Impression formation in the information age:
A study of and design for online dating

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Submitted to the Program of Arts and Sciences,
School of Architecture and Planning,
In partial fulfillment of the requirements for the degree of
Doctorate of Philosophy in Media Arts and Sciences
At the Massachusetts Institute of Technology

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Abstract

43% of American adults are single and many are looking for new social and romantic connections. At the same time, the Internet offers services to both research and contact other individuals. As a result, proactive computer savvy singles are logging on to find romantic partners. While the online dating industry advertises its success citing the large number of registered users, other evidence indicates broad dissatisfaction: the analysis of website behavior reveals that most users are inactive and experienced online daters state a preference for dating offline versus on. To account for this dissatisfaction, I locate decision-point failures. To improve the process, I propose and test an alternate model.

Part 1 shows that acquiring more information – one of the perceived benefits of meeting online and reading profiles – can have negative effects, such as leading to less liking over time, while failing to make people really believe they know others better. The expectation that getting to know others more will lead to more liking, coupled with the fact that more information leads to less liking, means that online daters are frequently disappointed, causing them to leave dating sites, and to continue to prefer offline dating despite its drawbacks.

Part 2 focuses on interventions to improve the online dating experience, making it more similar to life offline through the introduction of "virtual dates" where people "pre-meet" online before they meet face-to-face. In particular, these interventions are targeted at mitigating the overly positive expectations online daters who only read profiles have, bringing expectations for dates more in line with reality, leading to less disappointment – and possibly increased likelihood of finding a match.

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1 Introduction

When two people meet, they gather information about one another through conversation and observation. In doing so, they begin to form impressions of each other, representations used to choose future action (Berger, 1979). In many liberal societies, people interested in getting married or finding a companion date. On a date, two people spend time together in order to develop this type of impression. Based on this impression, two people can choose whether they would like to jointly enter a more formal and committed relationship or desist. As such, the process of dating is both a way to get acquainted and a preview of what life would be like as a member of a particular couple. By virtue of its continued existence, dating has demonstrated itself to be an effective mechanism for singles to gather information about one another in order to decide upon future action.

Unfortunately, recent societal shifts have rendered dating disappointing. 43% of American adults are single (U.S. Census Bureau, 2003) and having difficulty locating and attracting partners. One reason for this high rate of involuntary singlehood is the decreased involvement in religious and social institutions that historically served to introduce like-minded people for marriage (Putnam, 2000). The result is a large population of people interested in finding partners but unable to meet appropriate people when they wish to marry.

At the same time, there is an increase in access to technology and the communication options it affords. On average, people in America log onto the Internet from home once a day for about an hour per session (Nielson Ratings, 2005). While online, users browse searchable hyper-linked documents, communicate with family and friends, play games, shop and date.

Over the last 5 years, online dating has expanded to effect vast numbers of people. Industry revenues have grown quickly particularly during the period of 2002-2003 (73% and 77% respectively) (Jupiter Research, 2005). During one month in 2003, 40 million Americans visited an online dating site (Egan, 2003). These figures indicate great interest in online dating as a solution to involuntary singlehood.

When an activity, such as dating, migrates from the offline domain to the online one, there are palpable changes. While online dating is not categorically different from offline dating it varies along many dimensions including options available, flexibility, expense, access, and quality of information.

To online date, users visit an Internet dating website. Currently, people choose from dozens of such sites that vary in style, number of users, target audience and in a few cases, interaction design. On most sites, anyone can define and conduct simple searches of the site's database of users and post a personal profile to be included in the database. Users read through personal profiles to locate others of interest. Personal profiles contain a variety of pieces of user-supplied text and photo-based information. To contact others

or read mail, registered users join the site for a monthly subscription fee. Members can utilize the full suite of online dating services including detail search capabilities and a variety of communication services.

When people date online, they gain access to an expanded set of options. Typically, an online dater defines and submits a query to the site's database (e.g. for women, 25-35 years old who live within 20 miles of Boston). A basic search on a large online dating site returns hundreds of profiles. Users peruse through these profiles to choose any one of these hundreds of people to contact. People solely offline dating are restricted to those either within or loosely tied to their social network as singles often meet at parties or through friends. Extraverted people may increase their options by approaching others in more anonymous social settings (e.g. a bar or cafe). In contrast, online dating instantly provides a larger and more diverse group of singles from which to choose.

Online dating also gives members license to contact others. In offline life, people may see someone they find attractive but social norms often suggest caution. People, encountered in daily life, may or may not be single, available and interested. While the same is true for those online, online daters at least broadcast interest in finding dates therefore it is more likely they are available. Online dating also lowers the social barriers to making first contact. In online dating, people message others they perceive as attractive using internal email and instant message clients or by choosing a low commitment pre-scripted notes to be delivered like an email. These are low risk means to contact others. If the message is not welcome, the recipient easily ignores or declines further attention. Either way, the person who sent the message has lost little and the rejection is a private one. In the offline (real) world, unwanted attention may be awkward for the recipient and rejection uncomfortable for the person who initiated it. Offline flirting and advances may be either fun and rewarding or result in public embarrassment.

People also choose online dating for the flexibility it affords. People can date online from home at their own chosen time and for any duration. For people with busy schedules, care taking responsibilities and financial constraints, online dating may be liberating. Because most of online dating correspondence is asynchronous, a user can log on at any time to remain up to date and active regardless of scheduling constraints. Online dating also collapses distances both physical and social. People who live in remote or small communities, with limited offline dating options, can bridge geographical barriers to connect with singles from other areas. Similarly, online dating facilitates meetings between geographically scattered singles seeking to date someone of a particular ethnicity, religion or political affiliation – qualities not necessarily apparent offline but easily indicated in online representations.

The most dramatic difference between online and offline dating is the quality and type of information available about a potential date. When online dating, people view others described in personal profiles. In offline contact, people do not instantly reveal explicit lists of personal characteristics and traits like those displayed in an online personal profile. They appear as a particular person with a set of immediately apparent physical qualities, then incrementally reveal other attributes and aspects of identity. When

strangers meet, they begin to learn about one another through direct questioning as well as observation of one another (Berger 1975). In this process, they discover similarities and differences in the midst of sophisticated social cues and feedback. People speaking face-to-face communicate through many channels simultaneously (e.g. visual, sound, and scent) and exchange information on many levels (e.g. intentionally and automatically). In online dating, people forgo this rich interaction for other benefits of the medium enumerated above.

1.1 The dissertation

In this dissertation, I examine how users interpret information as it is presented in personal profiles and experiment with new mechanisms to exchange information. Although extensive, online personal profiles are particularly constrained representations different from how people interact face-to-face (FTF). This dissertation documents the process of one person gathering information about another and beginning to form an impression of that other. By impression I mean a mental representation of the other with which to decide on future action. Increasingly, people are evaluating one another online through representations like those created for online dating. This dissertation examines the implications of information design on impression formation. I identify patterns in social impression formation while online dating and propose and test a design to improve the process.

To motivate the central contributions of this dissertation, I begin by describing online dating and information gathering more generally. In Chapter 2, I present a biographical description of users of one commercial online dating site and some of the behavior that occurs there. Then I present survey data on the reactions of users to online dating as a whole. Cumulatively, this analysis suggests widespread dissatisfaction with online dating and little engagement with the activity as a whole. In order to account for these results, I propose two points of decision failure in this process.

The first empirical contribution of this work is to document the unexpected effect of information gathering on impressions formed and confidence ascribed to these impressions. Online daters gather potentially extensive information about one another within personal profiles. People feel that such an informational search will be beneficial to social relationships and enact this belief through continued attention to profiles. Through experimental and field-study data, I demonstrate discrepancies between beliefs about the utility of information and its function in decision-making. I present this work in a manuscript reprinted in Chapter 3. I further suggest that people feel overly confident about impressions formed in this domain. In a second set of experiments, I show that confidence ratings (as those of liking) do not correspond with beliefs about confidence, heightening the likelihood of eventual disappointment. These results form the body of Chapter 4. The implication is that personal profiles, devoid of many of the social cues of FTF interaction, may inspire an image that differs from FTF perceptions. If so, when online daters eventually meet, someone could more likely be disappointed. To address this possibility, I explore an alternate way for people to get to know one another online virtual dates. Reading a personal profile is not the only way to gather information about

another human being online. Rather than solely providing introductions and access to other singles through dating sites, I present the idea of having substantive online dates. I study the implications of this interaction model on impression formation and how such impressions coincide with offline evaluations. In Chapter 5, I discuss a study that explores the idea of an online date. Within the area of interaction and impression formation, I look at how levels of disclosure impact social evaluations of a target. Chapter 6 tests a second online dating activity for impression formation. I compare the virtual date with how people generally meet online dating (reading a personal profile) to see which activity produces more veridical, persistent impressions when online exchanges lead to face-to-face meetings. I end this work, by proposing additional online activity that I view as promising for online dating.

2 Situating this dissertation

Tens of millions of people are online dating in the United States alone (Egan, 2003). As online dating becomes more socially acceptable, the population engaged in it increasingly comes to resemble the population at large. Most of the sites employ similar interaction designs and include similar types of information about their users but other commercial ventures rework the approach. In this chapter, I describe who is online, what they are doing, and finally the reaction to this experience. The current state of online dating suggests complications in the online dating process. I end the chapter by proposing failure points in online dating and specifically in online dating impression formation. As such, this analysis motivates the later empirical work and design studies.

2.1 The activity of online dating

Hundreds of sites now exist catering to the tens of millions of single people looking for new relationships. The services offered by these sites vary according to breadth of perceived need. Yet, the majority of these sites resemble one another in structure and capability. Online dating sites generally employ the same interaction model and mode of presenting information while featuring different aspects of personality, catering to distinct communities and focusing on people with specific relationship goals. Below, I spell out both the uses of online dating for different people as well as the functionality of current sites and services.

One role of online dating, which appeals to many people interested in it, is to connect people with other available singles. With people marrying later, at a time in life with fewer social outlets through which to meet like-minded others, there is simply a need for people to gain introductions to one another (Egan, 2003). Most online dating sites empower users to become their own matchmaker. That is, people choose personal criteria, query a database accordingly and scan through the resulting list. Alternatively, users evaluate and choose to respond to or ignore messages from others. Online dating, in this scenario, is an active process I compare to matchmaking oneself. As an activity generally it may resemble others such as comparison-shopping through retail sites.

In this proactive search, people choose from large mainstream sites with seemingly limitless listings of other individuals, with surely a match among them and smaller, niche sites that attempt to collect people of shared interest, sexual orientation, race, ethnicity or relationship goals in effect encouraging users to self-select as part of an online community. On the larger sites, finding a person to date may be a numbers game, simply searching the listings until an appropriate match is found. Using the smaller community sites, people assume that those of interest will collect of their own volition. These sites use similar interaction models and system architecture to connect different types of communities across space and social networks.

But to be one's own matchmaker requires knowing what one wants and needs as well as being able to represent oneself effectively. This may not appeal or be possible for all users. Some sites, recognizing this, relocate the matchmaking role to the system itself, using computational methods to improve resulting matches. This approach is particularly appealing to users interested in finding a long-term companion. Through extensive surveys, the assumption is, people reveal their personal attributes and can be matched with those who are compatible along the crucial dimensions. People looking for this core compatibility with another human being, are increasingly interested in being "set up" using algorithms that claim scientific a basis.

A third role of online dating is entertainment. The process itself can be a kind of hobby whether or not it leads to love. People, particularly young people not looking for a deep commitment, may use these sites to satisfy curiosity and titillate either through simply observation and online interaction or through the casual relationships they foster there (Egan 2003). Any and probably all sites function somewhat to entertain but some sites do so explicitly.

Depending on the goals and personality of a particular individual, his or her path through the online dating experience will differ. Most people try more than one site exploring whether one interaction model or population is more fruitful than another. For the purpose of explanation, I will describe the methods of the differing types of sites separately, what I will call the mainstream and niche listing sites, matchmaking and finally the social networking sites with an understanding that a particular user may be using one or more of these services.

2.1.1 General schema – Proactive dating sites

The most common interaction model and interface design for online dating sites is much like that of online retail, a listing service for people. In online dating, users resemble both the buyers and the sellers in such a marketplace, while the site functions and profits as a go between. Users proactively search for, scan through and post personal profilevertisements. Any user can contact any other user, decreasing the barrier to enter the activity. At the same time, the anonymity minimizes the responsibility to respond. While visitors have limited search capabilities, people subscribe to have full search and contact rights on the site. In effect, most online dating sites are a combination of two types of online retail businesses, Amazon and ebay. Below, I describe the activities that together compose the activity of online dating.

Browsing and searching

People generally begin online dating through casual browsing and searching. Most sites allow any visitor to the site to search through the user database in at least a limited fashion. To do so, users visit the site URL home page. Non-registered users are presented with a search interface to the database often limited to gender, location, sexual preference, relationship sought and age. Such queries result in a listing of appropriate users displayed 10 to 20 to a page in differing configurations. This list resembles any

collection of records that fit a web query as in a web search or a product search. The site usually order results by those with pictures and who are active. On a large site, this first search may turn up hundreds of potential dates. On Match.com, a search carried out in the winter of 2005 for men between the ages of 25 and 35 in the Cambridge, Ma area turned up 34 pages of results with 15 people per page. The wealth of choices makes online dating options appear limitless and consequently opportunity boundless. Smaller sites struggle to assemble a critical mass of users. Analogous searches at the same time on a new site, AnimalAttraction.com, only revealed 100 female users and 30 male users in and around Cambridge, but publicity promises to raise that number shortly. Such niche sites rely on the implied self-selection and similarity of their users to find a match even within a smaller population.

Creating a profile

If a user sees a person of interest or the site otherwise maintains interest, he or she may begin to online date. Sites quickly encourage new visitors to register. To begin actively online dating users create a profile of their own, either by limiting the casual visitor's ability to search the database, or through other prompt systems. Again, this step is always free. The online dating model depends on amassing users; therefore companies generally encourage visitors to become, or at least to make the motions towards becoming, registered users if not paid members. To make a profile, a visitor follows a link to a web form. This form includes a variety of questions that differ in type, extent and content depending on the site. These questions together comprise the personal profile. The overarching themes in personal profiles are biographical information, self-descriptions, descriptions of relationship sought and type of person wanted. Users are also encouraged to upload pictures of them and potentially include additional forms of media.

The personal profile is an often-evolving description of an individual with people ostensibly improving self-descriptions over time. Creating an ad is often challenging unfamiliar task as it may be the first time since grade school that a person is asked to write an autobiographical description – particularly an informal, personal one – and perhaps the first time someone is explicitly asked to describe what they are looking for in a relationship and with what type of person. As such, these descriptions vary in quality both over time as well as across people. A founder of one major online dating site noted that the first personal profile is often written with heavy use of disclaimers (such as my friends put me up to this or this is stupid but I thought I'd give it a try) often disparaging of online dating in general. But such methods quickly shift. Within a week or two, users generally rework their personal profile, deleting such caveats in exchange for more clear descriptions. Beyond this common inclination, styles and voices differ by individual.

In all services, online dating profiles contain a wealth of information. This information varies from physical characteristics of the individual to descriptors of dietary restrictions, housing situation, income level, educational background, relationship history, and relationship sought: information that may or may not be relevant to a potential date. In any case, online daters must decide how to both present themselves to others and to prioritize and discriminate between people based on the included information.

Online dating communication

After creating an ad, users are able to receive email or instant messages using their anonymous online profile. On established sites, if they want to write another user or in some cases even read and/or reply to someone, they generally have to pay. Most sites function on a subscription model with users paying $20 - $35 dollars a month to belong to a web site. Other sites use a pay as you go model where users pay a fee to write an email. Newer sites entice users with free services. As full members, users may search for, locate and write to other users or alternatively wait for other users to write them. Most users do a combination of asynchronous and synchronous methods. They write and respond to messages using an internal email client and use the synchronic instant messaging clients built into many sites. This is the first stage of filtering users to find or recognize someone of interest. To enlarge their pool of dates, users may also sign up on more than one site at a time. Based on my survey results, users tend to register on an average of 2.58 sites[1]. Email and instant messaging comprise the main online interaction of online activity.

After two people have corresponded through the site, they may choose to escalate their relationship to personal, less anonymous email exchanges, telephone calls or a meeting. This is the second stage in filtering – where a user recognizes another person as worth further investment and tacitly chooses to bring this offline interaction to a potentially offline one, integrated into the rest of life. People proceed through the steps of purely anonymous site-based interaction (except for the picture), to some combination of off-site email, telephone and or face-to-face contact at differing speeds. People may have multiple online dating partners at once each proceeding through these differing stages.

Niche sites and the population

Some niche sites utilize the interaction model described above but attract a specific population of users. Sites now exist to appeal to all types of people so people can choose between a site aimed indiscriminately at the population at large or specifically towards some group of which they are a member. While large sites such as Match and Yahoo Personals give users the most amount of choice, niche sites may help users find a match through self-selection. There are currently sites for every type of ethnic, religious and interest group. Social networking sites, described below, can function as a niche site in that they appeal to a particular segment of the population. Ostensibly, only people of a particular type or persuasion join a niche site therefore increasing the chances that a user will connect with someone of the same group (as he or she defines it). This kind of site raises at least the perception of similarity. Perceived attractiveness, which is highly correlated with similarity (Wetzel 1982) may therefore benefit from this perception.

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[1] 186 (94 men and 92 women, age range 18 to 64) people followed a link posted on an online dating site and voluntarily filled out a general survey on online dating behavior. See Appendix A for full survey.

Alternatively, this perception could lead to heightened expectations that in turn lead to disappointment (See the experimental work).

2.1.2 Matchmaking sites

Most online dating sites have users function as their own matchmaker. That is, a single logs on, searches through ads and chooses appropriate others or decides that a person is worth a reply. Matchmaking sites in contrast, with (the most successful and ambitious being eHarmony) assume the role of the matchmaker for the user. These questions aim to capture some description of core values, personality and relationship style of that individual. The matches are based on this extensive representation of a user, one only visible to the system itself. After filling out the initial survey, a user may or may not be presented immediately with a match. If not, matches follow as they become available. Once people receive a match, they can write their match certain pieces of information. The site structures the interaction between users for the first handful of messages. Each person answers specific questions for the other and after some interaction they see pictures of one another. In this way, the site slowly reveals information about a person over time. Still, eventually these people simply choose to meet or not. But when they do, they have already had an extensive interaction; this experience itself along with the initial matching could serve to cement the ancient relationship.

One reason for the authority credited to eHarmony (and other matchmaking sites) is that a "relationship expert" created it. The founder of the site is a psychologist with clinical experience working with couples. He claims to have built the eHarmony match algorithms according to this experience. In the eHarmony model, love is predicated by matching (28) core features. Although the match algorithm is a black box, marketing materials suggest some of its components (Abraham 2005).

2.1.3 Social networking

While proactive dating sites and matchmaking sites characterize the typical online dating experience, other sites have emerged to challenge this model. One category of alternative sites is social network sites. These sites capitalize on offline social networks to foster new social connections between people for dating, friendship and networking. Therefore both single people and those in committed relationships contribute to social networking sites. One of the early such sites is Friendster with others following e.g. MySpace for social purposes and LinkedIn to foster professional contacts.

Social networking sites, in contrast to typical online dating ones, describe people indirectly. On online dating people are called upon to describe themselves in first person narrative style. In contrast on social networking sites, people primarily define themselves through social associations and preferences. To join such a site, a user must be invited by another. After joining the site he or she can in turn invite others to join. There are personal profiles on these sites but they are primarily composed of preferences and social network connections. The descriptions that do exist, e.g. the testimonials on Friendster,

are mostly written by others in the network – third parties whose comments can be accepted or rejected by the user. Personal preferences including favorite bands and books supplement these testimonials. While this information may not be a meaningful description of a target person, it *feels* meaningful. Social networking sites also differ from other types of online dating in that while online dating sites often capitalize on the anonymity, social networking sites utilize offline relationships to facilitate online meeting that feel like they make sense.

One drawback of such systems is that the social networks are not well described and as the network grows it can lose its assumed value. There is only one kind of link on most sites. On Friendster some either is or is not a friend but the type of acquaintanceship, close, distant, social or professional is not specified. One person situated two links away from another may or may not share mutual interests or affiliates. Still, while such a site may not help find a mate particularly, Friendster and others appeal to both online daters and others drawing a large user base and providing entertainment for a variety of users. But, these non-online daters may not be interested enough to pay subscriptions fees that will probably follow. The professional networking version may appeal to a large population willing to enlist the service for a fee.

2.1.4 Function of online dating and issues present

Online dating varies in method but at its most basic level, online dating is an introduction service. The process of online dating is the process of gathering information about others online and generally reading a personal profile does this. In most cases, the profile (normally) describes a complete stranger. The assumption in this model is that a profile resembles a person enough so that online daters will not be disappointed when they finally meet. Online dating sites provide access to these personal profiles and a means to contact the people who created them.

Online dating is not dating at all. It is a method to locate and contact a person. What happens afterward may be facilitated by the service (e.g. emails and instant messages) but primarily this is the scope of a later activity, just general dating. Online dating is a way to signal interest in finding others, a mechanism to locate others engaged in this simultaneous signaling behavior and to gather information about those people. A possible extension to online dating is to bring dating activity to the online sphere. In doing so, I can bridge the divide between online information gathering and later socializing.
In this section, I explore some of the social needs filled by online dating; the functionality meant to address these needs and end by identifying some of the gaps in the service. In the next section, I examine whom, in terms of socio-economic variables is online to see if these sites are servicing the population utilizing them.

2.2 The population online dating

2.2.1 Origin of the data

While the proliferation of online sites makes describing the entire online dating population precisely beyond the scope of this dissertation, I can accurately describe the communities whose data I do have. To analyze current online dating practice I forged a relationship with a national dating site. This particular site organizes their members according to community affiliations. These affiliations are both geographically and thematically based. In this work, I look at a cross-section of such communities: Boston area users, San Diego area users, nudists and Jewish users. In this analysis I examine general behavior using the larger mainstream communities, Boston and San Diego and at points contrast these results with those of the theme sites, the Jewish site and the Nudist site. Chapter four continues this work with an examination of user behavior by these four groups.

2.2.2 Commercial data set

The size of the chosen groups varied. Boston community was the largest of the four with 21,901 users during the time frame studied, although only 13,478 had usable data[2]. San Diego was the second largest with exactly 15,000 people in this time with the nudist site being the third largest with 11, 209 and the Jewish site being the smallest with 3,180 people nationwide. I felt these communities would give us a large breadth and diversity in data. These data describe users with active profiles in the system on August 18, 2003.

While the analysis below draws upon these commercial sources of data, I also created an online dating site for Boston and Cambridge area university affiliates of my own and collected the resulting data. Students, faculty and alumni from area institutions including MIT, Harvard, Wellesley, BU, BC, Brandeis, Tufts, Berklee, Emerson and Simmons were given access to the site free of charge. This site mimics the set up of typical online dating sites and served as a platform to collect behavioral data. During its tenure it has averaged about 1,000 active users at any one time. These are users with profiles that are accessible to others who may or may not be writing to other people through the site. While the commercial site provides a more representative and informative sample, I use the college site to buttress my results and explore issues that where difficult to pursue otherwise. These data are reported in other sections of this dissertation.

[2] The user profile includes many multiple choice questions encoded as an array of characters. Because of several shifts in that encoding over time, only recent users who had supplied answers to the current set of questions were used.

Analysis method

The site shared two types of data with us, the content of the personal profiles and log files of the activity on the site. The profiles are stored in a single text file formatted as a list of field names and content for each registered user of the site. I wrote Perl scripts to parse these files and insert the content into a MySQL database. The behavior-log files are organized by user such that each person had a text-log file with action taken. Each user file was stored in a personal directory by user name that in turn was in a directory labeled with the first letter of their username. These files were also parsed with Perl scripts and each behavior inserted into a table of the database. The content of this database was queried for the analysis below.

In the case of my online dating site, user behavior was logged and entered into a database as it occurred to simplify the later analysis and profile information is stored in another table of the database. (will expand if I add this data)

2.2.3 Biographical description

Gender makeup

Contrary to previous studies on online dating activity, women and men visit the studied sites in roughly equivalent numbers. A Canadian study of online daters found that there were more than two men to every woman who used Internet dating sites in 2001 (Love online). my findings, in contrast, found smaller discrepancies with these discrepancies varying by the nature and theme of the site. In mainstream sites, that do not target a particular interest or other group, men seem to dominate the user pool somewhat. In both the Boston (55.6 % men and 44.4% women) and San Diego (56.6% men and 43.4% women) sites, men are slightly more numerous than women.

Although men and women both appear interested in online dating, they are drawn to different types of sites. Analysis of site register found that a site which seems to cater to more casual relationships, the nudist site, is male dominated with men outnumbering women ten to one (90.3% men). Women simply may not be interested in the matches this site offers. But women are online. For example there are slightly more women than men on the Jewish community site (51.9% women versus 48.1% men). These numbers suggest that although men may be online dating in larger numbers than women, women are also interested in this activity. Sites targeting people interested in long-term relationships (eHarmony) and those focused on social networks to catalyze social connections (e.g. Friendster, myspace) both informally purport to have more female than male members.

Information from profiles and surveys also indicate that people self-select to sites according to their relationship goals. Users of the mainstream Boston site, when asked for their personal profile about the type of relationship they seek, are more likely to say they are looking for a serious relationship than people on the nudist site. This is true for both

men (36.6% on Boston, 22.1% Nudist) and even more dramatically for women (39.9% on Boston, versus 17.5% on the Nudist site). In self-reported measures collected through a survey posted on the Boston site, users were asked if they would like to be in a long-term relationship. The rate of response of "I would like to be in a long-term relationship" is nearly equivalent to the profile measures. They are slightly higher for men (43.8%) and exactly the same for women (39.8%)[3]. I do not have this measure for the Nudist user base specifically. Yet, these results indicate that people use sites that match current goals with some sites matching the goals of more women than other sites as is true for men.

Age distribution

For all four population groups, the largest block of users fall in the 31 - 35 year old age group with an apparent normal distribution across the lifespan. See Figure 1 for the age distribution of Boston users compared to the population of the same Metropolitan area at large. While the age distributions in both populations are similar, older adults are almost absent from this data set. Other sources suggest a recent population shift with differential growth in the older adult online dating population. According to Nielson ratings, the older adult segment has now grown to comprise about 15% of the online dating population (Boston Globe, Nielson Rating September, 2004), making it proportional to the age distribution in the United States at large.

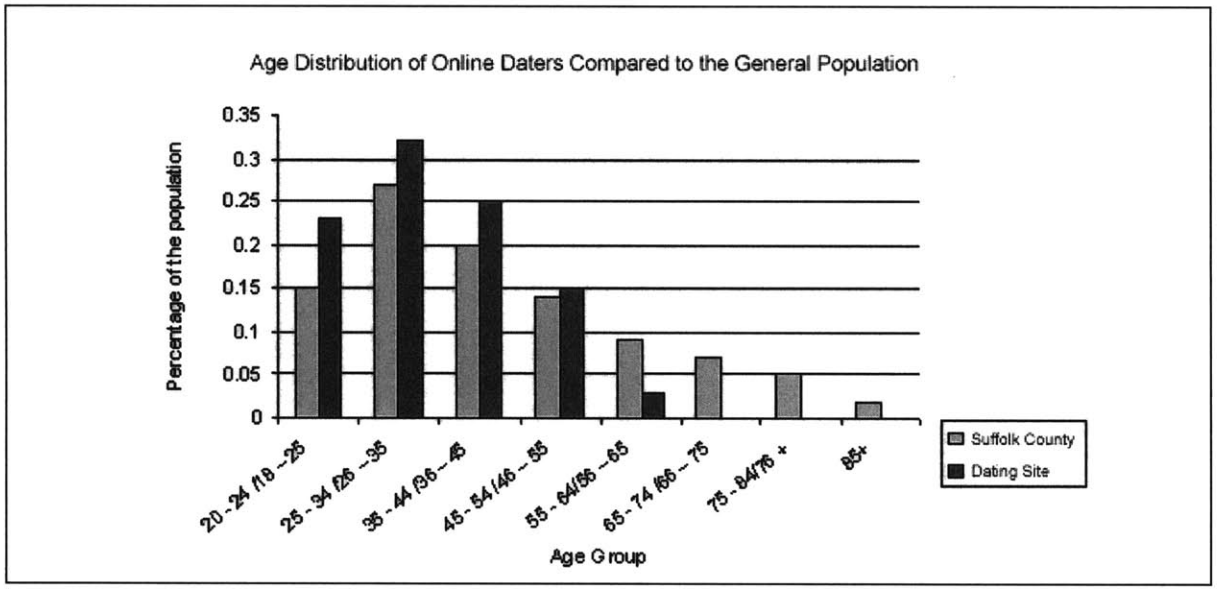

Figure 1. The age distribution of Boston online dating compared to the Boston area (Suffolk County). The site users are slightly younger than the population of Suffolk county. Categories in these data sets differ slightly. Still, these data suggest that older adults are less likely to be on this site. This may be due to fear and lack of access with technology. Recent data suggests this pattern is changing with older adults beginning to use online dating sites.

[3] 196 (98 men and 98 women) online dating users were surveyed. To complete the survey, users voluntarily clicked on my banner ad asking for study volunteers. Respondents chose between five responses to the question "Are you looking for a long-term relationship": "no", "eventually", "if I meet an exceptional person", "I would like to be in a long-term relationship" and "I am currently in a long-term relationship."

Racial composition

The online dating population is less diverse than the population of the United States or on a community-by-community basis, the local area from which it draws. In the Boston area community, 71% of online daters described themselves with the general descriptor White/Caucasian, with an additional 8% describing themselves as of Western or Central European origin. According to the 2000 census, Boston is over 50% (primarily non-white) minorities (http://members.tripod.com/~thefensnet/ps.htm). In this online population, only 5% of people described themselves as Black/African American, 5% as Asian, and 4% as Hispanic; these figures are lower than the city average but still demonstrate some ethnic diversity within this online community. In San Diego, the racial makeup of the site is slightly different, mirroring the makeup of the city itself. 63% of the users in San Diego described themselves as White/Caucasian, with 9% more claiming Western or Central European origin. 12% of the users in San Diego described themselves as Hispanic, 5% as Black/African American, and 5% Asian, with the remaining people describing themselves in small numbers as south and South East Asian, Middle Eastern, Arabic or other ethnic variance. San Diego has a more diverse online dating community. Still although online dating is available to anyone, these mainstream websites appear to appeal to a mainly white clientele. The special interest Nudist site is also primary white/Caucasian (65% of members) with a slightly larger Asian user base than the other communities (9% of members). Unfortunately, I have no data on the relative prevalence of ethno-centric sites. Sites such as "blackplanet" which targets African American online daters and claims 14,493,961 users currently (blackplanet.com) and "amigos" targeting Hispanic users and claims 3,686,195 members (amigos.com) may serve a large contingent of minority online daters. Their existence suggests that online dating may attenuate tendencies for singles to seek out people of their own ethnicity for dating (See Appendix E for a more extensive discussion of ethnicity and dating.

Ethnicity and dating

These tendencies coincide with marriage patterns in the United States. With all the efforts to achieve racial equality and co-existence in this country, intermarriage is still a relatively rare occurrence representing only 4% of the American unions. For example, although black people make up a relatively small segment of American society, 94% of African Americans marry other African Americans. In contrast, random pairings of people in the U.S. would result in 44% mixed marriages[4] (Fisman Working Paper). The difference between this hypothetical figure and the current reality points to the tendency for people to marry those of their own ethnicity. But it gives no indication whether this is the intention of an individual or not. Although social norms operate in all spheres, online dating data gives some indication of both stated preferences as well as behavior. These results help to explain what drives current practice.

[4] Under random matching (including entire populations, regardless of age. The analysis was restricted to some notion of "marriageable" populations yields similar numbers), 44% of marriages would be interracial

In self-reports of what men and women seek, women of some ethnicities are more likely to state they want to date others of the same ethnicity than men are. This is particularly true for Caucasian (21% of men and 47% of women) and African Americans (8% of men and 25% of women), with women more than twice as likely than men to want to date those of the same race. Black women report wanting to be with a black man 3 times as much as black men report wanting to be with black women. And white women are the most likely to say they want to be with a white man and least likely to say that it doesn't matter.

Female users / Male users	Asian		White		Black		Hispanic	
Same	0.17	0.17	0.21	0.47	0.08	0.25	0.11	0.13
Different	0.09	0.12	0.01	0.01	0.08	0.07	0.05	0.1
Doesn't matter	0.69	0.67	0.76	0.51	0.82	0.66	0.77	0.71
Did not disclose	0.05	0.04	0.02	0.01	0.02	0.02	0.07	0.05

Table 1. Shows the difference between male (shown in white) and female (shown in gray) users in their preferences to date within or outside of their own ethnic group. These data were mined from personal profiles for which users were asked for their dating preferences. Users chose from four responses provided by the site: (A) The same as mine (B), Different than mine (C), It doesn't matter or (D), A different species! People of all races are most likely to state they do not care about the race of their date but White and Black women are much more likely to want to date people the same ethnic group than those of other ethnicities irregardless of gender. Black outlines these key comparisons.

For white users in particular, behavior attenuates some of the stated preferences. Table 2 lists the percentage of contacts initiated to people of their own race compared with their stated preferences. Consistent with their preferences, white women wrote people of their own race (white men) more than any other group. Of the minorities included, Hispanics wrote to other Hispanics in larger numbers than other groups and Asians wrote the fewest emails to people of their own race. These behavioral results indicate that in practical terms people are even more inclined to date others shared race than they state. This may be, as in "real" life a product of the scarcity of minorities present online. As in many offline communities, online worlds may self-select for racial homogeneity.

2.2.4 Socioeconomic variables

People using online dating sites are on average are more educated, more likely to be professionals, and slightly highly paid than the rest of the population. This is also true for people using matchmaking services generally (Adelman). To online date, people need access to appropriate technology as well as the time and freedom to use this technology for personal activity. As such, online dating may self-select for particular socio-economic groups.

Behavior					Difference	
Stated Preference	Men		Women		Men	Women
White	0.21	0.64	0.47	0.71	-0.43	-0.24
Hispanic	0.11	0.27	0.13	0.23	-0.16	-0.1
Black	0.08	0.05	0.25	0.08	0.03	0.17
Asian	0.17	0.02	0.17	0.01	0.15	0.16

Table 2. Percentage of messages written to people with shared ethnicity by race compared to stated preference to date someone of shared race with differences between the two in orange. White women, consistent with stated preferences, are most likely to write to those of the same race but behavior is even more extreme than stated preference. Given the small number of minorities on the site, people may have difficulty finding some minorities. On the other hand, the fact that there are relatively few Hispanics but Hispanics date one another more than self-described other ethnic groups suggests that Hispanics are dis-proportionally likely to seek out others of the same ethnicity.

Income level

When creating a personal profile, users input answers to many multiple-choice questions. One such question asks people to choose from a list of income brackets that range from $0 - 12,000 bracket to over $250,000 annual income. Referencing these self-reported income levels, the stated median incomes are slightly above the national ones and in the case of the geographically organized communities, above the median incomes of the areas from which they draw their user base. The effect is more pronounced for men than women, with men reporting a larger difference between their stated median income and that of their community.

In Boston, the self-reported median stated income of the men on the site is $50,000 – 75,000, while its one bracket below or $35,000-$50,000 for women. While these figures are above the median income for both men ($37,435) and women ($32,421) working in the city of Boston and do work for a living, the difference is larger for men[5]. But, because a significant number of users of online dating site users choose not to disclose their income, and ostensibly the users who do not report income have a lower ones, the income of online daters approaches that of the greater Boston area.

Similarly, in San Diego, of those who report their income, people online dating report earning somewhat higher salaries than the population in general, but this difference may be due to the high rate of non-disclosure. The median income of the working male online daters is evenly split between the brackets of $35-50,000 and $50-75,000 (with in12.2 %

[5] The site attracts users from the greater Boston area of Suffolk county as well where the median income is slightly higher (37,174 for men and 32,176 for women) according to the census of 2000.

and 12.1% respectively). In the city and county of San Diego the median income falls in the lower end of this spectrum ($36,984 in the city and $36,952 in the greater county). For women the disparity is slightly greater between online daters and the general population. Women who report working and supply their income have a median one between $35 and 50,000 while in San Diego proper it is $31,076 and in San Diego county it was $30,356 in the 2000 census. But again, because my data is limited to self-reported categorical responses and due to of the high rate of non-disclosure, these differences are not conclusive and presumed to be minimal.

In the other two communities, people also have slightly higher incomes than the general population, with the Jewish users reporting incomes similar to those of the Boston community and the Nudists reporting making less money than the other communities. See Figure 2 for comparisons. These figures are partially explained by differing response rates across communities (See Appendix E for a complete discussion).

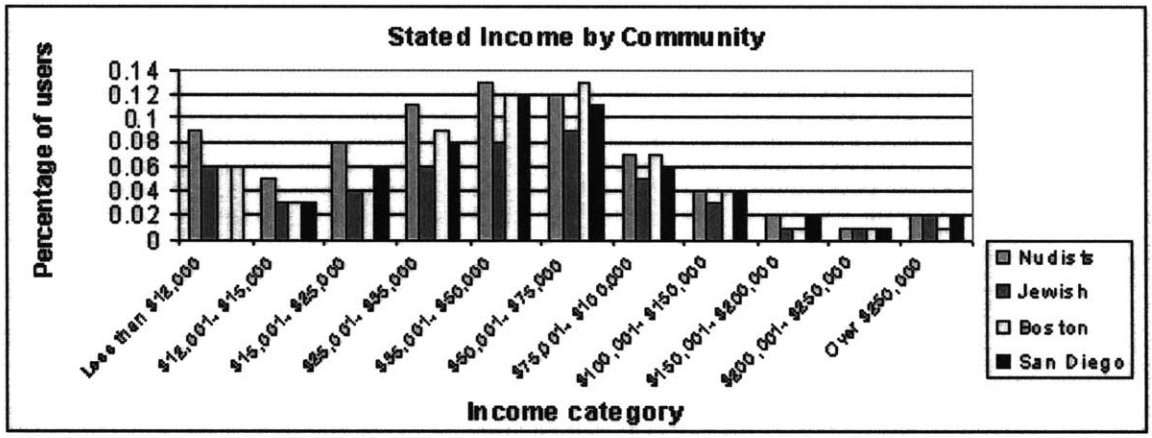

Figure 2. Income distribution of users who disclosed income level shown categorized by community of user. The median income in all cases is above the national average. These figures could be biased due to the level of non-disclosure (See next section).

Education level

Unlike some of the other socio-economic descriptors, people online dating report higher education levels than those living in the same areas. In particular, 53% of online dating users from Boston have had at least a college education compared to 32.5% of people in Suffolk county (which includes the city of Boston and surrounding areas). Similarly, 45% of the users in San Diego have received this level of education in contrast to the 25.1% in the City of San Diego and 29.6% in greater San Diego county. While the other two populations are national, so comparable populations cannot be assessed, the averages are also higher than the cities mentioned. 41% of Nudists and 63% of Jewish have a college diploma. Education thus represents the highest disparity between online daters and others.

2.2.5 Discussion and Conclusion

Contrary to public opinion, people who use dating services are not different from those who do not. In fact, people who use offline matchmaking services are just as socially able and attractive as their contemporaries (Adelman). The users of this site are slightly more likely to be younger, Caucasian and wealthier than the general population from which they draw. And these users are more educated than their peers. With no explanatory data available, I can only speculate that this population may be working more hours and be more accepting of alternative uses of technology making them early adopters of online dating resources.

There are a couple of limitations to this dataset. First, it draws from large urban communities. These communities at large may be more technologically oriented and therefore accepting of online dating than some rural communities. Also, city dwellers may use online dating for different reasons than people from less populated areas. In smaller communities, people use online dating because of the shortage of local options[6]. Second, because of the prevalence of niche sites, for people of different ethnicities and sexual preferences, this data set may be more homogenous than the online dating population at large. Although I do have access to a couple of the niche site's data, the contribution of these niche sites to the overall population is still an open question, but the existence of sites such as blackplanet (serving African Americans), amigos (for Spanish speaking singles) and jdate (for Jewish users globally) demonstrate a variety of ethnic and racial groups are online and finding one another there.

And, the discrepancies that do exist are probably shrinking. PCs and Internet connections are becoming increasingly available and consequently, more people turn to new media services. People in this population look very much like those in their surrounding areas. As online dating becomes more socially acceptable the differences recorded here continue to shrink. For example, in the last year, online dating usage for middle age to older adults has grown disproportionately to other age groups (D'Innocenzio 2004) making the online dating population closely resemble the age distribution of the offline world. Online dating as an enterprise has slowed in its rate of growth (JupiterResearch 2005), but that does not indicate that people of all communities are not drawn to the service for a variety of reasons.

In addition to being able to compare online daters to others, this data set exposes some aspects of general dating behavior not normally recorded. In this work, I begin to explore discrepancies between stated preferences and behavior particularly on the topic of race and dating. And I see how self-disclosure varies in different populations.

In the area of race preferences and gender, I see that women, who are generally more liberal politically (Lena 2002), operate here as more socially conservative. Women, of all race and ethnic groups, are more likely than men to state a preference to date someone of

[6] Response from an open ended question included in the General Dating Survey quoted in the Appendices.

their own ethnicity. And women in most groups (excluding Hispanic women) are more likely to write to someone of their own race to date than men are. Caucasian women are the most likely to write to people of their own race. And for both genders, although this may be a product of the homogeneity of the data set, people are less likely to seek out others of another race than they state they will.

These data, therefore, suggest both who is online dating and more generally something about dating preferences. As the online dating population comes to resemble the rest of the population at large, the utility of this data to understand human attraction more increases.

2.3 Online dating behavior

Online dating has attracted a lot of attention by various types of users. People of all ages, ethnicities and socioeconomic groups seem to have turned to online dating. But, anecdotal stories suggest these users have a mixed experience. To begin to understand current online dating practice, I analyze data from an active, large-scale online dating site described at the beginning of this chapter. I supplement this source with surveys and experiments distributed through this site. By parsing, organizing and analyzing user logs and proprietary profile text files, I began to get a sense of how people act on these sites. Through eliciting survey responses I explored how people feel about this experience. The first section of this describes the people engaged in this activity. This section reports on the behavior and experience of online dating.

2.3.1 Survey data

User data from the online dating sites do not include any outcome measures or data about the personal experience of online dating. Examining these data, I do not know if a user left the site because he or she successfully formed a relationship or due to frustration or other negative experience online. To compensate for this gap in the data set, I began early in the work to post surveys within the commercial dating site. Users voluntarily followed a link on the site to participate in a research study. In some cases, they also chose to enter their email addresses to participate in future studies. Through this process I gained access to a population currently online dating as well as a substantial group with whom I could follow up at a later date. The majority of the study and survey participants draw from this population unless otherwise noted. And in most cases, these participants volunteered to fill out these web forms. Surveys are included as Appendices as noted.

2.3.2 Engagement does not match interest

The popularity of online dating grew rapidly over the last five years, tapering off only recently, as the market began to saturate (Jupiter Research, 2005). 40-million people viewed an online dating site during a single month of last year (Egan, 2003). The large total number of registered site users seems to be evidence that this industry is lucrative and full of potential. But these figures do not describe the whole story. Many registered users are not actually revisiting the site or paying for it. While it seems that people are curious about online dating and millions log on to give it a try, this interest does not necessarily translate into profits or a personally positive experience.

Low rate of participation

I examine behavior for a single community and find a surprising low participation rates. Specifically, most of the Boston area users of this site are not active. Less than half of them have sent an email (42%) and only 68% have received an email. 16% of the

profiles were never even seen, therefore a substantial number of the users are given no chance to enter the online dating activity. And disastrously for the company, only 18% of users have paid. People generally use the site for the length of the trial period then leave. The trial period during the data collection was one month long. The average user stayed with the site for 41.1 days with a high level of variance (SD = 106.63) with some long time users shifting the average. While there appears to be tens of thousands of users in the Boston area, these numbers are deceiving given the high rate of non-active people.

Participation, on this site, also differs by gender with men being slightly more plentiful and much more active on the site than women are. The gender discrepancy is not large in the Boston user group (56% men and 44% women), but the experience of the average man and women differ considerably. As noted in Chapter 3, men and women on this Boston site, claim in profiles and surveys to seek serious relationships at about the same rate but men and women go about their goals differently. Men appear to be more proactive on the site. Men visit the site more (M = 60.21 times, SD = 263.22 versus M = 47.48 times, SD = 141.73 for women, $t[13478]= 3.352$, $p < .001$), view more pages on the site (M = 1885.70, SD = 12,350.58 versus M = 1147.74 times, SD = 7488.39 for women, $t[13478]= 4.042$, $p < .0001$) and initiate more conversations than women (M = 30.79 times, SD = 243.45 versus M = 11.35 times, SD = 75.08 by the average women, $t[13478]= 5.907$, $p < .0001$). And, since most of these men are heterosexual, women receive a disproportionate amount of attention. Women's profiles are browsed more often than men (166.97 times for the average man's profile, SD = 778.88 and 392.14 for the average woman's profile, SD = 1420.87, $t[13478]= 11.726$, $p < .0001$) and women receive more total email than men (40.92 received by the average man, SD = 277.51 and 62.37 by the average woman, SD = 492.33, $t[13478]= 3.198$, $p < .001$). Consequently, men and women may have very different views into this world.

But in a survey of people who had actively participated in online dating, men and women both tend to locate at least one person of interest. 140 people (51 men and 88 women ranging in age from 18 to 74, M = 39.5 years old) who had at one time online dated filled out a survey regarding their experience online and participated in my follow up dating survey. [7] People from this sample use online dating sites on average for a little over a year (M = 12.13 months, Range 1 – 35 months). During this time online, 52 % of these respondents stated they have dated someone seriously whom they met online, with women being slightly more likely to have met someone than men (55% of women versus 47% of men, ns). To locate someone interesting, these people went on an average of 7.59 first dates and continued on to meet on average 2.93 of these people more than once. For comparison, during that time, the same people went on an average of 7.32 offline dates. Online dates, to their credit, appear to be more fruitful than offline meetings. People were more likely to of met someone online with whom they were interested in dating seriously than during the same time period offline with 52.2% of people having met someone offline (during the time they were online) and 67.4% of people having met someone

[7] The respondents for this survey who had participated in a study by following a link on a web site and at that time agreed to take part in future studies. These 140 people responded to a mass email and filled out the survey. This is not a randomized sample due to the low response rate (of less than 10%) and there fore may be more favorably oriented towards online dating than online daters in general.

online who they would have liked to date (and in both cases may have). And, at the time of filling out the survey, many people were dating someone they met online. 50% of people were currently in relationships and the majority of those relationships were with people met online (69.44% percent of relationships formed were formed online, 61.1% of relationships were through online dating sites specifically). This finding is limited as it only suggests something about the experience of people who were actively online dating and persevered with the activity. It also negates the possibility that time spent online does not effect contemporaneous offline search (See Appendix F for a discussion of time tradeoffs in online dating).

This section reviews data from two sources: a national online dating site and a survey distributed to some of the active users from that site. Examining the online user behavior directly, it appears as if a large number of registered users never become active members. They primarily stay on the site for the free trial period then disappear, only a small percentage ever purchasing anything. But, the analysis of a survey given to active and self-selected online daters, suggests some success of the site. The majority of people who remain on the site, seem to locate someone of interest during their tenure there and many (35%) were with someone at the time surveyed. This suggests that people who persist may find interesting dates. The next section explores how experience online shapes one's reactions to online dating.

Engage in micro-activities but dissatisfaction with overall experience

While some people who have remained online may have found someone of interest to date, these respondents are still ambivalent about online dating as a practice and prefer offline to online dating. Men and women report feeling, on average, only slightly above neutral about online dating and less positive about online dating than dating in general. Both men and women rated online dating as only slightly higher than the neutral five ($M = 5.55$, $SD = 2.36$)[8] on a ten point scale not at all to very much (no significant difference by gender). To give a sense of how this activity compared to others in their lives, I asked people to rate how they felt about other daily-related actions. Respondents generally enjoy other activities in their lives such as watching movies, writing email more than online dating[9]. Most importantly, people enjoy dating offline ($M = 6.99$, $SD = 2.25$) more than online dating ($M = 5.49$, $SD = 2.34$) ($t[134] = 6.023$, $p < .0001$). Even the respondents who report having dated someone seriously who they met online, prefer offline dating to online dating ($M = 6.39$, $SD = 2.04$ online versus $M = 7.19$ offline, $SD = 2.14$, $t[70] = 2.69$, $p = .009$). This indicates the dissatisfaction with online dating and thereby motivates this dissertation. This comparison also offers a specific insight into online dating. Namely, online dating should optimally come to resemble offline contact.

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[8] These data are taken from the same follow-up survey. See Appendix B.

[9] In paired t-test comparing ratings of writing email ($M = 7.39$, $SD = 2.38$) and online dating and watching movies ($M = 7.77$, $SD = 2.19$) and online dating, people are more positive about both writing email ($t[135] = -6.59$, $p < .0001$) and watching movies ($t[135] = -9.05$, $p < .0001$) than they are about online dating generally.

And, this level of satisfaction is not tied to level of engagement. People who actively online date for a longer period of time are not more happy with online dating and people who invest time in each particular activity associated with the process are no more happy than those who do not. There is no correlation between the cumulative time spent online dating and overall enjoyment. And, there is no relationship between the time spent searching for others, writing to others, or meeting with others and overall enjoyment with the process.

The only measure that correlates with satisfaction with online dating is attention received. In particular, the users who report having received more messages are more pleased with online dating as a whole ($r[95]= .21$, $p = .043$). These people are getting more spontaneous interest in their personal profile.

Although people rate online dating as only slightly above neutral, they still engage in online dating activity regularly. These users report checking their online dating email on average more than once a day ($M = 9.27$ times per week, $SD = 8.18$). And if asked to choose which email they prefer to check, their general email or their online dating email, more people reported preferring to check their online dating email (66% of respondents) than their general one. In addition, when asked if they were more likely to use a free 10 minute period to call a friend or check dating email, the majority reported they were more likely to check their dating email (69.8% of people). These measures indicate that there is something fun and engaging about the micro-activities of online dating, although this may not translate into overall satisfaction with the process.

Possible numbers game

While the precursors to satisfaction with online dating are not related to how much people engage in proactive online dating activity. People who have dated someone seriously through online dating do suggest some strategies for success if not satisfaction online dating. In some ways, this subset of the respondents resemble the others e.g. in number of email received, response rate, correspondences initiated, and correspondences had. The difference between these groups is in the frequency of FTF meetings. Those who dated someone seriously have met more people for dates than those who did not have a relationship. They met more people for first dates ($M = 8.78$, $SD = 12.25$ relationships, $M = 4.93$, $SD = 4.81$ no relationships, $t[132] = 2.02$, $p = 0.045$) as well as second dates ($M = 3.42$, $SD = 4.66$ relationships, $M = 1.91$, $SD = 2.09$ no relationships, $t[131] = 2.03$, $p = 0.044$). While the same percentage of first dates lead to second ones for both groups (38%) indicating that these two groups are similarly able to initiate a relationship the people who have more first dates more likely to find someone interesting and form a relationship. While online dating may be often disappointing and less appealing than offline dating, if a person is willing to go on many dates (and assume the attitude that behavior requires) they may find someone. Online dating is partially a numbers game with increasing the number of dates heightening the possibility of forming a relationship online.

2.3.3 Section summary

Online dating is drawing tens of millions of interested individuals to sites each month (JupiterResearch 2005). Data from the site described here suggest that most of these people never actively online date. Although people are interested in online dating; they visit sites and may even register and post an ad. Most people never persist. A substantial number of the profiles on this site are never viewed by anyone (16%) and less than half of the users take the proactive step to email another user (42 %). These results suggest that many users quickly abandon the site; they never truly enter the marketplace of online dating. Those that do could be a different story.

I explore this possibility with follow up survey data. I asked active online daters about their experience. Although these people do use online dating services for substantive amounts of time, their activity level does not necessarily denote satisfactions. There is no correlation between level of engagement with the activity and enjoyment of it. People who online date longer are not happier; people who spend more hours a week searching, writing, or meeting people are no happier than those who do not. The factors that impact satisfaction are those that point to popularity on the site. People who receive more messages are happier and not surprisingly people who have met someone interesting are happier with online dating generally.

Even these respondents, many of whom had had some online dating success, express limited satisfaction with online dating as a whole. They report slightly higher than neutral ratings of online dating and a preference for offline compared to online dating. This result indicates problems in online dating. Even those who actively do it would prefer to not. It also suggests that to succeed, online dating could evolve to feel more like offline dating. To understand the trajectory of online dating more precisely and design for it, I have conducted a series of experiments. I introduce this work in the next section.

2.4 Conclusion and introduction to the empirical work

Putting dating online supplies singles access to otherwise strangers, offers an alternative to dating within one's social network, and provides contact to people specifically signaling that they too are ready for a date. Consequently, online dating is interesting to tens of millions Americans and people around the world. And according to this data set, online dating draws from every socio-economic stratum. They log on, register and attempt to choose from extensive listings of personal profiles. My analysis demonstrated that many users do not get beyond this point, never receiving or writing any messages and certainly not meeting anyone. Yet, some users persist, carrying on many conversations, meeting people for one and sometimes even more than one date and in some cases, even continuing on to create substantive relationships. But even those who actively online date, are not particularly pleased with the activity in general. Specifically, they would prefer to be dating offline.

There are many potential issues in online dating, I focus on one: the effect of different information formats and gathering strategies on impression formation and the consequences of this process on later face-to-face meetings. I propose that one reason for dissatisfaction online is that people evaluate one another based on the awkward format of the online dating profile. While users scour online dating sites to find a person of interest. A person described online may not resemble the actual person him or herself. Previous research in computer-mediated communication suggests that non-meaningful features and perceive group affiliations temper social impressions (Lea, 1991). This suggests that online profiles may not be understood as are offline selves. If this is the case, when people read about one another they might develop an erroneous impression of the other – followed by disappointment at a FTF meeting.

In this dissertation, I test the validity of this concern. Namely, I explore how people interpret explicitly stated character descriptors. People read online dating profiles implicitly signifying a belief that this process will help them locate a target of interest. At the same time, widespread inactivity online and ambivalence about online suggests this process does not work. To document this process more precisely, I conduct a series of studies on beliefs and choice in impression formation based on variable amounts of information. I first look at the interpretation process on ratings, expectation and excitement about others. I then study how people come to feel they know a target described online. From there, I can postulate if online profiles resemble offline personas.

The descriptive work suggests that online dating would do better to feel more like offline dating. Therefore, in the design component of this work, I look at how to create online experiences that could more easily translate into offline communication. One component of offline dating is that people reveal information about themselves organically and within a larger conversation and context, they gather information through experience. To mimic this process, I develop the idea of the online date – shared activity conducted in the virtual sphere. In doing so, I create interactions that more closely resemble the contact people have face-to-face and the way in which people generally learn about one another. I propose, that this type of organic information gathering will lead to more veridical impression formation. I test this idea with online contact followed by offline meeting.

2.5 Road map of the remainder of this dissertation

In this online domain, and in others, people amass information about one another over time and begin to form impressions of each other given these data. The empirical work in this dissertation focuses on the broad question, how does the extent and delivery of personal information impact impression formation? Within this broad question, I look at several aspects of the impression formation experience. First, in Chapter 3, I quote our[10] paper on how information extent effects impressions. As people get to know one another they accumulate increasing amounts of information about each other. In day-to-day life, people actively search for such information using a variety of strategies with the implicit

assumption that this information search benefits social relationships. But what is the impact on information gathering on impressions formed? Framing this inquiry around impression formation generally as well as online dating specifically, I document whether intuitions and inclinations are consistent with judgment. In Chapter 4, I look at how people develop not only an impression of another, but the feeling of knowing another individual. Chapter 4 outlines a series of studies on the feeling of knowing, operationalized as confidence in an evaluation of another, and the information extent. In this work, as in that of Chapter 3, people want more information but do not appear to benefit from its acquisition. After completing this work, I begin to explore new ways for people to learn about one another to online date and thus develop more appropriate impressions of each other. These design studies represent online dates, activities to reveal and share relevant information. The idea is to decrease the disconnect between online and offline impression formation. Chapter 5 examines a question and answer game to look at the interaction between disclosure levels and feelings about a conversation partner. Finally, in Chapter 6, I look at how people form impressions through differing exposure to one another, namely reading a personal profile versus interaction in a rich chat environment and how those impressions impact judgment in a later face-to-face meeting.

3 To Know, Know, Know You is to Like, Dislike, then Hate You: When and Why Familiarity Breeds Contempt

Abstract

The present research demonstrates – despite people's strong intuitions to the contrary – that familiarity breeds contempt: Learning more about another leads to less liking. Though *passive* repeated exposure to others – when individuals merely witness another person on multiple occasions – can lead to increased liking, *active* increased exposure – when individuals learn new information about others as they come to know them – leads to decreased liking. People hold initially optimistic views of how much they will like others because they anticipate liking for and similarity with strangers, but learning more about others leads to less liking due to the cascading properties of dissimilarity: The more people learn about others, the less similarity they perceive. I demonstrate the negative relationship between knowledge and liking both in laboratory studies and by using real-world pre-and post-date data from online daters, and discuss the costs and benefits of people holding overly optimistic first impressions.

Note on this work:

This chapter is a reprint of my manuscript on the topic of information delivery and impression formations. This work will be submitted for Publication as: "To Know, Know, Know You is to Like, Dislike, then Hate You: When and Why Familiarity Breeds Contempt", Michael I. Norton, Jeana Frost, Dan Ariely. The studies reported here comprise my first work on the relationship between information extent and impressions formed. The framing of this paper is on impression formation generally, how when people collect information about one another they react to it. Such information delivery more closely resembles online dating than social interaction in general. In the chapters that follow, I continue this work more explicitly in the area of online dating.

To Know, Know, Know You is to Like, Dislike, then Hate You:

When and Why Familiarity Breeds Contempt

"Blair's like a very sweet pudding. The first mouthful is nice, but then it becomes nauseating."

- A Tory MPs view of British Prime Minister Tony Blair (Remnick, 2005)

"Everything looks perfect from far away"

- The Postal Service, "Such Great Heights"

3.1 Introduction

Familiarity leads to liking; familiarity breeds contempt. The first proposition is supported by decades of research in psychology, while the second is supported by, among other data, the ever-increasing percentage of marriages that end in divorce, at least in the United States. I suggest, in fact, that both hypotheses are true, and that the seeming paradox can be resolved by determining to which domain each proposition applies. It is certainly a truism that the more I know about someone, the more I like them. There are six or so billion people any individual could possibly know: The vast majority, of course, consists of people one has not met, may never meet, and about whom one knows next to nothing (aside from some general knowledge about what language they are likely to speak, for example). There is then a smaller set of people – call them acquaintances – about whom I have some information, and for whom I have some liking: my classmates from kindergarten, for example. Within this subset is the still smaller set of people one holds nearest and dearest – friends, family members, significant others – about whom one often has a staggering amount of intimate knowledge, and correspondent levels of affection. Plotting amount of information on an imaginary x-axis and level of liking on the y-axis, then, would demonstrate a clear positive correlation between amount of knowledge about someone and the degree to which I like them. This correlation, of course, is due to the human tendency to screen individuals. Take the domain in which screening is most pronounced, and most consequential: Selecting a mate. The intrepid dater meets many individuals with whom she has one date – meeting for coffee, for example – then never sees again; as the quotes with which I opened suggest, many prospects who looked so good from afar when little information was known suddenly seems less attractive once more information is known, from the common man to world leaders. On the rare instance in which someone passes the initial screening, a second date

may ensue: Liking thus leads to the potential for further information acquisition. Over time, my dater completes the screening process, weeding people out until the person she likes best is the only one left standing – this person, of course, is also the one about whom she has gathered the most information. This screening process applies more broadly than just to dating, of course: In many settings in life, individuals learn a small amount of information about someone, decide they don't like them, and then never acquire further information about them. Thus the first proposition above, that familiarity leads to liking, is supported.

The present investigation explores whether people make the mistake of thinking that because more knowledge is related to more liking *across* many individuals, more knowledge also leads to more liking *within* any given individual. An analogy to literature reveals the obvious error. People have the strong belief that the endings of books are the best part, despite the fact that the author spent at least as much time on the rest of the book. Why might this be so? People only read the endings of books that match their tastes enough to ensure continued effort. Thus most endings of books are good, at least in each reader's experience. In contrast, people have read the beginning of many books that they did not match their tastes, and which they therefore never finished, meaning they did not expose themselves to these potentially less satisfying endings. Across many books, then, it is true that more information (in this case pages read) leads to more liking, but it is certainly not the case that continuing to read any single book will make it better. Individuals also make the error of believing this to be true about the people they encounter. In fact, I suggest that the relationship between knowledge and liking *within* individuals is not only not positive, but actually negative: More information about any one individual leads, on average, to *less* liking for that individual. When forming impressions of others, people engage in an active screening process in which they look for evidence that someone matches their taste; once evidence to the contrary is found, subsequent information is then interpreted as evidence of further dissimilarity. Thus on average, the more information learned about others the greater the level of perceived dissimilarity, leading to decreased liking. There are, of course, those rare cases in which people look and do not find a sufficient number of differences – as with their partners and close friends – and it is precisely these cases that drive the real-world correlation between knowledge and exposure; these cases may also drive people's perception that this correlation holds true *within* individuals, since my close others are much more salient to us than the thousands of people I have met briefly, didn't click with, and never met again. In the studies below, however, I demonstrate that – given one individual at random – the more knowledge acquired, the less this individual is liked, offering a process model for why familiarity breeds contempt and offering support the second proposition above.

3.1.1 Knowing and Liking

The hypothesis that individuals come to like a given individual less the more they know seems to conflict with research demonstrating that increased exposure to a given stimulus leads to increased liking for that stimulus (Zajonc 1968; Kunst-Wilson 1980); indeed, one of the most memorable demonstrations of the effects of "mere exposure" showed that increased exposure to people (in the form of confederate attending a large lecture) led

people to like that person more (Moreland 1992) , see also Saegert 1973). Importantly, however, these paradigms rely on *passive* repeated exposure: Participants saw confederates more or less frequently because they were trapped in the same lecture hall, for example; in many situations, of course, people take a more *active* role in determining to whom they are and are not exposed, by gathering information about others and deciding if they wish to continue the relationship. Indeed, Moreland and Beach (1992) specifically eliminated the opportunity for participants to acquire information, as confederates were instructed not to interact with other students. Thus while increased *exposure* to the identical stimulus often leads to increased liking, I propose that that acquiring additional *information* about stimuli can lead to less liking. Though people's faces may remain much the same over repeated exposures, nearly every interaction with a new person leads to acquisition of new knowledge, especially given the variability in people's personalities across time and social roles (Markus 1986). Two contradictory studies on the well-known effect of propinquity in liking are illustrative: Festinger, Schachter, and Back (1950) showed that the simple factor of how near people lived to each other predicted the frequency of friendships, but Ebbesen, Kjos, and Konecni (1976) showed that while propinquity does predict the emergence of friendships, it does an even better job of predicting the emergence of enemies, suggesting support for the notion that the more that is learned about someone, the less that person is liked, on average.[11]

Our hypothesis that more information leads to greater dislike also seems in conflict with two further lines of research, especially when these two lines are taken in tandem: research on the person-positivity bias, the notion that people are overly positive about other individuals (Sears 1983), and research on positive illusions in relationships, which suggests that many people hold overly positive views of their partners (e.g., Murray, Holmes & Griffin, 1996; see Gagné & Lydon, 2004 for a review). How can I reconcile my conjecture that more information leads to less liking with research that suggests that people are overly positive at first blush, and if anything feel even more positively towards those about whom they have the most information, their partners? Again, I do not argue that increased information leads to less liking in every case, but rather that this is the case on average. While individuals may feel positively about individuals at first blush this liking can quickly lead to dislike as more information is acquired. And while individuals may feel overly positively toward their significant others, these are the few individuals who have passed the screening process; less salient are the hundreds or thousands of individuals who failed the screening process, who were disliked and discarded.

3.1.2 The Screening Process: Searching for (Dis)similarities

Taken together, research on person positivity, mere exposure, and positive illusions in close relationships suggests that people are easily duped: Individuals like others at first sight, the more they see of them the more they like them, and marriage inevitably ensues.

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[11] Even within the domain of mere exposure, in fact, increased exposure does not always lead to greater liking: Swap (1977), for example, showed that while repeated exposure to a rewarding person lead to increased liking, repeated exposure to a source associated with punishment could reverse the effect. In addition, research on senses other than vision – such as taste – often demonstrates habituation effects such that increased exposure leads to less liking (e.g., Groves & Thompson, 1970).

As suggested above, however, people are decidedly more active in choosing their amount of exposure to others; indeed, one of the reasons the positive correlation between information and liking exists in the real-world is precisely due to people's tendency to limit exposure to those they dislike and increase exposure to those they like (see Denrell, in press). But how do people decide who they like and dislike? Clearly the valence of an initial interaction is important – someone who is rude, for example, is less likely (thought not always) to make the cut. Indeed, negative information often has much more of an impact than positive information, both generally (e.g., Baumeister 2001; Rozin 2001) and specifically in the domain of person perception (e.g., Kanouse 1972; Fiske 1980; Peeters 1990). While negativity is clearly an important factor in impression formation, some models suggest that people are primarily looking for information that is most diagnostic in forming impressions of others (e.g., Reeder 1979; Anderson 1981; Skowronski 1989). While negative information is often highly diagnostic, other types of information also can lend diagnostic power, including extreme information (e.g., Fiske, 1980) and a well-documented effect for a strong impact of information that is unexpected or inconsistent with previous information (e.g., Hastie 1979), an effect that is particularly pronounced when positive expectations are followed with negative information (e.g., Aronson 1965; Afifi 2000; Norton 2004).

The explorations of impression formation reviewed above have typically been conducted in isolation from other research exploring more social determinants of impression formation, which demonstrate the impact on liking of factors such as shared group memberships (e.g., Sherif 1961; Tajfel 1982) down to seemingly trivial factors such as shared birthdays (Miller 1998). In general, this research demonstrates the key role that that similarity – from shared groups to shared birthdays – plays in determining liking (e.g., Byrne 1971; Byrne 1986). How can I integrate the research reviewed above – which shows the impact of negative, extreme, and unexpected information – with the large body of research demonstrating the primacy of similarity in impression formation? I suggest that similarity may be the factor underlying the effects in many of the studies which explore the effects of different factors on liking. Again, the domain of dating is instructive: People frequently encounter others who are perfectly nice, yet who they simply do not have any desire to meet again. One key reason for this is similarity – people can simply feel that they and their date "don't have that much in common." Thus though the valence of the information may be positive, liking does not always follow; I suggest that this is due to the well-documented relationship between similarity and liking: increased similarity leads to more liking. Above, I reviewed literature suggesting that unexpected negative information carries a great deal of weight in impression formation; I suggest that these effects may be due in part to the fact that negative information is likely to be perceived as evidence of dissimilarity, because people generally have overly positive views of themselves (e.g., Goethals 1986). The fact that unexpected information also carries great weight in impression formation may also be due to perceived dissimilarity: people (often falsely) assume that others share their beliefs and behaviors (e.g., Ross 1977; Krueger 1997) and expect others to be similar in the absence of other information (e.g., Rosenbaum 1986)); it is the unexpectedness of finding dissimilarities with others that leads to decreases in liking (e.g., Hoyle 1993). Thus the impact of both negative and unexpected information thus may be due in part to the diagnosticity these

kinds of information have in determining dissimilarity. It is therefore not surprising that the two taken together – as when someone receives unexpected negative information about a target – should have such a strong impact on impression formation.

3.1.3 Dissimilarity Cascades

The fact that dissimilarity plays a key role in liking, however, does not explain why more information would lead to increased perceptions of dissimilarity, thus causing the decreases in liking I predict. Assuming that information about others – both similarities and dissimilarities – is encountered somewhat haphazardly, why would more such information tend to lead to greater perception of dissimilarity? I propose that because dissimilarity is so diagnostic in forming impressions, once one dissimilarity has been found, dissimilarity cascades, such that subsequent information is more likely to be interpreted as further dissimilarity, while if one hadn't encountered dissimilarity this information might be coded as similarity. This prediction owes it's lineage to early research on impression formation; Asch (1946) showed that presenting the exact same information about a target individuals (thus controlling for overall valence) but varying the order (such that the traits were ordered from positive to negative or negative to positive) drastically changed the overall ratings of the target – when the list started with negative traits, subsequent traits were likely to be interpreted in line with that frame, leading to judgments in the direction of the trend in valence. Kelley (1950) demonstrated the same effect when participants actually observed behavior: positive or negative expectations led subsequent behavior to be interpreted in that light; Nisbett and Wilson (1977) showed specifically that the very same aspects of an individual (e.g., mannerisms and foreign accent) were rated more or less positively depending on how warmly that person behaved. Just as one instance of negative information about a target can lead subsequent information to be interpreted more negatively, I suggest that one instance of dissimilarity causes subsequent information to be interpreted as further evidence of dissimilarity; thus I predict that perceived dissimilarity will cascade as more information is acquired about a target, leading to less liking for that target.

3.1.4 Overview

The studies presented below show that – holding the content of information constant – more information about others leads to less liking due to the tendency for dissimilarity to cascade through the course of information acquisition. I introduce a paradigm that attempts to mirror impression formation in the real world; given a random set of attributes that individuals whom I encounter may or may not possess, I are often randomly exposed both to which information I learn about first, and how much information I learn about any given person. I therefore create lists of traits and then randomly assign participants varying numbers of these traits, thus controlling for valence, and therefore testing only the impact of more information on liking.

I first show that while people are correct in intuiting the positive relationship between information and liking across individuals (Study 1A), they make the mistake of believing

that this relationship holds true within individuals, erroneously believing that that the more they get to know about a single person the more they will like them (Study 1B). I then demonstrate the negative relationship between knowledge and liking in the real world, showing that online daters tend to both know more about yet like each other less after dates than they did before those dates had occurred (Study 2). I then present three studies demonstrating the negative relationship between information and liking, by giving participants varying amounts of information (and randomly assigning that information) about targets and showing that those participants who were given more information liked targets less (Study 3A); I also explore a moderating role for gender of participants and gender of target, finding little impact of gender on the general bias (Studies 3B and 3C). Next I turn to demonstrating the mediator of this effect: Perceived similarity. I show that more information leads to both less liking and less perceived similarity, such that decreases in perceived similarity mediate the effect of information on liking (Study 4A). I then show that this effect is due to a tendency for dissimilarity to cascade: Once one dissimilarity is found, subsequent information is more likely to be seen as further evidence of dissimilarity (Study 4B). Finally, Study 5 demonstrates my mediator in the real world, showing that online daters like each other less after dates because they perceive themselves as less similar to their partners than they did prior to dates.

3.2 Intuitions Between and Within Individuals

In these first two studies, I wanted to demonstrate that while individuals are correct in intuiting the real-world relationship between familiarity and liking (the more I know about someone, the more I like them) across individuals (Study 1A), they incorrectly believe that this relationship is also true within any given individual (Study 1B).

3.2.1 Study 1A

Method and Results

Participants ($N = 294$) completed the survey by following a link on an online dating website.[12] I created five versions of the task, in which participants were asked to choose which of two target individuals they would like better, an individual about whom they knew one/two/three/four/five trait(s), or an individual about whom they knew two/four/six/eight/ten traits.

Across all versions, participants expressed the clear belief that they would like the person about whom they knew more, as 81% (238/294) chose the target about whom they had more information, $\chi^2 (1, N = 294) = 112.67, p < .001$, an effect that held across all versions (one vs. two: 77%, two vs. four: 88%, three vs. six: 81%, four vs. eight: 80%, five vs. ten: 83%), all $ps < .001$. Thus across all pairings, participants showed an overwhelming preference for someone about whom they knew twice as much information.

[12] Due to experimenter error I did not collect demographic information in this study.

3.2.2 Study 1B

Thus Study 1A shows that people correctly predict the relationship across individuals between information and liking: Given two individuals, it is the case – on average – that people have more affection for those they know best. In Study 1B, I show that people make the mistake of believing this relationship to be true within a given individual, that the more they learn about any one person the more they will like that person.

Method and Results

Participants ($N = 49$; 24 Male, Age $M = 19.73$, $SD = 2.50$) were MIT undergraduates approached in the campus student center. Participants were asked to choose whether, when they met someone for the first time, they tended to like that person more the more they got to know about him/her, or like that person less the more they got to know about him/her.

As with intuitions across individuals, participants held the strong belief that more information would lead to more liking within individuals, as the vast majority (88%) indicated that they liked people more the more they got to know about them, $\chi^2(1, N = 49) = 27.94$, $p < .001$.

3.2.3 Study 2: Knowledge and Liking in the Real World

In this study, I wanted to demonstrate, in the real world, the negative relationship between amount of information and liking. To do this, I asked users of an online dating website questions about their dating experiences: I asked some participants how much they knew about and liked someone with whom they were about to go on a date, and asked others these same questions about someone with whom they had recently been on a date. I expected that while knowledge about one's date would increase from pre- to post-date, liking would decrease.

Method

Participants ($N = 95$; 40 male, Age: $M = 35.59$, $SD = 11.38$) completed the survey by following a link on an online dating website. I removed any participants who completed the survey more than once; thus ratings pre- and post-date never referred to the same date, allowing us to examine average pre- and post-date reports of liking and knowledge.[13]

All participants first indicated their gender and age. Participants who completed the *pre-date* survey were asked to think about someone with whom they were about to go on a

[13] An alternative method, of course, would be to use the same respondent's pre- and post-date ratings of the same date; I avoided this methodology due to the obvious demand characteristics: Asking people about the same date pre- and post-date would assess respondents' *intuitions* about changes in knowledge and liking from pre- to post-date, a problem I avoid with the current methodology.

date, then were asked two questions designed to tap into the positivity of their expectations about the individual: "How excited are you about the person you are going to go on a date with?" (1: *not at all* to 10: *very*) and "How would you characterize your expectations about this date?" (1: *low* to 10: *high*); I created a composite measure of liking from these two items (Cronbach's $\alpha = .80$). Participants were then asked four questions designed to test for knowledge about the other person: "How much do you know about your date's a) hobbies and interests b) family c) occupation and d) social life?", each on 10-point scales (1: *not at all* to 10: *a lot*); I created a composite measure of knowledge from these four items (Cronbach's $\alpha = .82$). Participants who completed the *post-date* survey were asked to think of someone with whom they had recently gone on a date, and were asked the same six questions, with changes in tense as needed (e.g., "How would you characterize your expectations about future dates with this person?").

Results and Discussion

As expected, I found that respondents reported knowing more about the person post-date ($M = 5.78$, $SD = 1.78$) than pre-date ($M = 4.94$, $SD = 1.88$), $F(1, 91) = 6.15$, $p < .02$; there was no effect of gender of respondent, and no interaction ($ps > .25$). As predicted, these increases in knowledge were accompanied by *decreases* in liking: the high ratings people gave to their dates before meeting them ($M = 7.08$, $SD = 1.37$) were significantly lower after those dates had occurred ($M = 4.95$, $SD = 2.71$), $F(1, 91) = 15.59$, $p < .001$. I also observed a main effect for gender such that males provided higher overall ratings ($M = 6.94$, $SD = 1.69$) than females ($M = 5.28$, $SD = 2.61$), $F(1, 91) = 9.96$, $p < .01$, and these two main effects were qualified by an interaction such that males showed less of a drop from pre- to post-date ($Ms = 7.04$ and 6.78, $SDs = 1.34$ and 2.15) than did females, ($Ms = 7.11$ and 4.06, $SDs = 1.43$ and 2.51), $F(1, 91) = 11.07$, $p < .01$.

As predicted, the increases in knowledge that occur after meeting someone are accompanied, on average, by decreases in liking for that individual, a decrease that was more pronounced for females than for males. In the next three studies, I explore whether people are aware of this effect, or whether, as I suggest, people mistakenly believe that the better they know someone, the more they will come to like them.

3.3 More is Less

If participants' intuitions in Study 1B are correct, then I should observe a strong positive correlation between amount of knowledge about an individual and liking for that individual; if however, the decrease in liking I observe from pre- to post-date in Study 2 is due at least in part to the acquisition of more information, I should observe a negative correlation. In Studies 3A through 3C, I demonstrate that people's intuitions are wrong and that the experiences of online daters more closely conform to reality.

General Method for Studies 3A-3C

I created a standard list of 28 traits, drawn from Asch (1946), Edwards and Geary (1993), and Pavelchak (1989; see Appendix B for complete list). In all three studies, I presented

participants with variable numbers of traits drawn randomly from this list. Participants were told that I had asked other people to list traits that described themselves, and that I were randomly drawing from one person's list for them to see.[14] Participants read traits, then rated how much they thought they would like the individual on a 10-point scale (1: *wouldn't like at all* to 10: *would like very much*). While previous studies have carefully controlled the placement and spacing of traits (e.g., Anderson 1965; Hodges 1974; Bird 1987), this methodology allows us to more closely simulate how information about others is encountered in the real world, randomly and in varying amounts. Study 3A is a demonstration of the basic effect of more information leading to less liking, and Studies 3B and 3C replicate this effect while exploring the role of the gender of the target.

3.3.1 Study 3A

In this study, I wanted to demonstrate the basic effect, that – controlling for what information is presented – more information leads to less liking.

Method and Results

Participants ($N = 78$; 30 males, 46 females, 2 did not report gender; Age $M = 24.03$, $SD = 10.19$) who were approached on the MIT campus or completed the survey as part of a class exercise. Participants in this first study read either 2, 4, 6, or 8 traits – randomly drawn from the set of 28 – and then indicated how much they liked the target.

As predicted, and in contrast to participants' intuitions in Study 1B, I observed a significant n*egative* correlation between number of traits and liking, $r(78) = -.23$, $p = .05$. Because traits were selected randomly for each participant, this effect cannot be attributed to systematic biases on trait selection. Holding traits constant, participants simply liked target individuals less when they had more information about them.

3.3.2 Studies 3B & 3C: The Role of Gender

I had two primary goals in next two studies, both of which were targeted at exploring the generalizability of the effect. First, I wanted to replicate the effect using a more representative population, which I achieved using Internet samples. Second, and more interestingly, given my results from Study 2 in which females showed more of a decrease from pre- to post-date than males, I wanted to investigate the impact of gender on the negative relationship between information and liking demonstrated in Study 3A. Studies 3B and 3C explore a potential moderating role for gender of participant (e.g., perhaps males show a stronger negative relationship between information and liking), for gender of target (perhaps the effect is more pronounced when participants rate males versus females), and for the interaction of the two (e.g., perhaps the effect is different for males

[14] I told participants that I randomly drew from the traits that people listed about themselves in order to ensure that participants were not drawing inferences about, for example, the kind of person who would only list two traits about him/herself.

rating females than males rating fellow males). In Study 3B I asked participants to guess the gender targets after they had learned about and rated them; in Study 3C I told participants the gender of targets before they learned about and rated them.

3.3.3 Study 3B: Guessing Gender

Method

Participants ($N = 332$; 191 Males, Age $M = 32.71$, $SD = 10.56$) completed the survey by following a link on an online dating website. I again manipulated the number of traits participants saw, this time assigning participants to receive either 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 traits drawn from the list used in Study 3A. After reading the traits, participants were asked to rate how much they thought they would like the person on a 10-point scale (1: *wouldn't like at all* to 10: *would like very much*). They were then asked to guess the target person's gender.

Results

Replicating Study 3A, the correlation between number of traits and liking was significantly negative, $r(332) = -.13$, $p < .02$.

I asked participants to guess the target's gender after they had completed their rating. Interestingly, though females were no more likely to think the target was female than male (56% vs. 44%, $\chi^2(1, N = 141) = 2.05$, *ns*), males were twice as likely to think targets were female rather than male (68% vs. 32%, $\chi^2(1, N = 191) = 24.93$, $p < .001$. In addition, increased liking for targets was associated with increased likelihood of predicting that the target was female, $r(332) = .12$, $p < .03$, a relationship which held for both males, $r(191) = .10$, and females, $r(141) = .12$. Given these effects, I investigated whether and how participant gender may have interacted with predicted target gender to moderate the relationship between information and liking. Across all pairings of rater and target gender, however, the relationship between amount of information and liking was negative: males rating males, $r(61) = -.18$; males rating females, $r(130) = -.06$; females rating males, $r(62) = -.10$; females rating females, $r(79) = -.18$.

3.3.4 Study 3C: Assigning Gender

While in Study 3B participants were asked to guess the gender of the target person, in Study 3C I wanted to explore how evaluations might differ if participants were forewarned about the gender of the target – as they are, of course, in the real world. Though results did not vary by gender of target in Study 3B, it is possible that providing participants with gender before they begin to form impressions might impact the bias.

Method and Results

Participants (N = 470; 245 Male, Age M = 33.26, SD = 12.04) completed the survey by following a link on an online dating website. Because I were doubling my design by adding gender of target, I cut the number of trait conditions in half; thus participants saw targets with 1, 3, 5, 7, or 9 traits, then indicated their liking for the target.

I again replicated the finding that more traits led to less liking, $r(470) = -.11$, $p < .02$. As in Study 3B, this relationship was true for all four combinations of rater/targets: males rating males, $r(105) = -.15$; males rating females, $r(140) = -.06$; females rating males, $r(121) = -.14$; females rating females, $r(104) = -.11$. Thus whether my participants were male or female, and whether they rated males or females, the relationship held true: on average, more information about other individuals leads people to like them less.

3.4 Information, Similarity, and Liking

Studies 3A – 3C all demonstrated that more information leads to less liking; these studies tell us something about the robustness of the effect (it occurs across student and more general populations, and across all gender combinations of rater and target), but do little to explain the mechanism underlying the effect. As outlined in the introduction, I suggest that the negative relationship between information and liking is caused by the fact that dissimilarity cascades as information increases; because similarity is strongly related to liking, more information – and thus more dissimilarity – leads to less liking. In Study 4A I show that more information leads to increases in perceived dissimilarity, and that this increase in dissimilarity mediates the negative relationship between information and liking. In Study 4B I demonstrate more directly the cascading nature of dissimilarity, by showing that encountering one dissimilarity leads participants to interpret subsequent information as evidence of further dissimilarity.

3.4.1 Study 4A: Dissimilarity Mediates the Relationship between Knowing and Liking

Study 4A had three main goals: First and most importantly, I wanted to demonstrate a mediating role for perceived similarity in the relationship between information and liking. Second, I wanted to rule out a role for another potential mediator: confidence. Some research has suggested that confidence is associated with more extreme ratings (e.g., Hamilton 1972; Ronis 1985), so it is possible that as my participants receive more information, their ratings get more extreme due to increases in confidence; I thus assess participants' confidence in their ratings of targets to show that increased confidence cannot account for the negative relationship between information and liking. Finally, Studies 3A-3B relied on a limited set of traits gleaned from existing sources. In Study 4A I use a more externally valid set of traits by gathering traits that people spontaneously offered to describe themselves.

Trait Generation

I surveyed 120 people (52 male; age $M = 34.4$, $SD = 12.2$) who followed a link on an online dating website. Respondents were simply asked to list traits that described themselves. I eliminated duplicate traits and those that were gendered (e.g., "country gal"), leaving us with a set of 218 traits (See Appendix B-2).

Method

Participants ($N = 304$; 161 male, age $M = 34.54$, $SD = 11.19$) completed the survey by following a link on an online dating website. Participants read either 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 traits from the set of 218, then rated their liking for the target.[15] I then asked participants to indicate how confident they were in their ratings, on a 10-point scale (1: *not at all* to 10: *very*). Finally, I asked participants to indicate the number of traits they saw that they would also use to describe themselves, my measure of similarity.

Results and Discussion

First, using a new set of traits generated by previous participants, I again replicated the standard finding, that more information led to less liking, $r(304) = -.12$, $p < .05$. As before, the relationship held for both males, $r(161) = -.12$, and females, $r(143) = -.12$.

Most importantly, the present study allows us to explore the role of similarity. First, replicating previous research (e.g., Byrne, 1971), number of shared traits was related to liking, $r(304) = .16$, $p < .005$. Not surprisingly, number of shared traits was also positively related to number of total traits, $r(304) = .77$, $p < .001$; there are, of course, more shared traits in a larger array. This *positive* relationship between number of shared traits and condition do little to explain the *negative* correlation between number of traits and liking. If people were simply counting shared traits, and more information leads to more shared traits, we'd expect a positive correlation between number of traits and liking. I suggest, however, that while the *absolute number* of shared traits may rise as more information is encountered, the *relative percentage* decreases due to the cascading property of dissimilarity. As expected, when I calculated the percentage of shared traits, this measure was *negatively* related to number of traits, $r(304) = -.17$, $p < .005$, but remained positively related to liking, $r(304) = .37$, $p < .001$. Thus, as predicted, more information led to both decreases in perceived similarity and decreases in liking.

To demonstrate that similarity drove the negative relationship between information and liking, I conducted mediational analyses following the procedures outlined by Baron and Kenny (1986)(Baron 1986). First, number of traits was related to liking, $\beta = -.12$, $p < .05$. In addition, number of traits was significantly related to the mediator, percentage of shared traits, $\beta = -.17$, $p < .01$. Finally, percentage of shared traits was related to liking when number of traits was included in the regression equation, $\beta = .36$, $p < .001$, and the relationship between number of traits dropped to nonsignificant, $\beta = -.01$. A Sobel test

[15] Because I used the full range of traits from 1 to 10, I did not include gender of the target as a variable in ths experiment.

indicated that the drop (from -.12 to -.01) was significant, $Z = 2.73$, $p < .01$, demonstrating full mediation.

Finally, confidence in ratings was not related to number of traits, $r(300) = -.05$, $p > .35$, ruling out confidence as a potential mediator of the negative relationship between amount of information and liking.

3.4.2 Study 4B

Study 4A showed that the negative relationship between liking and information was driven by a curious effect: controlling for which information people learned, it was the case that the more people learned about someone, the less similarity they perceived between themselves and that person. I suggest that once one dissimilarity has been encountered subsequent information will be interpreted in light of that dissimilarity. Again, this logic follows from the initial Asch (1946) and Kelley (1950) studies, in which information once encountered changed the meaning of subsequently encountered information. I again randomly assigned traits that purportedly described another individual to participants, but this time asked participants whether or not each trait was also a trait they would use to describe themselves. I expected those participants who encountered dissimilarity early in the list of ten traits to rate more traits as dissimilar than those participants who did not encounter dissimilarity early in the list, demonstrating the cascading nature of dissimilarity.

In addition, Study 4B offers an opportunity to explore another aspect of impression formation: At what point in process of forming an impression my participants make their decisions about whether or not they like a target. All of the previous studies in which participants were asked to form impressions provided a maximum of ten traits; in Study 4B, I ask participants to indicate the point at which they decided whether or not they liked targets, in order to show that ten traits is a sufficient amount of information for people to feel comfortable making a judgment.

Method

Participants ($N = 199$; 72 male; age $M = 31.34$, SD = 11.85) were MIT and Yale undergraduates and graduate students who completed the web-based survey in a series of unrelated experiments or as part of a classroom exercise.

As in previous studies, participants were randomly assigned traits (in this study, I again used the set of 28 traits used in experiment 3A – 3C). Unlike in previous studies, each participant received ten traits, but received these traits one at a time. After seeing the first trait, participants were asked to indicate if that trait also described themselves, and then were shown the second trait and asked the same question; this process continued until participants had seen and rated al ten traits. After all ten traits had been presented, participants were asked whether they liked the person or not (Yes/No), and on what number trait they had decided whether or not they liked the person (1 through 10).

Results and Discussion

There are many ways to demonstrate the cascading of dissimilarity with these data, but the most straightforward is simply to examine how encountering dissimilarities early predicts encountering dissimilarities later. I did this by exploring whether those participants who indicated that the first trait was a dissimilarity found more dissimilarities in traits 2 through 10 than did those participants whose first trait was a similarity. The correlation between matching on the first trait and matching on traits two through ten was significant, $r(197) = .29$, $p < .001$.[16] Looked at by means, those participants for whom the first trait was a dissimilarity found fewer similarities in traits 2 through 10 ($M = 4.23$, $SD = 2.13$) than did those whose first trait was a similarity ($M = 5.37$, $SD = 1.65$), $t(195) = 4.19$, $p < .001$. Thus although all traits were randomly selected – meaning that there should have been, on average, the same number of similarities in traits two through ten regardless of whether trait one was a match or not – encountering a dissimilar trait early in the list led subsequent traits to be more likely to be interpreted as evidence of further dissimilarity. Summing across traits one through ten, participants who encountered a similarity on trait one ended up with 6.37 similarities, while those who encountered a dissimilarity on trait one ended up with just 4.23 similarities, and this difference in perceived dissimilarity had consequences: As before, liking was related to similarity, $r(192) = .22$, $p < .01$.

I also asked participants to indicate the trait on which they decided whether they liked the target or not. On average, people decided roughly two-thirds of the way through ($M = 6.25$, $SD = 2.72$), suggesting that most people felt they had enough information to decide, and that my choice of 10 traits was large enough to capture – for most participants – the span of information gathering they felt necessary to make a decision.[17]

3.4.3 Study 5: Knowledge, Similarity, and Liking in the Real World

The previous two studies offered strong evidence that decreases in perceived similarity account for the negative relationship between knowledge and liking (Study 4A), due to the tendency for dissimilarity to cascade (Study 4B). In Study 5, I return to the methodology used in Study 2, using pre- and post-date data from online daters, to explore my whether my mechanism – that decreases in liking go hand in hand with decreases in perceived similarity – holds in the real world.

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[16] This correlation may also reflect an individual difference: Some people are more likely to perceive dissimilarity with others. One way to address this possibility is to show that the dissimilarity of a random trait is a better predictor of those that follow it than those that precede it; a higher correlation with those that follow would offer further support for a cascading account. This is indeed the case: the fifth trait that participants received was more highly correlated ($r = .32$) with traits six through nine than it was with the same number of traits that preceded it, traits one though four ($r = .22$).

[17] As part of an additional study using the same design, I gave Yale undergraduate and graduate students (N =160; 52 Males, Age $M = 36.51$, $SD = 11.80$) 20 traits rather than the usual 10, and found that even here the mean trait on which people decided was within 10 traits ($M = 9.65$, $SD = 5.86$), offering further support for the idea that 10 traits are sufficient for participants to form impressions.

Method

Participants ($N = 247$; 112 male, age $M = 39.28$, $SD = 11.19$) completed the survey by following a link on an online dating website. I again used only participants who completed the survey once.

As in Study 2, participants first indicated their gender and age. Participants in the pre-date condition were asked to think about someone with whom they were about to go on a date, then were asked the same two questions from Study 2 that assessed liking for their date; I again created a composite measure of expectations from these two items (Cronbach's $\alpha = .85$). I added a question which asked how similar to themselves participants thought their date was, on a 10-point scale (1: *not at all* to 10: *very*). In the interest of brevity, I removed questions assessing participants' knowledge about their date. As before, participants who completed the post-date questionnaire were asked to think of someone with whom they had recently gone on a date, and were asked the same questions with changes in tense (e.g., "How similar to you was your date?").

Results and Discussion

As in Study 2, I found that the high expectations people had before dates ($M = 6.67$, $SD = 2.02$) were lower after dates had actually occurred ($M = 5.75$, $SD = 2.99$), $F(1,243) = 9.04$, $p < .01$, in this study, there was no main effect for gender of respondent, and no interaction, $ps > .20$. Confirming my prediction, the amount of similarity participants perceived between themselves and their potential mates before dates ($M = 6.43$, $SD = 1.98$) dropped significantly after those dates had occurred ($M = 5.65$, $SD = 2.60$), $F(1,243) = 7.54$, $p < .01$, and there was again no main effect for gender of respondent, and no interaction, $ps > .24$. Finally, the correlation between perceived similarity and liking was high, $r(247) = .70$, $p < .001$, and this relationship was the same both pre- ($r = .63$) and post-date ($r = .73$), suggesting that decreases in ratings of similarity went hand in hand with ratings of liking. As expected, then, increased knowledge about another – gained form going on a date – was accompanied by decreases in perceived similarity and decreases in liking, offering real-world support for the role of dissimilarity in the negative correlation between knowledge and liking.

3.5 General Discussion

While some research predicts that increased exposure to individuals leads to more liking, I show that when paired with simultaneous acquisition of greater knowledge and more variegated information, increased exposure leads to less liking for others: Familiarity can indeed breed contempt. The present investigation demonstrates that, on average, learning more about others leads people to like them less, and this effect was robust across different participant populations and for all combinations of males and females rating their own and the other gender. I showed that the effect is driven by decreases in perceived similarity, due to the unfortunate tendency of dissimilarity to cascade over the course of information acquisition; though people are initially positive about others and later hold positive illusions about their significant others, I demonstrate the careful

screening process that occurs in between. I moved beyond the laboratory to demonstrate these effects in the real world, showing that online daters liked their dates much less after meeting them then they did before, and these *decreases* in liking went hand in hand with *increases* in knowledge and *decreases* in perceived similarity. These effects occur despite people's intuition that more information leads to *more* liking, as they make the mistake of believing that the positive correlation between liking and information across individuals also holds within any given individual.[18]

3.5.1 More Is Less, but Why Is Less More?

Another way of viewing the negative correlation between information and liking, of course, is to ask why less information would lead to more liking: Why should people perceive more similarity with and experience greater affection for those about whom much is unknown? Such a relationship is surprising in light of many theories and much research suggesting that uncertainty – a state in which people find themselves whenever meeting a stranger – is an aversive state that people seek to avoid or at least reduce. The concept that uncertainty is aversive echoes through many domains of psychology: Festinger's (1957) theory of cognitive dissonance, for example, suggests that uncertainty about one's attitudes is an aversive state that must be rectified, while one of the underlying principles in research on decision-making is that decisions are difficult because outcomes are uncertain (e.g., Kahneman 1979). Indeed, the fact that an individual difference scale was developed to measure "Intolerance for Uncertainty" (Buhr 2002) suggests the widely-held assumption that uncertainty is aversive.

At the same time, however, uncertainty and ambiguity can have positive qualities – especially when viewed retrospectively; for example, though one may be unbearably worried and anxious when preparing to meet a blind date, this mood may still be preferable to one's mood when the date ends disastrously. In cases where outcomes are negative, the uncertainty I experience prior to learning that negative outcome will often be more pleasurable than the experience of the negative outcome. Wilson, Centerbar, Kermer and Gilbert (2005) suggest that ambiguity regarding the source of positive events can actually prolong the pleasure derived from those events, while certainty decreases satisfaction. Ambiguity has other benefits in the social world, allowing for more self-serving estimates of the prevalence of ones' opinions (Gilovich 1990) and more positive views of one's personality traits (Dunning 1989). Ambiguity can also license people to view others in a desired manner, a phenomenon that has been demonstrated repeatedly in the domain of stereotyping (e.g., Darley 1983; Norton 2004). I suggest that vagueness – in many dimensions – has this key property of allowing people to read into stimuli what they wish. Given that people in general expect to like others and find things in common with them (Sears 1983; Rosenbaum 1986), they may be likely to read positive things

[18] People's erroneous belief that more information about others is better offers an interesting parallel to research showing that while people believe they will be happier with more options to choose from, they are actually more satisfied with fewer (e.g., Iyengar & Lepper, 2000); while these studies show that more options leads to less liking for any one option, my studies suggest that more information about any one option leads to less liking for that option.

when a target is sufficiently ambiguous, as when only a small amount is known; as information increases – and ambiguity decreases – this person-positivity proves short-lived.[19]

Ambiguity is clearly one source of the liking I observe for those about whom little is known. A related line of research which focuses on impression formation during social interactions suggests that interacting with others about whom little is known has other positive consequences; as they gear up to meet strangers, people can experience increased liking for that individual (e.g., Darley & Berscheid, 1967; Goodwin, Fiske, Rosen, & Rosenthal, 2002). In general, self-presentational concerns can lead people to try harder in interactions, whether those concerns stem from trying to impress attractive people (Chaiken 1979) or avoid being labeled as biased by members of stigmatized groups (Norton 2005). In fact, though people's strong intuition is that interacting with those they know well will make them happier, interacting with strangers leads to greater improvements in mood (Dunn 2005), suggesting positive byproducts of stranger anxiety. Though people may prefer the comfort that comes with knowing more about an individual, this comfort can mean decreased efforts at self-presentation, and thus may lead people to miss out on the positive impact on moods that comes from interacting with those about whom little is known: In the domain of interaction, as well, less is sometimes more.

3.5.2 Learning about Liking

The heightened liking and expectations people experience when anticipating an initial encounter, of course, can have negative repercussions when that person turns out to be just another person; as reviewed above, high expectations that go unfulfilled can lead to highly negative ratings of individuals. Study 1B shows, however, that people fail to predict that their high expectations will go unfulfilled, as they expect to like people more the more they get to know about them. I wondered whether people's falsely high expectations might be tempered over time, as people learn that their expectations continually go unfulfilled. To return to the domain of dating: Does the dater who is going on his fifty-third blind date learn to temper his expectations and not continue to expect the perfect match? my data from my online daters in Studies 1 and 5 shed light onto the learning process. In both of these studies, I also asked participants to report the number of first dates they had been on since joining the site, and the number of relationships they had in their lives. I then looked at the relationship between these measures of experience – as well as another measure of experience, age – and my composite measure of expectations. I combined the two data sets, as results were similar across the two. Overall, there was little evidence of people learning to temper their expectations: age was not correlated with expectations, $r(338) = -.04$, $p = .43$, and both number of dates, $r(338) = -.07$, $p = .22$ and number of relationships, $r(341) = -.09$, $p = .087$ were not significantly correlated with expectations, though each was in the direction of tempered

[19] The lure of ambiguity may extend beyond social perception: Berger (1972), for example, suggests that art becomes more interesting as it becomes more ambiguous in form, echoing René Magritte: "The mind loves the unknown. It loves images whose meaning is unknown" (Gablik, 1985).

expectations after more experience.[20] Interestingly, males seemed to learn to temper their expectations more than females: For males, number of dates and number of relationships were negatively correlated with expectations, $r(149) = -.17$, $p < .04$ and $r(151) = -.15$, $p = .059$, respectively, while the same was not true for females ($rs = -.01$ and $-.06$, $ps > .40$), and these results cannot simply be attributed to the fact that males went on more dates or had more relationships than females (males reported an average of 17.82 dates and 6.18 relationships; females reported 15.29 and 4.88, respectively, $ps > .20$).

Why is there so little learning? First, as I demonstrated in Study 1B, people believe that more information leads to more liking, suggesting that people truly believe they will like people initially and come to like them more. Second, though I show that people are highly tuned to noticing dissimilarities, people may believe that they are looking for similarities, another form of thinking the best of others and expecting to like them. Indeed, in a brief survey, I asked MIT undergraduates approached in the campus student center ($N = 50$; 32 male, age $M = 22.31$, $SD = 4.50$) whether, when meeting someone for the first time, they looked for similarities or differences between themselves and the person; participants overwhelmingly reported looking for similarities (84%, $\chi^2(1, N = 50) = 23.12$, $p < .001$). While people truly believe the more they learn about others, the more similarities they will find and affection they will have, I hesitate to say that people are wrong – at least in the sense that this error is necessarily costly. While it is true that having high expectations dashed is disheartening, it is also true that the screening process is long and arduous, and it is possible that the robustness of positivity despite experience to the contrary may serve to motivate people to continue the screening process until they find their mate. Thus what may appear to be an error may have other, more adaptive functions (see Funder 1987).

3.5.3 Alternative Explanations

Our paradigm – assigning participants traits at random – was designed to allow us to explore the role of increased information without regard to the valence of that information, so that I could demonstrate the crucial role of perceived similarity on the relationship between knowledge and liking. While my findings revealed that perceptions of dissimilarity increased over time, it may also be true that the valence of the information became more negative over time as well. I do not doubt that as people received more information, they received more negative information (as they would have received more positive information, as well); as I suggested in the introduction, however, negativity may simply serve as evidence of dissimilarity, my proposed mediator. Indeed, the fact that perceived similarity fully mediated the effect of information on liking offers support for this account – were negativity exerting an effect independent of similarity that accounted for the relationship between information and liking, I would not have expected to see full mediation. A valence account and my dissimilarity account can be pitted

[20] In fairness to my online daters, their inflated expectations are derived solely from information that their prospective partners want them to know; the control afforded by online dating profiles and the internet more generally allows people to present the very best versions of themselves possible (e.g., Vazire & Gosling, 2004 and Walthers, 1996).

against each other in the following manner: A valence account would hold that more positive information should always lead to more liking (or a weaker version might hold that greater positive information should at the least not lead to less liking); a similarity account, however, would hold that positive information only increases liking to the extent that it also demonstrates similarity with one's rosy view of oneself. The available evidence tends to support the similarity account: Encountering individuals who are *too* good – those who resemble people's ideal selves rather than being similar to their actual selves – are actually liked less, showing that increasing positivity can lead to less liking, and again demonstrating the key role of similarity to the self in predicting liking (e.g., Herbst 2003). I cannot conclusively rule out an independent role for negativity in my studies, of course. One means of doing so, however, would be to explore these effects at the idiographic level, asking participants prior to my task to list positive and negative traits that described themselves, a design that would allow a direct examination of the relative impact of negativity and similarity.

Another possible explanation for my results centers on research demonstrating that more extreme judgments of others are associated with increased confidence in those judgments (e.g. Ronis 1985), an effect that may be particularly pronounced for negative judgments (Hamilton 1972). The accounts, however, generally suggest that increased confidence arises from the extremity of information; in Hamilton and Zanna (1972), participants were more confident about extreme negative ratings because they received unambiguously negative information, while other participants received mixed information (positive and negative). It is not surprising that people would be more confident to the extent that there is no ambivalence in the target information. This situation does not usually map onto the real world, however, where the information I learn about others is often of mixed valence, as is the case in my paradigm; and as I showed in Study 4A, ratings of confidence were not correlated with amount of information received, ruling out confidence as a potential mediator. Other research shows that though people believe that gaining more information about others will lead to more confidence in judgments of those individuals, the ambiguous nature of much of the information received when forming impressions actually fails to increase confidence (Frost 2005).

3.5.4 Accuracy in Person Perception

No discussion of confidence in ratings of stimuli would be complete without a discussion of the accuracy of those ratings, given the large body of literature that suggests the two are often unrelated (e.g., Oskamp 1965; Dunning 1990; Swann 1997; Kenny 2004) see Kenny, 2004). Indeed, implicit in my analysis of learning in my online dating samples is the notion that more dating should lead to more realistic – or accurate – expectations for those dates. Some research suggests that while people may have overly positive global views of their partners, couples are more accurate about their partners in relationship-relevant domains (Goodwin 2002; Gill 2004) an accuracy that can lead to greater relationship satisfaction (Gill 2004; Neff 2005). Though a cynic might claim that the fact that ratings in my experiments become more negative over time suggests increased accuracy on the part of my participants – boding well for these individuals when they

enter into relationships – I cannot say conclusively that the more negative opinions people hold after receiving more information are more accurate (since I cannot compare participant ratings to reality). However, the fact that more information leads to less liking suggests that expectations may be naturally tempered over time, though the slow learning by my online daters suggests that much time may be needed.

3.6 Conclusion

Benjamin Franklin famously stated that fish and visitors have one thing in common: Both stink after three days. The present research offers empirical support for Franklin's quip: The more people learn about others – and anyone who has had houseguests knows all too well how much one can come to know in a short time – the less they like them, on average. Thus to the list of other factors shown to play a key role in liking – such as propinquity and similarity – I add a novel and, at least to my participants, counterintuitive factor: Ambiguity. Unlike these other factors, unfortunately, which remain constant or increase over time, ambiguity necessarily decreases over the course of acquaintance, and the positive expectations people read into ambiguous others diminish as more and more evidence of dissimilarity is uncovered. Though people believe that knowing leads to liking, knowing more means liking less[21].

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4 Confidence in impression formation: How much do I need to know?

4.1 Introduction

In the previous chapter, I demonstrate some of the issues in impression formation based on sparse information. Contrary to intuitions, people liked those about whom they knew less. Such judgments are particularly problematic as an opinion based on scant data may not be correct. If a subject is certain of an evaluation, such a judgment could lead to disappointment – when an image held in mind does not match reality. On the other hand, if people understand the limitations of the online environment and do not invest confidence in judgment made within it, then accuracy failures will be less disappointing. In other words, confidence in online dating judgments may dictate how people feel about the activity as a whole.

Ostensibly, the more information available, the higher the confidence in a decision made based on that information. It follows that, as people acquire increasing amounts of information, they should be more certain of their judgment. While some evidence points to confidence in judgment increasing with expanded information (Oskamp 1965), at the same time people online and off tend to make rapid and perhaps premature social evaluations of one another based on shorthand cues (such as perceived group affiliations) (Walther 1996). This behavior suggests premature confidence in judgment.

In this work, I examine more precisely, how the confidence in an evaluation of another, develops. I am particularly interested in the relationship between information gathering and confidence levels – whether confidence does in fact increase as people obtain more relevant information. As people get to know one another, they trade personal stories, facts and anecdotes. In addition, current media technologies allow people to research others, garnering increasing amounts of information about each other. This work examines the impact of information search on confidence levels and beliefs about this process. Namely, at what point in my information search does one person feel they know another? Do we experience this feeling when we imagine we will?

4.1.1 Online Information Gathering

The online domain, relative to face-to-face contact, selectively hinders and augments information gathering strategies. During face-to-face contact, there are a variety of methods people use to get acquainted and reduce uncertainty about one another: some of them are direct, such as engaging a person with direct questions; and others are considered indirect, like observing people either with or without their knowledge (Berger 1979). But in most online interaction, (such as email) only a subset of these strategies exists. Observation is limited or non-existent; paralinguistic information is invisible. Consistent with Social Information Processing theory, people do adapt. Users engage in

more direct information gathering online (the strategy that is available to them online) than they do during face-to-face interaction (Tidwell 2002). And people online employ, strategies unique to new media, termed extractive strategies, such as searching for an individual, reading message postings, and personal sites created by the target (Ramirez 2002). People commonly admit to "googling" one another before a meeting and numerous services (e.g., companies such as ZoomInfo and webInvestigator) thrive on conducting background checks and distributing biographical information. One such service purports to have information on 90% of the U.S. population (NetDetective). Therefore, while mediated communication limits some methods to collect information about one another, people appear to adapt with new communication strategies.

In online dating specifically, websites offer a variety of tools for members to learn about one another in both direct and indirect ways. In social networking sites, users list a variety of personal preference information as well as biographical statistics (e.g., Friendster and myspace). And more prototypical dating sites offer biographical information along with newer sources such as audio and video clips (Match.com). One such site even uses background checks on all of its customers as its primary marketing device (True.com). These behaviors and niche businesses suggest that people routinely use the Internet to both overtly and clandestinely collect a variety of information.

4.1.2 Confidence and Information Gathering (Online)

The assumption in these information gathering efforts seems to be, at least partially, that finding out more information about another person will lead to heightened feelings of knowing that other individual. Work outside of impression formation, coincides with this thinking. Confidence, irrespective of accuracy, has been shown to increase with expanded information (regarding a case study) (Oskamp 1965) as it does with practice effects and experience (Paese 1991). This work seems to recognize that confidence ought to be calibrated according to how strong the basis is for the decision.

When people make a decision online, they make it based on less information. In some cases, people do perceive the limitations of new media. In the area of online impression formation, people factor in media type in their ability rate others. People refuse, for example, to make attributional ratings on specific dimensions of personality after CMC but not after FTF contact (Hancock 2001). This behavior suggests some trepidation, or lack of confidence, in judging another person in low information, online conditions.

But observations of impression formation and online activity suggest that people are not always moderating confidence levels contingent on information present. In some situations, people make rapid judgments about one another that persist across time and enjoy above chance levels of accuracy. By evaluating short samples of information, subjects are able to make predictions about personal character; from small voice samples, people can predict rates of malpractice suits (Ambady and Chaumeton 2002), and make judgments about personal attributes, by viewing still photographs and short video, people judge sexual orientation at better than chance levels (Ambady 1999). Actions taken online also point to a tendency to draw quick conclusions about one another. Although

online environments are not as data rich as face-to-face ones, they still seem to engender some intimate social connections. While in some defined collaborative task situations, people in online environments act more impersonally than those working together face to face (Social Presence theory), there is also a tendency for people to engage in intimate social conversation generally avoided in casual offline interaction, termed hyperpersonal communication (Walther 1996) and to engage in anti-social behavior like flaming not normally tolerated in offline exchange. Therefore while ostensibly people ought to operate in a restrained manner online, people often create and act upon both positive and negative attributions. Indirectly these people seem to be exhibiting high confidence in their social impressions. One proposed mechanism to account for these feelings is that people identify with others they meet online. Depending on the task, online interaction elicits both in-group and out-group alliances that inspire assigning attributes to targets accordingly (Lea 1991). These evaluations may bias judgment and impact confidence. In related work, online interaction has been shown to elicit more "extreme" ratings [Hancock, #99]. And, heightened confidence, in turn, has been associated with extreme ratings (Ronis 1985). These results together suggest that people feel prematurely confident about the judgments of others they make during mediated exchanges.

Such rapid decision-making may not follow beliefs about best practice. People do seek out information. This searching strategy indicates that people perceive a benefit in gathering information before reaching a decision. People may believe they ought to be more confident of a well-informed versus a not well-informed decision. This does not mean that beliefs necessarily guide behavior. It does suggest that cueing people to the current information conditions before making a decision could impact the ultimate choice. When subjects know information will increase over time they appear to calibrate confidence accordingly (Paese 1991). If so, in conditions that cue beliefs, people will act according to them. For example, when people were exposed to increasing amounts of information pertinent to understanding a case study, their confidence in evaluating that case increased as more information became available (Oskamp 1965). In this situation, the process of revealing information incrementally may have cued subjects to the fact that there ought to be a relationship between information and confidence levels. In cases without such cues, such as online interaction without contrasting offline contact, behavior may function in ways that depart from belief systems. Such a situation could result in intimate social exchanges such as hyperpersonal communication. More precisely, beliefs about confidence and unchecked confidence levels could operate in opposite directions.

4.1.3 Possible scenarios and questions to be addressed

Drawing from the literature described above, the dynamics of confidence in online dating impression formation may vary in a few ways. First, the time course of confidence is unclear; it may rise incrementally and monotonically; as such, it may resemble how people analyze and revise their assessment of case studies described above (Oskamp, 1965). Alternatively, confidence online could increase abruptly because of visible salient cues such as those identified in the thin-slice literature (Ambady 1992) or perceived group affiliation or alienation (Lea 1991), explaining some of the experiences users have online. In addition, confidence may increase according to differing factors including time,

expanded information set, relevancy of the information, experience with the task (Paese 1991), and/or according to beliefs held. Oskamp's case-study example (1965) conflates most of these possibilities since in that experiment people saw relevant information, had increased practice with the task, and each incremental increase may have cued beliefs about confidence.

While there are many possible questions to explore, this work focuses on only a few. In particular, I limit my inquiry to the impact of solely relevant information on impression formation. In the paired-down environment of online communication (and online dating specifically), many pieces of information feel relevant. My work focuses instead on the relationship between information level of relevant information and confidence, the content and impact of beliefs on confidence and how peak confidence coincides with when a decision is made.

Our main hypothesis in this work is that behavior will deviate from beliefs. People will report a relationship between information extent and confidence but will not act on such a belief. As such, intuitions and behavior will function in opposing directions. I further argue that choice will follow beliefs when people are cued to engage them. Therefore, beliefs and choice will function together when people are told to use beliefs in choice.

To test these hypotheses, I outline a series of studies. In Study 1, I probe people for their beliefs about confidence. I ask them to report their intuitions. Studies 2 and 3 measure levels confidence with differing amounts of descriptive information and differing sets of attributes. I document the relationship between information and confidence and test whether behavior follows beliefs held. In Study 4, I extend my findings to include a new task and preference information. And in the last two studies, I examine if people are cued to employ beliefs. To do so, in Study 5, information is revealed over time and confidence is measured throughout that process. In Study 6, subjects are explicitly told that information will increase through the study, in an effort to cue beliefs more clearly. Together these studies explore both beliefs about and behavior in impression formation.

4.2 Study 1: Intuitions on Vagueness and Confidence

To begin, I examine people's intuitions about how they form impressions. I address the question: Do people see a connection between the amount of information they have and their confidence in subsequent decisions? In the first study, I asked people directly to report their intuitions. By doing so, I capture a measure of beliefs about confidence.

4.2.1 Method

People online dating voluntarily followed a link posted on a national online dating site to my web survey. All subjects for all studies were recruited through the same site unless otherwise specified. I asked participants (N = 159, 84 males, range: 18 - 64, M = 33.5) if given a choice whether they would be more confident in their ratings of liking for someone who they knew more or less about. I had five conditions. People were asked

specifically if they would be more confident of an evaluation based on particular numbers of traits, 1 vs. 2, 2 vs. 4, 3 vs. 6, 4 vs. 8, or 5 vs. 10 depending on the condition. Participants then rated how confident they would be in their rating of someone for whom they had the smaller amount of information, then rated how confident they would be about someone for whom they had the larger amount of information, both on 10-point scales (1: *not at all* to 10: *very much*).

4.2.2 Results

As hypothesized, participants expressed a belief in the relationship between information and confidence. People predicted they would be much more confident in their ratings of those about whom they had more information ($M = 7.18$, $SD = 2.00$) than about those they had less information ($M = 4.75$, $SD = 1.93$), paired $t(157) = -18.98$, $p < .001$. This trend held true across all conditions (See Table One). In this study, I demonstrated that people believe they will make more confident decisions if they have more information on which to base the decision.

Condition	Less Information	More Information	
1 vs. 2	4.68 (2.36)	7.00 (2.20)	$t(24) = -7.25$, $p < .001$
2 vs. 4	4.31 (2.33)	6.46 (2.16)	$t(38) = -7.54$, $p < .001$
3 vs. 6	5.10 (1.75)	7.30 (1.97)	$t(29) = -6.46$, $p < .001$
4 vs. 8	5.00 (1.35)	8.04 (1.43)	$T(24) = -14.34$, $p < .001$
5 vs. 10	4.79 (1.63)	7.38 (1.84)	$T(38) = -10.92$, $p < .001$

Table 3 In each condition, subjects report that they would be more confident of a choice based on more information than they would be for a choice based on fewer pieces of information.

4.3 Study 2: Choice and Confidence

In Study 1 participants indicated their intuitive beliefs, that having an increased amount of information available would lead in turn to an increase in confidence in evaluating a description. But in Study 2, I sought to test whether this intuition corresponded with revealed preferences in a rating task. Do people act upon the beliefs captured in Study 1?

4.3.1 Method

470 participants completed the survey by following a link on a major online dating website. Participants first indicated their gender and age. They were told that I had asked individuals to list traits about themselves, and that I had randomly selected some traits from those lists. I chose 28 traits (from Asch, 1946; Edwards & Geary, 1993; Pavelchak, 1989, see Appendix B); and a subset of traits was randomly selected for each participant. There were five conditions. Participants saw a list of 1, 3, 5, 7, or 9 traits that described a target. After reading the traits, participants were asked to rate how much they thought they would like the person on a 10-point scale (1: *wouldn't like at all* to 10: *would like*

very much) and to gauge (on a 10-point scale, 1 = not at all to 10 = very confident) how confident they were in their rating. Finally, I asked participants to fill in the number of traits they shared with the target.

4.3.2 Results

In this study, I saw how confidence ratings differed depending on the amount of information on which the rating was made. Contrary to people's intuition, confidence was unrelated to number of traits presented, (r = -.02). Thus, people in less information conditions (even those viewing a single adjective descriptor) were no less confident than subjects in the high information conditions (up to ten traits). Information did not increase participants' confidence in their ratings. These results stand in opposition to intuitions recorded in Study 1. At the same time, my measure of confidence was related to liking, $r(470) = .27$, $p < .001$, suggesting that participants were more confident in ratings of those they liked the most.

In addition, as reported in Chapter 3, I found relationships between liking ratings and information. More traits was correlated with less liking, $r(470) = -.11$, $p < .02$. This relationship was true for all four combinations of rater/targets: male rating male (-.15), male rating female (-.06), female rating male (-.14), and female rating female (-.11). Consistent with the attraction literature that suggests similarity to self as a appealing characteristic, liking was related to number of shared traits, $r(468) = .18$, $p < .001$. Also, the gender of the target impacted ratings. Participants overall, men and women, provided higher ratings for targets they knew were female, $r(470) = .09$, $p < .05$.

4.4 Study 3: Real Traits

The previous study used a set of traits gleaned from existing sources. These may or may not be the types of adjectives people use to describe themselves. To address this possibility, in this study I collected autobiographical traits from people online dating and used these self-reported adjectives to run the same paradigm as in Study 2 (these are people accustomed to volunteering self-descriptions for the purpose of online dating). By collecting these adjectives from online dating-site users to describe my target individuals, I are mimicking the way people represent themselves in online communication, specifically in online dating and social-networking applications. I expect the same pattern of results as in Study 2 with these ecologically valid traits.

4.4.1 Trait Generation

To collect the stimuli, I surveyed 120 people from an online dating site (68 women, 52 men) ranging from 18 to 77 years old (M = 34.4, SD = 12.2), who were asked to list traits that described themselves. I eliminated duplicate traits and those that were gendered (e.g., "country gal"), leaving us with a set of 218 traits (see Appendix). These traits were aggregated and subsets were randomly chosen for each subject.

4.4.2 Method

304 participants recruited through an online dating site (age: range 18-62, $M = 34.54$, $SD = 11.19$, 161 Male, 143 Female) participated in my study. As in Study 2, these participants saw lists of descriptors about a target (the list ranged in length from 1-10 traits). Again after reading these descriptions, participants then rated level of liking, confidence as well as number of shared traits and perceived similarity to self (all on a 1-10 scale).

4.4.3 Results

I replicated my findings using participant supplied traits. As in the previous study, confidence is not related to condition; people report equal levels of confidence independent of the number of provided descriptors ($r = -.05$, ns). Instead, confidence is correlated with liking ($r = .12$, $p < .05$). As such, liking may motivate increased confidence that the evaluation is in fact justified. And again, choice operates against beliefs held.

Also, I again found a negative correlation between the number of traits and measures of liking, $r(304) = -.12$, $p < .05$. This result holds for both male (-.12) and female (-.12) participants.

4.5 Study 4: Image-based preference study

In Study 2 and 3, subjects rated others based on lists of personality descriptors. These descriptors resemble the ways in which people describe themselves in personal profiles posted on dating sites. In this study, I strove to explore two issues. First, I sought to understand how people react to other types of information. When people meet, they exchange a variety of information types; for example, interests they share and preferences in tastes and activities. Do people understand the limitations of this type of information in the same way as trait information? Does this confidence information relationship persist with different types of information? Are people aware of this relationship?

To examine these questions, I chose to create a new task with novel content and add additional measures. Specifically, I integrated preference-based information into a picture-based survey. In this survey, participants input their preferred item and see whether their preferences "match" those of a hypothetical target. In each trial of the experiment, subjects saw three thematically related pictures and choose their preferred item from the triptych. After a subject clicked on one of the three pictures, the screen changed to reveal whether the subject "matched" a hypothetical other user. Through this game-like survey, participants both share and compare preferences with another.

After proceeding through ten trials of the experiment, subjects filled out a short survey. This survey included the same measures as in Study 3 plus two additional measures. Subjects were asked both how telling the viewed information was about the target (who

supposedly supplied it) and how telling the subjects' inputs would be to a target. Using these measures, I could see how level of seeming informative interacted with confidence.

4.5.1 Method

162 people (105 women, 57 men) completed the survey. Subjects were told that other people had taken this survey and their responses were going to be compared to those of someone who had already completed this survey. After reading the instructions, subjects were shown a screen with three pictures and instructed to choose their favorite of the three. After the subject clicked on an image, the next screen revealed if they had in fact "matched" the other person. A button click served to bring the subject to the next trial with a new category of images. The image triads included subjects such as favorite female vocalist (Britney Spears, Billy Holiday, or Patty Smith) and favorite source of protein (beef, chicken or tofu). Participants saw either 3 or 10 trials in total depending on which of two conditions they were randomly assigned. After completing these trials, participants competed a short survey. They were asked the same questions as in the previous studies (to rate the person they had just "played," to rate their confidence in their judgment as well as similarity to self) as well as input how informative their choices were and how indicative the other person's choices were to the subjects.

4.5.2 Results

This study has two new components: one is whether preference data is integrated into impression formation in a way similar to trait data; the second is about the perception of how informative information is and how this perception impacts confidence. This second aspect taps beliefs about impression formation. Consistent with Study 1, subjects did report knowing more about the target and communicating more to the target in the higher information condition than the lower information condition. Participants saw their own choices as more informative in the 10-trial condition (M=6.94, SD2.1) than the 3-trial condition (M=5.91, SD=2.8) ($t[160]= 2.62$, $p<.01$). And, subjects saw the other peoples' choices as more telling in the 10 trial condition (M=6.50, SD=2.1) than in the 3-trial condition (M=5.68, SD=2.9) ($t[160]= -2.01$, $p=.045$). This result indicates that subjects understand that more information is more informative for both parties involved in the interaction.

Still, as in the previous studies, I replicated the finding that more information does not lead to higher confidence. Although subjects believed they communicated and received more information in the high-information condition, confidence ratings in the two conditions did not differ. Subjects made confidence measures of equal strength whether they saw 3 (M = 7.31, SD=2.50) or 10 (M = 7.20, SD=2.32) trials of revealed preferences ($t[160]= .54$, $p=.58$). Therefore, although people seemed to realize the importance of information, they did not integrate this understanding into their confidence measures.

As in the other studies, confidence was still correlated with ratings of how much the participant thought he or she would like the target ($r(160) = .23$, $p<.0001$). This study replicated the strong correlation between liking and perceived similarity to self ($r(160)$ =

.59, p<.0001). Unlike my other work, liking in this study was not correlated with the study condition.

4.6 Study 5: Revealed traits and confidence

People's overall confidence about a judgment is not correlated with the amount of information given either in the lists-of-traits or in the picture-preference tasks. But, these results may be due to experimental conditions: both cases, participants made judgments based on a static set of data. As such, these tasks did not cue participants to search for more information or to respond to new information. In short, these tasks did not cue people to employ beliefs. To address this limitation, I ran Study 5 to examine the effect of revealing information over time on confidence levels. In this study I tested whether revealing information over time would prompt people to use information as a cue to confidence (Paese 1991) and look at if people update confidence based on the information revealed. This also allowed us to examine more precisely the time course of developing confidence within one subject's decision-making experience.

4.6.1 Method

125 people (46 men and 79 women) ranging in age from 18 - 71 years old (M = 31.9, SD = 12.7) participated in this study. Subjects were recruited through an online dating site as well as from both the MIT and Yale communities. The subjects completed the study online through my web page. Five people were excluded from the analysis because they failed to complete the study. On the first page, subjects inputted basic biographical information including gender, relationship status and age and read the instructions. These instructions mirrored those of Study 2 and 3, with the additional information that traits would be presented one at a time and subjects were to rate the target after viewing each trait, based on the cumulative trait information. On each page that followed, the subjects saw a new trait and were asked to rate how much they thought they would like the person, how confident they were of this evaluation and now how similar they felt they were to the target. Every subject saw a total of 10 traits and answered these questions 10 times. These traits were a random selection of the 28 traits used in study 2. After proceeding through these pages, subjects answered a final set of questions. They were asked if they ended up liking the person and the trait number (1-10) on which they thought they came to this conclusion. Below these questions, I listed the traits seen. Subjects were asked to go through the list and check off which ones they had in common with the target. The study took about 5 minutes to complete.

4.6.2 Results

In this task, subjects were exposed to information in an incremental fashion and cued by the instructions to some aspects of this process. Even with this difference in paradigm, this study replicated my main findings from Studies 1-4. As people progressed through the study, they had increasing amount of information upon which to base their judgment, but this did not appear to impact confidence levels. There was no correlation between the

trial num (the number of traits read thus far) and confidence ($r(1250) = .027$ $p = .34$). Therefore people did not seem to consider increases in information as a factor in calibrating confidence. Instead, as in my other studies, confidence was correlated with another feature, the level of likeability ($r(1250) = .400$ $p < .001$).

Our next step was to look at the development of confidence over time and the relationship between confidence and the formation of the final judgment. Although people reported only making their decision after reading two-thirds of the traits that were provided ($M = 6.43$, $SD = 2.70$), they reached their maximum confidence level much earlier in the study ($M = 3.41$, $SD = 2.57$). Consistent with this finding, there was no correlation between the point at which they reported decisively evaluating the other and the trial with the maximum confidence level ($r(125) = .014$, ns). As such, confidence levels do not correspond with reported point of decision-making. Rather, confidence preceded the stated end of the information search process.

This discrepancy between peak confidence level and stated amount of search could also point to the difference between stated beliefs and behavior. Although people claim to have looked at six traits before making a final evaluation of the target, their confidence measures indicate that they believe in the accuracy of their evaluation at an earlier period in time. As such, peak confidence level, or the feeling of knowing, comes before the report of knowing as if people consciously attempt to withhold judgment although in some ways they do not.

Also of note, people were favorably disposed towards the target. In a yes-no question on whether the subject ultimately liked the target, 83% of people stated they did with only 14% people stating they did not and 3% people failing to answer the question. This may reflect both a person-positivity bias and a reluctance to dismiss another person entirely.

4.7 Study 6: Cued revealed traits

Although in Study 5, subjects saw increasing amounts of information over time, they were not cued explicitly to expect further information. This lack of a cue could account for the failure of people to calibrate confidence according to the amount of information received. While such a process seems analogous to real life (where people receive information over time but are not precisely told to expect more information as such), I chose in Study 6 to make this process more explicit, in an effort to indicate to people clearly the incompleteness of the information.

4.7.1 Method

74 People recruited from MIT and Yale ranging in age from 18 – 51 ($M = 30.48$) participated in this study (26 men and 47 women). All Subjects filled out the survey on a web page as part of a collection of experiments. MIT students were paid a flat rate of $3 for filling out the survey while Yale students were entered into a lottery for a $50 Amazon gift certificate.

The study proceeded as in Study 5 except that subjects were clearly told in the instructions that they were going to see 10 traits that described a person, one at a time. As in Study 5, subjects saw one trait per page and evaluated the target after seeing each trait accordingly using the same measures as in Study 5. They saw one trait after the other, 10 traits in total, after which, participants again recorded whether they liked the target, when they decided on that evaluation, and reviewed the traits seen checking off those they shared with the target.

4.7.2 Results

Again confidence did not increase across trials. Although people were both cued to the fact that more information was coming and were given that information, there was no correlation between trial number and confidence level $r(743) = .027$.

Again, subjects report deciding about the target after seeing almost two thirds of the trait information ($M = 6.01$, $SD = 2.64$).

4.8 General Discussion

These studies extend my understanding of the relationship between confidence in an impression formed and the amount of information the impression was based upon, and how beliefs about behavior and behavior itself deviate in this domain. I examined beliefs about confidence in a few ways. In Study 1, I capture people's attitudes directly on the subject. Participants report thinking that they would be more confident about an impression formed based on more rather than less information. In Study 4, I test whether people view information extent as related to revealing and gathering data about another person. In that study, people do in fact report learning and communicating more in the high-information condition as compared to the low information condition indicating awareness that information is pertinent to forming an impression of another person. And lastly, the results of Study 4 report learning and communicating more in the high information condition compared to the low information condition indicating awareness that information is pertinent to forming an impression of another person. And lastly, the results of Study 5 indicate how beliefs and behavior may depart. In that study, people report viewing six pieces of data before reaching a final decision. But, the same group exhibits a peak in confidence levels at an earlier stage in the study. Thus at least suggesting there may be a difference in when people choose to report a decision has been made and when they experience the feeling that they know their answer. my behavioral results stand in opposition to this work. In all cases, peoples' confidence is unchanged by information presented. Even in Study 6 where I explicitly cue subjects to expect more information, they view information as a cue to increase confidence across trials. Therefore although my original hypothesis that beliefs stand in opposition to behavior has been substantiated, I did not locate a task in which these beliefs impacted confidence ratings.

Confidence is associated with one of my measures. Specifically, confidence levels are consistently significantly correlated across studies with how much a subject anticipated liking the target. my initial analysis suggested simply that the more a subject reported liking the target, the higher the confidence in this evaluation. Closer examination of these results indicate a slightly more complex story.

To explore the relationship between confidence and liking more precisely, I measured the mean rating of the confidence for each response on the liking scale. This atypical analysis highlights the relationship between rating and confidence demonstrating that not only does confidence increase with increasingly positive liking ratings, confidence is also highest regarding targets rated the lowest. Consistent with the findings of Ronis and Lipinski (Ronis 1985), confidence is highest for what they label the most extreme ratings, both high and low. A retrospective look at all of my studies indicates this is a persistent trend in the data. In Study 3, for example, the real traits study confidence measures are highest for ratings of those described as a ten (M = 9.25, SD = 1.7.) and second highest for the targets rated a one (M= 9.14, SD = 1.94) and lowest for people rated as a four (M = 6.88, SD = 1.78) and second lowest for those described as a six (M = 6.91, SD = 2.08) (See Figure 3).

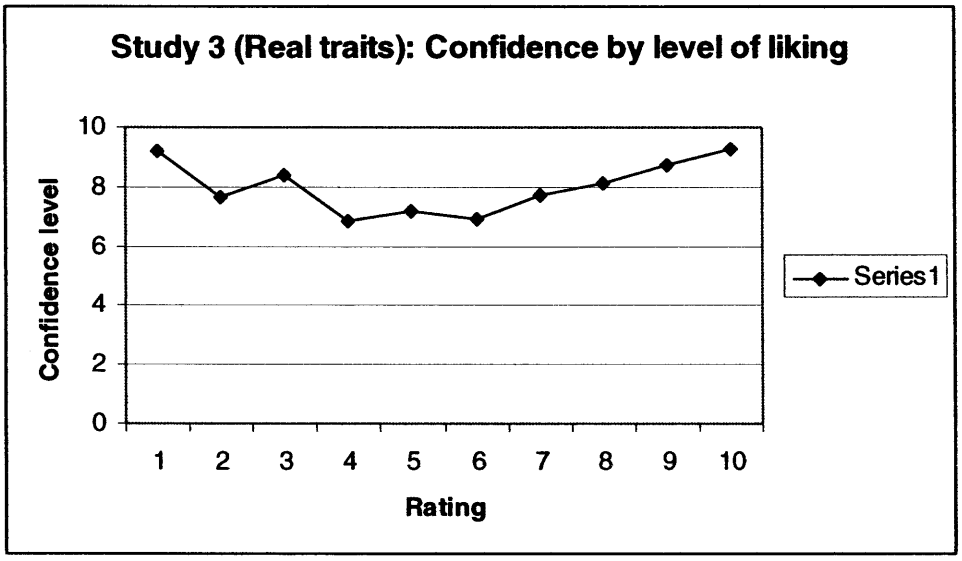

Figure 3. Confidence ratings peak for targets rated as extreme both positively and negatively. Participants felt more certain about those they rated with extreme evaluations.

People feel very confident about both identifying a target as very likeable as well as dismissing a person as unappealing. This result demonstrates how confidence functions in decision making in two ways. If people are confident about their most negative evaluations, then they may feel justified in filtering out a target as unworthy of further consideration. In doing so, people may reduce the emotional cost of omitting a target. As people encounter others both online and off, they have limited resources to invest in each new other. Therefore, one step in the process of finding someone interesting is excluding others. Increased confidence in omitting the least attractive options allows for a decrease

in the set to be considered. At the same time, increased confidence for likeable others helps to justify choosing a specific person over others, making the decision to pursue someone online as having a stronger basis. As stated above, such confidence is probably not warranted; yet it ultimately may facilitate the decision-making process. People, with limited social resources, must feel that the targets they invest in have been identified for a real reason just as those omitted were done so justifiably.

In mediated communication, people may believe that they will make a more confident decision if they were to have more information. Following this inclination, they may seek out relevant data spending time and money to accumulate facts that appear to be of some import. But, these data suggest that such efforts have little consequence for feelings about decisions made. If people are just as willing to ascribe confidence to a decision based on a single piece of information, as they are a decision based on ten pieces of information, perhaps information searching is not crucial. On the other hand, perhaps these beliefs help us. If I were to follow my inclination to ascribe high confidence measures to unfounded decisions, I may continue to make faulty decisions. Searching for further information may indeed help us make better decisions. Still, shouldn't I know ourselves better?

4.9 Conclusion

In impression formation, calibrating confidence or failing to has real implications for emotional well-being. Positively oriented over confidence could lead to unrealistic expectations and finally disappointment, while negative over confidence could lead to misses – people omitting appropriate options. Specifically in online interaction, people may react prematurely to someone they know little about either over-investing unwarrantedly or skipping over opportunities. Consequently, people ought to reserve confidence in a judgment until they have gathered substantive information with which to make a decision. Confidence, it seems, should be tied to the amount of information available to make the initial decision.

This chapter focuses on the relationship between confidence levels and information content. My results demonstrate that beliefs correspond with the logic that a decision worthy of confidence is one based on extensive information. People believe intuitively that they will be more confident of an evaluation of another if it is based on more (opposed to less) information. But my subsequent work demonstrates that choice does not mirror beliefs. In revealed preference tasks, where subjects made judgments and rated their confidence in those judgments, confidence levels were not related to information level. In Study 3, I replicated this result using traits generated by online daters to describe themselves. In Study 4, I expanded this finding to include a novel task and began to further specify the effect with added measures. Users in that Study chose their favorite from a set of three related pictures. Although confidence was still no higher in the more-information condition than the less information one, subjects report that the larger information condition was "more informative" than the smaller one. These results suggest that subjects recognize that there ought to be a relationship between confidence and information although these beliefs do not guide behavior. In the final two studies, I tried

to cue subjects to use information when gauging confidence by revealing traits over time. In study 5 I list traits one after the other and ask subjects to report confidence measures after reading each one. In Study 6, I include explicit instructions about how much data will be presented and ask subjects to make their choices and confidence judgments accordingly. Even with these cues, confidence does not change across information conditions.

These results could indicate that subjects understood the limitations of the particular format and quality of the cues present, but further analysis of the results indicates otherwise. Confidence in this setting is not uniform, but rather is tied to levels of liking. More specifically people are most confident of extreme choices either negative or positive, although the direction of the decision ought to be unrelated to confidence. This correlation between liking and confidence pattern supports the assertion that people are not calibrating confidence correctly.

If confidence is unaffected by information in this domain, then increasing the number of this type of cue does not benefit impression formation. It may also indicate that these types of cues are not helpful in choice more generally. Reading traits about another person may not function the same way as other social information gathering techniques. In this work, I test impression formation in lean media, these results may not hold in richer interaction. In the work that follows, I explore information gathering through activity. People learn about one another over time in daily life, with relevant information presented along with more incidental cues, the result being a rich assortment of information cues. Perhaps in this type of interaction confidence will correlate more highly with exposure to social information. The next two chapters examine ways to improve social interaction online and how confidence varies across types of social activity[22].

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5 Structuring conversation in online dating

In Chapter 3, I discuss how people react to two different types of information gathering, repeated exposure to the same information and exposure to increasing levels of information. Repeated exposure to a target tends to increase level of attraction towards it while my studies demonstrate that accumulating information leads to decreased liking across information conditions. People believe they will be drawn to those with whom they know more about, but rarely are. Rather the effect is driven by another variable: similarity.

In this chapter, I explore a third model of information gathering, the idea of *interactive* information gathering in which people learn about one another through shared activity and conversation. Through interaction, people reveal and present information over time. They talk to and observe one another to begin to decrease uncertainty about one another. They disclose personal facts with the normative understanding that such openness is often reciprocal. And, in the midst of circumstantial and other less-relevant information, they use evolving paralinguistic cues to signal interest or lack thereof (Berger 1975). This information gathering process stands in stark contrast to learning about another by reading a personal profile. In daily interaction people do not instantaneously divulge a list of biographical traits, like those proffered in a personal profile; rather people learn about one another incrementally. Interaction thus presents a more externally valid method of information exchange between people.

Interaction is also a promising model for online dating in that interaction itself tends to foster feelings of connection within dyads independent of other features. Specifically, similarity to self is a meaningful predictor of attraction (ref and see Chapter 3) and yet, interaction effects appear to be even more crucial. In the laboratory setting, having a short conversation obliterates the effect of similarity. People like each other equivalent amounts after talking, regardless of similarity (Sunnafrank 1981). Furthermore, dissimilar dyads that meet for a discussion like each other more than those who simply read a description of the other. And the effect persists beyond the first conversation. Ultimately, after further conversation, ratings reverse with dissimilar others receiving higher ratings than similar others (Sunnafrank, 1991). These results suggest that conversation modifies social perception independent of similarity ratings. One explanation for these results is that similarity to self (as determined by lists of descriptors) may not be meaningful in itself. Rather people connect when they discover not only points of similarity but a shared understanding and interpretation of these characteristics and experiences (Duck, 1991, Duck, 1998). Shifting this discovery process to online interaction may help people foster good-will online more likely to persist offline.

At the same time, interaction is often limited by both social convention and failure to expand topical conversation areas. Getting acquainted generally occurs in a predictable fashion with questions escalating in intimacy over time. While the particular words differ by situation, people tend to engage in similar lines of questioning (e.g. "small-talk") with

zero-history others (Berger, 1969); interaction behavior becomes routine. At least in face-to-face interaction, this questioning takes place within and augments rich social interaction so that even superficial conversations about work life and place of residence may at least reveal through gesture, intonation and body language some aspects of personality. The analogous conversation online has a relatively impoverished outcome. People online have no ability to observe paralinguistic cues or make inferences based on non-textual information. Consequently, online people learn about one another solely through direct questioning and other textual exchanges. These exchanges constrained by social norms may not be sufficient to get to know another person. In some cases, people online escalate the intimacy conversations. People tend to foster emotionally intense relationships online (Walthers, 1996). This escalation may be a reaction to the data limitations of mediated communication. Upsetting social convention may heighten connection fostered online. Alternatively, it may cause discomfort between members of a dyad.

This chapter explores two areas. First, I focus on how to introduce new types of information into the online dating exchange. Rather than reading personal profiles, I propose that zero-history dyads meet through interacting online to ask each other questions and respond to answers. Second, I explore the effect of disrupting social convention in an initial conversation between two strangers. To explore both of these issues I created a question and answer conversation tool. With this tool, I compare the behavior of people generating direct questions to address to a partner (questions that may follow general social conventions) with dyads provided with questions (and therefore given license to ask more revealing questions). The proposition here is therefore two-fold. First, interaction is a promising way to introduce new information into conversation as well as foster feelings of connection between partners. Second, people will choose to shed social norms and escalate the conversation when given the opportunity to do so and this will lead to more exciting but perhaps disquieting conversations.

5.1 Question and answer game

5.1.1 Stimuli

I compared a free-form condition, in which participants generated personal questions to present to their partner with a select condition in which subjects chose a question from a pre-tested list. To create the questions for the choice condition, 105 questions were collected from preexisting social games or generated by the researchers. The questions were then pre-tested by 6 independent raters. The raters judged each question on two dimensions: level of intimacy and information conveyed both on a scale of 1 to 10 not at all intimate and not at all informative to very intimate and very informative respectively. I averaged these ratings. For the game, I chose 30 questions varying in level of intimacy. Specifically, I chose the 10 most intimate, the 10 least intimate, and 10 questions squarely in the middle of the rating spectrum. By doing so, I hoped to capture three distinct sets of questions with varying intimacy.

5.1.2 Method

Subjects

Subjects were recruited both on campus and through a national online dating site. Online dater respondents from previous experiments who volunteered for future studies were emailed requesting they volunteer for a time slot. Pairs of people, one man and one woman, were created according the gender makeup and time constraints of the group. Through attrition, lack of secondary response and no shows, only two pairs of people completed the study and were included in the analysis. These subjects completed the study online on a computer of their choice. 24 subjects participated during experimental sessions held on campus. 8 people participated as part of a psychology course and 16 people were recruited on campus and completed the study for a set hourly rate. The participants from MIT attended an experiment sessions in a large computer laboratory on campus. Participants were spaced far from one another to avoid extraneous communication. Experimenters randomly assigned subjects to pair with one another taking care to position members of a pair across the room from each other.

Procedure

A synchronic online environment was created for this question-and-answer interaction. Players logged onto the site with an anonymous user name and invited or accepted an invitation to play with another user. The pairs were randomly assigned to a condition. In both conditions, the first subject asked the other subject five questions and then the subjects switched roles so that the second subject asked the questions. By the completion of the game, subjects had both asked and answered questions. As they proceeded through the game, subjects rated each question and answer. They responded to the question "How intimate of a question do you think this is?" with 1–10 rating (not at all to very intimate) as well as to "How revealing was your Answer?" – for those who answered the question - and "Please rate how informative this answer is:" – for the subject asking the questions. Again, in one condition, subjects asked each other free form questions. In the other, subjects chose questions from a predefined list pre-tested as specified above. Otherwise the interaction was the same in both conditions.

52 people participated in the game (29 men and 23 women age range of 17 to 57). All participants played one round of the game. That is, they both asked and answered five questions with their partner. In all possible cases, participants played someone of the opposite sex. Because of the slightly higher number of male than female participants, some males played together. After completing the interaction, subjects filled out a post-game survey. Subjects entered biographical information, rated how enjoyable game was, and rated how they felt about the other person.

They rated their feelings on how attractive they thought the other person was, how intelligent how excited they are about this other person, how much they would enjoy seeing this other person, how comfortable they would be meeting the other, and how

much they think they know about the other person. Subjects entered ratings on analogous questions about what they thought the other person thought of them.

5.2 Results

Subjects, as projected, escalated the level of disclosure when given the opportunity to do so. More intimate questions were chosen from the list than people generated spontaneously in the free form condition, indicating that when given the opportunity, question askers use more intimate questions than they would compose themselves. Both partners report a difference in levels of intimacy between the two conditions, both the people asking the questions ($M = 4.14$, $SD = 2.61$ free form, $M = 5.29$, $SD = 2.56$ select question condition, $t(260) = -3.42$, $p = .001$) and those answering them ($M = 3.80$, $SD = 2.59$ free form, $M = 5.28$, $SD = 2.40$ select question condition, $t(257) = -4.59$, $p < .001$). People, if given the license to do so, attempt to escalate the conversation more than they would do in non-directed questioning.

This does not necessarily mean that respondents supply the desired answers to questioners. While respondents see themselves as supplying more revealing information to more intimate questions, questioners do not see this link. Respondents see their answers as more intimate in the choose-question condition than in the free-form one ($M = 4.13$, $SD = 2.29$ free form, $M = 5.30$, $SD = 2.30$ select question condition, $t(257) = -3.90$, $p < .001$). Across conditions, respondents report a correlation between the intimacy of questions posed to them and the level of information provided by them ($r[257] = .56$, $p < .001$). This is not true when these people are in the role of questioner. The questioners report no correlation between the levels of the questions posed and the answers received and no difference in the intimacy of the responses in the two conditions. So while respondents view themselves as disclosing information to the questioner, the questioner may not perceive responses this way. In general, questioners and respondents agree about the nature of the questions but not the answers. There is a significant correlation between how both parties rate questions ($r[259]=.354$ $p<.001$) but no such agreement between how these parties rate the answers to the questions ($r[259] = -.08$, $p = .2$).

As proposed, heightened disclosure did correspond to increased level of excitement. People in the select, high-disclosure condition were more excited about the other person ($M = 6.31$, $SD = 1.97$) than those randomly assigned to the non-scripted, free-form condition ($M = 4.70$, $SD = 2.74$, $t(50) =$, $p = .017$). Although there was some concern that disclosure may have deleterious effects on social evaluations, there were no statistical differences in levels of enjoyment in the conversation, intelligence ratings of the target or desire to contact the other person. One measure, level of comfort, approached significance in the negative direction with people anticipating being less comfortable at the prospect of meeting their partner after the select-a-question condition ($M = 5.03$, $SD = 1.96$) than in the free-form one($M = 6.20$, $SD = 2.59$, $t(50) =$, $p = .071$). These data demonstrate that in the high-disclosure condition people are more excited about the other person. But because this result is coupled with some evidence that people may be less comfortable with those with whom they have exchanged intimacies, premature disclosure could lead to some negative effects.

5.3 Discussion

One additional area of interest is pacing of intimate questions and resulting disclosure. Because of the brevity of this interaction, participants only asked each other five questions apiece, there was little time to for the conversation to escalate. Still, questioners did understand themselves to be asking increasingly intimate questions ($r[260] = .136$, $p = .028$). At the same time, they perceived the answers as decreasing in level of information over the five trials ($r[234] = -.206$, $p = .002$). Throughout this game, the respondents report no change in intimacy for either the questions or the answers. These results point to the differences in perception by both parties, although all subjects were cast in each role over the course of the interaction. It also suggests that the questioner attempts to escalate the conversation although he or she is met with subjectively non-revealing answers. The respondents, at the same time, do not appear to have the same goals in mind. This difference in ideal pacing may be due to the asymmetry in the interaction, where one person asks a complete set of questions before changing roles with the respondent. It also points to resistance by users to over-disclose.

The results of this study are limited by virtue of the game design. In particular, the pacing of this game hindered the interaction. Because users rated each question and answer after each input, partners experienced long delays between trials. While the interaction felt somewhat like instant messaging, delay and early bugs in the game led to awkwardness in the interaction. Although having all of the rating data allowed for a detailed analysis, future work would remove the turn-based ratings to streamline the activity. These issues may have decreasing the overall enjoyment of the game.

5.4 Conclusion

People learn about one another through differing strategies. In Chapter 3, I documented the effect of active, in contrast to, passive information gathering on impressions formed. In this chapter, I present my first findings on *interactive* impression formation. I begin to explore the idea of what it means to have a substantive date online. In this particular effort, I look at introducing new information into online conversation and the resulting intimacy of that information. One assumption in this work is that social norms often dictate what people talk about in first conversations; the question I address is whether these norms limit conversation and, or protect people from premature disclosure. I explored this possibility by creating two versions of a question and answer game in which players exchanged requests and responses to inquiry. In one condition, users generated their own questions to ask their partner. In the other, users chose questions of my construction. These supplied questions were created to expand upon the topics people may normally cover in a first exchange.

Our results of this study are two-fold. First, they indicate that questioners will choose to escalate the intimacy of a conversation when provided with the tools (the questions) to do so. People in the choice condition asked more intimate questions than those assigned to the self-generated question game. Second, heightened disclosure is correlated with increased excitement about the other person. While high disclosure had no effect on

judgments of the other's attractiveness or intelligence it did result in higher levels of excitement. At the same time, higher disclose may lead to decreased comfort level although this effect did not reach significance.

The results were not conclusive. On the one hand, there are some positive indicators in favor of the intervention. People were more excited about their partner in the canned questioned condition and no less positive about the target generally. But, the implications of this heightened excitement are not clear. In this case, heightened excitement corresponded with a trend towards lower levels of comfort in the prospect of meeting the target individual. If the goal of the design is to heighten pleasure in the present game, the select a question intervention appears useful, but if people are planning on continuing the interaction FTF, heightening the excitement and intimacy may result in discomfort later. To attempt to make a more informative and expressive environment and achieve conclusive results, I explored another and ultimately more encouraging effort reported in the next chapter.

6 Impressions by activity

6.1 Introduction

Online dating is exciting at first, but disappointment often follows. This seems to be the experience of most people online dating. When people meet through sites, communicate online and then choose to meet in person, their expectations do not often match the reality they eventually see before them. In Chapter 3, Study 2, I compare assessments of dates before and after a FTF meeting. While people are excited before a date to meet the other, on average, they are disappointed and they do not learn. Additionally, people suffer disappointment time and time again across many dates.

The empirical work of this dissertation begins to suggest some reason for this experience. I report, in Chapter 3, that people interpreting descriptions of others respond more positively and with higher expectations to the limited and therefore more ambiguous descriptions than they do to extensive ones. One explanation could be linked to the lack of cues available. Users may be filling in the vague information of the personal profile with optimistic evaluations. Expressing a bias towards optimism akin to other well-documented positive biases (Sears, 1983). With less ambiguity, there is correspondingly less room for imagining an ideal scenario. Alternatively, the cues listed in my studies and/or those in a personal profile may not be useful. In daily contact, people employ a variety of strategies to get to know one another including observation and inference as well as direct questioning (Berger, 1979). Those processes may be categorically different from reading static descriptions in personal profiles. In either case, the cues present in my studies, and those in personal profiles appear to invite overly positive evaluations of and high expectations about a target. And these high expectations may lead to unnecessary levels of disappointment.

A certain level of optimism and excitement is necessary to fuel interest. If people have no expectations before a date, there will be no date. Online dating must be exciting to occur at all. At the same time, there is evidence that it is important to modulate this excitement. In the case of excitement due to over disclosure, the work of Chapter 5 suggests that more intimate questions heighten the level of excitement, but also seemed to decrease anticipated comfort with the other person (although, this result was not conclusive). In general, artificially elevated ratings and heightened expectations will probably often be followed by disappointment. Therefore although excitement may motivate people to online date in the first place, overly high expectations do not help the enterprise as a whole, if there is ever to be a second date.

This work looks at modulating expectations to decrease disappointment. I do so, as in Chapter 5, by introducing dating into online dating. Through creating a shared informative activity, I hope to improve the process of online dating as a whole. There are two sets of ideas underlying this work. First, interaction is a demonstrated means to create liking between two people. People are not only seeking similarity, they enjoy the

process of uncovering and revealing shared qualities and interpretations of those qualities (Duck, 1998). Second, people online dating are ideally preparing for an offline relationship; therefore the online contact that precedes it should resemble the final goal of interacting FTF. That is, online dating should somehow simulate offline contact. One result that buttresses this work is from my survey data reported in chapter four where online daters, many of whom have met interesting people through online dating sites, still state a preference for offline dating compared to online dating. This again suggests that online dating could be more successful as it evolves to feel more like offline contact.

In particular, online interaction could include some of the information gathering techniques of the offline world. As mentioned in previous chapters, people use a variety of strategies to get to know one another both direct (as in direct questioning and observation) and indirect (as in consulting third parties). CMC has been conceptualized as lacking some cues crucial to using these techniques, while introducing others (Tidwell, 2002). The thought is that people adapt to new media to use a limited channel to be as expressive as possible (Walther, 1994). But mediated communication assumes multiple forms. Not only can users can adapt to the medium, mediated communication evolves. Media forms can be augmented to encode and present information typically not transmitted in pure text channels.

Design researchers have implemented many such systems to enrich mediated communication. Specifically in the area of synchronous communication, these efforts incorporate paralinguistic information into chat environments, making what is normally invisible in chat visible. For example, a chat client Fugue used font size and weight and a two-dimensional plot to visualize turn taking and presence in a multi-layered synchronous chat environment (Rosenberger 1998). In a related project, Conductive Chat, users wore galvanic-skin-response sensors while chatting. The graphic display reflected the real-time reading of these sensors to other users through dynamics in the physical characteristics of the text (DiMicco 2002). These environments brought characteristics of communication and physiological features into the chat experience.

For an online dating application, these types of enrichments may begin to suggest something about personality, introducing observation and inference into online communication. When people meet FTF, they see each other, enact, and observe body language and otherwise connect. In online communication people could engage in the same sorts of activities. Turn taking, gesture and physical proximity all indicate something about personal style and personality. These physical attributes can be translated into virtual traces.

Dating is also a time where people engage in shared activity. When people "go out" they navigate the world together, negotiate situations collaboratively and otherwise explore a space. In doing so, they have opportunities to observe one another's reactions and activity in the context of a larger experience. Moreover, artifacts and experiences serve as social catalysts to stimulate conversation (Karahalios 2004). In virtual environments, such as MUDs or simulation games, users can engage in similar evaluations of one another's

conduct as well as create situation ripe for discussion. Such features could be established in online dating games.

Local work in the Media Laboratory, Social Computing Group, Chat Circles is a synchronous communication environment that visualizes elements of conversation and reveals aspects of personality. Within a Chat Circles room, users mingle as in a cocktail party. They move through the virtual space represented by a circular avatar approaching and retreating from others. Text appears in real time within a person's circle then disappears quickly demanding that other users pay attention or miss the utterance completely and emphasizing turn taking. Chat circles represents many of the social cues normally omitted in mediated conversation and allows users to meet and explore together in a naturalistic setting. This environment provides a rich world for online dates.

In this study, I expand on the work of the last chapter. I look more broadly at the effect of expectation from different mediated experiences on future evaluations. I compare impressions formed through Chat Circles with those created reading a personal profile. I then had singles meet in the orchestrated setting of speed-dating, to see what they thought of one another FTF. I propose that virtual activity, using the enriched chat client, will lead to more veridical impressions when compared to online dating profiles and that these virtual dates will help people calibrate expectations and avoid disappointment.

6.2 Enriched communication: Chat Circles

Chat Circles is a multi-user chat environment that incorporates aspects of physical presence, movement, turn taking, gesture and proximity into a synchronous chat. Users, represented by simple circular avatars, move through the environment where they can either distribute or collect for conversation. Chat Circles is Java enabled and runs in all Internet browsers. Users log in, choose a color to represent them, and are entered into a particular chat room. Once inside users, represented by a simple circle in the color of their choice, move through this virtual space that extends beyond the boundaries of the browser window. As such, the screen functions as a window into a larger virtual environment grounded by a schematic map that remains in the upper left corner of the screen. Activity is marked by slight changes in the avatar itself. While a user formulates a message in the text box, her circle pulses slightly radiating concentric circles for other users to spy, increasing anticipation for the words to come. When sent, the message appears within the avatar circle itself visible to the other users in close proximity. To "hear," a user one must find him or her, and place oneself close by and pay attention. The circle expands to fit the text size. But, after a few seconds, the text disappears and the circle shrinks leaving a trace of color the size of the message remaining. A wandering eye will miss an utterance and only see a residual trace of the message, an area of diffused color that functions much as a look of disappointment or expectation as the speaker waits for a response. A boisterous busy conversation has a completely different visual form than a more restrained one. Interruptions may cause circles to overlap and frequent messages written in the same area of the chat room pile traces one on top of the other creating chaotic Ven diagrams that last beyond the presence of the users themselves. During explorations of the space, users must be close together to hear one another but

choose just how close – possibly experiencing an uncomfortable moment when the circles land one on top of the other. In this process, a person may use the avatar itself to point or gesture at some image or artifact that occupies the room in which they talk. Although the representations in this world are simple, these behaviors display turn-taking, verbosity, utterance length, comfort with (virtual) physical proximity and social presence and at the same time, provides a space for collaborative wanderings and exploration as people move together through a room. For a more complete description, see (Viegas 1999)[23]. Figure 4 shows a screen shot of the interface.

Figure 4. Screen shot of Chat Circles augmented with pictures. This view shows one segment of the chat room with 2 players, one in blue, Fred, with a visible utterance and one in brown, Lily, who does not. The text box, where users type messages is seen at the bottom of the screen.

6.3 Personal profiles

People routinely create and read personal profiles while online dating. In this study, participants evaluate one another based on their personal profiles and then reevaluate them after a brief face-to-face meeting. Most of the participants in this study are active

[23] I collaborated with members of the Sociable Media Group for this project. I am very grateful to Judith Donath and Fernanda Viegas for their support and Andrew Fiore for his generous help in augmenting the environment for use in this study.

members of the same online dating site; the site I created for local university affiliates. In this study, I used the ads from member participants who had posted a picture within their personal profile. These profiles resemble those of other dating sites. They contain the responses to multiple choice questions regarding occupation and school status, religion, relationship goals, desire for children etc., as well as a username, headline and an open ended personal essay (See Figure 7). Participants were randomly assigned to view one or more personal profiles created by other participants of the opposite sex.

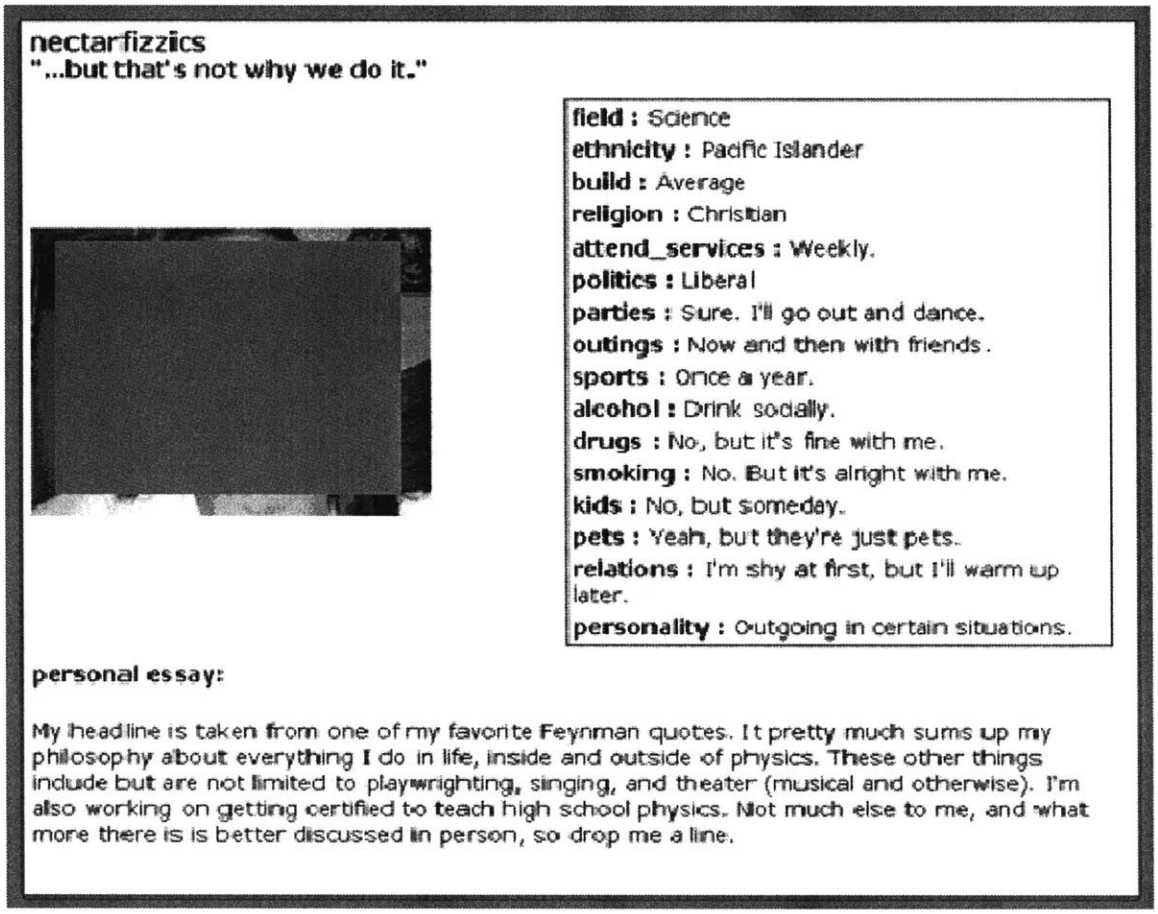

Figure 5. Screen shot of one personal profile viewed by participants. The listing includes a name, tag line, picture, answers to multiple-choice questions and a personal essay. Picture edited out to maintain anonymity

6.4 Speed-dating

To compare the effect of impression formation in a virtual data and standard online dating (e.g. reading profiles) on later FTF evaluations, I had participants meet. To facilitate multiple controlled meetings, I chose to use a speed-dating format to bring people together. In this type of interaction, people are paired together for quick timed conversations, one person after the other. Many commercial companies have been created to organize these events and now they are routinely held across the United States and beyond. During these events, singles congregate in large rooms, in restaurants, bars,

hotels or the like, set up with multiple two-person stations. Each member of one group, typically women, is assigned to a particular station. Members of the other group, often men, begin the evening at a particular station, meet the person there for a single round of conversation that lasts anywhere from 2 to 10 minutes (3 minutes in this work), and, when signaled to do so, move to the next station. Over the course of the evening each person meets many others, in some cases up to 40 or more people. After each meeting, participants mark down whether they are interested in having contact with their current partner again for possible friendship or professional contact, a romantic relationship or not at all. Dyads that "match" are later alerted and given the appropriate contact information. In my events, participants filled out more extensive surveys about the other person. Surveys were organized on a clipboard that was covered with a blank sheet of paper. In general, the facilitator of the event tabulates the input after the event and delivers contact information to the appropriate people when there are mutual "matches." I did the same at my events. In this way, the event is relatively safe and near anonymous with personal information exchanged only at the request of both parties. My events were modeled after one observed commercial event.

6.5 Method

Subjects were recruited through my online dating web site and posters distributed around campus. The study was composed of three parts: rating personal profiles crafted by other participants, chatting with another participant and finally meeting participants during an evening speed-dating event. After each portion of the study, participants filled out short surveys about their experience and the target. I attended and ran three speed-dating sessions to collect the current data set.

Our data collection technique evolved over the three events. For the first two sessions, participants scheduled a time in the days preceding the speed-dating event to use the chat software on their own PC and were asked to view a randomly assigned profile of another participant, at their leisure, before the night of the event. To use the chat client, these participants were required to have high-speed Internet access, the appropriate Java run-time environment installed and to log in when scheduled so as to meet another participants. Because of scheduling complications, people failing to keep appointments and technical difficulties, many of these conversations did not take place as planned. To attempt to gather more data, I chose to complete all activities for the last session during one evening.

The speed-dating methods also evolved over time. For the first session, I worked with a local student run speed-dating company. I paid the $15 entry fee in exchange for the subjects' participation. But because of the overwhelming level of attendance for the event, not all of the participants met one another. Therefore, I chose to organize my own events for the remainder of the studies. My events resembled the commercial one. Participants met on campus for the speed-dates and I provided food and drinks for participants. The primary difference was that these participants had no access to alcohol, they recorded data after meeting each person, and these events were smaller than typical ones with 24 people attending each one (See Figure 8). Also, in Session three, people

congregated earlier in the evening in a computer lab to complete the chat and profile portion of the study before progressing to the speed-dating room.

For all three sessions, subjects were randomly assigned to one of two conditions, either with pictures in the chat environment or without pictures, and they were randomly paired with someone of the opposite gender, although scheduling restrictions were taken into consideration. All subjects were told to use this opportunity to get to know their chat partner as if it were an online date. Users logged onto the site using a pre-assigned URL. This address entered them into an instance of the chat environment with their partner. Once they logged in subjects in the no-picture condition were just allowed to chat and use Chat Circles as it was designed. In the picture condition, subjects occupied a chat room with sets of images scattered throughout the environment. In this condition, I juxtaposed related images of different sports and foods, Lisa Simpson and Jessica Simpson, Bush and Kerry and a picture of a scar next to a picture of a tattoo. I collected images to reflect a wide variety of tastes (See Appendix D for full listing). People could explore the whole environment by moving their avatar. In both conditions, participants chatted for 10 to 15 minutes. After that time, users were asked to fill out a short survey.

In this survey, participants were asked questions mirroring my previous studies. These came in three sections. Liking, confidence, and similarity as in the impression formation tasks, some specific impressions of the other person and projected believed impressions of them (as in the disclosure game) and the amount of knowledge gathered (as in the before and after date study). These measures were designed to assess the value of content in conversation as well as the relationship between knowing a person and liking them.

a. **b.**

Figure 6. Subjects met one another at a speed-dating event with the last two groups attending events organized for this study and held on campus. The photos above capture moments from the first campus event. During these evenings, each subject communicated with subjects of the opposite sex for a three minute period each. Photo (a) shows one such interaction. After the conversation, subjects noted down ratings of their partner as seen in photo (b). After which men shifted seats to speak with the next person.

6.6 Results

Online dates often result in disappointment. Reading a personal profile then meeting the person depicted FTF is analogously disheartening. People who view a person's profile experience a drop in post FTF meeting ratings along several dimension, in this case every dimension recorded. These decreases are significant for level of excitement about the other person ($M = 4.26$, $SD = 2.48$ before meeting and $M = 2.73$, $SD = 1.79$ after meeting the target, $t(78) = 2.25$, $p = .027$), how attractive one person views the other ($M = 4.91$, $SD = 2.40$ before meeting and $M = 3.07$, $SD = 2.19$ after meeting the target, $t(78) = 2.71$, $p = .008$) and how similar the person thinks he or she is to the target individual ($M = 4.17$, $SD = 2.18$ before meeting and $M = 3.07$, $SD = 1.80$ after meeting the target, $t(93) = 2.41$, $p = .018$). Consistent with findings from before and after online dates, people report disappointment in those they had previously viewed online.

But, the same participants had a different experience of those with whom they had chatted with before meeting face-to-face. The transition from online chat to FTF contact did not lead to disappointment. Through enriched chat, people appear to make veridical evaluations of one another. When they meet, people match one another's view of each other. Furthermore, peoples' ratings of one another even improved numerically although most increases failed to reach significance. One result that did reach significance is comfort (moving from the already high mean of 7.14, $SD = 2.39$ to 8.29, $SD = 1.57$, $t(113) = -2.23$, $p = .028$). Without unrealistic expectations, people may feel more comfortable with one another. And generally, although online interaction is thought to be sparse, online interaction in this venue helped people form representations that were equivalent to the face-to-face reality.

And this disparity is not due to discrepancies in ratings for chat partners compared to profiles viewed initially. In measures taken after chat and after reading personal profiles, but before FTF meeting, participants rate these different targets similarly. They do rate those seen in personal profiles as more similar to themselves ($M = 5.69$, $SD = 2.55$ in the profile condition and $M = 4.43$, $SD = 1.77$ in the chat condition, $t(154) = -3.65$, $p < .001$) but they are more comfortable about meeting their chat partners ($M = 3.83$, $SD = 2.04$ in the profile condition and $M = 7.14$, $SD = 2.39$ in the chat condition, $t(154) = 9.07$, $p < .0001$). On other dimensions such as overall rating of liking, attractiveness, prospect of a future relationship and intelligence, the ratings do not differ.

The most notable difference between conditions is that people are much more excited about those whose profile they have seen compared to those with whom they have chatted. What seems to differ is expectation. People appear to have elevated levels of excitement in the profile condition that cannot be sustained in a FTF meeting. In the chat condition, people do not experience the same levels of initial excitement and after an in person meeting these levels increase slightly (See Figure 9). Such volatile excitement may make online dating fun and at the same time result in disappointment.

Ultimately, and therefore most importantly, people think more highly of those with whom they have chatted more than those whose profile they have viewed. They rate these

targets higher along every dimension and most of these reach significance. They like them more overall, they think they are more attractive, they are more excited about them and much more comfortable with them.

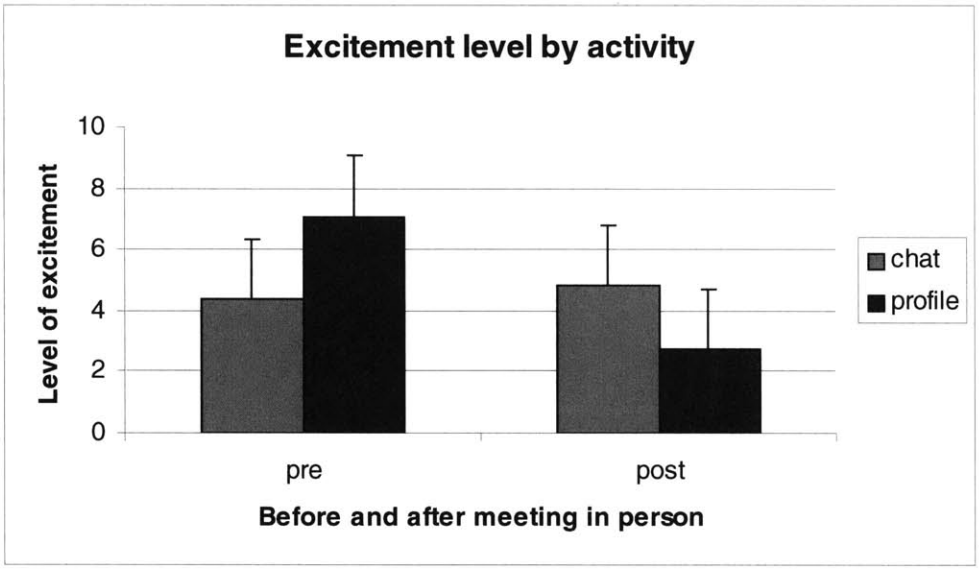

Figure 7. Level of excitement is highest after reading a personal profile and falls significantly after meeting the depicted person face-to-face. Meantime, people are not as excited initially about those with whom they chatted online, but these ratings remain consistent after meeting the chat partner in person. Error bars show one standard deviation.

6.7 Discussion

One alternate explanation for these data is that the people who posted personal profiles with pictures are simply less attractive in person than the other participants. For consistency, I only used the profiles with photos. It is possible that these particular people are not as good looking in person as the others in the room. Because, as part of another parallel study, participants rated each person's level of attractiveness after each speed-date, I was able to account for this possibility. I compared the average rating of physical attractiveness of those viewed in the profiles with those who were not. There is no significant difference (M = 5.87 for those with pictured compared to M= 6.35 for those not pictured, p = .135). Therefore, these results are not due to some categorical difference between users with and without profiles including pictures.

This study also resolves some of the open questions on confidence raised in Chapter 4. Within those studies, information gathering did not result in heightened confidence levels. Rather, confidence in that work was related to how mush a subject liked a target. In contrast, the transition from online information gathering to meeting someone in person did result in elevated levels of confidence in an impression formed. This is true in both conditions, from reading a profile to meeting another person (M = 5.80, SD= 2.46

before meeting but after reading a profile and M = 7.27, SD = 2.86 after meeting the target in person, t(93) = – 2.57 , p = .012) and when chatting online then meeting someone in person (M = 5.54, SD= 2.66 after chatting and M = 7.04, SD = 2.22 after meeting the target, t(113) = – 2.54 , p = .012). Although in Chapter 4, confidence was shown to be unrelated to the amount of online explicitly stated trait information offered, confidence increases significantly when online interaction goes offline.

Unfortunately, there were not perceptible differences between the picture and no picture conditions. Participants, perhaps because of inexperience with the software, did not explore the space fully. In the few cases people did view the pictures and these became the topic of conversation, yet, this shift in conversation did not appear to result in changes in the overall ratings of one another these became the topic of conversation. Future efforts could include using more personal content and assigning tasks that required participants to move through the environment more completely.

These data overall are encouraging. People are consistent in their ratings across the chat and FTF experiences. This is not the case with personal profiles. People appear to develop veridical evaluations in the chat condition while they do not by reading a profile. In addition, ultimately, people like those with whom they chatted more than those whose personal profile they reviewed, suggesting that the experience itself may have a positive effect on interpersonal relationships. This combination of increased accurate information and ultimately elevated liking suggest makes online games are a promising avenue for online dating development.

6.8 Implications for design

At the same time, this study offers little explanation for what causes the pattern of results observed. The difference between the two conditions seems to be driven by two effects: both unrealistic expectations not met in the profile condition and a benefit of interaction on later meeting in the virtual date condition. But little is known about what drives these effects. This preliminary study therefore raises a new set of questions.

A personal profile could inspire high expectations pre-meeting for a variety of reasons. These include the quality, the format and the interpretation of the personal profile. This dissertation thus far examines the latter, the interpretation of information in a personal profile. In this section, I explore some of the other possible issues.

Online dating profiles are of a particular format and include specific sorts of information. This information may not be meaningful devoid of any contextual information. Therefore one point of failure could be the way in which people are supplied the information. This format may allow for interpretations tempered by optimistic evaluations. Spears and Lea (1991) demonstrate that people in impoverished mediated environments use minor social cues to form social impressions. The direction of these evaluations depend on group affiliations with in-group members perceived positively based on scant information and out-group members perceived negatively based on the same scant information. There are a few reasons an online dater may not interpret an ad accurately. Online daters, highly

motivated to locate a date of interest, may presume an in-group affiliation with a target leading to analogous overly positive evaluations. Also, online daters usually evaluate ads over time at their leisure. There is ample room for fantasies of future love to color evaluations. Information provided within a richer social interaction with less room for imaginings may not be as susceptible to these biased evaluations and heightened expectations.

The format of the ad may also impact its interpretation as it restricts the representation to only include particular aspects of identity. These qualities may or may not be of import in later face-to-face meeting but, because supplied they may be *perceived* as important. Daters choosing between targets may choose someone with whom they share some of the stated qualities. Such perceived similarity may inspire high evaluations and expectations. But at time of meeting these shared qualities may be meaningless. As stated earlier, shared qualities may not be meaningful if the dyad does not share an interpretation of these qualities (e.g. it may not important if two people are Catholic if one is practicing and one is not) (Duck, 1998) but each member of the dyad may not anticipate this result. People may presume shared interpretation of a quality when in fact they only share a quality.

This effect of presumed similarity and attraction may be exaggerated when the data supplied is very vivid. In particular, photographs that capture information on expression, physical features and personal presentation, seem to suggest a specific view of a person. And yet, one image of an individual may not accurately depict his or her later appearance. This discrepancy between image and "reality" could be another source for both high expectations (as people viewing the image believe they know what another person looks like) and disappointment (when the image perceived is not the appearance discovered). The personal profile is a vague representation but images and other data imply otherwise. The use of these materials in the formation of expectations requires further study.

One issue I did not examine in this dissertation is of accuracy in personal representation. Personal profiles appear to deviate from reality, but the question of specifically how remains unanswered. As discussed in the introduction, in mediated communication, people have heightened control over self-presentation. People, when constructing a personal profile, have the additional leverage to edit their description and refine their presentation over time in turn raising the level of control over self-presentation further. Additionally people may deceive others online either consciously, thinking that a good date will override an omission or minor alteration, or unconsciously, as people do not always have an accurate view of themselves. For either reason, a person described is not necessarily a person seen. This quality of personal profiles could therefore also explain both high expectations (as the personal profiles are written to be appealing) and disappointment (as personal profiles are more attractive that the individuals they represent). The results of my preliminary study are limited as they suggest that online profiles are not accurate but I did not examine this question explicitly or attempt to identify where or why the discrepancies occurred.

Therefore, it remains an open question as to why and people form unwarranted expectations after viewing a personal profile. Online interaction as experienced in a virtual date appears to solve some of the problems associated with reading a profile. I can only conjecture some reasons for this outcome.

Firstly, interaction itself may be beneficial to social interaction. This possibility was introduced at the beginning of the chapter. Interaction seems to lead to liking independent of other qualities (such as similarity) that mediate attraction (Sunnafrank, 1991). In this study, the virtual date may supply people with a topic to discuss. When people met after having a virtual date, they often referred to that experience. They talked about what they liked and disliked in the software and the experience of "meeting" online. This helped begin a conversation during a potentially awkward first meeting. People could also continue conversations. Although it was the first time they met in person, participants could refer back to a previous experience; they already had a shared history. After reading a personal profile, daters also have material for future interaction. But information displayed in a personal profile may feel different when used in conversation than information consciously shared. A content analysis of both the mediated and later FTF interaction could reveal the specific utility of a virtual date on later exchanges.

Another possibility suggested by Duck (1998) is that people enjoy discovering mutually understood similarity. During a virtual date, partners have the opportunity to ask about topics they value and discover shared interests and priorities. Although a content analysis was beyond the scope of this work, I did locate instances where subjects employed image content placed in the virtual environment to identify common hobbies and assign personal value to shared interests. For example, several people looked at an image of a Tango dance and began to discuss their personal feelings about and experience dancing. For example one dyad had this exchange:

> M: yes, waltz?
> A: cool, I took a ballroom dance lessons last semester
> M: which style do you like most?
> A: Tango is a lot of fun. Do you dance just for fun or do you compete?
> M: I'm only good at waltz, Vienesse...just for fun, but love it!

By discussing the image shown, this dyad discovered the unlikely coincidence that they shared a committed interest to partner dancing. This fortuitous discovery may lead to a feeling of connection that may persist when they meet.

Unfortunately, in this study there was no statistical difference between the conversations conducted in the picture and no picture conditions. One reason could have been that some people did not travel around the entire virtual space and therefore did not discover the dispersed image content. If the images seen first did not inspire conversation, images were rarely discussed. Still, the isolate instances of people using images (e.g. the Tango dancers) to locate points of similarity suggest that artifacts can augment conversation. This remains an inspiration for future work.

6.9 Conclusion

In current online dating, people evaluate one another through personal profiles listed on sites, or are matched by the system itself based on some sort of personal evaluation. In at least the former case, people tend to get very excited about an upcoming date then generally experience disappointment when the date's physical self does not correspond with the representation imagined. One reason for this disappointment is that profiles contain few cues. In my empirical work of Chapter 3, few cues led to probable unwarranted elevated expectations and positive evaluations. And increasing the information does not lead people to feel like they know the other more (see Chapter 4). When people see a photograph of another person this experience may be even more problematic, as photographs could inspire concrete expectations. The result of the limited cues appears to be that people form representations of one another that do not match reality.

This present work, supports this claim. In this study, users participated in several activities. They read personal profiles by other participants, chatted with one of those people through a rich chat environment online and finally met the other participants during an evening speed dating session. During that session, they spent three minutes talking to each of the other participants of the opposite sex. After each of these experiences, subjects filled out short questionnaires. Over these experiences, people's evaluations from personal profiles did not seem to match reality, while those from chatting did. Subjects were excited about one another after reading personal profiles, this excitement fades after people talked during a speed date again suggesting that the image they held was not matched by reality.

At the same time, impressions formed through rich chat interaction do persist over experience. People's evaluations after chat endure even when they meet FTF. Their experience of shared activity online seems to promote more veridical impression of the other, an impression that matches a person's FTF persona. In addition, interaction itself may be a positive experience. People favor those with whom they have talked regardless of similarity to that person (Sunnafrank, 1991). This online chat may function like a conversation to foster liking between dyads. In this game, goodwill persisted beyond chat to FTF contact. Ultimately this experience resulted in people favoring those with whom they chatted over those whose personal profiles they had seen.

This work is encouraging as it suggests online dating will improve its success rates if it evolves to look more like offline interaction. In this virtual environment, people communicated using natural language. They shared a space and navigated it together. These environmental variables made online communication more like the information gathering people do offline and helped people form connections online. This first effort to bring dating activity into online worlds suggests other possible design directions. People could begin to use online interaction as a simulation and experimentation platform for how people would function together during real world experiences and challenges. Such environments could function for people to both choose a date of interest and begin to learn if couples at late stages of their relationship function in a compatible way. This

work both suggests how to improve the accuracy of online impression formation and begins to suggest new interaction models for online dating.

7 Conclusion

The most common use of the Internet is to communicate. While people generally use Internet services to talk to family, friends, and professional contacts, people also log on to locate, contact and get to know new people for friendship, professional purposes (Nie, 2004), and in ever increasing numbers, romance (Jupiter Research, 2004). When people meet in any sphere, they seek to know each other, to learn about one another. They do so offline through a combination of indirect and direct information gathering strategies (Berger, 1969); they do so online using an analogous but depreciated set (Ramirez, 2002). This dissertation explores the effect of information gathering behavior on impression formation in particular in the impoverished virtual environment of online dating.

Tens of millions of Americans logged on to online dating websites in a single month of 2003 (Egan, 2003). This figure suggests that online dating is a vibrant successful marketplace. Unfortunately, online dating behavior suggests otherwise. In this dissertation, I analyze activity on one commercial dating website. Half of online daters leave this site within ten days of their initial visit. While their departure could indicate rapid dating success, further analysis of the data indicates otherwise. 16% of users' personal profiles are never viewed. 38% never receive any email. These users have no path to begin the process of dating online. At the same time, less than half of people write email, ensuring inactivity in this marketplace. Some users do persist, remaining on the site for many months, initiating correspondences, responding to messages, and meeting people for dates. In my survey of active and somewhat successful online daters, people report using online dating sites on average for over a year. Over half of these "super users" have met someone they dated seriously online and almost a third were dating someone they met online when surveyed. Even given this success, these users report ambivalence towards the enterprise of online dating. They report slightly above neutral ratings of online dating generally and state a preference for dating offline versus on.In summary, analysis of behavior online dating reveals both that engagement in online dating does not match interest in it and even those who do actively participate prefer offline to online dating.

This dissertation proposes two reasons for dissatisfaction in online dating. First, impressions do not match later experienced reality. People respond to information with unrealistic evaluations and heightened expectations that lead to disappointment at time of FTF date. Second, people do not calibrate confidence. When people evaluate one another online, the paucity of the information does not factor into confidence ascribed to resulting judgment.

This dissertation tests these assertions. Specifically, I document the relationship between information type and extent on impression formation. People seek out information online about one another. Such information could elevate evaluations of a target. In repeated exposure paradigms, people like others better whom they see more compared to those they see less often (Zajonc, 1968). But not all cases of increased knowledge leads to

heightened evaluations, as evidenced by the fact that most interpersonal relationships disintegrate and half of all marriages in the United States ending in divorce. I resolve this apparent contradiction in a set of reported studies. While repeated exposure (passive exposure) to the same information may lead to increased liking and people believe that they will like someone better if they know more about him or her (See Chapter 3), judgment functions otherwise. Converging evidence from dating experience and empirical studies indicate the information search results in decreased liking of the other. I further specify this result demonstrating that the effect is mediated by similarity to self with people liking those with whom they share qualities. Additionally, I report, dissimilarity cascades, that is, when participants viewed a dissimilar-to-self attribute initially they were more likely to perceive the following attributes as dissimilar. Cumulatively, these studies suggest that information operates unlike predictions and gathering more explicit trait information is detrimental to liking.

While explicit trait information does not catalyze social connections it may help people develop confidence in their evaluations of a target. In fact, people believe they will have more confidence in a judgment based on more versus less information. I record these beliefs in Chapter 4, Study 1. But, revealed preference tasks suggest that trait information, the type supplied in personal profiles, does not increase confidence. People feel just as strongly about a judgment based on one attributed as they of a judgment based on ten attributes. Confidence, rather, is correlated with level of liking: people feel more strongly about extreme ratings. This tendency could contribute to heightened expectations and disappointment. Thus, as with information, beliefs about confidence contradict behavior regarding confidence. Information does not impact confidence in a meaningful way.

One source of possible failure in online dating may be due to the format and type of information presented. People generally do not get to know one another through lists of personal characteristics. Information gathered offline incrementally and within a larger environment may not be susceptible to the same biases and misjudgments as is trait data. In offline dates, people not only share directly stated information encoded into language, they also reveal and interpret an array of social cues and physical attributes and they do so within in a context that may inspire conversation. In mediated communication, most communication cues are absent and the environment is generally devoid of content to spawn ideas. To improve impression formation online, I propose a different model of information exchange, the virtual date. A virtual date is an effort to introduce some paralinguistic information as well as content for conversation into online contact: to make online dates feel more like offline ones. In creating virtual dates, I sought to help people calibrate their expectations and confidence in a judgment of another and increase the veracity of the impression formed; I aimed to improve online dating by decreasing (and ideally reversing) the disappointment prevalent in current practice.

In this dissertation, I present two formats for virtual dates. In Chapter 5, I outline an online date to integrate new information into mediated exchanges. In particular, I developed a question and answer game with two conditions. Players assigned to condition 1 generated questions spontaneously to pose to their partners. In condition 2,

players chose from a list of pre-tested, "canned" questions. In both conditions, players rated questions and answers after each action. Using this game, I tested whether supplied questions would inspire more interesting conversations – if I could improve conversation by supplying a social catalyst (in this case a question). The data revealed that canned questions do in fact heighten the excitement of a game. One reason being, that in the canned condition, those asking the questions chose more intimate questions than people generated in the freeform condition. This is a promising first result. But these results were complicated by a trend towards decreased comfort about future FTF contact in the canned condition, although this result was not significant. Still, this experiment was limited. While I could compare the generated to canned condition, there was no mechanism to understand the implications of this process on future FTF meetings. As a result, this first virtual game study was incomplete.

To further develop the idea of a virtual date, I implemented and tested a second virtual date format described in Chapter 6. In this design, a pair of people explores a virtual environment together – one in which people not only exchange messages, they do so within a context they can discuss and that supports enriched communication. To create this experience, I worked with a pre-existing online application Chatcircles created by the Sociable Media Group within the MIT Media Lab. This application encodes aspects of offline interpersonal exchanges into mediated communication including turn taking, gesture, and proximity. It also presents a context in which people meet, a virtual room inhabited by photographs. These qualities expand online communication to more closely resemble an offline meeting. Using this tool, I designed an experiment to compare "online dating" with virtual dates for impression formation and later FTF evaluation. In particular, participants viewed a randomly selected personal profile of another participant and attended a virtual date. All participants then met during a speeddating event. While viewing a profile lead to high initial evaluations followed by decreased evaluations of a target after a FTF meeting (analogous to the pre and post date study described in Chapter 3), having been on a virtual date did not have this effect. People were not disappointed in others with whom they had met on a date and ultimately favored those who they had chatted with over those who they had viewed. This preliminary study suggests that virtual dates appear to erase disappointment and lead to more veridical impressions when compared to viewing personal profiles.

7.1 Future Work

The work of this dissertation identifies some of the issues in impression formation and online dating and suggests some potential redesigns for the activity on a whole. I begin to explore some design solutions in the form of the virtual date. The preliminary success of these interventions leads to further ideas within this domain.

One issue present in current online dating is the disconnect between the image of a target based on the online dating profile and the target perceived FTF coupled with high confidence in that image. While the virtual date described in Chapter 6 produced more veridical impressions compared to a personal profile, there may be other promising ways to address this issue. One possible solution is to rework the personal profile presented to

include information online that will be more informative and true to offline personas. Some current sites begin to explore this idea. Friendster, for example, includes third party descriptions of members (written by friends) as well as freeform and therefore often highly detailed preference information. Consequently, an online dater can locate others that share any esoteric interest. Another possible direction is to include alternative personal data into an online description e.g. photo archives stored on a PC, Internet browsing history or a weblog either automatically or voluntarily shared with others. Such artifacts may be more informative as to a persons interests and routines than a constrained personal profile.

Another issue identified is the heightened expectations often associated with a first meeting of an online date. These expectations may lead to disappointment and discouragement. Alternate interventions could address this issue to help people calibrate expectations appropriately. One piece of evidence from this dissertation may be useful towards this end: people who have dated someone seriously who they met online have met twice as many people through a site than those who have not. Therefore, one possible intervention could be a commitment by users to meet a set number of people through a site. By agreeing to meet several people, a user may not expect the first or second or even third person to be "the one." This intervention could encourage users to pace themselves realistically.

In the current dissertation, I propose some particular redesigns to online dating, virtual dates. My suggested virtual dates are a first effort to collapse the discrepancy between online and offline interaction. Chatcircles, in particular, is an environment in which people use natural language to communicate, simulate being in physical proximity with another, and gain access to some of the conversational and social cues normally absent in online communication. This initial promising result suggests new directions for online dating systems in several ways.

The most natural extension is to use Chatcircles, or a similar application, as shared community spaces for like-minded people to linger and meet. People regularly meet through shared online activity such as real-time gaming environments, bulletin boards and chat rooms. Rather than the current search and scan method, an online dating site could explicitly use activity driven self-selection into virtual spaces to sort its users. In my design study, I paired subjects for Chatcircles dates. But Chatcircles, as an application, supports multiple simultaneous users and allows them the space and freedom to mingle and locate others of interest. Current niche sites attract users of a specific ethnicity or with particular interests. This same idea of self-selection into a community could be used with Chatcircles. Users, with a particular interest or intent, could choose a Chatcircles room with a particular theme and populated with artifacts accordingly. After mingling as a group, two people could choose to continue the conversation by agreeing to enter private shared virtual rooms – without relinquishing anonymity. Users themselves could populate these more personal spaces uploading digital images, favorite links and fantasy furnishings to create a room that indicates personal style and interests. People, in this type of online environment, would interact within a more vibrant and provocative setting. As a result, people could make inferences about one another by virtue of their

choice of space visited, behavior within it and design of it while "meeting" in a low-pressure way. This functionality would extend the current IM messaging systems available on online dating sites.

This dissertation begins to suggest how virtual date formats could help people test compatibility by emulating offline experience online. This concept could be more fully explored through online gaming. Online games already function to bring people together around shared activity. Not only to people chat and send messages to each other while gaming, they observe one another's behavior and skill. This behavior may be more informative than messages alone. In general, games are a way to mimic other life experiences in a safe way. Online date games could be a means to try out dating without committing to even meet. Models for appropriate games already exist. One such model is simulation games. Games such as the SIM games imitate "real world" situations and become explicit testing ground for people of all ages to make and remake life-altering decisions. Incorporating a social component into a SIM game could be an informative tool for two people to preview a potential future together. Another model for an online dating game could be an adventure game. In adventure games people navigate obstacles and make decisions, progress through a series of challenges. In day-to-day life people demonstrate their beliefs and values through the decisions that they make and the behavior they enact. A collaborative version of a real-world based adventure game could begin to expose preferences and negotiation style. *Choose Your own Adventure* series had readers flip to different chapters corresponding to branches of a decision tree. Users could engage in this type of process together. By playing such a game a couple could explore qualities about each other often hidden in dating. Typically, dating services help people meet but do not support people in forming relationships (Duck, 1998). Online dating games of this type could go a step further than standard services to help people investigate a possible future relationship.

In this dissertation, I focus on how strangers perceive one another online. But a virtual date would not have to be limited to strangers. This format begins to suggest how computation could aid dating at both a relationship's conception as well as further along in courtship (e.g. at a moment when people are considering more dramatic commitment to one another). Simulating potentially unforeseen events may help people understand how a shared future could proceed and whether or not that future matches personal wishes. In this way, a virtual date, like role-playing or other therapeutic techniques, could augment any type of courtship process.

7.2 Online dating as a mapping problem

In online dating, there is a perceptible and often disheartening discrepancy between the perception of an online representation and offline persona. This disconnect stems from selective presentation, deception, biased interpretation, over-confidence as well as a difference between the traits featured and presented as of import online and their future interest in offline communication. The result is a mapping problem between the online and the offline world.

This predicament could be solved in two ways. Either, users of online dating systems can begin to understand the limitations of the media and prepare themselves accordingly or system designers can improve the interaction model to collapse this discrepancy. This dissertation assumes the latter approach suggesting alternatives to current online dating procedure. I conclude this dissertation with solutions for an analogous mapping problem in the domain of online retail.

Online retail, like online dating, provides expanded access to options represented with online descriptions. For many goods, such as a new known compact disc or book, online retail establishments are ideal. Consumers can compare prices across sites and be assured of the quality of the product. But for other more unique and tailored items such as a pair of shoes, a couch or a bathing suit, choosing a particular item through solely online viewing is rarely adequate. People can compensate for the ambiguity of a product description strategically. Rather than expecting the only bathing suit purchased to fit perfectly, people routinely purchase a few, choosing one to keep and returning others. This technique would be similar to an online dater meeting several people over time and resisting the temptation to believe the first person found will be her soul mate.

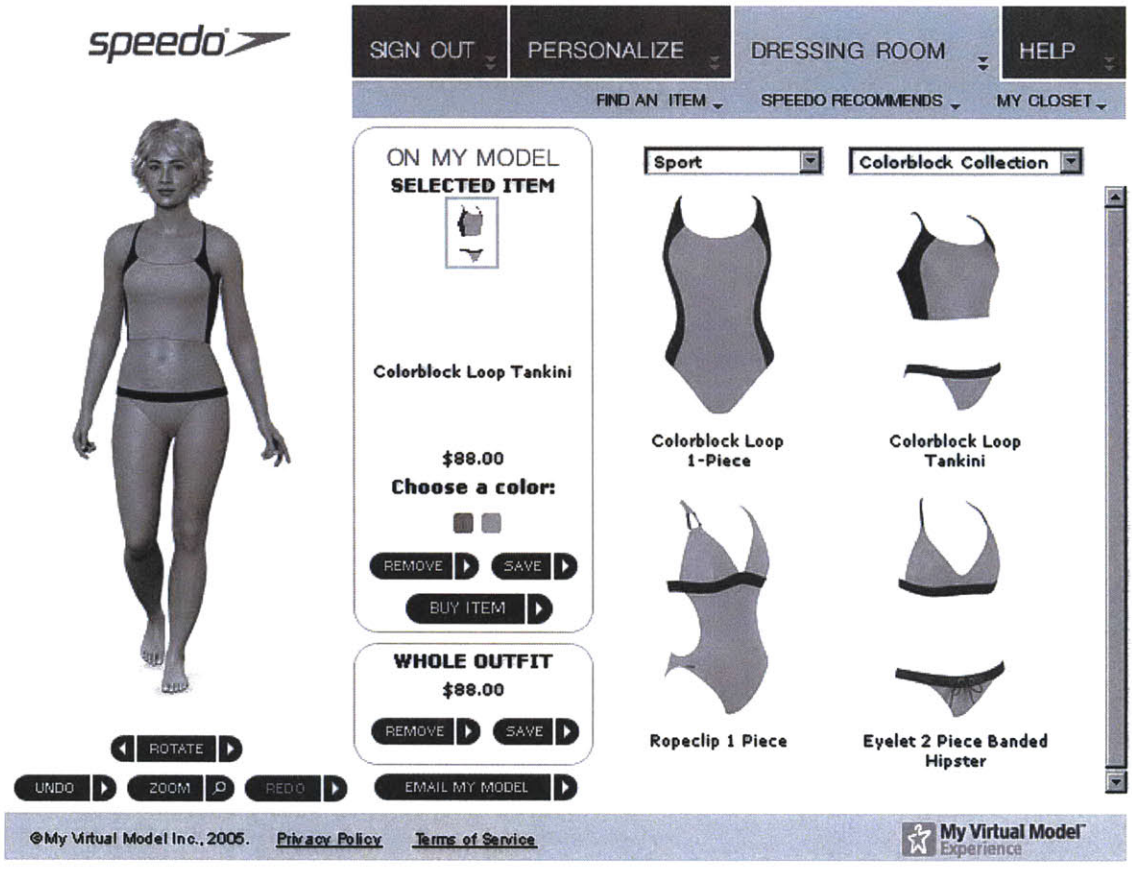

Figure 8.Virtual models place a representation of an individual into the item to be purchased. This virtual model is a simulation of future interaction with a product. A virtual date is the analogous online dating experience.

Alternatively, consumers can enlist third party services to bridge the divide between online and offline. The virtual model, seen in Figure 10, depicts a personalized digital

representation of a consumer. Using this virtual model, a consumer can "try on" a particular bathing suit, placing herself within the digital domain. Through this simulation, she can better anticipate how a particular product will fit her physical self. Virtual dates are an analogous effort to bridge the divide between the virtual and the physical. Both the virtual model and the virtual date have limitations, but they bring one domain a step closer to the other.

Appendices

Appendix A
Follow up dating survey adapted from the online version

Online dating Survey

This is a quick survey about people's experience online dating. Filling out this survey completely and candidly will enter you into a lottery for $50 gift certificates to Amazon. This study is part of a MIT Media Lab research project. All of the results are anonymous and confidential and the data will only be used for academic research. If you have had some experience online dating, please take a few minutes to answer the following questions. Any questions or comments can be addressed to checkmate at media. mit . edu and thank you for your help!

Gender
Pick one: Male / Female
Age _____

Please enter your email so I can contact you with your prize (I will not use this email for any other purpose)
(note: participants were enter into a lottery for a $50 Amazon gift certificate)

What were you looking for online dating?
Pick one:
- Friends
- Casual Encounters
- Casual Dating
- Serious relationship
- Possible marriage or life partner

When did you start online dating?

Pick One:
- Not Applicable
- January
- February
- March
- April
- May
- June
- July
- August
- September

Pick one:
- Before 1999
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005

October
November
December

When did you stop online dating? (Same options as above)

If you have stopped online dating, please choose the reason you did so:

Pick one:

Overwhelmed with unwanted email
Did not receive enough email of interest
Did not find anyone of interest
Required too much time
Met someone online
Met someone offline
Other

I know that sometimes people start and stop online dating, how long cumulatively did you actively online date (e.g. log in, write and receive messages)?

Pick one: (1-35+ months) (1-3 weeks)

What is your current relationship status?

Pick one:

Single
Dating someone casually
Open relationship
In a relationship
Married

If you are with someone, how did you meet this person?

Pick one:

online - dating site
online - chat room
online – other
offline – friends
offline – work
offline – family
offline – bar
offline – school
offline – party
offline - religious institution
offline - other

If you are with someone, how long have you been with this person?

Pick one: (1-35+ months) (1-3 weeks)

If you are with someone, how possible is that you might marry or be in a lifelong relationship this person?

very unlikely 1 2 3 4 5 6 7 8 9 10 certain

Did you date anyone seriously that you met online? Pick oneYesNo

What is the longest period of time that you have dated someone who you met online?
Pick one: (1 - 35+ months) (1 - 3 weeks)

Do/did you enjoy online dating?
Not at all 1 2 3 4 5 6 7 8 9 10 Very much
If applicable, have you generally enjoyed the dates you went on with people you met online?
Not at all 1 2 3 4 5 6 7 8 9 10 Very much

How many friends did you refer to online dating?
Pick one: (0 – 9+)

When you are/were actively online dating, approximately how many hours a week do/did you devote to...

Searching for potential dates? _____ Times per week

Initiating and responding to email and instant messages? _____ Times per week

Meeting people face-to-face? _____ Times per week

How often, on average, did/do you check your email for new online dating messages?
_____ Times per week

Roughly, how many people wrote to you? _____
What percentage of these did you reply to? _____ %
Approximately, how many people did you write? _____
And, what percentage of the time did you receive replies? _____ %
How many people did you communicate back and forth with? _____
Roughly, how many people did you meet? _____
How many people have you gone on more than one date with? _____
In that time, how many offline dates have/had you been on? _____

What do you prefer, meeting people online or offline?
Pick one:
Online
Offline
Did you meet anyone you wanted to seriously date online?
Pick one: Yes / No

During the time you were online dating, did you meet anyone offline (during your day-to-day life) that you wanted to date?

Pick one: Yes / No

While you were online dating did you spend more, the same or less time on the following activities:

Parties, bars and social events	More / The Same / Less
Work	More / The Same / Less
Calling friends and family	More / The Same / Less
In chat rooms and other online environments	More / The Same / Less
Watching television and/or playing video games	More / The Same / Less

When online dating, if you had 10 minutes free were you more likely to call a friend or check mail from potential dates? Call a friend / Check email

When online dating, were you more excited to check your general email or your online dating email? General email / Dating email

In the process of online dating, did you learn anything about yourself?

No, nothing 1 2 3 4 5 6 7 8 9 10 A lot

In the process, did you learn anything about what you were looking for in relationship?

No, nothing 1 2 3 4 5 6 7 8 9 10 A lot

Do/did you enjoy dating generally (not specifically online dating)?

Not at all 1 2 3 4 5 6 7 8 9 10 Very much

Do/did you enjoy emailing friends and family?

Not at all 1 2 3 4 5 6 7 8 9 10 Very much

Do/did you enjoy watching movies?

Not at all 1 2 3 4 5 6 7 8 9 10 Very much

Do/did you enjoy life generally?

Not at all 1 2 3 4 5 6 7 8 9 10 Very much

Appendix B

Traits Used for Chapter 3 Studies 3A-3C & 4B and Chapter 4 Study 2

ambitious
boring
bright
critical
cultured
deliberate
dependable
emotional
enthusiastic
idealistic
imaginative
impulsive
individualistic
industrious
intelligent
level-headed
methodical
observant
open-minded
opinionated
polite
reliable
resourceful
self-disciplined
sensitive
stubborn
studious
talkative

Appendix B-2

Traits generated and used for Chapter 3 study 4A and Chapter 5 study 3

caring
accepting
active
adventurous
ambitious
analytical
apathetic
arrogant
artistic
assertive
attractive
blunt
boring
bratty
bubbly
casual
cautious
charismatic
cheerful
chubby
comfortable
committed
companionable
compassionate
competitive
conscientious
conservative
considerate
cool
courteous
coy
crazy
creative
cuddly
curious
cute
cynical
dedicated
dependable
determined
different
difficult
distant
doting
down-to-earth
driven
duty bound
earthy
easy to get along with
easy-going
eccentric
educated
emotional
emotionally unavailable
empathetic
empathic
energetic
enthusiastic
ethical
exciting
extrovert
extroverted
faithful
family oriented
flexible
flirtatious
free spirited
friendly
fulfilled
full of life
fun
fun loving
funny
gay
generous
gentle
genuine
giving
goal oriented
good
good listener
good-natured
goofy
gracious
great smile
grounded
happy
hard worker
hardworking
headstrong
helpful
homebody
honest
horny
hospitable
hot-blooded
humorous
imaginative
impatient
impulsive
independent
inquisitive
insecure
intellectual
intelligent
interesting
introverted
intuitive
inventive
jingoistic
joyous
judging
kind
laidback
laid-back
lazy
liberal
lighthearted
logical
lonely
lovable
loving
loyal
mischievous
moody
moral
nervous
nice
nurturing

open
open-minded
opinionated
optimistic
organized
outdoorsy
outgoing
outspoken
passionate
passive aggressive
patient
people person
perceptive
perfectionist
playful
polite
positive
professional
protective
proud
punctual
quick
quiet
quirky
realistic
reclusive
red-haired
relaxed
reliable
resourceful
respectful
responsible
romantic
sarcastic
sensible
sensitive
sensual
sentimental
serious
sexual
sexy
sharing
short
shy
silly
sincere
skeptical
slightly judgmental
smart
outgoing outspoken
passionate
passive aggressive
patient
people person
perceptive
perfectionist
playful
polite
positive
professional
protective
proud
punctual
quick
quiet
quirky
realistic
reclusive
red-haired
relaxed
reliable
resourceful
respectful
responsible
romantic
sarcastic
sensible
sensitive
sensual
sentimental
serious
sexual
sexy
sharing
short
shy
silly
sincere
skeptical
slightly judgmental
smart
sometimes loud and obnoxious
somewhat shy
special
spontaneous
stable
straightforward
strict
strong
stubborn
studious
supportive
sweet
sympathetic
talkative
tall
tenacious
thinking
thoughtful
timely
traveled
trusting
trustworthy
unapproachable
understanding
unique
unloved
unpredictable
upbeat
verbal
vocal
warm
welcoming
well rounded
well spoken
well-read
willing
witty
workaholic
zany

Appendix C
General online dating survey (adapted from the online version)

MIT Online dating Survey::Web Site Use

This is quick survey on how people use online dating sites. Please record your answers below.

Gender

Male / Female

Age

_____

1. How long have you used online dating services? _____ Months
2. How many online sites are you currently using? _____
3. How many sites have you tried in total? _____
4. Approximately how many people have you exchanged email with in the last 4 weeks?_____
5. How many people have you met face-to-face through online dating services in the last 4 weeks? _____
6. During the entire time you've been online dating, how many people have you met with?
   Once?
   2 times?
   3-5 times?
   6 or more times?
7. What is the longest period of time you have dated someone you met through this type of service? _____
8. Are you looking for a long-term relationship?
   No
   Eventually
   If I meet an exceptional person
   I would like to be in a long term relationship
   I am currently in a long-term relationship
9. Would you like to get married?
10. Have you tried speed dating? A type of matchmaking service where you meet several people for a short period of time and then decide whether you are interested in them.(y/n)
11. Do you belong to any singles groups or organizations?(y/n)
12. How much contact do you like to have with a person before you meet them face-to-face?
    I like to exchange about ___emails
    and to talk on the phone about ___ number of times
13. Do you get along better with people you contact or people who contact you?
    Contact me
    People I contact

14. How do you prefer to meet people? Rate the choices below from 1, your preferred method, to 5, the least desirable way.

    Online
    Through a friend
    At work or school
    At a bar, cafe or other public place at parties

15. Why did you choose to try online dating?

Appendix D

Pictures used in the Chapter 5, Chat Circles study for the picture condition

Appendix E
Indicating income

In all of these communities, a significant percentage of people chose not to disclose income levels. In the geographically based sites, 34% of both the people from Boston and San Diego deferred on the income question while 46%, of the Jewish community users chose not to answer the question. Unexpectedly, only 19% of the nudists did not report income. Although some of this variance is due to the gender inequality on the nudist site since men report income more frequently than women, this difference does not explain the effect. Both men and women on the nudist site are more likely than other users to report income. For example, only 28% of women on the nudist site did not state their income while 48% of women from San Diego did not – although these two communities report similar overall income distributions. One possible explanation for this difference is that Nudists and the mainstream population have different priorities about financial status. As such, individuals have different comfort levels in disclosing income. Nudists may not be as stigmatized by a lower income and therefore more willing to share it while people from other communities, e.g. San Diego, may pay more attention to this feature of a profile. In addition, this high rate of reporting income could account for the lower median income in the nudist population; the low rate of reporting income in the Jewish community could account for the heightened median income levels.

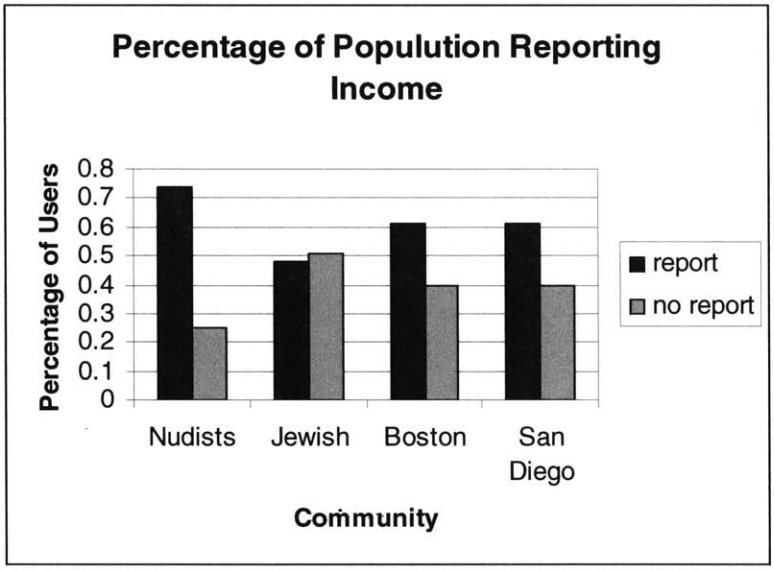

Figure. In each community, a real percentage of the population chose not to report their income. These response rates may indicate attitudes within these communities

Appendix F

Time tradeoffs in online dating

Time is an inelastic resource, with people online dating potentially sacrificing ability to maintain other pursuits (e.g. limiting opportunities to locate people offline). To explore the area of time tradeoffs in online dating, I asked a short set of questions about time usage while online dating. When asked if they spent less, the same or more time on other activities while online dating, more people report time trade-offs with television viewing than other activities (40.6% of people spent less time watching TV while online dating). Offline social life may also suffer, with 20.6 percent of people reporting spending less time for social activities while online dating. In addition, online dating may actually contribute to people working harder (with 14.6% of people saying they worked harder while online dating). Online dating is thought to be more popular with people with time consuming work schedules (Bryn 2001). This result suggests the additional finding, that people while online dating may actually work more, perhaps because they have a more efficient and computer-based mechanism to locate people without leaving their desks.

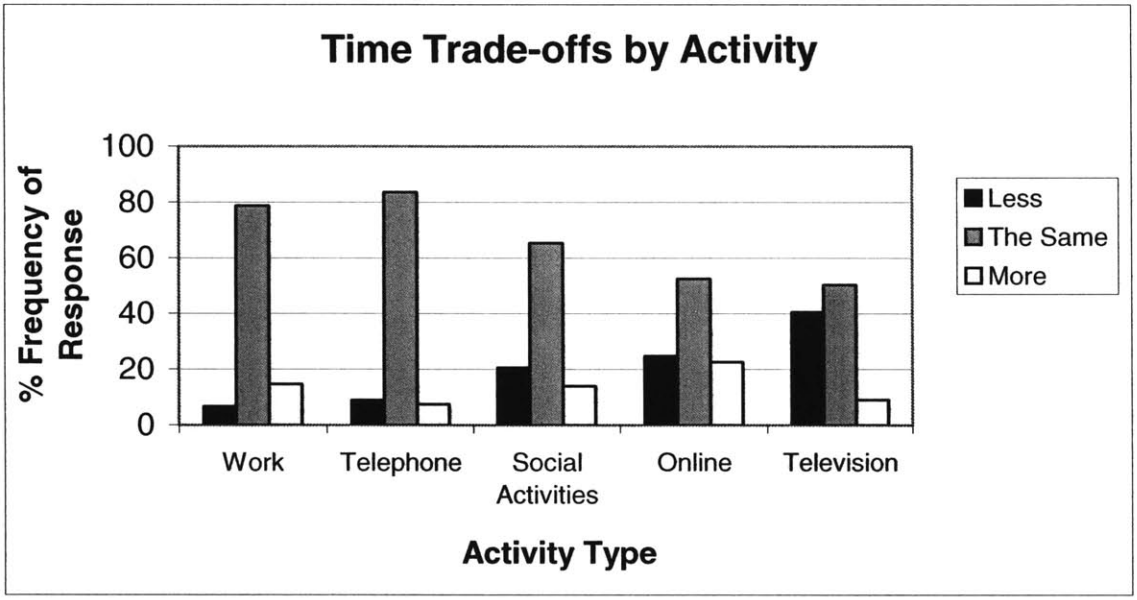

Figure 9. Shifts in time allotted to different activities while online dating. Online daters, were asked if they spent less, the same or more time on each of these categories of activity while online dating. Online dating primarily consumes time otherwise spent watching television although it may adversely effect offline social activity.

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