008).

These sites' design patterns are the elements that communicate the purpose of their services to their audience and shape the use of that site. Online social networking sites are an emerging "Web 2.0" internet service technology where users are content creators. Therefore such sites are ideal places for entrepreneurs to build a reputation, showcase their projects, and receive feedback. Site developers use design patterns to support these activities. The design patterns used in these sites may vary slightly to emphasize peer-to-peer communication (e.g., Facebook), help users promote their own music (e.g., MySpace), or help them manage their professional connections (e.g., LinkedIn).

There are several emerging and niche social networking sites that address the needs of entrepreneurs. CrowdSpring offers a place to collaborate on projects, Fuel

Brand Network operates several sites to help people with their entrepreneurial endeavors, Kickstarter helps fund new ideas, Quirky takes their users' creations from sketch to the market, Bulbstorm helps seek opportunities for its users' ideas, and You Noodle predicts the success of an entrepreneur's start-up. Angelsoft and Kiva are two major social network sites helping entrepreneurs seek financing. Angelsoft connects entrepreneurs to angel investors. These investors are "generally wealthy people seeking promising start-ups that are too small to attract the attention of venture capitalists" (Sohl, 2008). Kiva connects entrepreneurs from around the world to micro-lenders. Because of their informal approach to lending, micro-lenders are not regarded as angel investors but they can be seen as the "Long Tail" (Anderson, 2008) of a large population of investors.

OP is trying to differentiate itself from all the companies discussed above. Based in Durham, NC, OP operates a social networking site aiming to serve the needs of a highly innovative and entrepreneurial audience. However, because its current membership is small, a study that would ask only its members for feedback may not be broad enough. Furthermore, its members have already signed-on and have thus already been attracted by OP's services.

To attract more users, OP would like to be perceived as useful to more entrepreneurs. Its design team has several ideas to accomplish these goals but not all of them may be equally important to its current or future members. The following is a series of ideas that OP's design team wants to implement: Collaboration support, creative support (e.g., sketching tools), privacy settings, aesthetic assistance (e.g., beautifying a user's project profile), business tools (e.g., financial assistance, legal protection), motivational support (e.g., periodic shows, entertainment), and information (e.g., news

blog). Yet, OP has no evidence that collaboration, for example, is what entrepreneurs are looking for. They may be more attracted by a competitive environment, for instance.

Research Question and Hypotheses

This study explores the possibility that particular design patterns fit the interaction needs and desires of entrepreneurs. Specifically, it asks whether there is a noticeable relationship between EAO scores and design pattern preferences. If such a relationship is discovered, it will be examined more closely, in order to provide guidance to designers at OP and similar organizations.

LITERATURE REVIEW

This chapter will provide a brief summary of research concerning the relationship between the appeal of technology and psychological characteristics. The research comes from a wide array of sources and contexts including the military, education, psychology, and computer science. Strengths and weaknesses of various studies will be discussed to show a gap in the literature that this study aims to fill.

HCI Research and Individual Differences

Human-Computer Interaction (HCI) research is concerned with fitting and adapting systems for human use (Hewett, Baecker, Card, Gasen, Mantei, Perlman, Strong, & Verplank, 1992, p. 19). Outside the military, users in the marketplace are consumers with the power of choice. When a user is presented with a set of new systems or with the option to keep or abandon an old system, the user will make a judgment on the usefulness of each system before switching (Smith & Mosier, 1986). Many of the dimensions of this sort of technological selection and tailoring can evolve during design or usage, by designers, users, or even by the system itself (Hewett, Baecker, Card, Gasen, Mantei, Perlman, Strong, & Verplank, 1992, p. 19). Thus, HCI research and software designers are concerned with finding ways to adapt system characteristics to user characteristics. Psychological and physiological characteristics—those that address both brain and body—are among the many human factors studied in order to understand how they may affect HCI. Theories of cognition, perception, and attitude have been explored

to this end. Because human diversity is vast, as interface design grows and matures, HCI researchers seek more and better ways to ways to measure psychological traits that may inform interface design.

A good example is a study that sought individual differences among users that had rated search engine usability. Four types of individual differences were tested: study approaches, cognitive features, demographic features, and perceptions of and preferred approaches to Web-based information seeking. Comparing two types of subjects, wholist and analytic, showed that only the first would change search strategies as task complexity increased. Subjects' expectations of the quality of the results and other such factors particular to search, affected changes in strategy (Ford, Miller, & Moss, 2005). Because my study does not involve performing tasks, contextual factors will not be addressed. However, Ford's study shows that personal characteristics, tested before a task is performed, do affect subjects' performance once that task is given. Hence, I have good reason to believe that individual differences will affect subjects' design pattern preferences, which act as an anticipation of a task.

The Challenge of Matching Mind and Design

In order to pursue the HCI goal to map personal characteristics to preference of different design patterns, we must ask: how do individual cognitive and affective differences affect individual perceptions of usefulness of user interface design patterns?

Well established design patterns have emerged in User Interface Design, making it a maturing profession (Anderson, McRee, & Wilson, p. 295). It is becoming easier for designers to implement interface elements that are relatively easy to use for a general

audience. For many developers and web service companies, the issue is not in how to build a general-purpose website but how to tailor it to their intended audience. Websites that already have an audience may analyze web traffic on their site or conduct a usability test in order to improve the site's interface. For those who lack an audience, the challenge of tailoring a website is greater. However, regardless of the stage of development or length of time present on the web, websites could make better use of user data in order to improve their interfaces. Some emerging sources of user data include users' email content, online social behavior, and search term history. Website developers could use all these sources to customize their interface to specific users or user groups with similar traits.

Overview of Current Approaches

Automatic profiling is used in Recommender Systems (RS) (Resnick, 1997), to help a system adapt to users' needs remotely, while profiling users manually is more often used in software development or usability testing. Both automatic and hand-made user profiling are relevant to the challenge of matching users to interfaces. The first emphasizes the system's perspective, trying to tailor, personalize, or adapt the interface by making best guesses about user preferences while users interact with the interface. The major techniques employed by these systems are content-based, collaborative filtering, demographic, utility-based, and/or knowledge-based (Burke, 2002). But RS generally do not use psychological dimensions, even though these are "powerful features that can improve the recommendations significantly" (Gonzalez, de la Rosa, & Montaner,

2007). RS systems that use psychological profiling could be used in Social Matching Systems (Terveen & McDonald, 2005).

On the other hand, human-driven interface development is a process where intuition and empathy are often leveraged to make design decisions. Personas, for example, are one common artifact produced by designers to represent their audience (Anderson, McRee, & Wilson, p. 196). Such personas often include details about the users' psychological characteristics such as the root of one's motivations: for example, convenience versus altruism.

When users are available to interact with, software designers may employ Participatory Design, a method that goes beyond just personas and deliberately includes potential users in the design process, from the beginning to the end (Weinberg & Stephen, 2002). The issue of matching user preferences to variation in the interface can also be addressed by software-shaping workshops where users are given the tools to customize the interface (Costabile, Piccinno, Fogli, & Marcante, 2006). However, not all system design efforts can afford to include such tools.

Research in Individual Differences and User Interface Design

HCI Researchers have attempted to draw personality characteristics from a broad array of sources including psychology (Nunes, Cerri, & Blanc, 2008; Brinkman & Fine, 2005; Karsvall, 2002), socio-economics (Liang, Chen, & Turban, 2009), marketing (Ho, Davern, & Tam, 2008), education (Caporusso, 2009), human-computer interaction itself (Massey, Khatrim, & Montoya-Weiss, 2008) and culture (Srite & Karahanna, 2006).

In psychology, openness, conscientiousness, extraversion, agreeableness, and neuroticism comprise the big five traits of personality. It was demonstrated that, when recommending humans to other humans -- in this case, a presidential candidate to test subjects -- these five personality traits were exceptionally good predictors of people's presidential choices (Nunes et al., 2008). Although this study suggests that an RS could match people to other people in the same way they would have done so themselves, it is not clear whether it could recommend an interface. The same personality inventory and a test of motivation towards something desirable or undesirable were used in an exploratory study to predict users' preference of software skins (the graphical look and feel of an application). Unfortunately, the personality traits and scales proved to be too broad and compromised the strength of the correlations (Brinkman & Fine, 2005). Furthermore, because the skins were deconstructed by the testers and placed into categories such as scary or calm based on the skin theme and color, this study introduces social norms not likely present in matching users to the more functional aspects of an interface that indicate usefulness rather than hedonic appeal. An earlier study that simply tested users on a scale from introversion to extroversion and their preference for interface color and shape provides some support for predicting this preference (Karsvall, 2002). However, the sample size was only 24 subjects and was highly skewed on the side of extroversion. Furthermore, this study also involved social norms since the interfaces tested were designed to attract either introverts, assuming they would prefer a more modest design, or extroverts, assuming they would prefer a flashier one.

When incorporating users' rational choices in addition to personal characteristics, one study observed that the latter is a stronger determinant of users' perceptions of

usefulness of personalized online services (Liang et al., 2009). Their study was limited to services found in online bookstores, which are known to leverage users' searches and clicks to make personalized recommendations on content—an advantage that few websites enjoy. This study limited its observation of personality characteristics to emotional responses. But in another study, rational choices were considered in addition to three major personality traits observed in marketing research: need for cognition (being naturally driven to seek and process high amounts of information), variety seeking, and need for uniqueness. In that study, researchers found that personality traits moderate users' preferences for personalized content (Ho et al., 2008). Although Ho et al. studied content rather than design patterns and leveraged previous usage in order to generate personalized content, the results point out the significant impact of personal characteristics on users' perceptions of usefulness, especially for those with a high need for cognition and uniqueness.

Technology Readiness (TR) is a multidimensional construct of psychographic attributes (relating to personality, values, attitudes, interests, or lifestyles) that helps segment online customers in terms of their underlying positive and negative beliefs about technology, including optimism, innovativeness, discomfort, and insecurity. Controlling for age, gender and prior web experience, the effect of these four dimensions was observed on usability in terms of content, ease-of-use, made-for-the-medium, and promotion. The researchers provide several findings. Emotion is more important to older users, optimistic users regard ease-of-use important, and web experience can mitigate discomfort and insecurity over time (Massey et al., 2008). Although this study focuses only on technology-related attitudes, it does provide some evidence that

personality characteristics influence perceptions of interface design. Unfortunately, the subjects did not interact with an interface. Instead, they were asked to rate usability requirements such as ease-of-use, based on Microsoft usability guidelines. One drawback in using usability guidelines is that they please the majority of users, not the niche. Usability guidelines are considered a particular instance of design pattern. Therefore, another drawback of using guidelines is that they carry a bias towards a particular design.

Like TR, the Technology Acceptance Model also attempts to explain how users come to accept a technology, although more generally, by proposing two major factors: users' perceptions of the technology's ease-of-use (PEOU) and usefulness (PU) (Davis, 1989). Six determinants of such perceptions -- computer self-efficacy, facilitating conditions, intrinsic motivation (computer playfulness), emotion (level of computer anxiety), objective usability, and perceived enjoyment -- were considered (Venkatesh, 2000). This study does not link individual differences to differences in the interface. The reason is that the interfaces were drastically different and each was tested with completely different users, in different settings. There was no systematic variation of the interfaces, which included an interactive online help desk system, a multimedia system for property management, and a company payroll application. Another relevant perspective is taken in a study that considered culture's moderating effect on technology acceptance (Srite & Karahanna, 2006). The cultural dimension most relevant to my study was individualism versus collectivism. However, it had no significant effect as a moderator of technology acceptance. The researchers "suggest that [these] social norms

need to be conceptualized in a more distinguishing manner to capture the nuances of the social environment” (Srite & Karahanna, 2006, p. 697).

Summary

This review covered the research done to match human diversity in the realm of affect and cognition to distinct interface designs or design elements. Several approaches to assessing diversity in human cognition and affect were outlined. These approaches vary in which personal characteristics are considered, and in the level of detail used to segment users based on those characteristics. Some approaches depended on pre-tests in order to profile the users' personal characteristics, while other approaches use online user behavior as an implicit means of evaluating the differences in users' personal characteristics.

Call to Action

The adoption of a system based on perception is subject to change depending on various circumstantial factors. Therefore, it is more appropriate to focus on attitude, a changeable and transient human factor, than personality which is considered to be more permanent. Attitudes are personal traits exhibited towards someone or something, for example towards smoking and drinking or towards the church (Ajzen, 1988, p.1). Because attitudes are more poignant to a particular object, issue, or cause, in my opinion, they seem to fit better with particular task-supporting functionality on the web.

As shown, there has been a great variety of efforts to capture individual differences in relation to user and system interaction. Although this review was not

exhaustive, it served as a good indication that most studies take a global view of personality that segments the population into major groups. Among these, the weakest attempts to provide a richer perspective on personality are those studies that propose a dualistic view, dividing the population into two major categories.

It's always been a trend in HCI to reach into surrounding bodies of knowledge in order to better inform HCI research. The research done so far indicates that there is still more to be reached for in psychology, especially more fine-grained traits. There are numerous scales to be tested against recently-established usability guidelines and design patterns. Such studies would benefit designers and users, and would leverage the growing availability of online user data. Moreover, in light of growing web traffic and the availability and popularity of tests of individual differences online, the time to match precise and granular assessments of individual differences to interface design may have never been better.

A study of how fine-grained dimensions of cognition affect users' perceptions of interfaces would be a welcomed contribution to the area of Human-Centered Design within HCI. It could help web service developers quicken the development process and reach their target audiences, and it could help users evaluate an interface's usefulness quicker and adopt an interface knowing it supports their individual needs.

METHODS

This study will attempt to bridge two bodies of knowledge, one concerning attitude and another concerning best practices in user interface design. Efforts in developing these two have been extensive and have lasted many years, starting from qualitative exploration to now concrete measures of attitudes and well-accepted solutions to challenges in information management.

While some portions of the study methods have been tested in a variety of other contexts, other portions are newly-developed for this study. Overall, this study's nature is highly exploratory, so the research hypotheses have been limited to the following:

H1: Design pattern preferences will differ between those with different levels of entrepreneurial attitude orientation.

Rationale: Assuming reputation is especially important to high-performing, entrepreneurial individuals, the preferences of that group will be different than that of others.

H2: High entrepreneurial attitude orientation scores will correlate positively with preference for competitive social design patterns.

Rationale: Those with a strongly entrepreneurial attitude orientation are likely to enjoy competition because it provides the opportunity to “win” and thus build personal reputation.

A sample from UNC students and mostly Triangle-based entrepreneurial individuals participated. A questionnaire collected demographic characteristics and measured entrepreneurial attitude and preference for social networking interaction. A recruitment email was sent out, linking to the online questionnaire. The data were analyzed, using Spearman correlations to examine the relationships of primary interest. The study methods are described in more detail here.

Sample

A convenience sample was drawn from the researcher's immediate network at the University of North Carolina at Chapel Hill and personal contacts beyond. The researcher contacted employees at OP, and students and professors at the business school at UNC. A snowball sample was generated as the email asked for participants to refer other participants.

Because the goal of the study was to rank design patterns according to the preferences of most to least entrepreneurial subjects, it was not desirable to screen subjects for high entrepreneurial attitude orientation. On the contrary, this study sought a wide range in entrepreneurial attitude orientation among subjects. Because the sample was drawn from a diverse population, a wide range of EAO scores was expected.

To recruit the sample, four recruitment emails (see Appendix C) were sent out: one to Kenan-Flagler Business School students, one to all other students at UNC, one to Kenan-Flagler Business School faculty, and one to acquaintances outside UNC that the researcher had encountered through entrepreneurial activities.

All students at UNC, business and non-business, were contacted through the UNC mass email system. The emails targeting this pool explained the purpose of the study, and briefly described the study procedures in terms of how much time it was expected to take, and the basic steps involved.

Kenan-Flagler professors at UNC were also contacted through the UNC mass email system. Their particular emails also explained the purpose of the study, and briefly described the procedure in terms of how much time it would take and the basic steps involved. However, the main purpose of their email was to ask professors to encourage their students to participate. This encouragement was necessary to increase the chances of recruiting entrepreneurial-minded individuals.

The researcher also contacted professionals in the area that he had met over the past year and a half at events for entrepreneurs. As in traditional snowball sampling, these contacts were encouraged to forward the email to other professionals involved in entrepreneurial activities.

A small amount of grant money was used to stimulate participation and compensate for of the participants' time (about 20 minutes). However, not all subjects were paid. The disbursement followed a random drawing (using a random number generator) of four \$50 prizes, each given out to a unique participant. The recruitment email explained that entering the random drawing would occur at the end of the questionnaire.

Variables and Measurement Techniques

There were two variables of interest for this study – entrepreneurial attitude orientation and design pattern preference. Each of these variables was measured with a questionnaire. The questionnaire was chosen as a means of data collection for several reasons. First, it was chosen because it has at least a 30 year history of being used to measure attitudes and preferences in a systematic way and with a high response rate if crafted properly (Dillman, 1978). The field of psychometrics provides us with a variety of tools for ensuring that measures taken with questionnaires are reliable and valid.

Second, questionnaires were chosen because of their similarity to online quizzes. As was mentioned previously, the web has been seeing a growing number of free quizzes and tests. Users are taking these to learn about themselves or share their results with others. The use of a scale taken from research in psychology is a surrogate for an online quiz. In fact, with only 75 questions, the EAO could easily be one of the many tests administered online.

Lastly, questionnaires are relatively more time-efficient, cheaper and farther-reaching. Being able to administer the questionnaire online may increase the generalizability of the study because more subjects could be reached. Because it can be completed from the comfort of the subject's home, more subjects are likely to participate.

This study will make use of three questionnaires: a demographic questionnaire, the Entrepreneurial Attitude Orientation (EAO) questionnaire and the Social Design Pattern Questionnaire (SDPQ). Each is described here.

The Demographic Questionnaire

The demographic questionnaire asked about age, sex, and educational level, and whether the respondent was currently a business student or not. This was minimal demographic information, as demographic analysis was not the primary focus of the study.

The Entrepreneurial Attitude Orientation (EAO) Questionnaire

The EAO questionnaire was developed (Huefner, Hunt, & Robinson, 1996) to predict entrepreneurship, based on attitude rather than personality theory. It is based on a three-part model that states that cognition (thought), affect (feeling), and conation (behavioral intentions) are the fundamental components for orienting attitudes towards achievement, innovation, personal control, and self esteem. These four components are the EAO as subscales, and one can calculate a single score for each (Robinson et al., 1991).

The EAO questionnaire contains a series of close-ended questions and measurement scales that together help evaluate a subject's level of entrepreneurial attitude and its orientation. In total, the EAO has four subscales: 1) Achievement in Business (ACH), referring to concrete results associated with the start-up and growth of a business venture; 2) Innovation in Business (INN), relating to perceiving and acting upon business activities in new and unique ways; 3) Perceived Personal Control of Business Outcomes (PC), concerning the individual's perception of control and influence over his or her business; and 4) Perceived Self-Esteem in Business (SE), pertaining to the self-confidence and perceived competency of an individual in conjunction with his or her business affairs (Robinson et al., 1991).

In its entirety, the EAO consists of 75 statements (see appendix B). The subject indicates how much he/she agrees with each of the statements by circling a number between 1 and 10³ where 1 indicates strong disagreement with the statement and 10 indicates strong agreement with the statement, as shown in Figure 1. A 5 indicates that he/she only slightly disagrees and a 6 shows only slight agreement (see instruction in appendix B).

Figure 1: The 10-point rating scale used in the EAO questionnaire



The anchors between 2 and 4 and between 7 and 9 were not labeled because of the lack of words of evenly increasing magnitude that all subjects are likely to agree upon. Numbers, however, will still be used as labels, as shown in Figure 1. The instructions and statements will also be written in a way to avoid disrupting subjects' adaptation to the style used in the EAO.

The range of the four EAO subscale scores is 1.0 to 10.0 after averaging the responses. On each subscale, the higher the value, the more entrepreneurial the individual is predicted to be.

With their introduction of the EAO, Robinson et al. also report on its validity. Entrepreneurs' EAO scores are significantly higher than non-entrepreneurs. Its reliability

³ Peterson (2000, p.41) explains that subjects can distinguish the level of one number compared to the next on scales of up to 11 points.

was shown to be acceptable, though the researchers regret having tested reliability with naïve introductory psychology students rather than entrepreneurs.

The Social Design Pattern Questionnaire (SDPQ)

The Yahoo! DP Library is one of the resources found at the Yahoo! Developer Network. It was selected as the basis for this study in acknowledgement of their experience and success in designing for the World Wide Web. The DPs in this library serve as solutions to specific problems in user interface design. All patterns are sensitive to context. Yahoo's DPs are created using a process that begins with practice and is then supported through usability testing and user experience research.⁴ Yahoo provides a title, problem, context, and solution for each DP. For the purpose of this study, it is important to note, however, that there is always some amount of ambiguity associated with each pattern and, ultimately, their use often depends on context or the designers' best guess.

For this study, DPs that address the social web were selected from the various categories in the library (see Appendix A). The SDPQ was designed specifically for this study, to determine the subjects' preferences for particular DPs, from caring to combative social user interface DPs. Minimal context was included within the questionnaire statements and a general entrepreneurial context was provided in the questionnaire instructions, as follows:

Design an online social network!

In this exercise, you'll decide how a new online social networking website will work. This social network is intended to help you launch projects successfully. For each problem, please respond as directed, either ranking the solutions that would fit best with you, or selecting the best choice for you.

⁴ <http://developer.yahoo.com/ypatterns/about/>

Likert scales are not used in the SDPQ but the wording is clear and the order of the questions is appropriate because they were pilot-tested and iterated for several weeks prior to the start of the study. All four SDPQ questions are ranking questions. While each question shows five rankable options, the subjects need only choose their top three in order of preference. It is hoped that choosing three out of five will have provided enough breadth to distinguish vehement opinion (first choice) from simple conformity (third choice).

To construct effective statements, Peterson (2000) advises researchers to avoid double negatives. Statements in the SPDQ do not contain double negatives. Peterson also recommends using as few words as possible, however, statements in the SPDQ also articulate nuances between social patterns. Another recommendation is not to overuse commas, clauses, not to sound convoluted, and to use smaller words when possible (p. 50). Considering the challenges of expressing social design patterns, these considerations were followed as closely as possible when crafting the questions and choices in the SDPQ.

Yahoo!'s "competitive spectrum" details a range of patterns that manage member reputation with varying levels of competitiveness, from caring to combative. Yahoo! provides the following introduction to all Reputation DPs:

A person participating in a social structure expects to develop a reputation and hopes for insight into the reputations of others, but each designed model of participation and reputation embodies its own set of biases and incentive

*structures. Balancing these forces determines in large measure the success or failure of a social system.*⁵

The Competitive Spectrum is one dimension within Reputation. Yahoo! claims that a community's competitiveness "depends on the individual goals of community members, the actions they engage in, and to what degree inter-person comparisons or contests are desired." Yahoo! suggests that designers "pay careful consideration to the degree of competitiveness the community ought to exhibit" in order to design an appropriate reputation system, if required.

Each of the five competitiveness levels differs on three factors: (1) the goal that motivates the "competitors," (2) how reputation is used, and (3) how it is represented. It is implied that designers already understand the motivations of the members in their social network. Factor two simply ties the goal to the appropriate DP, which is described in factor three.

Among those who are motivated by caring, helping others is suggested as the goal. For those who seek collaboration, collaborating with others is, of course, the goal. There are those who may seek the cordial, neutral goal and desire to be at peace with others as their goal. Community members who seek competition look to out-perform others. And finally, combative members aim to win over others.

Yahoo! implies that caring members value reputation if it prompts others to consider their advice. Collaborators use it to assess trustworthiness. Cordial members use it to compare their own interests and values with each other. Competitive members

⁵ <http://developer.yahoo.com/ypatterns/social/people/reputation/index.html>

use it to check their performance against each other, and combative types use it to inspire admiration in their peers.

Representation can be as simple as a nominal or numeric title or label. For members motivated by helping others, Yahoo! suggests placing a label that expresses members' unique expertise. For all others, Yahoo! suggests a ranking because it carries comparative information. The difference lies in how revealing or detailed to make the information. A non-numeric ranking based on standard, well-established levels of achievement is proposed for collaborators. A more internal, community-based ranking may work best for cordial members, yet less granular than that for competitive and combative members.

Frary (1995) explains that, "when responders are asked to rate items for which the general level of approval is high," social norms may influence subjects to answer according to what they perceive is valued in society. In the United States, there are undeniable stigmas against extremely aggressive competition but there are also known pressures towards competition overall. Frary suggests that a "strategy for reducing the tendency to mark every item at the same end of the scale is to ask responders to rate both positive and negative stimuli". SDPQ statements are deliberately written to vary randomly in this respect. This is important in order to dispel or reduce support for a bias towards the social norm. The default ranking order that flows from caring to combative in question 4 is reversed in question 1. Order reversal communicates to the respondent that the order is arbitrary, and that the choices do not judge personal preference but rather keep an open mind.

Although Yahoo!'s DP Library leverages iconic visuals to make a point, the SDPQ is text-only, without any visual aids. This will reduce the influence on the subjects. Ultimately, illustration of DPs may be detrimental to the purpose of a DP because they are to be understood as mere patterns, intended to be repurposed and redressed. The intent of this study is not to test the usage of or preference for a particular manifestation of any given DP. The purpose is to test the concept behind DPs and the appropriateness of their solution from the point of view of my subjects. Any illustrations would likely lead to assumptions and confusion. Subjects would link particular manifestations of the DP concepts with the concepts themselves.

Traditionally, a subject's answers are aggregated to arrive at his/her overall measure. SDPQ answers will also be summed to arrive at a single score for each subject. Please refer to Appendix G for a detailed explanation of the scoring.

Procedures

Implicit informed consent was obtained online. The recruitment emails had a link to an information sheet (Appendix D). Once there, the participant was able to click on a link to give consent and proceed to the questionnaire. The participant could also click on a link in the recruitment email to be taken directly to the questionnaire, skipping the information sheet. The respondent was informed that clicking any of these links gives consent and certifies that the respondent is above 18 years of age.

Emails (see Appendix C) containing a hyperlink to the four-part questionnaire were sent out to the prospective subjects. I allowed a few weeks for participants to submit their answers. Since less than 500 subjects responded, a second email was sent as

a reminder. The four parts of the questionnaire were the demographic questionnaire; the Entrepreneurial Attitude Orientation (EAO) scale, that asked subjects questions about their behavior when completing projects and how they manage and feel about accomplishing tasks; the Social Design Preference Questionnaire (SDPQ), that asked subjects to express their preferences for particular social web patterns found in the Yahoo! DP Library; and a fourth part, which asked subjects to submit contact information should they choose to participate in the drawing for monetary compensation.

Qualtrics⁶ software was be used to create the form. Subjects were expected to take about 20 minutes to complete the entire questionnaire. Once data was collected, it was exported from Qualtrics and imported into SPSS.

There were no known risks in answering the online questionnaire. The IP address is normally captured with each response to a Qualtrics questionnaire. In this study, the IP addresses were deleted immediately. The names or email addresses (depending which one the participant chose to provide) of those subjects wanting to participate in the drawing were be stored separately from the data.

The entire study required about one month for data collection. The final report was completed by August, 2010.

Data Analysis

Whereas each Social DP has been validated for a general user base, this study will fragment its pool of subjects using the EAO questionnaire. It will look at how the social DP preferences among the individuals with the strongest entrepreneurial attitudes

⁶ <http://www.qualtrics.com/>.

compare to those preferences among those with the lowest entrepreneurial attitude orientation. In this way, the SDPQ was used to test the appropriateness of differing Social DPs for an entrepreneurial context.

The answers to the EAO scale were aggregated by subscale, generating a score on each subscale for each subject (see Appendix F for calculation details). Similarly, an SDPQ score was calculated for each subject (see Appendix G for calculation details). Using SPSS, Spearman's rho was calculated to examine the relationships between EAO subscales and SDPQ total scores. Particular attention was paid to the possibility that, as EAO sub-scores increased or decreased, DP preferences changed from caring to combative. In further analysis, the four EAO subscale scores were used to divide the subjects into three groups, with high, medium, and low scores on each of the four subscales on entrepreneurial attitudes. The mean SDPQ scores for each segmentation/subscale were compared using analysis of variance (ANOVA).

RESULTS

Participant Characteristics

Of the many people who might have responded to the questionnaire, 216 attempted to complete the study and 144 of them completed it entirely. This gives a completion rate of about 67% (144/216). It is interesting to note that, out of the 72 individuals who did not complete the questionnaire, about 94% reported their age, nearly 99% reported their sex, highest level of education, and UNC student status, and nearly 96% reported their business school status. Therefore, we can compare the demographic characteristics of participants (144) versus non-completers (72).

Participants reported ages ranging from 18 to 63 with an average age of 27.24 and standard deviation of 10.18. Non-completers were similar, having an average age of 26.69, and a standard deviation of 9.64. Eight participants did not report their age. All participants reported their sex. Ninety-nine (69%) reported that they were female and 45 (31%), male. Within non-completers, 49 (68%) reported that they were female and 22 (31%), male.

Respondents were asked about the highest level of education they had completed. Table 2 shows the breakdown of highest achieved education level. Most of the respondents had at least a bachelor's degree.

Table 2: Highest Education Levels Achieved

| Highest Education Level | Those completing the questionnaire | | Those starting but not completing the questionnaire | |
|-------------------------|------------------------------------|------------|---|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Primary school | 1 | 0.7% | 0 | 0.0% |
| Secondary school | 40 | 27.8% | 18 | 25.0% |
| Associates | 2 | 1.4% | 0 | 0.0% |
| Bachelors | 69 | 47.9% | 36 | 50.0% |
| Masters | 27 | 18.8% | 13 | 18.1% |
| PhD | 4 | 2.8% | 4 | 5.6% |
| No response | 1 | 0.7% | 1 | 1.4% |
| TOTAL | 144 | 100.1% | 72 | 100.1% |

In a separate question, respondents were asked whether they were students at UNC. About 65% were enrolled as students at UNC. Five or 6 of these were also business students. Among non-completers, 70% were enrolled as students at UNC and there may have been one business student. This ambiguity is explained and analyzed in the Discussion chapter.

Age, sex, level of education, enrollment at UNC, and enrollment in business school were compared between participants and non-completers. In each case, the null hypothesis was that there is no difference between those who completed the questionnaire and those who didn't. For age, a t-test was used to compare the mean ages for both groups; there was no statistically significant difference ($t = 0.328$, $p = 0.961$). For sex, a contingency table and chi square test was used to test the distribution in both groups; there was no statistically significant difference in the distribution by sex ($\chi^2 = 0.002$, $p = 0.969$). Chi square was used for education level after grouping into three categories rather than six. This was done to avoid low expected frequencies, which makes the chi

square test invalid. Since Primary school, Associates degree, and PhD had very low frequencies, the new categories group primary with secondary school, associates' degrees with bachelors' degrees, and masters' with PhD. There was no statistically significant difference in the distribution by level of educational attainment ($\chi^2 = 0.309, p = 0.857$). Finally, chi square was also used to examine possible differences in enrollment at UNC and in business school. There was no statistically significant difference in either of these distributions ($\chi^2 = 0.569, p = 0.451$, and $\chi^2 = 1.372, p = 0.242$, respectively). From these analyses, we can conclude that the participants and those who did not complete the questionnaire did not differ on any of the demographic characteristics examined.

Results on Entrepreneurial Attitude Orientation (EAO)

Theoretically, subscale scores on the EAO could range from 1 to 10. The participants' mean scores (and standard deviations) for each of the four subscales are shown in Table 3.

Table 3: EAO Scores by Subscale

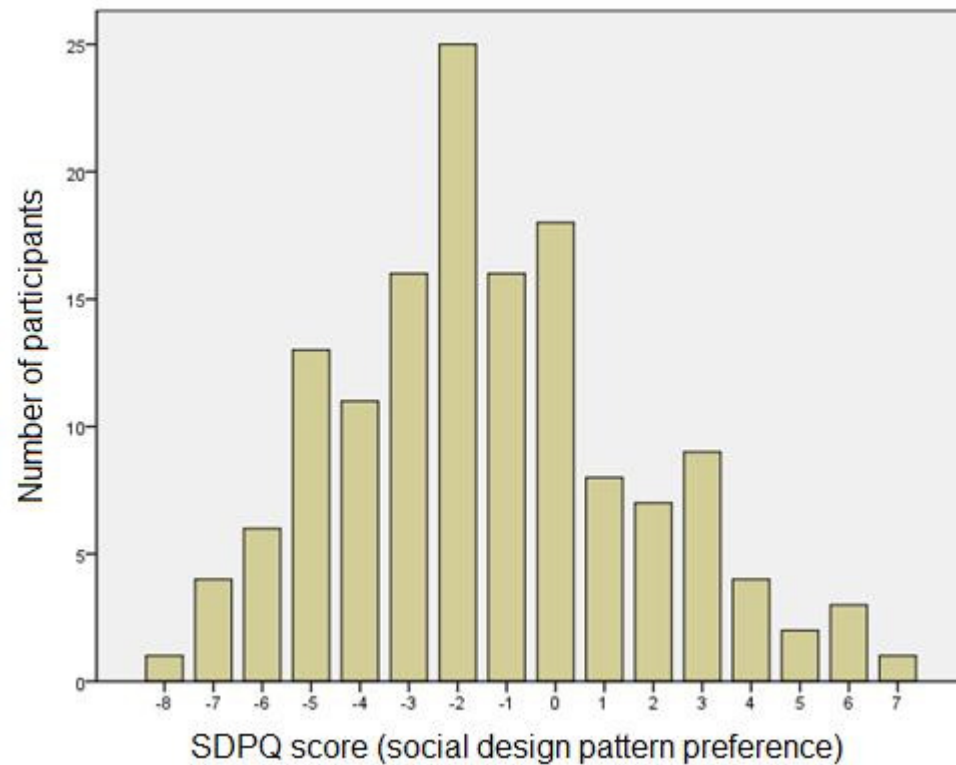
| | Mean | Standard Deviation | Range |
|------------------|------|--------------------|-----------|
| Achievement | 7.55 | 0.87 | 3.82-9.48 |
| Innovation | 6.51 | 0.94 | 3.42-8.65 |
| Personal Control | 6.55 | 1.02 | 2.50-8.83 |
| Self Esteem | 6.03 | 0.73 | 4.50-8.11 |

Results on Design Patterns

An overall score on social design pattern preference ("preference" hereafter) was calculated for each participant. The scores ranged from -8 to 7, with collaborative patterns at the negative end of the scale, and competitive patterns at the positive end of

the scale. The average was -1.35 and standard deviation was 3.09. The distribution can be seen in Figure 2.

Figure 2: SPDQ (preference) Distribution



Relationship between EAO and Social Design Pattern Preferences

Table 4 shows the Spearman correlations derived for each sub-score against preference. None of these correlations were statistically significant.

Table 4: Correlations between EAO Subscales and Design Pattern Preferences

| EAO subscale | Spearman's ρ | P |
|---------------------|-------------------------------------|-----------------------|
| Achievement | -0.052 | 0.538 |
| Innovation | 0.051 | 0.543 |
| Personal control | -0.010 | 0.909 |
| Self esteem | 0.007 | 0.930 |

It is possible that the correlations were not statistically significant because there is a curvilinear relationship between the two variables, rather than a linear relationship that can be detected with correlation. Therefore, further analysis was conducted to investigate

this possibility. Each subscale was divided roughly into thirds at natural cuts where the sub-scores seems to divert quickly to extremely low or high levels. Table 5 shows the cuts between groups for each subscale.

Table 5: Groupings Based on EAO Subscale Scores

| EAO subscale | Low | | Middle | | High | |
|------------------|--------------|-----------------|---------------------|-----------------|--------------|-----------------|
| | Score cutoff | Number in group | Score cutoff | Number in group | Score cutoff | Number in group |
| Achievement | ≤ 7 | 34 | > 7 and < 8 | 63 | ≥ 8 | 47 |
| Innovation | ≤ 6 | 40 | > 6 and < 7 | 56 | ≥ 7 | 48 |
| Personal Control | ≤ 6 | 42 | > 6 and < 7 | 59 | ≥ 7 | 43 |
| Self Esteem | ≤ 5.5 | 38 | > 5.5 and < 6.5 | 69 | ≥ 6.5 | 37 |

The mean and standard deviation were calculated for the preference scores corresponding to each group. Table 6 shows these results. The differences in preference scores were not statistically significantly different for any of the EAO subscales.

Table 6: Preference Scores for Each EAO Subscale Grouping

| | Mean Preference Score | Standard Deviation of Preference Scores | ANOVA Results |
|-------------------------------|--------------------------|--|------------------------|
| EAO Achievement subscale | | | $F = 0.271, p = 0.763$ |
| Low | -1.00 | 2.759 | |
| Medium | -1.44 | 2.826 | |
| High | -1.48 | 3.593 | |
| EAO Innovation subscale | | | $F = 0.271, p = 0.763$ |
| Low | -1.62 | 2.670 | |
| Medium | -1.29 | 3.251 | |
| High | -1.24 | 3.222 | |
| EAO Personal Control subscale | | | $F = 0.189, p = 0.828$ |
| Low | -0.98 | 2.926 | |
| Medium | -1.90 | 2.759 | |
| High | -0.98 | 3.582 | |
| EAO Self Esteem subscale | | | $F = 0.074, p = 0.928$ |
| Low | -1.33 | 3.319 | |
| Medium | -1.27 | 2.959 | |
| High | -1.51 | 3.128 | |

DISCUSSION

Many respondents abandoned the questionnaire and it is not clear why. The good news is that demographic characteristics are similar between participants and non-completers. Age, sex, and education level were similar among participants and non-respondents. However, the reasons for aborting the survey may lie in some other characteristic. For instance, non-completers may have been less entrepreneurial. Upon discovering the focus of the survey, they may have lost interest or surmised that the study was not intended to include them and aborted the survey. Thus, while it is clear that the sample was not biased in terms of demographic characteristics, it may be biased in other ways.

The sample was relatively young and female, with only 1/3 of the sample above 37 years of age and 1/3 being male. As many of the participants were UNC students, this is not surprising, since the UNC undergraduate student population is primarily of traditional college age and the majority of the students are female.⁷

The sample is highly educated, as nearly 2/3 have at least a bachelor's degree. This group includes 39 participants 21 years of age and older that also reported being enrolled at UNC – presumably graduate students. However, one participant must have

⁷ Based on data from Fall 2009, 94% of the UNC-Chapel Hill undergraduate students were between 18 and 24 years old; 59% of the undergraduate student population was female (<http://www.northcarolina.edu/web/facts.php>).

misunderstood the question as he/she reported to have completed primary school, yet also claimed to be enrolled at UNC.

The questionnaire asked only UNC students to report whether they were also business students. Five UNC students did so; however, one non-UNC student reported being a business student as well. This error happened with one subject in the non-completer group as well. These two participants were either business students at another university or made some logical mistake when answering these enrollment questions. They were counted as business students because it seems more likely that they overlooked an “if yes” logical clause, than that they reported being business students when they were not.

With a mean of -1.35, preference is off-center toward the lower end on the scale. This means that the participant pool, as a whole, prefers caring and collaborative over competitive or combative social design patterns.

The primary goal of this study was to examine the relationship between entrepreneurial attitude orientation and social design pattern preferences. Specifically, the relationship between the four subscale scores on the EAO and SDPQ scores were evaluated. There was no significant relationship between EAO and SDPQ. The case for the Personal Control subscale is worth mentioning for its unique, symmetrical and quite pronounced U-shape. Further research should investigate if low and high desire for personal control lead to higher preference for numeric and granular displays of performance.

H1 stated that social design pattern preferences would differ between those with different levels of entrepreneurial attitude orientation. No evidence was found to support this hypothesis.

H2 stated that high EAO scores would correlate positively with preference for competitive social design patterns. Since the correlations are not significant, this hypothesis cannot be supported either

The results were surprising to me, although many studies fail to find relationships between personality and attitudes toward technology. It would have been beneficial to seek a larger number of real entrepreneurs to compare to the sample represented in this study. It may have also helped to have a controlled environment for subjects rather than have them answer questions at their leisure and whereabouts.

Limitations

Among the range of styles employed to collect information from subjects, from conversational to highly-structured rating scales, this study uses the latter because its prevalence online is broad and its relative efficiency of statistical analysis over content analysis. However, the limitations of questionnaires are well known. Relative to other methods, questionnaire data quality is less complete and accurate, response rates are usually poor, and responders are less motivated. Because questionnaires depend more on writing than talking, simplicity on behalf of the questionnaire, and literacy on behalf of the participant are more critical. Misconceptions are more difficult to resolve, wording is more influential on the answers. Participant honesty is unverifiable and participants are more wary of the proper usage of the data. If not crafted properly, questions can be

ambiguous. However, the use of a validated and reliable scale in this study should have ameliorated this limitation. While the SPDQ was newly-developed for this study, it was quick and hopefully entertaining.

The SDPQ had its own limitations. It was neither not tested for reliability nor validity. It has never been used before, and could suffer from many mistakes and problems.

Finally, selecting a convenience sample meant that the sample studied may be quite unlike the population targeted by marketers or social network web designers. Because of this sampling method, the merits of this study are purely exploratory.

CONCLUSION

It is important to investigate the possibility that people with particular cognitive or personality characteristics prefer particular design patterns, because the results of such studies can give developers an idea about what interface design patterns are preferred by a particular segment of the population before these developers spend as many resources as they do today in designing an interface. Should UNC deploy a social networking site, I would advise that they employ rather collaborative social design patterns, given the results of this study. The respondents were predominantly UNC students and their overall mean SDPQ score tended toward the more collaborative design patterns.

The results also imply that individuals who show highly entrepreneurial attitudes do not have a predictable preference for online collaboration or competition, as was expected. No statistically significant relationship was discovered between entrepreneurial attitude orientation and social design pattern preferences.

Design of a social network for highly entrepreneurial types may require detailed customization. There seem to be many classes of entrepreneurial types – those who possess rather collaborative motivations and those that feel motivated by competitive opportunities. This poses a problem for designers should they rely on anonymous data (data sans email or IP addresses). Of course, should their data be disambiguated, designers could target particular entrepreneurial individuals, based on their individual preferences.

What we do not know is how important this preference is to these entrepreneurial individuals. Some who prefer collaborative social networks may outright reject a social network that encourages competition. Others who possess the same preference may accept it, adapt to it, or even learn to like and thrive in it. But it's not clear whether those who prefer competition are more likely to adapt to collaboration or vice versa.

Facebook, LinkedIn, and other such networks have seen their growth act as a driver itself, as members pull their friends in. Those who resist joining these networks despite peer pressure may be especially stoic, sacrificing the benefits of online social networking for personal reasons. Each one of us may have our own individual threshold when we decide to join a network. What does it take for each one of us to give up privacy for social cohesion? Similarly, entrepreneurial individuals may have a threshold of their own. Each one of them may tolerate a different level of competition or collaboration with others. Other factors may also moderate this tolerance, such as the number of social networks in the market. Research should be undertaken to find this characteristic among individuals. If I would have the opportunity to do a follow-up study, I would eliminate the EAO and focus on the SPDQ and enhance it. I would make sure the SDPQ captures the degrees to which each design pattern is preferred over another. I would also inquire about past behavior regarding social network use and registration. Such information would let me know whether individual opinions about social design patterns or peer membership affects individuals' choices. Research of this sort would allow us determine whether web designers should focus on psychological individual differences or technological individual differences like being an early adopter and network individual differences like peer influence. Psychological individual

differences may only be interesting among members of a sample of highly influential early adopters so that web designers not only know who to target but what technology these individuals will be more likely to adopt and subsequently disseminate.

REFERENCES

- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago, IL: Dorsey Press.
- Anderson, C. (c2008). *The long tail : Why the future of business is selling less of more*. New York: Hyperion.
- Anderson, J., McRee, J., Wilson, R., (2010) *Effective UI: The Art of Building Great User Experience in Software*. Sebastopol :: O'Reilly Media, Inc., 2010
- Basadur, M., & Hausdorf, P. A. (1996). Measuring divergent thinking attitudes related to creative problem solving and innovation management. *Creativity Research Journal*, 9, 21-32.
- Brinkman, W., & Fine, N. (2005). Towards customized emotional design: An explorative study of user personality and user interface skin preferences. *ACM International Conference Proceeding Series*. Chania, Greece, 132, 107-114.
- Burke, R. (2002). Hybrid recommender systems: Survey and experiments. *User Modeling and User-Adapted Interaction*, 12(4),331–370. Caporusso, N. (2009). Personality-aware interfaces for learning applications. *ACM SIGUCCS Fall Conference on User Services Conference*. New York, NY, 189-196.
- Costabile, M. F., Piccinno, A., Fogli, D., & Marcante, A. (2006). Supporting interaction and co-evolution of users and systems. *Working Conference on Advanced Visual interface*. Venezia, Italy, 143-150.
- Cropley, A. (2000). Defining and Measuring Creativity: Are Creativity Tests Worth Using? *Roeper Review*, 23(2), 72.

- Crumlish, C., & Malone, E. (c2009). *Designing social interfaces : [principles, patterns, and practices for improving the user experience]*. Beijing ;; O'Reilly Media.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Dillman, D.A. (1978). *Mail and telephone surveys: The Total Design Method*. New York: Wiley.
- Ford, N., Miller, D., & Moss, N., (2005). Web search strategies and human individual differences: Cognitive and demographic factors, Internet attitudes, and approaches. *Journal of the American Society for Information Science and Technology*, 56(7), 741-756.
- Frery RB. A brief guide to questionnaire development. Available at:
<http://ericae.net/ft/tamu/vpiques3.htm>. Accessed December 2009.
- Gamma, E. (c1995). *Design patterns : Elements of reusable object-oriented software*. Reading, Mass.: Addison-Wesley.
- Gonzalez, G., de la Rosa, J.L., & Montaner, M. (2007). Embedding Emotional Context in Recommender Systems. *The 20th International Florida Artificial Intelligence Research Society Conference*. Key West, Florida.
- Hewett, T., Baecker, R., Card, S., Gasen, J., Mantei, M., Perlman, G., Strong, G., Verplank, W.:
 ACM SIGCHI, Curricula for Human-computer Interaction. Report of the ACM SIGCHI Curriculum Development Group, ACM (1992)

- Ho, S.Y., Davern, M., and Tam, K. Y. (2008) Personalization and choice behavior: The role of personality traits. *Date Base for Advances in Information Systems*, 39(4), 31-47.
- Huefner, J., Hunt H. K., & Robinson P.B. (1996). A comparison of four scales predicting entrepreneurship. *Academy of Entrepreneurship Journal*, 1(2), 56-80.
- Karsvall, A. (2002). Personality preferences in graphical interface design. *The Second Nordic Conference on Human-Computer Interaction*. Aarhus, Denmark, 19-23.
- Liang, T., Chen, H., & Turban, E. (2009). Effect of personalization on the perceived usefulness of online customer services: A dual-core theory. *The 11th international Conference on Electronic Commerce*. Taipei, Taiwan, 279-288.
- Massey A.P., Khatrim V., & Montoya-Weiss, M.M., (2008). Online Services, Customer Characteristics and Usability Requirements," *Hawaii International Conference on System Sciences*. Big Island, Hawaii, 33.
- Nunes, M. A., Cerri, S. A., & Blanc, N. (2008). Towards user psychological profile. *The VIII Brazilian Symposium on Human Factors in Computing Systems*. Porto Alegre, Brazil, 378, 196-203.
- Peterson, R A. (c2000). *Constructing effective questionnaires*. Thousand Oaks, Calif.: Sage Publications.
- Resnick, R. (1997). Recommender systems. *Communications of the ACM*, 40(3), 56–58.
- Robinson, P., Stimpson, D., Huefner, J., & Hunt, H. (1991). An attitude approach to the prediction of entrepreneurship. *Entrepreneurship: Theory & Practice*, 15(4), 13-31.

- Smith, S.L. and Mosier, J.N. Guidelines for Designing User Interface Software. Report MTR.10090, The MITRE Corp, Bedford, MA, August 1986.
- Sohl, J. (2008). *The Angel Investor Market in 2008: A Down Year In Investment Dollars But Not In Deals*, Retrieved from <http://www.innovationamerica.us/index.php/publications-and-presentations/published-reports/75-the-angel-investor-market-in-2008-a-down-year-in-investment-dollars-but-not-in-deals>
- Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*, 30(3), 679-704.
- Terveen, L. & McDonald, D.W. (2005). Social matching: A framework and research agenda. *ACM Transactions on Computer-Human Interaction*, 12(3), 401–434.
- Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11(4), 342.
- Weinberg, J. B. & Stephen, M. L. (2002). Participatory design in a human-computer interaction course: Teaching ethnography methods to computer scientists. *The 33rd SIGCSE Technical Symposium on Computer Science Education*. Cincinnati, Kentucky, 237-241.
- Wildemuth, B M. (2009). *Applications of social research methods to questions in information and library science*. Westport, Conn.: Libraries Unlimited.

APPENDICES

Appendix A: Yahoo! Social Design Patterns

This table is taken directly from the Yahoo! Design Pattern Library, part of the Yahoo!






Developer's Network at

<http://developer.yahoo.com/ypatterns/social/people/reputation/competitive.html>. It was

borrowed and adapted from Christian Crumlish and Erin Malone in "Designing Social

Interfaces: Principles, Patterns, and Practices for Improving the User Experience" (see

References).

| Caring | Collaborative | Cordial | Competitive | Combative |
|---|--|--|---|---|
|  |  |  |  |  |
| Goals | | | | |
| Members are motivated by <i>helping</i> other members - giving advice, solace or comfort. | Member goals are largely <i>shared</i> ones. Members work together to achieve those goals. | Members have their own intrinsic motivations, but these goals need not conflict with other members' goals. | Members share the same goals, but must compete against each other to achieve them. | Members share opposing goals: in order for one member to achieve these goals, others must necessarily be <i>denied</i> their own. |
| Use Reputation to... | | | | |
| Identify senior community members of good standing, so that others can find them for advice and guidance. | Identify community members with a proven track-record of being trustworthy partners. | Show a member's history of <i>participation</i> , that others may get a <i>general</i> sense for their interests, identity and values. | Show a member's level of <i>accomplishment</i> , that others may acknowledge (and admire) their level of performance. | Show a member's history of accomplishments, including other members' victories and defeats against them. Reputation is used to establish bragging rights. |

Represent Reputation with...

Accept volunteers (of good standing) from the community to wear an [Identifying Label](#): 'Helpful' or 'Forum Leader'. New members can trust these folks to help initiate them into the community.

Use [Named Levels](#) to communicate members' history and standing: members with higher ranks should be trusted more easily than newbies.

Consider Statistical Evidence to highlight a members' contributions: just show the facts and let the community decide their worth. Optionally, [Top X](#) designations can highlight members with numerous valued contributions.

Allow easy comparisons between members with [Numbered Levels](#). Provide mini-motivations by awarding [Collectible Achievements](#).

Let a member track her own progress by assigning [Point Values](#) to different actions. [Rank](#) members against each other, displaying winners and losers.

Example Communities

- [Y! Health Expert Blogs](#)
- [Wikipedia](#)
- [Yahoo! Answers](#)
- [Y! Fantasy Sports](#)
- [Xbox Live](#)
- [Yelp](#)
- [Slashdot](#)
- [Ebay](#)

Appendix B: Entrepreneurial Attitude Orientation (EAO) Scale
with subscales and attitude components identified

Instructions: Indicate how much you agree with each of the following statements by circling a number between "1" and "10" where "1" indicates that you strongly disagree with the statement and "10" indicates you strongly agree with the statement. A "5" indicates you only slightly disagree and a "6" shows only slight agreement. Work as quickly as you can, don't stop to think too deeply about any one question, but mark down your first thought. Please answer all of the questions.

| | Statement | Subscale |
|------|---|----------------------------|
| 1 | I get my biggest thrills when my work is among the best there is. | achievement—affect |
| 2 | I seldom follow instructions unless the task I am working on is too complex, | innovation—behavior |
| 3 | I never put important matters off until a more convenient time, | achievement—behavior |
| 4 | I have always worked hard in order to be among the best in my field, | personal control—behavior |
| *5 | I feel like a total failure when my business plans don't turn out the way I think they should, | self-esteem—affect |
| 6 | I feel very energetic working with innovative colleagues in a dynamic business climate, | innovation—affect |
| 7 | I believe that concrete results are necessary in order to judge business success, | achievement—cognition |
| 8 | I create the business opportunities I take advantage of. | personal control—behavior |
| 9 | I spend a considerable amount of time making any organization I belong to function better, | achievement—behavior |
| 10 | I know that social and economic conditions will not effect my success in business, | personal control—cognition |
| 11 | I believe it is important to analyze your own weaknesses in business dealings, | achievement—cognition |
| 12 | I usually perform very well on my part of any business project I am involved with, | self-esteem—behavior |
| 13 | I get excited when I am able to approach tasks in unusual ways, | innovation—affect |
| *14 | I feel very self-conscious when making business proposals, | self-esteem—affect |
| 15 | I believe that in the business world the work of competent people will always be recognized, | personal control—cognition |
| 16 | I believe successful people handle themselves well at business gatherings, | self-esteem—cognition |
| 17 | I enjoy being able to use old business concepts in new ways, | innovation—affect |
| * 18 | I seem to spend a lot of time looking for someone who can tell me how to solve all my business problems, | self-esteem—behavior |
| 19 | I feel terribly restricted being tied down to tightly organized business activities, even when I am in control, | innovation—affect |
| 20 | I often sacrifice personal comfort in order to take advantage of | achievement—behavior |

| | Statement | Subscale |
|-----|--|--------------------------------|
| | business opportunities, | |
| *21 | I feel self-conscious when I am with very successful business people, | self-esteem—affect |
| 22 | I believe that to succeed in business it is important to get along with the people you work with, | self-esteem—cognition |
| 23 | I do every job as thoroughly as possible, | achievement—behavior |
| 24 | To be successful I believe it is important to use your time wisely, | achievement—cognition |
| 25 | I believe that the authority I have in business is due mainly to my expertise in certain areas, | self-esteem—cognition |
| 26 | I believe that to be successful a businessman must spend time planning the future of his business, | achievement—cognition |
| 27 | I make a conscientious effort to get the most out of my business resources, | achievement—behavior |
| *28 | I feel uncomfortable when I'm unsure of what my business associates think of me. | self-esteem—affect |
| *29 | I often put on a show to impress the people I work with, | self-esteem—behavior |
| 30 | I believe that one key to success in business is to not procrastinate, | achievement—cognition |
| 31 | I get a sense of pride when I do a good job on my business projects, | achievement—affect |
| 32 | I believe that organizations which don't experience radical changes now and then tend to get stuck in a rut. | innovation—cognition |
| *33 | I feel inferior to most people I work with, | self-esteem—affect |
| 34 | I think that to succeed in business these days you must eliminate inefficiencies, | achievement—cognition |
| 35 | I feel proud when I look at the results I have achieved in my business activities, | achievement—affect |
| 36 | I feel resentful when I get bossed around at work, | personal control— affect |
| *37 | Even though I spend some time trying to influence business events around me every day, I have had very little success, | personal control— behavior |
| *38 | I feel best about my work when I know I have followed accepted procedures, | innovation—behavior |
| 39 | Most of my time is spent working on several business ideas at the same time, | innovation—behavior |
| 40 | I believe it is more important to think about future possibilities than past accomplishments. | achievement—cognition |
| 41 | I believe that in order to succeed, one must conform to accepted business practices, | innovation—cognition |
| 42 | I believe that any organization can become more effective by employing competent people, | personal control— cognition |
| 43 | I usually delegate routine tasks after only a short period of time, | innovation—behavior |

| | Statement | Subscale |
|-----|--|-------------------------------|
| 44 | I will spend a considerable amount of time analyzing my future business needs before I allocate any resources, | achievement—behavior |
| 45 | I feel very good because I am ultimately responsible for my own business success, | personal control— affect |
| 46 | I believe that to become successful in business you must spend some time every day developing new opportunities, | innovation—cognition |
| 47 | I get excited creating my own business opportunities, | personal control— affect |
| 48 | I make it a point to do something significant and meaningful at work every day. | achievement—behavior |
| 49 | I usually take control in unstructured situations, | innovation—behavior |
| *50 | I never persist very long on a difficult job before giving up. | self-esteem—behavior |
| 51 | I spend a lot of time planning my business activities, | personal control— behavior |
| 52 | I believe that to arrive at a good solution to a business problem, it is important to question the assumptions made in defining the problem, | innovation—cognition |
| 53 | I often feel badly about the quality of work I do. | self-esteem—affect |
| 54 | I believe it is important to continually look for new ways to do things in business, | innovation—cognition |
| 55 | I believe it is important to make a good first impression, | self-esteem—cognition |
| 56 | I believe that when pursuing business goals or objectives, the final result is far more important than following the accepted procedures, | innovation—cognition |
| 57 | I feel depressed when I don't accomplish any meaningful work, | achievement—affect |
| 58 | I often approach business tasks in unique ways, | innovation—behavior |
| 59 | I believe the most important thing in selecting business associates is their competency, | achievement— cognition |
| 60 | I take an active part in community affairs so that I can influence events that affect my business, | personal control— behavior |
| 61 | I feel good when I have worked hard to improve my business, | achievement—affect |
| 62 | I enjoy finding good solutions for problems that nobody has looked at yet. | innovation—affect |
| 63 | I believe that to be successful a company must use business practices that may seem unusual at first glance, | innovation—cognition |
| 64 | My knack for dealing with people has enabled me to create many of my business opportunities, | personal control— behavior |
| 65 | I get a sense of accomplishment from the pursuit of my business opportunities, | achievement—affect |
| *66 | I believe that currently accepted regulations were established for a good reason, | innovation—cognition |
| 67 | I always feel good when I make the organizations I belong to function better, | achievement—affect |

| | Statement | Subscale |
|-----|---|----------------------|
| 68 | I get real excited when I think of new ideas to stimulate my business, | innovation—affect |
| 69 | I believe it is important to approach business opportunities in unique ways, | innovation—cognition |
| 70 | I always try to make friends with people who may be useful in my business, | achievement—behavior |
| 71 | I usually seek out colleagues who are excited about exploring new ways of doing things, | innovation—behavior |
| 72 | I enjoy being the catalyst for change in business affairs, | innovation—affect |
| *73 | I always follow accepted business practices in the dealings I have with others. | innovation—behavior |
| *74 | I rarely question the value of established procedures, | innovation—behavior |
| 75 | I get a thrill out of doing new, unusual things in my business affairs, | innovation—affect |

Appendix C: Email Invitations

Recruitment Email to Non-business Students

Subject: The Social Web and You – a study

To: {UNC mass email}

From: david.iberkleid@unc.edu

Dear Student,

The web is good for searching and collecting information. However, many people want to do more, like start projects and collaborate with others online. Designing the web to help people work together is challenging and expensive. My research at UNC aims to help.

You've been contacted to participate in my new research study. Participation is easy. There will be about 80 easy-to-rate statements. You should be done in about 20 minutes and you can enter a random drawing *at the end of the study* to win \$50. Chance of winning is roughly 1 in 130.

There are several benefits, should you choose to participate.

- 1) Play “designer” for an imaginary social networking website
- 2) Help science move forward
- 3) Express your opinion
- 4) Help a student complete his Masters degree
- 5) Spice up your day!

By clicking [here](#), I certify that I am over 18 years old, and agree to be a participant in this research study.

If you'd like to know more about the study before deciding whether to participate, click [here](#). You can also address questions to me or to my advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu. All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. If you contact the IRB, please reference study number 10-0482.

If you wish to participate at a later time, kindly respond within a week or before April 4th at the latest. In the meantime, please invite others to participate by simply sending this email to them.

Best,

David Iberkleid

M.S. Information Science candidate

UNC Chapel Hill

Recruitment Email to Students at Kenan-Flagler

Subject: Entrepreneurs and The Social Web – a study

To: {UNC mass email}

From: david.iberkleid@unc.edu

Dear Student,

The web is good for searching and collecting information. However, many people want to do more, like start projects and collaborate with others online. Designing the web to help people work together is challenging and expensive. My research at UNC aims to help.

You've been contacted to participate in my new research study. Participation is easy. There will be about 80 easy-to-rate statements. You should be done in about 20 minutes and you can enter a random drawing *at the end of the study* to win \$50. Chance of winning is roughly 1 in 130.

There are several benefits, should you choose to participate.

- 1) Play “designer” for an imaginary social networking website
- 2) Help science move forward
- 3) Express your opinion
- 4) Help a student complete his Masters degree
- 5) Spice up your day!

*Chance of winning is roughly 1 in 130.

By clicking [here](#), I certify that I am over 18 years old, and agree to be a participant in this research study.

If you'd like to know more about the study before deciding whether to participate, click [here](#). You can also address questions to me or to my advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu. All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. If you contact the IRB, please reference study number 10-0482.

If you wish to participate at a later time, kindly respond within a week or before April 4th at the latest. In the meantime, please invite others to participate by simply sending this email to them.

Best,

David Iberkleid

M.S. Information Science candidate

UNC Chapel Hill

Recruitment Email to faculty at Kenan-Flagler

Subject: Please mention in class: The Social Web and Us – a study

To: {UNC mass email}

From: david.iberkleid@unc.edu

Dear UNC Professor,

The web is good for searching and collecting information. However, many people want to do more, like start projects and collaborate with others online. Designing the web to help people work together is challenging and expensive. My research at UNC aims to help.

Some students that opt-in to receive mass email at UNC have received an email asking them to participate. However, you have been contacted because I am looking for a diverse pool of applicants. In particular, I seek students interested in entrepreneurship. As a professor at UNC, you can encourage your students to participate in my study.

If you wish to encourage your students to participate, kindly mention this research study in class and forward this email to them. You can also invite others outside the UNC to participate by simply sending this email to them.

Participation is easy. There will be about 80 easy-to-rate statements. The student should be done in about 20 minutes and they can enter a random drawing *at the end of the study* to win \$50. Chance of winning is roughly 1 in 130. The window for responding is open from now until April 4th at the latest.

There are several benefits, should you choose to participate.

- 1) Play “designer” for an imaginary social networking website
- 2) Help science move forward
- 3) Express your opinion
- 4) Help a student complete his Masters degree
- 5) Spice up your day!

By clicking [here](#), I certify that I am over 18 years old, and agree to be a participant in this research study.

If you or your students have any questions about the study, please ask me or my advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu. All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. If you contact the IRB, please reference study number 10-0482.

Best,

David Iberkleid

M.S. Information Science candidate

UNC Chapel Hill

Recruitment Email to Professionals

Subject: Entrepreneurs and The Social Web – a study

Bcc: {from my contacts and forwarded thereon}

From: david.iberkleid@unc.edu

Dear Friend,

The web is good for searching and collecting information. However, many people want to do more, like start projects and collaborate with others online. Designing the web to help people work together is challenging and expensive. My research at UNC aims to help.

You've been contacted to participate in my new research study because you possess entrepreneurial motivations. Participation is easy. There will be about 80 easy-to-rate statements. You should be done in about 20 minutes and you can enter a random drawing *at the end of the study* to win \$50. Chance of winning is roughly 1 in 130.

There are several benefits, should you choose to participate.

- 1) Play “designer” for an imaginary social networking website
- 2) Through the questions, reflect upon entrepreneurial traits
- 3) Help science move forward
- 4) Express your opinion
- 5) Help a student complete his Masters degree
- 6) Spice up your day!

By clicking [here](#), I certify that I am over 18 years old, and agree to be a participant in this research study.

If you'd like to know more about the study before deciding whether to participate, click [here](#). You can also address questions to me or to my advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu. All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. If you contact the IRB, please reference study number 10-0482.

If you wish to participate at a later time, kindly respond within a week or before April 4th at the latest. In the meantime, please invite others entrepreneurial acquaintances to participate by simply forwarding this email to them.

Best,

David Iberkleid

M.S. Information Science candidate

UNC Chapel Hill

Follow-up Email to Drawing Winners

Subject: Disbursement for UNC Study Participation
Bcc: {winners' emails}
From: david.iberkleid@unc.edu

Dear Participant,

A couple weeks ago you participated in my study. Thank you! As I promised, you were entered in a drawing to win one of three monetary prizes. You won! Please reply to this email with an address where I can send the bank certified check.

Best,
David Iberkleid
M.S. Information Science candidate
UNC Chapel Hill

Follow-up Call to Drawing Winners

Hi,

A couple weeks ago you participated in my study. Thank you for your participation. As I promised, you were entered in a drawing to win one of three monetary prizes. You won. Can you please provide an address where I can send the bank certified check?

...

Thank you.

It should arrive in the next few days.

Goodbye.

Appendix D: Consent Form



Entrepreneurial Individuals and the Social Web
More Information

The purpose of this study is to examine the relationships between entrepreneurial orientation and attitudes toward particular human-computer interface designs.

Your participation in this study is completely voluntary. Completion of the questionnaire should take no longer than 20 minutes. Your participation is anonymous. All data obtained in this study will be separated from your name and phone number (which you only need to provide if you want to participate in the drawing). No individual can be or will be identified. The only person who will have access to these data is the principal investigator, David Iberkleid.

If you have received this email directly, I'll be sending you a reminder email approximately 1 week after you receive this email.

There are no risks anticipated, should you participate in this study. You may skip any question for any reason, without penalty. However, there will be scientific benefit from this study. The results will help us understand how web applications might be designed to better serve the needs of entrepreneurs.

There is no cost to you except your time. However, you will be given a chance (approximately 1 in 130) to win one of four \$50 prizes.

You may contact me with any questions at (646) 270-4344 or by email (david.iberkleid@unc.edu), or you may contact my advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu.

All research on human volunteers is reviewed by a UNC-CH committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Thank you for considering participation in this study. I hope that we can share the results of the study with the greater scientific community and use your response to help shape recommendations for improving web design.

By clicking [here](#), I certify that I am over 18 years old, and agree to be a participant in this research study.

Sincerely,

David Iberkleid
MSIS candidate
UNC Chapel Hill

Appendix E: Survey Questions⁸

[PART I]

Thank you and welcome to my study.

Your participation will provide insight into the practice of web design. In particular, the purpose of this study is to discover the relationship between people's individual characteristics and their preference for online collaboration style, and use of reputation.

Please provide the following information below:

| | |
|-------------------------------------|--|
| Age | [open input] |
| Sex | [radio button for male, radio button for female] |
| Highest education level completed | [radio button for each: primary school, secondary school, associates, bachelors, masters, PhD or professional] |
| Are you currently a student at UNC? | [radio button for yes, radio button for no] |
| If yes, are you a business student? | [radio button for yes, radio button for no] |

[PART II]

Instructions: Indicate how much you agree with each of the following statements by selecting a number between "1" and "10" where "1" indicates that you strongly disagree with the statement and "10" indicates you strongly agree with the statement. A "5" indicates you only slightly disagree and a "6" shows only slight agreement. Work as quickly as you can; don't stop to think too deeply about any one question, but mark down your first thought. Please answer all of the questions.⁹

- I get my biggest thrills when my work is among the best there is.
- I seldom follow instructions unless the task I am working on is too complex.
- I never put important matters off until a more convenient time.

⁸ The font used in the actual Qualtrics survey was 12 pt. Verdana. Questions were spread throughout several screens in order to avoid scrolling. Participants could skip forward and backwards. A progress bar was placed on the bottom of each page.

⁹ Note, the format will be "statement" juxtaposed with a series of 10 numbered radio buttons. Numbers 1, 5, 6, and 10 will be also labeled "strongly disagree", "slightly disagree", "slightly agree", and "strongly agree", respectively.

- I have always worked hard in order to be among the best in my field.
- I feel like a total failure when my business plans don't turn out the way I think they should.
- I feel very energetic working with innovative colleagues in a dynamic business climate.
- I believe that concrete results are necessary in order to judge business success.
- I create the business opportunities I take advantage of.
- I spend a considerable amount of time making any organization I belong to function better.
- I know that social and economic conditions will not effect my success in business.
- I believe it is important to analyze your own weaknesses in business dealings.
- I usually perform very well on my part of any business project I am involved with.
- I get excited when I am able to approach tasks in unusual ways.
- I feel very self-conscious when making business proposals.
- I believe that in the business world the work of competent people will always be recognized.
- I believe successful people handle themselves well at business gatherings.
- I enjoy being able to use old business concepts in new ways.
- I seem to spend a lot of time looking for someone who can tell me how to solve all my business problems.
- I feel terribly restricted being tied down to tightly organized business activities, even when I am in control.
- I often sacrifice personal comfort in order to take advantage of business opportunities.
- I feel self-conscious when I am with very successful business people.
- I believe that to succeed in business it is important to get along with the people you work with.
- I do every job as thoroughly as possible.
- To be successful I believe it is important to use your time wisely.
- I believe that the authority I have in business is due mainly to my expertise in certain areas.
- I believe that to be successful a businessman must spend time planning the future of his business.
- I make a conscientious effort to get the most out of my business resources.
- I feel uncomfortable when I'm unsure of what my business associates think of me.
- I often put on a show to impress the people I work with.
- I believe that one key to success in business is to not procrastinate.
- I get a sense of pride when I do a good job on my business projects.
- I believe that organizations which don't experience radical changes now and then tend to get stuck in a rut.
- I feel inferior to most people I work with.
- I think that to succeed in business these days you must eliminate inefficiencies.
- I feel proud when I look at the results I have achieved in my business activities.
- I feel resentful when I get bossed around at work.

- Even though I spend some time trying to influence business events around me every day, I have had very little success.
- I feel best about my work when I know I have followed accepted procedures.
- Most of my time is spent working on several business ideas at the same time.
- I believe it is more important to think about future possibilities than past accomplishments.
- I believe that in order to succeed, one must conform to accepted business practices.
- I believe that any organization can become more effective by employing competent people.
- I usually delegate routine tasks after only a short period of time.
- I will spend a considerable amount of time analyzing my future business needs before I allocate any resources.
- I feel very good because I am ultimately responsible for my own business success.
- I believe that to become successful in business you must spend some time every day developing new opportunities.
- I get excited creating my own business opportunities.
- I make it a point to do something significant and meaningful at work every day.
- I usually take control in unstructured situations.
- I never persist very long on a difficult job before giving up.
- I spend a lot of time planning my business activities.
- I believe that to arrive at a good solution to a business problem, it is important to question the assumptions made in defining the problem.
- I often feel badly about the quality of work I do.
- I believe it is important to continually look for new ways to do things in business.
- I believe it is important to make a good first impression.
- I believe that when pursuing business goals or objectives, the final result is far more important than following the accepted procedures.
- I feel depressed when I don't accomplish any meaningful work.
- I often approach business tasks in unique ways.
- I believe the most important thing in selecting business associates is their competency.
- I take an active part in community affairs so that I can influence events that affect my business.
- I feel good when I have worked hard to improve my business.
- I enjoy finding good solutions for problems that nobody has looked at yet.
- I believe that to be successful a company must use business practices that may seem unusual at first glance.
- My knack for dealing with people has enabled me to create many of my business opportunities.
- I get a sense of accomplishment from the pursuit of my business opportunities.
- I believe that currently accepted regulations were established for a good reason.
- I always feel good when I make the organizations I belong to function better.
- I get real excited when I think of new ideas to stimulate my business.
- I believe it is important to approach business opportunities in unique ways.

- I always try to make friends with people who may be useful in my business.
- I usually seek out colleagues who are excited about exploring new ways of doing things.
- I enjoy being the catalyst for change in business affairs.
- I always follow accepted business practices in the dealings I have with others.
- I rarely question the value of established procedures.
- I get a thrill out of doing new, unusual things in my business affairs.

[PART III]

Design an online social network!

In this exercise, you'll decide how a new online social networking website will work. This social network is intended to help you launch projects successfully. For each problem, please respond as directed, either ranking the solutions that would fit best with you, or selecting the best choice for you.

1. What should members' motivations be in this new online social networking website? (Please rank your top three choices, 1 being most preferred)

- To compete head-to-head against each others in order to achieve *opposing* goals. (For one member to achieve his/her goals, others may necessarily be denied their own.)
- To compete shoulder-to-shoulder against each other in order to achieve *similar*, yet not mutually exclusive goals. (Many members can achieve the same goals.)
- To pursue *individual* goals that need not conflict with other members' goals.
- To work together to achieve shared goals.
- To help other members – giving advice, solace, or comfort.

2. As time passes, members' reputations will reflect their contributions and actions in the online community. Reputations are usually designated through a mix of nominations and calculations. Choose the one that you think should be more important.

- Nomination. Community members should nominate other members of good standing to wear an identifying label such as "Helpful" or "Forum Leader".
- Calculation. Use numerical evidence and statistical formulas (that just shows the facts) to highlight a members' progress, contribution, or general activity.

3. How granular should the designation be? (Choose one.)

- Non-granular. Use named levels such as "good" or "fantastic". These represent increasing talent or activity. The scale may have few levels because there are few words of sequential magnitude.
- Slightly granular. Place members in a "Top X" category such as "Top 10", "Top 50", etc.

- Moderately Granular. Use numbered levels such as “Level 5”, “Level 25”, etc., to allow precise comparisons between members.
- Very Granular. Use point values such as “80 Points”, “1,200 Points”, etc. for different actions to track members’ progress. This would allow very precise comparison between members.

4. How should reputation indicators be used? (Please rank your top three choices, 1 being most preferred)

- To identify senior community members of good standing, so that others can find them for advice and guidance.
- To identify community members with a proven track-record of being trustworthy partners.
- To show a member's history of participation so that others may get a general sense for their interests, identity, and values.
- To show a member's level of accomplishment so that others may acknowledge (or admire) their level of performance.
- To show a member's history of accomplishments, including other members' victories and defeats against them.

[PART IV]

If you would like to enter a random drawing for a chance to win one of four \$50 prizes in the form of bank certified checks, please provide your telephone number or email address below. If you win, I will contact you using the contact information you choose to provide.

Telephone or email

[open text input]

Appendix F: EAO Scoring

Each one of the 75 questions maps to one of the four subscales (see below). For the exact questions please refer to Appendix B. A participant's score for a particular subscale is the average of all the answers to the questions that map to that subscale. All asterisked questions are reverse scored such that lower answers on the Likert scales correspond to higher scoring on the subscale.

| Subscale | Questions |
|-----------------------|--|
| Achievement (ACH) | 1, 3, 7, 9, 11, 20, 23, 24, 26, 27, 30, 31, 34, 35, 40, 44, 48, 57, 61, 65, 67, 70 |
| Innovation (INN) | 2, 6, 13, 17, 19, 32, 38*, 39, 41, 43, 46, 49, 52, 54, 56, 58, 59, 62, 63, 66*, 68, 69, 71, 72, 73*, 74* |
| Personal Control (PC) | 4, 8, 10, 15, 36, 37*, 42, 45, 47, 51, 60, 64 |
| Self Esteem (SE) | 5*, 12, 14*, 16, 18*, 21*, 22, 25, 28*, 29*, 33*, 50*, 53, 55 |

Appendix E: SDPQ Scoring

The SDPQ has four questions, two of which require participants to rank three out of five answers according to preference. A participant's score is the sum of all his/her answers to the questions in the SDPQ. Each answer has a set value from -3 to 3. For the exact questions please refer to Appendix E.

| Question | Answers (value) |
|----------|-------------------------------------|
| 1 | 1 (3), 2 (2), 3 (0), 4 (-2), 5 (-3) |
| 2 | 1 (-1), 2 (1) |
| 3 | 1 (-2), 2 (-1), 3 (1), 4 (2) |
| 4 | 1 (-3), 2 (-2), 3 (0), 4 (2), 5 (3) |