Virtual Choice Architecture and Online Dating: The Effects of Choice Overload, Reversibility, and Impermanence on Online Daters' Satisfaction and Communication with Selected Partners

By

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ABSTRACT

Online dating has provided a fundamental shift in the romantic initiation process by giving individuals greater access to, and abundance of, potential mates. This dissertation presents two studies that investigate how conditions of greater choice impact dater satisfaction and initial message construction. The first study draws on choice overload and decision reversibility theoretical frameworks. It shows that one week after making their selection, online daters who chose from a large set of potential partners (i.e., 24) were less satisfied with their choice than those who selected from a small set (i.e., 6), and were more likely to change their selection. While choice reversibility did not affect daters' satisfaction, those who selected from a large pool and had the ability to reverse their choice were the least satisfied with their selected partner after one week. The second study draws on choice overload and loss of option theoretical frameworks. In this study, one week following the initial selection, online daters who chose from a large set of potential partners were less satisfied with their choice than those who selected from a small set, and they also composed less effortful messages to their selected dater. Additionally, this study provides evidence that the choice overload effect occurs in online dating because individuals presented with more options viewed more dater profiles and experienced greater cognitive burden with their decision of who to select. Presenting online daters with a pool of options who could potentially disappear had no effect, but those who selected from a large pool and were told that their choice might disappear were less satisfied with their selection than those who selected from a small pool and were told that their choice might disappear. The results here advance our understanding of how technological features related to choice affect interpersonal evaluations and communicative actions.

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TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Knowledge is easy to come by. Homeowners interested in a new vacuum can research attributes, attachments, and costs of a hundred models before ordering one. New parents seeking a pediatrician can access credentials, curricula vitae, and employment histories of dozens of potential physicians before he or she so much as meets the child. Oenophiles sitting at a bar can look up reviews of each and every bottle of wine on a menu before placing an order or taking a sip. And these homeowners, parents, and wine-aficionados can do all of this by just moving a few fingers on a screen. Put simply, the advent of the Internet has provided individuals with access to endless amounts of knowledge with little to no cost. One area where this new access and abundance is most noteworthy, and potentially presents the most striking ontological shift, is in the relationship formation process with online dating.

Indeed, more is what you get with online dating. Over 50,000 new singles per day! 113,849 people online right now! Over 20 million registered users! These claims, coming from the websites Plenty of Fish, OkCupid, and eHarmony respectively, illustrate one of the most significant aspects of online dating: the sheer abundance and ease of contacting potential relational partners. Individuals can now sign online at any time and have around the clock access to a wealth of available dates. As such, online dating is often described as a beneficial change (Heffez, Miller, & Riger, 2011), if not a revolution in the relationship initiation process (Finkel, Eastwick, Karney, Reis, & Sprecher, 2012). However, although great amounts of choice may seem appealing, some factors of mate choice and availability may actually affect online daters in a detrimental manner. The overarching question driving this research considers this explosion of romantic access and asks: how has this profound shift in the practices of mate selection affected the relational decision-making process?

This research systematically examines how the structuring of choice through design elements affects the interpersonal perceptions and communication of online daters. At a most basic level, online dating offers daters more individuals to connect with and continual access to this selection pool, should they want to connect again to a different individual. Yet, at the same time these new possibilities of connection remain only possibilities – the connection is always mediated at first. In this context, there is always a degree of uncertainty or impermanence associated with the potential dater behind a profile. Unlike the potential mate who charmingly smiles and walks across the bar to sit with you, there is no guarantee that the online dater behind any profile is still utilizing the website or still searching for a mate. Hence, this research asks three main questions concerning these realities of romantic connection online and their impact on interpersonal perceptions and communication: What is the effect of having more options to choose from? What is the effect of having the ability to reverse a decision and select again? What is the effect of selecting from a pool of impermanent options?

To best pursue this course and grow our understanding of online dater interpersonal perceptions and communication, a theoretical understanding of this phenomenon was developed by bringing together perspectives from behavioral economics in addition to those unique to communication research. This was not a novel undertaking for communication research. While the discipline is now characterized by a great breadth and depth of work in communication departments, this young discipline emerged from interdisciplinary roots and still benefits from such work. Communication research has advanced by drawing on fields such as political science, psychology, mathematics, statistics, sociology, and linguistics, among others (Peters, 2008). In this tradition, the research conducted here attempts to harness this interdisciplinary nature in order to best understand this timely and consequential communication phenomenon.

The Virtual Choice Architecture of Online Dating

The first connection to behavioral economics in this research emerges in the framework that we use to describe the ways in which choice can vary online; we are interested in the *virtual choice architecture of online dating*. This term is informed by behavioral economic work on choice architecture (Thaler & Sustein, 2008), which argues that the way choices are presented to consumers can affect their decision-making processes. In considering the virtual choice architecture of online dating, this research argues that the virtual features responsible for how choice is presented have important consequences for the online dating experience. Architects understand that structural decisions such as where to place windows and design decision such as the color and decoration of any building can affect how one experiences it. The same is true of the structural and design features of any website. As hinted at above in our discussion of our overarching questions, the specific features of interest here are those that govern amount of choice, reversibility of choice, and permanence of choice.

Perhaps the most fundamental aspect of virtual architecture that varies between websites is the amount of choice presented to online daters. Upon search, most dating websites provide a grid composed of dater thumbnail pictures and usernames, each linking to a more detailed profile. Some online dating websites, such as eHarmony, are known to provide fewer matches (as few as 4), whereas others such as OkCupid offer more opportunity to connect (40 or more). Hence, simply manipulating the amount of choice can offer insight into the effects of this virtual architecture across online dating websites.

The second aspect of virtual architecture that can vary between online dating websites is the notion of reversibility. Some websites take distinct actions to highlight one's ability to always select again. This variation comes primarily through the nomenclature of a dating website

which can implicitly make suggestions. On one end of this spectrum are dating websites such as Plenty of Fish or Datehookup, which by their very names may suggest that potential partners can be replaced easily and decisions are always reversible. On the other end of the spectrum are online dating websites such as Chemistry.com and eHarmony. Here, visual mottos present in the context of the website, such as those that suggest the website will help users find their "soulmates", may compel daters to believe that their first provided match is supposed to be the one and only. Hence, the initial selection of a partner may be one characterized by an ethos of permanence. Manipulating concrete notions of reversibility or permanence is a first step to understanding how the above design aspect of virtual architecture may affect online dater satisfaction with a selection.

The final aspect of virtual architecture that can vary between websites is any indication of permanence. Some websites such as match.com indicate the activity level of potential choices by listing when they were last active. This can serve as a cue to indicate that the person behind the profile is a distinct option. However, if this notification indicates a great length of inactivity, say a week or two, the choice can be viewed as an uncertain or impermanent option. There are many reasons why the individual behind an online dating profile may no longer be an option, ranging from an expired account to entering in a romantic relationship. Hence, the presence of this particular cue can prompt two different perceptions of a particular option– that of permanence versus that of impermanence. Manipulating dater perceptions of choice permanence versus impermanence will provide insight into the range of effects that this particular cue might have on online dater satisfaction with a selection.

From a broader perspective, investigating the effects of choice conditions in online dating can be informative on two levels. As above, structural features that govern amount of choice, and

design features that may prompt feelings of reversibility or impermanence, are commonplace and varied among online dating websites. Hence, insight into the psychological effects of these seemingly irrelevant factors of virtual architecture will be informative to website designers and potentially even online daters. At the same time, understanding how different choice conditions affect online daters may illuminate the divergent experiences of different online dating populations. Those in more rural areas where there is a less populated online dating space, or those in older age groups characterized by a less robust field of online daters, may naturally face reduced choice. This notion of a less active online dating space may diminish any sense of reversibility – if individuals find a good option in that sparse environment, they may want to hang on to him or her. The opposite may be true in highly active and fluctuating online dating environments – young professionals in large cities are likely to be consistently presented with many options and a sense of easy reversibility. At the same time, those in the fluctuating market may perceive greater impermanence as other online daters and individuals outside of online dating always present competing relational options, while those in the sparse market may have confidence their potential online matches do not really have any other place to go. Hence, although our focus is on the effects of manipulating virtual choice, the investigation may be insightful into the effects of variations arising from physical factors.

Importantly, just as amount of choice, reversibility, and impermanence are all realities of online dating, they are also conditions of interest in behavioral economic research. Considering the findings related to how these three decisions affect consumers in a marketplace can provide insight into how virtual architecture manipulations may affect online daters. In what follows we will consider the ample empirical work related to amount of choice, the more middling work related to reversibility, and those findings insightful into the condition of choice impermanence.

Choice Overload

Individuals report wanting and appreciating having a multitude of options in most situations (see Patall, Cooper, & Robinson, 2008 for review). However, this intuitive belief that more is better has been shown to be not quite accurate in the past decade and a half of research. Notions of the negative effect of choice began with a well-publicized study which established that individuals are less likely to purchase a jam from a larger pool than a smaller pool, and individuals are less satisfied with jam purchased from a larger pool than a smaller pool, (Iyengar & Lepper, 2000). Since this initial research, scholars have consistently documented that having more choice can actually be detrimental. While studied under different names such as the "excessive-choice effect" (Arunachalam, Henneberry, Lusk, & Norwood, 2009), "paradox of choice" (Schwartz, 2004), and "choice-overload" (Bollen et al., 2010; Diehl & Poynor, 2007; Iyngar & Lepper, 2000), the general phenomenon consistently emerges. (This latter term – the choice overload effect - is the one that we will utilize as we move forward to discuss this area of research.) Whether individuals choose from coffee (Mogilner, Rudnick, & Iyengar, 2008), pens (Shah & Wolford, 2007) gift boxes (Reutskaja & Hogarth, 2009); or charities to support (Scheibehenne, Greifeneder, & Todd, 2009), more choice has consistently been shown to lead to less satisfaction and more regret with the selected option, a greater likelihood of switching the choice, and to fewer instances of making a decision altogether.

The purpose of this literature review is to consider the research that has been conducted on the choice overload effect. As will become evident, this theory may seem parsimonious, but is not exactly clearly conceptualized. We are faced with a body of literature where choice overload is explained by an overlapping array of different stimulus characteristics, which prompt one or more potential mechanisms, which in turn result in a range of outcomes. Thus, in order to

attempt to consider this research body in a systematic manner, this review will divide the aspects of the phenomenon into three main areas for consideration: (1) Stimulus Characteristics, (2) Mechanisms, and (3) Outcomes. By highlighting stimulus characteristics, mechanisms, and outcomes as they have been previously studied, we hope to identify the crucial conditions for choice overload, how choice conditions may interact, and find room for development or clarification. Importantly, these three areas are consistent with factors that can be manipulated to some degree via virtual choice architecture and are consequently ones that online dating can shed new light unto. For example, the amount of information about each dater can be manipulated (stimulus), choices can be simplified by presenting potential daters in categories (mechanism), and online dating can lead to an array of outcome behaviors beyond a simple purchase or satisfaction rating.

Stimulus Characteristics

For choice overload to occur, one must be making a choice. Hence, a fundamental question we can ask is: What is one making a choice of? It turns out that this is an important question, because variations in the qualities of what one is choosing can affect choice overload processes and outcomes. As such, the presentation of choice, or the characteristics of the stimulus, are of particular interest. These consequential characteristics include *the number of options one can select*, *the qualities of those options*, *the need to justify a choice*, and *the overall complexity of the pool*. Importantly, each of these stimulus factors has potential to impact the presence of choice overload effects.

First and foremost, the *number of options* in a choice pool matters. To be clear, this is the core of the choice overload effect: more choice is theorized to produce less satisfaction. (The potential reasons why this occurs are explored below under discussion of mechanisms.)

Generally speaking, all the research discussed here in some way considers the effects of presenting a large number of options against a small number of options. That being said, there does exist some debate over what is considered a large number. Iyengar and Lepper (2000) settled on 24 because it seemed like a large, but not unusual, amount of choice. Considering this debate in their meta-analysis of choice overload research, Scheibehnne et al. (2010, pg. 411) offer the compelling argument that choice overload occurs when individuals face novel situations where the choice pool exceeds "ecologically unusual" amounts. (Thus, the heart of the argument seems to be whether a pool of 24 types of jam is large but not unusual, or in fact ecologically unusual.) Regardless, at some point the number becomes too much and triggers one of the mechanisms discussed below, producing a negative outcome. Further considering typical pool sizes in their meta-analysis, Scheibehnne et al. (2010) found that assortment sizes for small choice sets had an average of seven options for consumers to select, whereas the assortment size for large choice sets was 34. The interquartile ranges for these conditions were five to six and 24-30, respectively. Again, there is no consensus on what makes for a large pool. For the small choice pools, Iyengar and Lepper (2000) indicate that they based the numbers off of previous research which shows that having three to six options can lead to greater self-determination and heightened motivation (Zuckerman, Porac, Lathin, & Deci, 1978).

Importantly, there has been some debate on whether amount of choice always has an overall impact on satisfaction. That is, the above meta-analysis also suggested that there was in fact no mean effect size based on amount of choice, hence no evidence of an all-encompassing choice overload effect. However, the authors of this analysis indicate that this null finding may be due to the rather extreme variance between aspects of the studies they considered (Scheibehnne et al., 2010) (i. e., the conditions mentioned below in this review were not

accounted for, and may have impacted results.) To this point, a more recent meta-analysis indicates that there is in fact an overall effect of amount of choice on satisfaction, when taking choice set complexity, decision task difficulty, preference uncertainty, and decision goal into account as moderators (Chernev, Bockenholt & Goodman, 2015). Specifically, when choice is characterized by a pool of greater complexity, greater task difficulty, higher preference uncertainty, and when the chooser intends on making a choice as opposed to just browsing, the choice overload effect reliably appears.

The second characteristic that emerges with the stimulus/choice pool is the *quality of the options available*. Perhaps the clearest iteration of this factor is the perceived attractiveness of the options. Research suggests that having more attractive options is associated with greater effects of choice overload (Scheibehenne et al., 2009). For instance, if one has 3 highly attractive options as opposed to 2 highly attractive options, the decision will be harder and likely produce more regret, cognitive dissonance, etc. (these being mechanisms to be discussed below). Instead of leaving 1 good option on the table, individuals have to pass up 2 good options. This matters in choice overload because, generally speaking, if you have more options you are likely going to have more attractive options. (e.g. Individuals are more likely to find 3 highly attractive online dating options when considering a pool of 24, as opposed to when you are selecting from a pool of 6.) The relationship between attractive options and choice satisfaction is so strong that a more attractive small set produces more overload than a less attractive large set (Scheibehenne et al., 2009). For instance, an individual selecting from a pool of 6 highly attractive choices will face more overload than an individual facing a pool of 24 mediocre choices. An individual can easily discard 23 mediocre choices; leaving 5 highly attractive options on the table may produce more regret, cognitive dissonance, etc.

The next quality of a stimulus that may affect choice overload is the *need for justification* of the choice. If a decision is harder to justify, a state more likely to emerge when selecting out of a large array of good alternatives, individuals experience reduced satisfaction (Scheibehenne, Greifeneder, & Todd, 2009; Sela, Berger, & Liu, 2009). When individuals are faced with many good options, it likely becomes hard to identify a clear reason why one good option supersedes another, leading to lower feelings of satisfaction. That being said, the need to justify has only been isolated in one study (Scheibehenne et al., 2009), and has been treated primarily as a mediator/moderator with individuals being required to justify their decision within the experiment. This quality may be sufficient, but not necessary for choice overload to occur. It is curious that the choice overload effect still emerges in studies where there seems to be little need for justification such as for chocolates and jam (Iyengar & Lepper, 2000) or hypothetical vacation packages (Gingras, 2003). Hence, need for justification may not be necessary for choice overload to occur.

The fourth and final stimulus characteristic that can affect choice overload is the *choice set complexity*. This can be defined as the degree to which the choice set is intricate in its entirety, and is operationalized as the number of choices in a set multiplied by the number of attributes of each choice (Greifeneder, Scheibehenne, & Kleber, 2010). The basic idea is that if a pool of 24 objects is unidimensional, there are really only 24 options to consider – the choice may be less burdensome, and individuals may experience less regret or cognitive burden leaving 23 things behind. However, if those 24 options have many appealing and unappealing attributes, the decision becomes harder – there is more cognitive burden in the process and room for regret, cognitive dissonance, etc. For instance, passing up a type of chocolate may be simpler than passing up an individual who is unappealing because they or not of the same religion, but

appealing in their interests, careers, hobbies, etc. On this note, some research has indicated that increasing amount of choice reduces satisfaction, in line with the general choice overload hypothesis, but only when the options were characterized by having many attributes (Greifender et al., 2010; Reutskaja & Hogarth, 2009). Adding a few unidimensional options will not have the same effect as adding a few multidimensional options. Congruent with this notion, research suggests that reducing choice set complexity can reduce choice overload effects (Mogilner et al., 2008). For instance, if individuals can place their choices into categories, they experience greater satisfaction with their choice, because this exercise simplifies the choice (Mogilner et al., 2008).

Mechanism

Thus far, we have argued that choice overload effects are more likely to emerge when there are certain stimulus characteristics. However, the key to this is that these characteristics should trigger a particular mechanism. The mechanism is the psychological process that actually produces affective or behavioral change. To date, a number of different mechanisms have been proposed to explain choice overload: *expectation disconfirmation, cognitive burden, regret, counterfactual thinking, and cognitive dissonance*.

First, selecting from a large set of options may produce *expectation disconfirmation* (Diehl & Pynor, 2010). This occurs when individuals assume that a large pool will contain a great match, but find no such match, leading to negative feelings about their selection. For example, if an individual approaches an online dating website and sees that there are many possible matches, they may have immediate high expectations – they may believe that with so many options the perfect match may be out there. When they fail to find a perfect match, they will experience negative disconfirmation – their high expectations are not met. This leads to less satisfaction with the selection. When individuals see a small set of options to choose from, they

may have immediate low expectations, believing that no good match will be found. Then, when a good match is in fact found, they experience positive disconfirmation – their low expectations are exceeded. This leads to higher satisfaction with selection. Thus, a first possible explanation for low satisfaction from a large set of choices is negative disconfirmation; more choice is appealing, but doesn't always contain what we assume it will.

Selecting from a large choice set is also likely to produce *cognitive burden* (Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009, Botti & Iyengar, 2006). The idea is that large choice sets are inherently more difficult to select from, and individuals thus feel cognitive burden, which in turn creates frustration and diminishes satisfaction. This may explain why more complex choice sets produce less satisfaction (Greifender et al., 2010; Reutskaja & Hogarth, 2009) and potentially why expertise (Mogilner et al., 2008) leads to individuals being happier with their selection. Thus, a second possible explanation for low satisfaction from large choice sets is that they are simply harder to think about efficiently, and this makes choosers feel worse about their selection.

The next commonly discussed mechanism behind the choice overload effect is that of feeling *regret* (Iyengar & Lepper, 2000). Having more discarded alternatives produces more opportunities for regret to emerge, which in turn dampens people's enthusiasm for their choice (Iyengar & Lepper, 2000). By definition, a large choice set will have more discarded alternatives, and thus leave individuals with greater opportunity to feel regret for a potentially good choice not taken. Whether it be chocolate, jams, or online daters, if individuals select from more options, there are likely more options that they regret having left untaken. This in turn can diminish the satisfaction of the actual selection. This may also explain why having more attractive options (Scheibehenne et al., 2009) leads to more regret. It is likely individuals will

regret leaving attractive options on the table, more so than unattractive choices. Thus, a third possible reason why individuals selecting from larger pools feel diminished satisfaction is that there are more choices that they can feel regret for not taking.

The fourth mechanism postulated to produce the choice overload effect is *counterfactual thinking*. Counterfactual thinking is the process of considering imagined alternatives to the past, (e.g. imagining selecting the strawberry jam instead of the raspberry jam that you are currently putting on your toast,) and is often accompanied by negative emotions (Hafner et al., 2012). Thus, the argument here is that as an individual has more options, they have more ability to reflect on those paths not taken and consequently increase counterfactual thinking. Counterfactuals, in turn, lead to feelings of dissatisfaction (Markman, Gavanski, Sherman, & McMullen, 1993). As is readily evident, it is likely that counterfactual thinking operates hand-in-hand with feelings of regret. It seems that counterfactual thinking is a necessary condition for feelings of regret. (Albeit not a sufficient condition: if one is engaging in counterfactual thinking about imagined alternatives that were perceived as worse, e.g. 'I'm so glad I didn't select strawberry jam, it turns out I have some at home already…', it will not produce feeling of regret. For counterfactual thinking negative emotions often occur, but not always.) Thus, a fourth possible reason why large choice sets produce less satisfaction is that they offer more opportunity for counterfactual thinking – once again there is simply more to think about, more potential for regret.

The final mechanism potentially responsible for the choice overload effect is *cognitive dissonance* (Chernov, 2003). While the terms *cognitive dissonance* and *dissonance* have been used to refer to both a state of cognitive discomfort and the motivational state it produces to quell that discomfort, here the term is used in the former sense: by cognitive dissonance we mean a

state of cognitive discomfort. As a mechanism, cognitive dissonance typically occurs when individuals are allowed to choose between alternatives. In such a situation individuals typically face the psychologically uncomfortable state of dissonance, as each choice may have positive and negative qualities. Once a choice is made, individuals are motivated to reduce this dissonance (Festinger, 1957). To reduce dissonance, individuals engage in a number of dissonance reduction strategies in order to be more satisfied with their current choice of action. These strategies include subtracting dissonant cognitions (e.g. ignoring cognitions that conflict with the choice), adding consonant cognitions (e.g. thinking more positively about the alternative taken), decreasing the importance of dissonant cognitions (e.g. convincing oneself that the qualities of the unchosen alternative are less meaningful), and increasing the importance of consonant cognitions (e.g. convincing oneself that the qualities of the chosen alternative are more meaningful (Harmon-Jones, 2002). When used as an explanation within the choice overload literature, Chernov (2003, experiment 3) indicates that choice overload might occur if the attributes of choices are rated equally attractive, thus making commitment to each of the choices high, which in turn makes the cognitive dissonance associated with rejecting options more pronounced and lowering confidence regarding a decision. For example, if an individual is seeking a date and they find both individuals who like to read and like to hike equally attractive, and in the choice pool there exists and avid reader and avid hiker who are equal on all other means, they will face significant dissonance. It seems a key here is that cognitive dissonance is possible as a mechanism only if the options are of similar appeal, or there at least exists a group of similarly appealing options within a choice set; if there is a clear best choice there exists no psychological discomfort, or at least a lower amount of it, and no need to reduce dissonance (i.e. engage in dissonance reduction strategies.) When more choice is present, individuals are more

likely to find at least a group of similar highly rated alternatives, and thus face dissonance and experience reduced satisfaction with their decision.

Outcome

The final aspect to discuss regarding the choice overload effect is that of outcome. The outcome is what researchers choose to measure as the *dependent variable*. That being said, the dependent variable has typically been accessed in two different ways. The first is in *measurements of subjective state*. This includes aspects like an individual's feelings of satisfaction or confidence with their selection (Chernev 2003a; Chernev 2003b; Chernev 2006; Deihl & Poynor, 2010; Fasolo et al., 2009; Gourville & Soman, 2005; Greifender et al., 2010; Haynes, 2009; Iyengar & Leppar, 2000; Mogilner et al., 2008; Oppewal & Koelemeijer, 2005; Scheibehenne et al., 2009; Shah & Wolford, 2007) or feelings of regret for the selection or for not selecting unchosen alternatives (Haynes, 2009; Inbar et al., 2011; Lin & Wu, 2006). *Measurements of behavior* are the second category of outcomes measured as a dependent variable in choice overload research. This category includes aspects such as an individual's likelihood of switching after they make an initial selection (Chernev, 2003b), their decisions to forgo or defer any choice at all (Chernev, 2005; Iyengar & Lepper, 2000; Morrin et al., 2012; Scheibehenne et al., 2009; Shah & Wolford, 2007; Townsend & Kahn, 2014), and the decision to actually select an option (Chernev, 2003a; Gourville & Soman, 2005; Sela et al., 2009). If choice overload is present, individuals are more likely to switch their initial selection or forgo a decision totally if presented with a large pool of options, whereas individuals are more likely to select from a small pool of options.

Although these dependent variables have differed across studies of choice overload, a recent meta-analysis suggests that they are all valid outcomes by which to provide evidence of

the theory. That is, satisfaction/confidence, regret, choice deferral, and switching likelihood are interchangeable as dependent variables in choice overload research (Chernov et al., 2015). This makes sense, as there is conspicuous relation between these elements. If an individual is not confident they may avoid choice (defer), or experience regret upon making a choice. And if an individual experiences regret with their choice, they may be more likely to switch their decision.

The Reversibility Effect

While choice overload has an abundance of research and is often referred to as a theory, the effects of decision reversibility have received less empirical focus. That being said, the findings have been rather parsimonious and consistent. The reversibility effect (e.g., Frey, 1981; Frey, Kumpf, Irle & Gniech, 1984) suggests that when individuals are able to change their selection after they have made it, they experience reduced satisfaction with their selection. Similar to choice overload, when individuals have more choice (as expressed in the ability to return and exchange a selection), they are said to experience similar outcomes including reduced satisfaction with a selection and a greater likelihood to switch their decision (Gilbert & Ebert, 2002). Also consistent with choice overload, the mechanism of cognitive dissonance has been proposed (Frey, 1981, Gilbert & Ebert, 2002), and some have even argued that choice overload and reversibility share a mechanism of counterfactual thinking (Hafner, White, & Handley, 2012). Chapter 2 of this dissertation focuses distinctly on how overload and reversibility may work together in the context of online dating.

Option Impermanence

The final condition of choice that is of interest here is that of option impermanence. As stated before, this is when there exists an uncertain loss of options: one can select an option, without knowledge of whether that option truly exists as a choice. This is a relatively unique

decision making scenario. Outside of online dating, perhaps the housing market is one similar circumstance: it is possible to put in an offer that may never even be entertained. Hence, the condition of impermanence has not been considered directly in the literature to date. The closest area of research in behavioral economics is that of loss aversion.

Loss aversion research suggests, just as the nomenclature implies, that individuals are averse to loss (i.e., Kahneman, D., Knetsch, & Thaler, 1991; Tversky & Kahneman, 1991). Losing an option is so unappealing that decision makers will spend time and money to maintain option availability. Even if they view the option as one of little interest, they perceive some utility in having access to it (Shin & Ariely, 2004). It is noteworthy that this is consistent with choice overload research – individuals typically like having more choice. Also consistent with choice overload research is the fact that maintaining more choice can actually be harmful to satisfaction; it can cause individuals to select worse investments (Botti & Hsee, 2010), have more negative feelings about medical decisions (Botti, Orfali, & Iyengar, 2009), and be less confident in their choice (Chernev, 2006).

Loss aversion can also prompt individuals to make selections sooner: Some decision makers will choose an option sooner than they would normally if they are faced with a pool of options where they are told that options may disappear and some options are actively disappearing over time (Patalano, et al., 2015). It is noteworthy that in this latter research Patalano et al. (2015) indicated that this was a condition of uncertain loss of options, but experimentally the participants viewed options disappearing. This perception likely informed their response. When one sees an option actually disappear, any uncertainty regarding the potential of loss is reduced – loss is a certainty not a possibility. No research to date has

considered the effect of choosing from a pool of impermanent options on satisfaction with that selection, let alone what will occur in the context of online dating.

Areas for Theoretical Advancement

In the past two decades, research has vividly illustrated the counterintuitive notion that more choice is not always better than less choice for the decision maker. Moreover, if individuals have the ability to reverse their decisions they will experience reduced satisfaction. Where there is greater choice, there is likely reduced satisfaction. At the same time, individuals are opposed to losing options. While this begins to paint a picture of how factors of choice influence decision maker satisfaction, there exists much room for theoretical development by considering the practical question of how different conditions of choice work together. Hence, below we outline several potential theoretical advancements that focus on developing a better understanding in this very area. These advancements focus on choice overload theory as this 'theory' has the most robust foundation of empirical research and, as will continue to be indicated, online dating provides a fecund framework for testing particular pieces of choice overload theory, and how it will act in unison with conditions of reversibility and impermanent choice.

Expanding Boundaries: CMC & Choice Overload

First and foremost, we ask: does choice overload occur in high-stake contexts? It seems that individuals experience negative affect even when it is affordable to change the decision. If not satisfied with one type of chocolate, most individuals can buy another. The same holds true with jams, jelly beans, and hypothetical vacation packages. If they do not like their hypothetical trip to Hawaii, they can imagine being in Iceland, easily moving to a very different island. Yet, in these circumstances, individuals still feel the negative effects of choice overload. Thus, the question at hand is does this theory apply to more pressing circumstances where a decision may be more consequential? Does choice overload occur when individuals select a potential romantic

mate? Expanding the application of choice overload to online dating would broaden the significance of this theory.

Considering the prior literature, one would expect online dating to be a prime context for choice overload to occur. It is a decision-making scenario were often there is more than one good choice, each choice has many attributes, and there is an inherent personal and social justification required – eventually your friends will meet the individual you're dating. Hence, it is curious that the one prior examination of choice overload in online dating failed to find they hypothesized effects (Lenton & Stewart, 2008). A possible explanation for this finding is discussed in Chapter 2.

A second reason to consider choice overload in online dating is that it is likely that bringing behavioral economics to CMC will provide positive theoretical cross-pollination. Pre-interaction impressions concerning psychological state and trait have been established to impact later interpersonal judgments (Tong & Walther, 2012). Here, we argue that conditions of choice in CMC structure pre-interaction impression, which in turn impact interpersonal judgments. Specifically, the *virtual architecture of online dating* acts as other psychologically meaningful media features do (e.g. Toma, 2010, Tong et al., 2008), and impact interpersonal judgements and potentially communicative outcomes. Thus, conditions of choice (Behavioral Economics) presented and altered through media features (CMC) likely impact communication judgments and processes (Communication). Likewise, communication research can inform theories of choice: we expand the boundary of choice research to show it has effects beyond product selection to judgments of other individuals, and potentially communication outcomes. As both economic and communication decisions become more mediated, this union of theory and

research may prove to provide valuable insight into the perhaps unseen effects of choice and abundance online. Chapters 2 and 3 are guided by this overarching theoretical aim.

Choice Overload, Reversibility, & Impermanence

The second domain ripe for theoretical advancement comes in considering conditions of choice in joint action. Choice overload theory has primarily been examined alone. However, conditions of choice are seldom so isolated. As we discussed in our unpacking of online dating, daters often face a decision characterized by great numbers of options, the ability to reverse that decision at any time, and the underlying reality that any given option may disappear. While there is an empirical base to hypothesize about these conditions in isolation, little is known about how they may interact. What happens if an individual is faced with a large pool and the ability to reverse their decision? Is this more detrimental to satisfaction than just selecting from a large pool alone? What happens if an individual is faced with a small pool with the potential that their selection may disappear? Will this leave them feeling affinity towards their selection with a greater intensity than if they selected from a large pool? Chapter 2 will investigate the former and Chapter 3 will investigate the latter.

As the social and economic environment afforded by communication technology reflects a mix between these three choice conditions, the practical and theoretical value of these questions will only increase. We not only can select from thousands of shoes on zappos.com and hundreds of dates on match.com, we have the ability to return them and select another at basically no cost. Thus, an important line of research lies in understanding how these three choice conditions might operate together.

Time

The third issue at hand deals with time: what happens after the decision is made? All of the studies on choice overload have considered the outcome almost immediately after the decision was made. If time is an important factor, it has not been determined yet. As before indicated, at least one of the proposed mechanisms may produce greater change with time; even if dissonance starts out small, over time it can grow (Koller & Salzberger, 2012). Allowing for more time to pass may allow researchers to see choice overload results where there were previously null findings. As Chapter 2 suggests, this holds true in the context of online dating choices.

Behavioral Consequences

Related to the passing of time is the issue of further behavioral consequences produced by choice overload. Research has not assessed the outcome of behavior past satisfaction judgments and the decision of exchanging or not. It is possible that there may be more consequential behavioral outcomes to consider. If an individual is less satisfied with the chocolate bar, will they eat less of it? If an individual is less satisfied with their selection of a date online, will they write less positively to that dater? Yes, there are perhaps instances of reduced satisfaction, but it is curious whether these feelings of reduced satisfaction play out in actual behaviors beyond the subjective state. Chapter 3 examines how choice overload may lead to important behavioral consequences in online dating.

The Mechanism of Choice Overload

The fourth and final area apt for theoretical advancement is the question of why choice overload occurs. As stated in the review above, there are many proposed mechanisms for the nefarious effect of greater choice. By isolating the reason that more choice reduces satisfaction in online dating, it not only adds to the empirical base of this discussion in choice overload theory

research, it is of practical value. Such knowledge will allow designers to try to take steps to reduce or counteract the mechanism, while maintaining access to more daters. This will be a focus of Chapter 3.

Preview

The following investigation is grounded in two longitudinal experiments utilizing an ostensibly veracious online dating website. Methodologically, this is an innovative contribution. While previous research has presented individuals interested in meeting potential partners with seemingly real (but researcher-developed) profiles to review (Tong, Hancock, and Slatcher, 2016), or had participants search through options on an actual online dating website while data was recorded (Wu & Chiou, 2009; Yang & Chiou, 2010), no other communication research has developed a seemingly functional in-house dating system with manipulations built in and populated by profiles developed by actual individuals. Hence, this research tries to replicate the online dating process as closely as possible.

The following dissertation is composed of two studies presented as journal articles and a final comprehensive discussion. The first is a proof of concept study that investigates the effect of amount of choice and the ability to change a selection on online daters' judgement of satisfaction with the selection. The second study builds on the first by examining the conditions of choice overload and impermanent choice options on online daters' satisfaction with selection. The second study also serves to add greater breadth and depth to our understanding of how presentations of choice impact daters by examining the mechanism driving choice overload in the context of online dating and considering the communicative outcomes of having greater choice. Taken together, these studies begin to illustrate how the choice architecture of online dating can affect online dater satisfaction and communication.

CHAPTER 2[a]

THE EFFECTS OF CHOICE OVERLOAD AND REVERSIBILITY ON ONLINE DATERS' SATISFACTION WITH SELECTED PARTNERS

Online dating has revolutionized the relationship initiation process by providing singles with easy access to large pools of potential romantic partners – literally at the click of a button (Finkel, Eastwick, Karney, Reis, & Sprecher, 2012). The abundance of choice available to online daters is often touted as a considerable improvement on traditional dating, where getting just one date can be a time-consuming process (e.g., Heffez, Miller, & Riger, 2011). However, empirical research on how partner choice affects romantic outcomes in online dating is limited. At least one study, based on interviews with online daters, warns that having a great deal of choice may not be so beneficial after all, because it can make daters reluctant to commit to just one person (Ellison, Gibbs, & Heino, 2006).

The purpose of this study is to advance understanding of how partner choice affects online daters' romantic outcomes. We consider two aspects of partner choice: (1) *quantity*, or how many potential partners are presented as options to online daters; and (2) *reversibility*, or the extent to which online dating services allow users to change their mind about meeting a selected partner, and replace him/her with another. As a romantic outcome, we focus on pre-interaction impressions – specifically, daters' satisfaction with a selected partner, measured before any contact with that person took place. Pre-interaction impressions, or the perceptions communicators hold about their partners *before* interacting with them, powerfully shape subsequent meetings. For instance, when individuals were provided with positive information about their future online communication partner, they engaged in more positive behaviors when

[a] Please note that the study in this chapter has published in *Media Psychology*.

interacting with that partner online, and rated him/her as more socially attractive (Tong & Walther, 2012). Therefore, we argue that it is essential to understand pre-interaction impressions in online dating and, critically, how these impressions are shaped by media features.

Indeed, quantity and reversibility of choice can be construed as features of the online dating medium, born out of design decisions. Currently, the design of most online dating services enables users to access *all* potential partners in the system who meet their search criteria (i.e., matches). This tends to result in large numbers, reaching tens and even hundreds of individuals in densely populated areas. Similarly, to the best of our knowledge, all online dating companies currently allow users to reverse their choices (i.e., replace one potential partner with another as often as they wish). We label the design features that govern how many matches online daters are connected to, and whether they can replace them, the *choice architecture of online dating* (see also Thaler & Sustein, 2008). We argue that this choice architecture exercises subtle, but significant influence on online daters' pre-interaction impressions.

Theoretically, our examination is guided by the choice overload effect (Chernev, 2003; Iyengar & Lepper, 2000; Schwartz, 2002) and the decision reversibility effect (e.g., Bullens, van Harreveld, & Förster, 2011; Bullens, van Harreveld, Förster, & van der Pligt, 2013). These theoretical frameworks were originally developed in the field of behavioral economics, and have been applied widely to explain the effects of choice on consumer purchases such as jam (Iyengar & Lepper, 2000) and photography prints (Gilbert & Ebert, 2002). As we enter an age where partner selection via online dating sites presents an experience akin to shopping (i.e., "relationshopping," see Heino, Ellison, & Gibbs 2010) and where choice is built into the very medium of communication, we argue that these theories are uniquely insightful. Moreover, applying these theories to two new contexts (i.e., romantic relationships and mediated

communication) can serve to push their boundaries, an important theoretical undertaking. For instance, do people use the same choice heuristics in complex, high-stake contexts, such as selecting romantic partners, as they do in simple, low-stake contexts, such as selecting chocolates?

Below, we derive hypotheses from the choice overload and decision reversibility frameworks. Then, we consider the joint operation of choice overload and decision reversibility in online dating – a possibly nefarious combination.

The Choice Overload Effect

Americans like and want choice in most situations (see Patall, Cooper, & Robinson, 2008 for a review). Yet, they may be mistaken about the benefits of choice: Research shows convincingly that having more choices paradoxically makes people *less* satisfied with the selection they ultimately make (Schwartz, 2004). In a seminal study, consumers in a grocery store were significantly less satisfied with their purchase, and less likely to make one, if they were offered a selection of 24 rather than six flavors of jam (Iyengar & Lepper, 2000). This phenomenon, labeled the *choice overload effect,* has received support in numerous settings, such as selecting chocolates (Chernev, 2003), coffee (Mogilner, Rudnick, & Iyengar, 2008), pens (Shah & Wolford, 2007) and gift boxes (Reutskaja & Hogarth, 2009); supporting charities (Scheibehenne, Greifeneder, & Todd, 2009); and relying on movie recommendations (Bollen et al., 2010). In these studies, choosing from a large pool of options, as compared to a small one, yielded decreased satisfaction with the item selected, decreased preference strength (i.e., how much individuals preferred their chosen item compared to the alternatives) and disappointment (Scheibehnne, Greifender, & Todd, 2010). These outcomes are considered the hallmark of the choice overload effect.

Why do people respond negatively to large choice sets? While no clear consensus has yet emerged in the literature (see Scheibehenne, Greifeneder, & Todd, 2010 for a review), several possible explanations have been advanced. One explanation focuses on *regret* (Iyengar & Lepper, 2000), arguing that having more discarded alternatives produces more opportunities for regret to emerge, which in turn dampens people's enthusiasm for their choice. Another explanation proposes that more choice generates more *cognitive burden*, which in turn creates frustration and diminishes satisfaction. For instance, individuals who could easily place their choices into categories (thus reducing cognitive burden), experienced reduced choice overload effects (Mogilner et al., 2008). Similarly, choice complexity, operationalized as the number of choices in a set multiplied by the number of attributes of each choice, enhanced the choice overload effect, presumably because choice complexity increased cognitive burden (Reutskaja & Hogarth, 2009; Greifeneder, Scheibehenne, & Kleber, 2010). Another explanation focuses on *choice justification*: Individuals experience reduced satisfaction because it is harder to justify a choice to other people when selecting out of a large array of good alternatives (Scheibehenne, Greifeneder, & Todd, 2009; Sela, Berger, & Liu, 2009). Finally, researchers point to the role of *counterfactual thinking*: Having more choices allows people to generate counterfactuals, or evaluative thoughts about the merits of the discarded alternatives (i.e., "what might have been"), which in turn lower satisfaction (Hafner, White, & Handley, 2012).

To summarize, the literature to date proposes that freeing a choice of constraints (i.e., by giving people lots of options to choose from) has pernicious effects in that it can set in motion a variety of psychological processes (e.g., regret, counterfactual thinking) that lower satisfaction. Conversely, constraining a choice (i.e., by limiting the number of options) inhibits these noxious processes, keeping satisfaction high. This inhibition has been attributed to the activation of ego-

protective mechanisms, which serve to elevate individuals' sense of psychological well-being as they go through everyday life (Schwartz, 2002; Vaillant, 1993).

While the mechanism responsible for the choice overload effect is an important avenue for future research, so are the boundary conditions for the emergence of the effect. As this review shows, extant literature has focused on low-stake contexts, where the consequences of making a choice are relatively trivial. For instance, choosing a chocolate can at best result in an enjoyable treat, and at worst in wasting a few dollars. Here, we plan to investigate whether the choice overload effect can be extended to high-stakes contexts, such as online dating, where choosing a partner, even if only for a short involvement, can significantly affect emotional well-being (see Reis, Sheldon, Gable, Roscoe, & Ryan, 2000).

A series of cognate studies have already attempted this extension. Despite not using the choice overload effect as their theoretical framework, Wu and Chiou (2009) and Yang and Chiou (2010) found that online daters who were presented with more matches (30 vs. 60 vs. 90, and 40 vs. 80. respectively) engaged in more searching behaviors (i.e. examined more profiles) and selected partners who deviated more from their pre-specified ideal list of qualities. The evidence for the choice overload effect is indirect in these studies. First, the choice sets in both studies were much larger than the choice sets theorized to produce choice overload effects. A meta-analysis shows that the interquartile range of small choice sets conditions is typically five to six items, with large choice sets conditions containing 24-30 items (Scheibehenne et al., 2010). Arguably, participants in these prior studies were overloaded by choice across experimental conditions. Second, the outcome variables (i.e., search strategies, and the fit between characteristics of a selected potential partner and online daters' preexisting criteria for ideal

potential partners) were inconsistent with the choice overload framework, which makes predictions about people's *perceived satisfaction* with their choice.

One study to date has directly applied the choice overload framework to online daters' satisfaction with a selected partner, but it has not produced the predicted effect (Lenton & Stewart, 2008). Single women were asked to select a hypothetical match out of 4, 24, or 64 online dating profiles; however, their satisfaction with their selected partner was unaffected by the size of the choice set.

Despite this tepid evidence, we argue that the choice overload effect can be theoretically expected to emerge in the context of online dating. Recall that the effect is most likely to appear when choices are complex, in the sense that they contain an array of different attributes (e.g. Greifeneder et al., 2010), and when they require justification to others (e.g., Sela, Beger, & Liu, 2009). Choosing a potential romantic partner through online dating satisfies both these conditions – it is a complex choice, where a plurality of attributes need to be considered (e.g., attractiveness, education, job, religion, hobbies), and one that needs to be justified, not only to oneself, but to one's social network, whose approval is consequential for the success of romantic relationships (Sprecher & Felmlee, 1992). However, as an innovation adduced to prior studies, we argue that the choice complexity and public justification inherent to online dating require *processing time*, which is why the choice overload effect in this context should only be observable after some time has elapsed, and not immediately after the choice is made, as is the case in low-stake contexts.

As previously described, high-stake choices tend to be more complex, involving the consideration of a multitude of attributes. It should take individuals more time to ponder the ramifications of their complex choices, and certain ramifications may only emerge after the

choice has been made. For instance, research shows that people tend to ignore their relationship deal-breakers when meeting a potential romantic partner for the first time; however, over time, those who ignored deal-breakers were less satisfied with their partners, presumably because they had time to ponder these deal-breakers, and the initial excitement of identifying a potential romantic partner had waned (Eastwick, Finkel, & Eagly, 2011).

Additionally, social justification should be highly complex in online dating, as individuals typically introduce romantic partner to their family, friends, and acquaintances. While online daters seek a variety of romantic involvements, ranging from serious to casual, they should be concerned with social justification across these different types of relationships, because dating is a social endeavor that is typically the subject of conversation and question-asking from one's social circle. However, predicting the reactions of these different audiences likely takes time. Individuals might not immediately anticipate problems that these audiences have with a selected partner, but upon more careful reflection these problems may become evident, resulting in decreased satisfaction.

Finally, it is worth noting that online dating is not only a high-stakes context, but also an *experiential* one. Unlike the objects investigated by prior research (e.g., chocolates, pens), online dating is an experience, and one that unfolds over time. With pens or chocolates, one gets to sample them immediately after selecting them. With online dating, it takes time to actually experience the date. This increased time lag between the act of choice and the act of "consumption" (see Loewenstein, 1987) should give daters ample opportunity to ponder the merits of their upcoming opportunity. Given the psychological importance of romance, we expect them to utilize this time to engage in mental processing.

The importance of time, while not yet considered by choice overload research, has been addressed in cognate areas of research. A large body of literature shows that, when confronted with psychologically challenging situations, people engage in mental processing that unfold over time. For instance, cognitive dissonance, or the psychological discomfort created by an inconsistency between attitude and behavior, is resolved over time – usually a week after the discomfort arose in the first place (Menasco & Hawkins, 1978). In particular, the regret that sometimes accompanies dissonance has been shown to start out small or even nonexistent, and grow over time (Koller & Salzberger, 2012). Finally, rumination, or intrusive thoughts caused by negative or stressful life situations, also unfolds over time; in fact, it has been shown to affect mental well-being several months after the distressing episode took place (see Smith & Alloy, 2009, for a review). Since making a decision among a plethora of options in the high-stakes context of online dating is also a psychologically challenging situation, this body of research offers further indication that online daters are likely to engage in mental processing over time.

Hence, ours is the first study to consider the possibility that, in online dating, choice overload effects do not emerge immediately after the choice is made (consistent with the findings of Lenton & Stewart, 2008), but rather after some time has elapsed. We choose to investigate this effect one week after online daters make their choice, for two reasons: 1) this time frame is consistent with prior studies in the related domain of cognitive dissonance, which have allowed one week to pass between initial and secondary measures of satisfaction with a chosen item (Bem & McConnell, 1970; Brehm & Cohen, 1959); and 2) one week is a realistic amount of time that online daters take between identifying a desirable potential partner and meeting her/him face-to-face (Mapes, 2014). In sum, we advance the following hypothesis:

H1: One week after selecting a potential partner, online daters who chose from a large pool of matches will be less satisfied with their choice than those who chose from a small pool.

The Decision Reversibility Effect

Just as individuals like having more choices, they also enjoy the added choice that comes from being able to reverse a choice, and pick something else instead. For example, consumers appreciate being able to return purchases to such an extent that return policies are now recognized as a critical aspect of marketing (Autry, 2005). However, this desire may be psychologically ill-advised**:** The ability to change one's mind about a choice produces less satisfaction towards that choice, and more regret for discarded alternatives. For instance, one study shows that individuals who had the option to change their minds about their selection of a photography print liked the chosen print less than those who were not allowed to exchange it (Gilbert & Ebert, 2002). Likewise, individuals who evaluated the attractiveness of a selected book rated the alternatives as more attractive when they had the ability to switch (Frey, Kumpf, Irle & Gniech, 1984). This phenomenon has been labeled *the decision reversibility effect* (Bullens et al., 2011; Bullens, et al., 2013; Frey, 1981).

This effect has been described as a manifestation of the "psychological immune system," or the notion that individuals seek, interpret, and remember information in a self-protective manner (Antonovsky, 1987; Gilbert et al., 1998; Gilbert & Ebert, 2002). According to this notion, people "subjectively optimize" their perceptions of an outcome when they can't optimize the outcome itself (Glibert & Ebert, 2002, p. 504). In the case of irreversible choice, it is only possible to optimize perceptions, which is why people tend to extol the virtues of their chosen item or person. Conversely, in the case of reversible choice, it is possible to optimize outcomes by choosing an alternative, and no shift in perception is necessary to achieve a sense of

satisfaction. Put simply, if one cannot change something, one learns to like it. The example provided by Gilbert & Ebert (2002, p. 504) is uniquely appropriate here: "when conversation with a blind date proves uninteresting, people normally change partners ('I'll never go out with him again'), but when conversation with a spouse proves uninteresting, people normally change their attitudes ('Dull yes, but with a heart of gold')."

To summarize, a lack of reversibility can be conceptualized as a constraint to choice, similarly to having a small choice set. As such, it activates ego-protective mechanisms – in this case, the psychological immune system, that keep satisfaction with a choice high (Vaillant, 1993).

Importantly, ego-protective mechanisms can be expected to affect choice satisfaction, because everyday choices are the very substance of our psychological well-being. Whether the choice be of clothes, hobby, or career or the purchase of goods, it is likely to reflect who we are and how we feel about ourselves (Akerlof & Kranton, 2000; Suler, 2002). Therefore, people's responses to these choices are likely to be governed by ego-protective mechanisms that modulate psychological well-being (Gilbert et al., 1998; Valliant 1993) This should be especially true of romantic choices, as these choices are exceptionally consequential for people's their happiness and well-being (Reis, Collins, & Berscheid, 2000) and even reflects their own sense of identity (Buston & Emlen, 2003). Thus, if choosing a romantic partner is deeply tied to ego and reflective of a sense of self, it likely falls under the purview of ego-protective mechanisms.

No research has yet investigated the decision reversibility effect in the high-stake and experiential context of online dating. In fact, most previous studies involved fairly trivial choices (e.g., choose between two 15-minute tasks, Bullens et al., 2013; choose between books, Frey et al., 1984). However, this effect has been brought up repeatedly in the popular press. For

example, Ludlow (2013) writes that online dating simply "makes it too easy to find people [and] to ditch people." Theoretically, there is reason to expect decision reversibility effects to emerge in this context as much as in the previously investigated ones. An online dater who makes a selection, but knows that there are other options, should be prone to seek to maximize her outcomes by considering these other options. However, an online dater who makes a selection which she cannot change, should be likely to psychologically affirm her choice. Moreover, the effects may be even more salient in a high-stake context, where the motivation to make a good decision is high, leading to a stronger activation of the psychological immune system (Gilbert, Lieberman, Morewedge, & Wilson, 2004; Wilson & Gilbert, 2005).

Similarly to the choice overload effect, the decision reversibility effect is likely to take time to emerge in an online dating setting, as the ramifications of the choice need time to psychologically percolate. As before, we investigate the effect one week after online daters have made their selection. Notably, there is precedent for the need for time to elapse before the decision reversibility effect emerges in higher-stake choices. When examining individuals' selection of one of their own photographs for printing – arguably a meaningful decision, because individuals might feel ownership over their own photographs and perceive the decorations of their apartment, visible every day, to be important – the decision reversibility effect emerged two days after individuals made their choice (Gilbert & Ebert, 2002). Thus, we hypothesize:

H2: One week after making their partner selection, online daters who had the ability to change their selection will be less satisfied with the person they chose than those who did not have the ability to change.

The Joint Effect of Choice Overload and Reversibility

Individually, choice overload and decision reversibility should affect online daters' satisfaction with their choice of a potential partner. However, in online dating environments, it is typical for both abundant choice and convenient reversibility to co-exist – you can always go online and find someone else. This raises the question of how choice overload and decision reversibility work in tandem to affect online daters' satisfaction with a selected partner. From a theoretical standpoint, it is noteworthy that no research has yet investigated, in any context, how these two effects work jointly, despite the fact that both make predictions about individuals' satisfaction with their choices. We undertake this important theoretical task.

Recall that having a small choice set and lacking reversibility can be conceptualized as choice constraints – that is, factors that limit people's choices (Schwartz, 2002). Earlier we argued that the presence of either of these constraints activates ego-protective mechanisms, such as the inhibition of regret and counterfactual thinking (in the case of small choice sets) and the launching of the psychological immune system (in the case of a lack of reversibility). These mechanisms serve to keep satisfaction high and as such are adaptive, despite the fact that they operate through different routes (Gilbert et al., 1998).

In fact, ego-protective mechanisms are described as *functionally equivalent*, because they all serve the higher purpose of maintaining a sense of psychological well-being, and yielding similar effects on well-being (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Tesser, Crepaz, Collins, Cornell, & Beach, 2000; Vaillant, 1993). Therefore, we expect that the presence of either choice constraint (i.e., small set or lack of reversibility) will operate similarly in increasing satisfaction with a chosen person, because they each activate one type of ego-protective mechanism.

Further, ego-protective mechanisms are theorized to be *mutually redundant*, in that having multiple mechanisms activated at the same time does not supply more well-being than having just one activated (Gilbert et al., 1998; Tesser et al., 2000; Vaillant, 1993). This is the case because people don't take any opportunity available to feel good about themselves and their choices, but rather are content to feel "good enough" (Tesser et al., 2000). Supporting this notion, research in the area of consumer choice shows that there is a ceiling effect in satisfaction with a chosen item: Once people like something "well enough" it is hard to get them to like it more (Cadotte, Woodruff, & Jenkins, 1987; Oshikawa, 1971). Therefore, in our case, the presence of both constraints (i.e., small choice set and lack of reversibility) should *not* increase satisfaction more than the presence of either one of the two.

However, the complete absence of choice constraints (as is the case in the large choice set *and* reversibility condition) should be the most antithetic to satisfaction, because it doesn't activate any ego-protective mechanisms. Online daters whose options remain wide open should paradoxically experience a substantial decrease in satisfaction.

In sum, we predict that when at least one choice constraint is present (i.e., small choice set, lack of reversibility, or both), satisfaction should be fairly high due to the activation of self-protective mechanisms. However, the absence of choice constraints (i.e., large choice set *and* reversibility) should cause satisfaction to dip because no ego-protective mechanisms are activated. This effect should emerge one week after online daters have made their selection, as both choice overload and decision reversibility need maturation time:

H3: One week after making their selection, the online daters who had selected from a large pool of matches and were able to change their choice will be the *least* satisfied with their chosen partner.

Given the need for maturation time, online daters whose choices are unconstrained (due to choice overload and decision reversibility) should experience the greatest drop in satisfaction as time elapses. We test this notion directly:

H4: The online daters who selected from a large pool or matches and were able to reverse their choice will experience the greatest drop in satisfaction with their selected partner during the week following their initial selection.

Finally, actual exchange behavior must also be considered: To what extent will online daters act on their ability to change their selected partner when given an opportunity to do so? In previous studies, researchers found that, in addition to the perceptual outcomes described earlier (e.g., decreased satisfaction), choice overload and decision reversibility also impacted behavior, such as whether or not individuals purchased the item under consideration, or exchanged it when given the opportunity to do so (Gilbert & Ebert, 2002, Iyngar & Lepper, 2000). We expect similar effects in online dating. Since having a large pool of matches is predicted to generate less satisfaction with the selected partner than having a small pool of matches, daters in the former condition should be more likely to exercise their ability to change their selection (and thus to attempt to rectify their dissatisfaction) than daters in the latter condition:

H5: One week after selection, daters who were given the opportunity to reverse their choice will be more likely to do so if they choose from a large pool than a small pool of matches.

Method

Participants and Recruitment

Participants (*N*= 152; 74% female, 80% Caucasian, 10% Asian, 1% African American; age *M* = 20.1, *SD* = 1.46) were undergraduate students at a large Midwestern university who

were single, heterosexual[b], and interested in meeting a potential romantic partner through online dating. Participants were recruited through online advertisements placed on the department's research participation website and were compensated with extra-credit in their Communication courses.

Participants were given the following cover story: X[c] university was developing an in-house online dating system designed specifically for their large student population, and was recruiting single students to pilot the beta version of the website. Participants in this pilot study would be matched with potential dates and compensated with extra-credit in exchange for their feedback on the effectiveness of the dating system. This feedback would then be used to improve the website before launching it to the entire university.

The time taken by participants to complete the survey was recorded. Seventeen participants were eliminated because they failed the manipulation check (see Procedure and Design), and an additional 12 participants were eliminated because they completed the online survey in an unreasonably short amount of time, indicating inattention. Lastly, 24 participants were excluded because they did not return for the second phase of the study. This attrition rate is consistent with similar longitudinal research, in which more than 25% of participants failed to complete the experiment or responded inconsistently (Gilbert & Ebert, 2002). After removing all these participants, the effective sample size reduced was $N = 99$. Eliminated participants were randomly distributed across experimental conditions, and did not differ in age, gender, or any of the covariate measures (see Procedure and Design) from participants who were retained in the

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[b]The study was restricted to heterosexual participants in order to avoid the potential confounding effect of sexual orientation on perceptions of partner availability. Research shows that the pool of romantic partners is more restricted for same-sex than for heterosexual individuals (Mustanski, Lyons, & Garcia, 2011), which is why the former may have different reactions to our experimental manipulation. We invite future research to replicate our findings with a same-sex sample.

[c] Anonymized for peer review.

study. It is unlikely that the eliminated participants threatened the validity of the study. Rather, they were eliminated because of behaviors that demonstrated a lack of motivation to pay attention to the experimental procedure or to connect with a potential partner through online dating.

Procedure and Design

The study used a 2 (quantity of choice: six vs. 24) x 2 (choice reversibility: reversible vs. irreversible) experimental design. Participants were assigned to condition through randomization software.

Participants were required to come to the lab during two separate appointments (Time 1 and Time 2), spaced exactly one week apart. At Time 1, participants filled out a short survey with demographic and personality measures. This information was ostensibly used to match them with suitable partners. Then, participants were presented with a selection of either six (i.e., small choice set) or 24 matches (i.e., large choice set), and were prompted to examine them and select one person with whom they would like to go on a date. Additionally, participants were told that they could either change their selection the following week (reversible condition) or not (irreversible condition). After making their selection, participants completed an additional survey about their satisfaction with their choice.

Each participant was given a username and password to the online dating system. During the week between Time 1 and Time 2, participants were allowed to access the system at their discretion, including reviewing their choice and the partners they discarded. If they were in the reversible condition, participants were reminded through a notice on the website that they could change their selection during their second lab appointment.

At Time 2, participants came to the lab and were asked to log into the online dating system and review the profile of the person they selected. Afterwards, they reported their satisfaction with their choice using the same questionnaire they filled out at Time 1, along with some decoy questions. Additionally, participants were asked to recall whether they could change their choice or not. This question was intended as a manipulation check. Participants who answered incorrectly were eliminated from the analyses.

Stimuli

The online dating system was created specifically for this experiment. Visually, it was closely modeled after popular online dating systems, such as Match.com. Upon login, participants were shown a thumbnail display of their matches (either six or 24) and were able to view each profile by clicking on the respective thumbnail. The profiles were also modeled after popular dating systems, and contained one to three photographs, and a series of short-answer (e.g., height, age, ethnicity), and open-ended questions (e.g., "about me," "last book read"). The dating website contained a visibly prominent banner reminding participants whether or not they could change their choice of a potential partner (i.e., the reversibility condition). Participants were told that their matches were other students from the same university, who were single and interested in finding a romantic partner through online dating. In reality, they were undergraduate students from a different institution who filled out online dating profiles using a template developed by the research team, as part of a different, unrelated study. The students who filled out the profiles were in fact single and interested in meeting potential partners through online dating. All of them gave us permission to use their profiles in the current study.

Because attractiveness is a main criterion for selecting dating partners (Eastwick & Finkel, 2008), it was important that quantity of choice is *not* confounded with dating

attractiveness (e.g., profiles in the small choice set are more attractive than profiles in the large choice set, or vice versa). All profiles were rated for dating attractiveness by a group of unacquainted observers using a 2-item questionnaire (i.e. "How attractive is this online dater?", "How willing would you be to date this online dater?", $\alpha = .96$), measured on a scale from 1 (not at all) to 7 (extremely). We ensured that the average dating attractiveness of the profiles in each condition was equal (condition *means* were 3.94 and 3.97, with standard deviations of .48 and .55). The six profiles in the small choice set condition were a subset of the large choice set condition of 24. In other words, the large choice set subsumed the small choice set.

Measures

The dependent variable was satisfaction with the choice of a dating partner, and was measured using a 7-item satisfaction scale ($\alpha = .94$) adapted from previous research on choice overload and reversibility (Gilbert & Ebert, 2002; Iyngar & Lepper, 2000). The scale contained items such as: "How much do you like the individual whose profile you selected?", "How satisfied are you with the dater you chose?", and "How much are you looking forward to contacting this individual?" Each item was measured using a 7-point Likert scale, from 1 (not at all) to 7 (extremely).

A series of covariates that might affect choice satisfaction were collected: 1) gender, because research shows that women can be pickier when it comes to potential mates (Grammer, Kruck, Juette, & Fink, 2000), 2) tendency for romantic idealization (e.g., "Do you believe in soul mates?"), which has been shown to lead to more positive illusions, and hence more satisfaction, with romantic partners (Murray, Holmes, & Griffin, 1996), 3) previous relationship experience ("How many committed romantic relationships have you had to date?"), as this can affect perceptions of new partners (Furman, Brown, & Feiring, 1999), 4) online dating experience

("Have you ever dated someone you met through online dating?"), as experienced users may be more comfortable with online dating tools (Sautter, Tippett, Morgan, 2010), 5) attitudes towards online dating ("Would you be willing to use online dating in the future?"), in order to control for any existing stigma felt towards online dating (Cali, Coleman, & Campbell, 2013), and 6) online dating efficacy ("I can use online dating to get what I want"), or the extent to which participants believed themselves capable of navigating the online dating environment, because and online daters who are not comfortable using dating sites might not properly attend to the manipulation.

Results

All hypotheses make predictions about satisfaction ratings measured at Time 2. Prior to attending to these hypotheses, we probed for any effects of the manipulations at Time 1 to ensure that, as predicted, no such effects emerged. An ANCOVA with choice satisfaction ratings at Time 1 as the dependent variable, quantity of choice and reversibility as between-subject factors, and the covariates mentioned earlier was run. The omnibus test did not reach significance, $F(9, 91) = 1.26$, $p = .27$. There was no main effect of quantity of choice, $F(1, 89) = 1.66$, $p = .20$, with daters who selected from a pool of six ($M = 4.78$, $SD = .72$) being equally satisfied with their selection as daters who selected from a pool of 24 ($M = 4.57$, $SD = .85$). Similarly, there was no significant main effect of reversibility, $F(1, 89) = 1.13$, $p = .30$, with daters in the reversible condition ($M = 4.59$, $SD = .76$) being equally satisfied with their selection as daters in the condition where choice reversibility was not available ($M = 4.76$, $SD = .81$). None of the covariates were significant. Therefore, at Time 1, there was no evidence of a choice overload effect, which replicates the findings of Lenton & Stewart (2008), or of reversibility.

We hypothesized that, one week after selection, daters in the large choice set condition would be less satisfied with their choice than those in the small choice set condition (H1), and

that daters who had the ability to change their selection would be less satisfied than those who were not allowed to change it (H2). These predictions were tested through an ANCOVA with choice satisfaction at Time 2 as the dependent variable, quantity of choice and reversibility as the between-subjects factors, and all the covariates mentioned earlier. The omnibus test was marginally significant, $F(9, 89) = 1.69$, $p = .10$, *partial* $\eta^2 = .15$. However, the main effect of quantity of choice was significant, $F(1, 89) = 3.80$, $p < .05$, partial $\eta^2 = .04$. Simple-effects tests show that participants in the large choice set condition were less satisfied with their selection than those in the small choice set condition, $t(97) = 2.04$, $p < .05$, Cohen's $d = .41$, providing support for H1. The main effect for reversibility was not significant $F(1, 89) = .001$, $p = .74$, as there was no difference in choice satisfaction between the participants who could and could not change their selection, failing to support H2. None of the covariates reached significance, all F's < 3.02, all p's $> .05$. See Table 1 for means and standard deviations.

H3 predicted a joint effect: One week after selection, online daters who chose from the pool of 24 potential matches and had the ability to change their choice would be the least satisfied compared to those in the other three conditions. This hypothesis was tested through a planned contrast analysis performed on the satisfaction ratings at Time 2, while controlling for all the covariates indicated earlier (see the upper panel of Table 1 for contrast weights, means, and standard deviations). We used planned contrasts, rather than interaction effects, because they allow us to ask more precise questions (i.e., if there is a difference between only *one* group and all of the others) and have more power in detecting differences (Abdi & Williams, 2010; Ruxton & Beauchamp, 2008, Thompson 1990). The planned contrast analysis was significant, $t(95) = 1.72$, $p < .05$, $\eta^2 = .24$. Following the suggestion of Keppel and Wickens (2004), an analysis of the residual explained variance was conducted in order to determine if this set of contrast

weights adequately described the effect of the study manipulations on the dependent variable. This analysis showed that after accounting for the variance described by the hypothesized effect, a non-significant amount variance in the dependent variable remained, $F(3, 95) = .88$, $p = .45$, indicating that the proposed contrast weights adequately explained the patterns in the data. Thus, H3 received strong support.

H4 predicted that the joint effect of choice overload and reversibility would unfold over time: During the week from Time 1 selection to Time 2 reevaluation, those who selected from the large choice set and had the ability to change their choice would experience the greatest decrease in satisfaction compared to the other three conditions. To test this hypothesis, a difference score between satisfaction at Time 2 and satisfaction at Time 1 was first computed. Then, a planned contrast analysis was performed on this difference score, while controlling for all the covariates indicated earlier (see the lower panel of Table 1 for contrast weights, means, and standard deviations). The planned contrast analysis was significant, $t(95) = 1.85$, $p < .05$, $\eta^2 = .31$. As before, an analysis of the residual explained variance was conducted in order to determine if this set of contrast weights adequately describe the hypothesized effect. This analysis showed that after accounting for the variance described by the hypothesized effect, a non-significant amount variance in the dependent variable remained, $F(3, 95) = .04$, $p = .99$, supporting H4.

While the results of H3 suggest that at Time 2 the excessive choice can exchange group is least satisfied, and the results of H4 suggest a particular trend over time in which the excessive choice can exchange group sees a drastic and negative change over the course of the week but the other groups do not, the significance of this change over time must also be addressed. In order to conduct this analysis, we first combined the three theoretically similar conditions as

discussed above (See Zhao, Hoeffler, & Zauberman, 2007 for a similar procedure). In addition to being considered theoretically similar, there exists no statistical difference in satisfaction level changes between the excessive choice no exchange and limited choice no exchange condition $t(38)=-.308$, $p = 0.76$, the limited choice can exchange and limited choice no exchange condition $t(49)=.314$, $p = 0.75$, and the excessive choice no exchange and limited choice no exchange condition, $t(45)=.60$, $p = 0.95$. Thus, these groups were combined in order to run a repeated measures factorial ANCOVA with Time as the within-subjects factor and condition (choice overload can exchange condition vs other conditions) as the between-subjects factor. As expected, this analysis shows an interaction between time and condition $F(1,91) = 3.37$, $p < .05$, such that Time had a statistically significant effect on satisfaction level, and this effect depended on whether participants were in the excessive choice can exchange condition, or the other conditions. As indicated above, the excessive choice can exchange condition saw a drop in the level of satisfaction over time, whereas all others did not.

H5 predicted that of those offered the ability to reverse their decision, more daters in the large choice set condition would take advantage of this option than daters in the small choice set condition. While no daters in the small choice set condition chose to change their selected partner at Time 2, thirteen percent of the daters in the large choice set condition did. This difference was statistically significant, $\chi^2 (1) = 2.93$, $p < .05$, providing support for H5.

Discussion

Romantic relationships are key to personal happiness (Diener & Seligman, 2002), and nowadays online dating has become a prevalent modality for initiating these relationships: 35% of the long-term relationships established between 2005 and 2012 were the result of individuals meeting online, with half of those individuals meeting specifically through dating websites

(Cacioppo et al., 2013). The technological features of dating websites can play an important role in individuals' ability to establish romantic connections. This role may be obvious, as in the case of algorithms that identify "matches" for users, or rather subtle, as in the case of information presentation and packaging on the site. The latter is the focus of this paper. Specifically, we argue that how partner choice is presented on the website (i.e., how many potential partners are given to online daters, and whether these partners can be exchanged) exercises significant influence on daters' evaluation of potential partners. The results support this assertion. Online daters who were presented with large (i.e., 24) as opposed to small (i.e., six) pools of potential partners registered decreased satisfaction with their choice. Moreover, daters who had a large pool of partners *and* were given the option to reverse their selection were the least satisfied with their choice, and more likely to act on their ability to reverse their selection than daters who were given a small pool of partners. In other words, the mediated platform of online dating structured the partner selection process in ways that had significant interpersonal consequences.

These results offer a series of theoretical contributions. First, they introduce theories about people's perception of choice (i.e., choice overload and decision reversibility) from behavioral economics to the new contexts of mediated communication and romantic relationships, thus expanding the theories' boundaries. Second, they illuminate the joint operations of these theories, a previously unexamined topic. Third, they advance understanding of how media features affect relational processes. We detail these contributions below.

Extending Choice Theories to New Contexts

The choice overload effect, or the notion that having more choices decreases satisfaction with the item selected, has received robust empirical support for a multitude of low-stake choices, such as inexpensive consumer purchases. In applying this framework to online dating,

we pushed its boundaries from choices among objects to choices among people, and from low-stake to high-stake choices. The predicted effects emerged in online dating, underscoring the robustness of the choice overload framework across a variety of different types of choices.

However, choice overload effects in the high-stake context of online dating did not replicate low-stake contexts identically. Whereas in the latter contexts dissatisfaction with a selection made from a large set tends to set in immediately after the choice is made, in the former context the *passage of time* was a necessary condition for choice overload effects to emerge. We theorized that time is a key variable in high-stake contexts, because such contexts tend to be complex, involving ramifications that may be difficult to predict immediately (such as how family and friends will respond to a selected romantic partner). This argument is consistent with research in the related area of cognitive dissonance, which finds that dissonance, the uncomfortable mental state experienced by individuals after choosing between similarly attractive options, can start out small and grow over time (Koller & Salzberger, 2012). Together, our findings and dissonance research suggest that decisions that require thoughtfulness, either because they are high-stakes or close calls, may elicit psychological processes that unfold over time, as individuals evaluate and re-evaluate the merits of their choices.

Ours is the first study to identify the passage of time as a key ingredient in the emergence of choice overload effects in online dating, and thus explains why previous, non-longitudinal research failed to find this effect (Lenton & Stewart, 2008). Given these encouraging findings, we invite future research to pursue a deeper understanding of how time affects the evaluation of choices. For instance, do online daters ruminate over time, and does this rumination decrease their satisfaction with a selected partner? Do they consider the qualities of the discarded options

in greater depth? Similarly, future research should establish the minimum amount of time necessary for the emergence of the effect.

While the choice overload effect received strong empirical support, the main effect of reversibility effect did not emerge, either immediately after daters made their selections, or a week later. One explanation for this null finding is that our reversibility manipulation may not have been sufficiently strong. That is, the college students who took part in this experiment may not have felt entirely "bound" to the person they selected online, due to the availability of potential partners in their natural environment. It is possible that this effect will emerge more clearly in a setting where online daters perceive a greater scarcity of dates, such as among middle-aged or elderly adults, because these groups are more likely to believe that their choices are difficult to replace. We invite future research to examine this possibility.

Similarly, an unexpected finding was that excessive choice reduced choice satisfaction on its own, but that reversibility only did so in conjunction with choice satisfaction (i.e., there was no main effect of reversibility). Recall that we had theorized that excessive choice and reversibility were functionally equivalent in that they both deactivated ego-protective mechanisms. This unexpected pattern indicates that these two phenomena, while still functionally equivalent in the sense that they deactivate ego-protective mechanisms, might not operate in an identical way. At least in our online dating context, reversibility appears to have a different threshold for deactivating ego-protection – that is, the presence of an abundance of choice. Ego-protection mechanisms might kick in as predicted when daters can't reverse a choice made out of a small pool (i.e.,), but when the pool is large (i.e., 24), it may simply become impossible for individuals to protect themselves.

For illustrative purposes, consider one potential ego-protective mechanism: the reduction of regret. According to our findings, it appears that selecting from a pool of six potential daters triggers ego-protective mechanisms that allow individuals to defend their decision: our participants actually saw a small rise in satisfaction over the course of a week, likely feeling the effects of reduced regret for any options passed over. However, when selecting from a pool of 24 daters, individuals simply couldn't protect themselves from the noxious experience of regret: There were to simply too many options to reduce regret for.

The threshold for reversibility is not as clear. It appears that selecting from six potential mates and being able to reverse the decision left daters no less satisfied than if they selected from six dates and were *not* able to reverse the decision. It is possible that there was no regret to reduce when the pool of choices was small: There may simply be one best choice for a date. Thus, we see no drop in the reversible condition, and no difference between conditions. However, when selecting from 24 potential daters there is much room for regret. Instead of having only 5 options that represent a potential path untaken, there are 23. In this context, reversibility likely matters more. Those who were unable to reverse their decision in this situation felt the beneficial effects of the ego-protective mechanism: Even when faced with choice overload, they saw a rise in satisfaction with their selection to a level consistent with those who selected from a pool of 6 options. However, those who had the option to reverse their decision and were selecting from the larger pool had no ego-protective mechanisms activated, and thus experienced the drop in satisfaction. We invite future research to more directly test the conditions necessary for reversibility to deactivate ego-protective mechanisms.

Despite the lack of a main effect of reversibility, reversibility and choice overload worked in tandem to reduce online daters' satisfaction with their choice. Ours is the first study to

show that choice overload and decision reversibility, two frameworks that make predictions about choice satisfaction, work in a joint manner, such that reversible choices made of large sets result in the least amount of satisfaction with one's selection. We theorized that this pattern can be explained via the lens of *choice constraints,* or factors that limit people's choices (i.e., having a small choice set, or lacking reversibility). Because choice constraints activate ego-protective mechanisms that make people feel good about themselves and their choices, their removal has pernicious effects on choice satisfaction, causing it to dip over time. Interestingly, we found that these constraints do not have an additive effect – having both available at the same time does not raise satisfaction more than having just one, because the ego-protective mechanisms they activate are mutually redundant. While our results point to the value of adding at least one constraint to a choice, future research is necessary to directly test the relationship between choice constraints and the activation of ego-protective mechanisms (i.e., reduction of rumination, regret, or counterfactual thinking).

All in all, the data suggest that theories from behavioral economics retain their explanatory power in online dating. Additionally, they are consistent with theories of intimate relationships. Specifically, the investment model of developing relationships (Impett, Beals, & Peplau, 2001, Rusbult, 1980, 1983) argues that individuals' satisfaction with long-term romantic partners is contingent on their perceptions of the availability of alternative romantic partners: The more and higher quality alternatives individuals believe they have, the less likely they are to be satisfied with their existing romantic partner. Similarly, we find that even before long-term relationships commence, individuals' perceptions of their alternatives diminish their satisfaction with a selected potential partners. Thus, although they originate in different fields, these theories complement each other in showing that having a multitude of choices dampens satisfaction with

a romantic partner both in the incipient stages of relationships (as was the case in our study) and in established, long-term relationships (which are the purview of the investment model).

Additionally, our findings are consistent with recent research concerning real-world online dating outcomes. One study shows that couples who met through online dating had higher break-up rates than those who met in face-to-face settings (Paul, 2014). This may be an upshot of the effect identified in this research: Online daters may believe they have more choice than face-to-face daters, due to the sheer number of potential partners easily available online, and as a result they may be more apt to be dissatisfied with their chosen partner.

Interpersonal Effects of Media Features

In this paper, we have conceptualized quantity and reversibility of partner choice as media features of dating websites, in the sense that dating websites can make design decisions about how to structure users' ability to choose romantic partners. Specifically, dating websites can vary the number of matches users are presented with, and can enable or disable their ability to reverse their choices, once made. We find that these media features are psychologically meaningful, in that they affect daters' interpersonal evaluations of potential partners. This pattern is consistent with a growing body of research that demonstrates the influential role of the media in shaping interpersonal impressions. For instance, the presence or absence of a personal photograph has been shown to affect the perceived social attractiveness (Walther, Slovacek, & Tidwell, 2001) and trustworthiness (Toma, 2010) of online communication partners. Similarly, the number of Friends users have on social network sites, a website-generated cue, affects how attractive and extraverted they are perceived (Tong, Van Der Heide, Langwell, & Walther, 2008; Utz, 2010). In all, this body of research highlights the importance of mediated presentations of information in the establishment of interpersonal connections.

As noted earlier, our study imported theories from behavioral economics to the realm of online dating. We believe that these theories may become especially useful in understanding interpersonal interactions in a multitude of online communication contexts, beyond online dating. Indeed, choice is increasingly embedded in online platforms, with social network sites such as LinkedIn, Facebook, and Twitter accruing millions of members and presenting users, every time they log in, with generous options about whom to initiate contact with. These websites also visibly quantify choice, displaying clear numbers of how many Friends, followers, or contacts one has, or are online and available for interaction. These displays of choice may not be without interpersonal consequence. We argue that examining how the presentation of choice in mediated platforms is a rich avenue for future research and theorizing.

Practical Implications

Existing online dating websites treat amount of choice and decision reversibility quite differently in their virtual architecture. When it comes to choice, websites can range from default views of only four potential matches (eHarmony) to as many as 40 or more matches (Plenty of Fish) on a single page. When it comes to decision reversibility, there are tacit cues that might influence users' perceptions. A website such as Plenty of Fish or Datehookup may convey notions of reversibility by its very nomenclature, implicitly suggesting to users that potential partners are replaceable, and their decisions about whom to date reversible. Conversely, Chemistry.com and EHarmony.com advertise themselves as tools to help users find their "soulmates," implying that potential partners found on the site may not be easily replaced. These design decisions and packaging of information may alter users' perceptions of romantic connections made through the site, dampening their enthusiasm for a potential partner if choice appears plentiful and decisions easily reversible. Indeed, the fact that EHarmony, whose design

emphasizes both limited choice and limited reversibility, generates the greatest number of long-term partnerships and marriages (Cacioppo et al., 2013) is consistent with our findings.

Limitations & Future Research

This study used an undergraduate sample and a contrived online dating system. Although the use of dating sites is on the rise among college students, our convenience sample is younger than typical online daters, who are aged 25-45 (Smith & Duggan, 2013). We recommend that future research replicate our findings with older daters. Additionally, while participants believed they were using a real online dating website, were single, and were interested in finding dates, they may differ from actual subscribers of online dating services. Older subscribers of online dating websites may be more motivated to find relationship partners, more interested in serious relationships, and may perceive less availability of partners in their everyday environments. As such, they may be even more liable to choice overload and decision reversibility effects than our sample. We recommend that future research replicate this study with online dating subscribers of more varied demographics.

From a theoretical standpoint, it is important that future research examine the mechanism behind the combined effect of choice overload and reversibility. As previously noted, it is possible that online daters who have more choices experience more regret, cognitive burden, and need for justification, and they may ruminate about their choices over time. Future studies should directly assess these variables. For example, we noted earlier that the need for justification may arise out of relational goals. Future research should address whether relational goals impact need for justification, and this consequently predicts the presence of choice overload effects. Additionally, a particularly exciting avenue for future research is to follow up on how the pre-interaction impressions identified here affect subsequent interactions between daters. Do daters

whose satisfaction with selected partners is dampened by choice overload and reversibility effects interact more negatively with these partners in subsequent meetings, leading to self-fulfilling prophecies?

Conclusion

John Durham Peters (1999) writes that "the meaning of communicative connections, large and small, is an ongoing conundrum" (p. 224). The naturally enigmatic nature of connection is only amplified when considering the realm of mediated communication, where there is more possibility for connection than ever before. To that end, we hope to have taken a small step forward by identifying that, when it comes to finding a romantic partner online, more is not always better. Our study proposes that the framing and presentation of romantic choices in a dating website may systematically alter interpersonal evaluations, and may even affect the future trajectory of relationship development. We offer theoretical perspective for explaining these effects, and open up several promising avenues for future research.

CHAPTER 3

CHOICE OVERLOAD IN ONLINE DATING: MECHANISMS, MESSAGES, AND IMPERMANANCE

Meeting potential romantic partners online is easier than ever. There are an abundance of online dating websites available that are targeted at diverse audiences (Blackwell, 2016), many with no financial cost. Any negative stigma of online dating has declined, as nearly 40% of American adults who are looking for a partner have used a dating website or app (Smith & Anderson, 2016). Moreover, these numbers are likely to increase, as only growth is projected for the industry (Cesar, 2016). While the explosive popularity of online dating is apparent, there may be some hidden costs associated with it. The popular press is beginning to cover issues such as dating app fatigue (Beck, 2016) and online dating indecision (Schwartz, 2017), and present stories of individuals who "quit online dating to find love IRL" (Adams, 2015) because they were overwhelmed by the sheer number of potential online connections they had to sift through.

Recent academic research has introduced the theory of choice overload (e.g., Bollen et al., 2010; Diehl & Poynor, 2007; Iyngar & Lepper, 2000) to online dating in order to provide insight into this phenomenon. Having more dating options can actually hamper happiness: One study finds that a week after online daters selected a potential partner, those who selected from a larger pool rated their selection as less satisfactory than those who selected from a small pool (D'Angelo & Toma, 2017). Similar research found that having more options caused online daters to search more (Wu & Chiou, 2009) and select worse (Yang & Chiou, 2010). Indeed, the online dating landscape seems to produce the effects of choice overload: while individuals are likely to desire more choice (Patall, Cooper, & Robinson 2008), selecting from more options yields lower

satisfaction and reduces the likelihood to select a product at all (e.g., Chernev, 2003; Iyengar & Lepper, 2000; Schwartz, 2004).

Current research indicates that choice overload is a powerful lens through which to examine online dating, but there are still many questions left about how the presentation of choice affects online daters. Although D'Angelo & Toma (2017) found the perceptual effect of decreased satisfaction, it is still unclear what the psychological mechanism behind this reduction is. It is also unclear how this reduced satisfaction affects online daters' actual behaviors, or even if it does at all. Moreover, sheer volume is not the only notable factor of choice in online dating: there are other features that also merit attention.

The *virtual choice architecture of online dating* is a framework that suggests online dating features of choice do not exist in isolation and may jointly affect daters (D'Angelo & Toma, 2017). D'Angelo & Toma (2017) applied the notion of choice architecture (Thaler & Sustein, 2008) to online dating, and argued that the virtual features responsible for how choice is presented have important consequences for the online dating experience. To date, two aspects of virtual choice architecture in online dating have been investigated: amount of choice and reversibility of choices. More choice leaves daters less satisfied, and this effect is especially negative when daters also have the ability to reverse their decision and select another person (D'Angelo & Toma, 2017). We propose that a third element of online dating sites' choice architecture will have important relational consequences: impermanence of options. Engaging in online dating is often considered akin to shopping in a marketplace (Heino, et al., 2010), and just like many consumer products, online dating options can suddenly become unavailable. Impermanence of choice is a very real factor for online daters: Although daters populate a

website, there is no guarantee of availability associated with any option. Any given online dater may right now be going out on their last first date.

Pursuing these areas of inquiry in online dating offers both theoretical and practical reward. Theoretically, there is the potential of three distinct contributions. First, clarifying the mechanism behind choice overload represents a step forward in solving a persistent theoretical query: research suggests a number of potential mechanisms that might drive the effect, but offers no definitive answer (e.g., Scheibehenne, et al., 2009). Second, investigating the behavioral consequences of choice overload will provide further explanatory power to this theory. Little research has examined the behavioral consequences of choice overload and those studies only focused on the action of making a selection (as opposed to not) or switching a selection (e.g., Chernev, 2003a; Chernev, 2005; Gourville & Soman, 2005; Iyengar & Lepper, 2000; Morrin, Broniarczyk, & Inman, 2012; Sela et al., 2009; Shah & Wolford, 2007; Townsend & Kahn, 2014). Third, little research has examined choice overload in conjunction with other characteristics of choice. It is possible that a large (or small) selection pool will act as a necessary or exacerbating condition for any effects of impermanence on choice satisfaction. Such research pursuits are also of practical importance. Currently, 15% of all US adults and 27% of individuals age 18-24 report having used online dating (Smith, 2016). Hence, closely replicating the choice conditions of the most popular dating websites, with lots of options and impermanent options, will help illuminate the experience of millions of current users. The emerging insights can have design implications as dating websites continue to evolve. The findings here can inform designers whether choices should be constrained or if availability should be more clearly displayed.

To fill these gaps, the present research seeks to answer: what is the effect of *quantity*, or how many potential partners are presented as options to online daters, and *impermanence*, or the notion that a choice might soon disappear from the availability, on daters' romantic outcomes? We will use choice overload as our primary theoretical framework (e.g., Chernev, 2003; Iyengar & Lepper, 2000; Schwartz, 2004), but also integrate findings from the emerging research area of disappearing options (Patalano, et al., 2015).

The Choice Overload Effect

Traditional economic theory suggests that if individuals have more options they are more likely to find an option that suits their personal likes, and thus experience increased satisfaction (Mas-Colell, Whinston, & Green, 1995; Perloff, 2010). This view is echoed by public sentiment – people think more choice is better (Patall et al., 2008). Hence, it is no surprise that online dating websites often highlight their abundance of options (eHarmony: "Over 20 million registered users!"). Yet, this intuitive belief that more is better has been shown to be quite inaccurate in the past decade and a half of research. Notions of the negative effect of choice began with a well-publicized study which established that individuals were less likely to purchase a jam and were less satisfied with their eventual jam purchase when they were choosing from a large rather than a smaller pool of options (Iyengar & Lepper, 2000). Since this initial research, scholars have consistently documented the deleterious effect of abundant choice on consumers' satisfaction. Whether individuals choose from crackers (Townsend & Kahn, 2014), 401k retirement plans (Sethi-Iyengar, Huberman, & Jiang, 2004) camcorders (Diehl & Poynor, 2009); or vacation packages (Park & Jang, 2013), more choice has reliably been shown to lead to less satisfaction and more regret with the selected option, a greater likelihood of switching the choice, and fewer instances of making a decision altogether. This robust phenomenon was

labeled the “excessive-choice effect” (Arunachalam, Henneberry, Lusk, & Norwood, 2009), the “paradox of choice” (Schwartz, 2004), and “choice-overload” (Bollen et al., 2010; Diehl & Poynor, 2007; Iyngar & Lepper, 2000). (This latter term – the choice overload effect - is the one that we will utilize as we move forward to discuss this area of research.)

A few studies have extended this paradigm from a consumer to a relational context. Initial research failed to find evidence of the predicted effects of overload. When online dating experiments were modeled after typical consumer research with satisfaction measured directly after the selection of an online dating profile, no significant differences were found (Lenton & Stewart, 2008). The effect was later identified, as D’Angelo & Toma (2017) hypothesized that cognitive processing time was necessary for the effects of overload to emerge. Unlike a unidimensional and quickly experienced consumer product, selecting a potential mate is a complex choice that has both personal and social implications. It likely requires daters time to contemplate the aggregate ramifications of their selection – the effects of greater choice may only emerge after rumination. Hence, they predicted, and consequently found, that online daters who selected from a pool of 24 individuals as opposed to 6 individuals were equally satisfied immediately after making their choice. However, one week later, daters who selected from the larger pool were significantly less satisfied with their selection than those who selected from the smaller pool – direct evidence of choice overload in online dating. The effects of choice overload exist in online dating, but they require time to emerge.

Given that D’Angelo & Toma (2017) was the first study to find both direct evidence of choice overload in online dating and evidence that choice overload may occur over time, replication is important in this area of research. We do not expect to find significant differences

directly after online daters select a potential date from either large or small pools, but we expect differences to emerge after time has passed:

H1: One week after selecting a potential partner, online daters who chose from a large pool (24) of matches will be less satisfied with their choice than those who chose from a small pool (6).

Mechanism of Choice Overload in Online Dating

While there is consensus in the literature that more choice leads to less satisfaction with selection in a variety of contexts, there is not agreement on why this is so. Research has provided evidence for a plethora of mechanisms explaining why larger choice sets reduce satisfaction. More choices have been shown to produce: 1) *expectancy disconfirmation* by raising initial expectations of finding an "ideal" choice and increasing disappointment when these initial expectations are not met (Diehl & Pynor, 2010); 2) more *regret* for options left unchosen (Iyengar & Lepper, 2000); 3) more *counterfactual thinking*, or opportunities to ponder what life would have been like had a different choice been made (Hafner et al., 2012); and 4) more *cognitive burden*, or an increased demand on one's mental processing resources, causing frustration (Botti & Iyengar, 2006; Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009). The issue of mechanism remains a quandary in choice overload research, as these noted mechanisms fail to emerge consistently and across different choice scenarios (Scheibehenne et al., 2010).

Of the previously identified mechanisms driving the effects of choice overload, cognitive burden has received some of the most consistent support (Botti & Iyengar, 2006; Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009). People who are presented with more information often make less informed choices, because they cannot carefully process the

relevant information (Lee and Lee 2004; Lurie 2004), and individuals may feel decreased satisfaction because they are aware of their own inability to carefully assess all that they have access to (Scheibehenne et al., 2010). Typically, cognitive burden is manipulated experimentally. For example, researchers reduced cognitive burden and increased satisfaction with selection by placing options into categories, which are easier to process (Mogilner et al., 2008) or having objects vary in shape as opposed to color, because the perceptual cost of processing shapes is less (Reutskaja & Hogarth, 2009). Research has also found that satisfaction decreases with more choice only when options have many attributes – an increase of options with few attributes might not create cognitive burden to the extent that it affects satisfaction (Greifeneder et al., 2010). A limitation to this potential explanation of overload is that cognitive burden is rarely measured directly – but it is an absence that we will attend to in this research.

Online dating may be a context uniquely situated for producing cognitive burden. Here the sheer volume of information is so great (unlike a product, a person has a multitude of dimensions on which to be evaluated), that cognitive burden seems especially likely. It is possible that when individuals have more options to choose from, they are unable to process all of the options (and attributes of each option), and this leaves them feeling that the decision was more burdensome and less likely to be the correct one. In fact, there is already some evidence of this process: online daters presented with more options examined more profiles and selected partners further from their pre-specified ideals (Wu & Chiou, 2009; Yang & Chiou, 2010).

However, unlike other consumer purchases, we know that it takes time for choice to affect the satisfaction of online daters. That does not mean that there is not cognitive burden associated with the initial selection – it just may take time to affect overall satisfaction. It is possible that there is a unique initial excitement associated with the selection of a potential date,

and it is only with time that the selector feels the effects of cognitive burden. Experiences of cognitive burden may initially be experienced through a positive lens ("So many handsome options out there – this is awesome!"), but with more thought the weight of the decision becomes more problematic and negative emotions may emerge. Individuals selecting from a small pool have their choice constrained, thus reducing the complexity and burden associated with their decision, keeping satisfaction high. Those with greater choice will have the ability to search more, and will do so, thus leading to greater cognitive burden associated with this choice. Over time, this cognitive burden can lead to diminished satisfaction.

To the best of our knowledge, there is not yet evidence that enhanced or reduced searching directly affects cognitive burden, the latter of which has not been directly measured. We believe that this is what occurs in online dating: individuals who have the ability to search more do so, which in turn increases the cognitive burden associated with a selection. While cognitive burden does not have an immediate effect, the difficulty associated with this initial decision predicts the satisfaction one week later. Hence, we posit the following hypothesis:

H2: Online daters presented with a large (as opposed to small) pool of partners will experience decreased satisfaction with the person chosen one week later, because they search more prior to the initial selection which causes them to experience greater cognitive burden with their decision.

The Effect of Impermanent Options

When considering an online dating website, daters always face a choice of impermanent options: At any time, a choice can potentially disappear. Even though there may be an abundance of options at first glance, there is uncertainty regarding the solidity of those options. Although a profile may present a readily available dater, the individual behind that profile may be actively

dating others and ignoring the website or may have abandoned their profile, no longer interested in online dating. Online dating websites try to combat the problem of unavailable daters who clutter the site by presenting the most active users first, purging inactive accounts, or providing indications of responsiveness or activity on daters' profiles (such as last login date). Yet these efforts are not foolproof, especially when it comes to online daters who are currently dating a good prospect and rapidly losing motivation to access the website.

The closest area of research to this phenomenon considers how individuals perceive and act towards potential loss or make decisions in the face of actually disappearing options. Whereas impermanence implies uncertainty of loss, research has focused on situations where individuals are told there will be loss or visually perceive options disappearing. It is well documented that individuals are averse to loss (i.e., Kahneman, D., Knetsch, & Thaler, 1991; Tversky & Kahneman, 1991). Even if an option is of little interest, decision-makers will invest money and time to keep options open because they believe there is some added value or utility to having more options to choose from (Shin & Ariely, 2004). Consistent with the choice overload hypothesis, this action of keeping options open can cause individuals to select worse investments (Botti & Hsee, 2010), have more negative feelings about medical decisions (Botti, Orfali, & Iyengar, 2009), and be less confident in their choice (Chernev, 2006). We also know that when faced with a pool of options, where some options are actively disappearing over time, some decision-makers will choose sooner to avoid feeling regret (Patalano, et al., 2015). No research to date has considered the effect of choosing from a pool of impermanent options on satisfaction with that selection, let alone what will occur in the context of online dating.

Arguments can be made that daters experience either increased or decreased satisfaction when selecting from a pool of options that can potentially disappear. It is possible that there can

be an effect of scarcity. Commodity theory suggests that "any commodity will be valued to the extent that it is unavailable," with value referring to a commodity's "potency for affecting attitudes and behaviors" (Brock, 1968, pg. 246). Hence, scarcity can increase an item's utility or desirability (Lynn, 1991). If daters find a good match but know it may potentially disappear, they may perceive it with enhanced value or satisfaction. However, it is also possible that the condition of impermanence will trigger reactance. According to reactance theory, when individuals have their freedom threatened, they take action to reassert that freedom, or if that freedom cannot be reasserted, they may "subjectively decrease the attractiveness of" the imposed condition (Miron & Brehm, 2006). Importantly, this process can take place even if a threat to freedom is not explicit, but only a possibility (Andreoli, Worchel, & Folger, 1974; Brehm & Sensenig, 1966; Worchel & Brehm, 1971). When faced with selecting an option that may disappear, daters may perceive the impermanence as a threat to their freedom to choose (as the option may be taken away before they can even do anything about it). This can result in a decrease in how attractive that option is perceived and how satisfied daters are with that selection. "This is a good match, but I may not even get to touch base with them at all – they're probably not that cool anyway." Consistent with previous research on loss of options, this cognitive action may prevent greater feelings of regret that may be associated with an actual loss.

Given the lack of research on how selecting from impermanent options affects satisfaction, and the unharmonious insight offered by related theory, we propose the following research question:

RQ1: Does presenting online daters with a pool of options who may disappear affect their satisfaction with that selection immediately after selection compared to online daters who are told their choice will remain available for the following week?

Just as there exists no strong theoretical foundation to predict the effects of online daters selecting from impermanent options, the combined effect of impermanent options and variations in amount of choice remains untested and atheoretical. Although the practicality of these choice conditions being tested together is clear in an online dating context, theoretically we know little about how they may operate together and there is not yet evidence to suggest that they share a mechanism. It is possible that the fact that a selected dater may disappear has little consequence when there are many options from which to choose. “So many good options, what do I care if my selection disappears?” However, it is also plausible that negative feelings will arise from the impermanent condition and will increase the effects of choice overload, only serving to drop satisfaction further: “This was a really hard decision, what if I have to make it again?” Hence, the following research question is posited:

RQ 2: Is there a relationship between amount of choice and selection from impermanent options on online dater satisfaction with choice immediately after a selection?

When considering impermanent options, there is also a second scenario to consider: What happens when the impermanent does not in fact go away? Consider an online dater who finds an attractive choice. However, they see their choice has not been active for a week. Our dater is interested in connecting, but there is uncertainty: this person might have already met their match and not respond or have simply taken advantage of a free trial and left the website. If this choice becomes visually active again, what is the effect on our online dater? Does this increase appeal of this choice?

Here again there is little previous research to guide our predictions. As noted above, it is possible that impermanence will result in negative emotions. If that is so, then in this second scenario, of returning to find a dater still available, may be positive - when negative expectation

turns out to be wrong there is a feeling of relief (Castelfranchi & Lorini, 2003). In this situation, any reactance may be negated, and feelings of relief will likely drive up satisfaction with this particular choice to a level higher than those who return to their choice with no notions of relief. However, it is also possible that the scarcity associated with impermanence results in higher initial judgements of satisfaction towards a selected dater. If they become clearly available, does that mean that they are not in fact scarce? It is not unheard of for an online dater, or any dater for that matter, to wonder: "You're so great, why exactly are you still single/available? Is there something… wrong?" The effect of an impermanent option failing to disappear might not be so uniquely positive; it may in fact be a source of doubt. Both practically and theoretically, this is a context that has been unaccounted for in research to date. Hence, we pose the following research questions:

RQ 3: One week after selection, how satisfied will online daters be who chose from a pool of impermanent options and find that the option remains available compared to online daters who choose from a pool and are told their choice will remain available and find the option indeed remains available?

Finally, it is possible that the experience of online daters who return to find their impermanent option remains will differ for those who have many options and those who have few options. As with before, there is no research directly predictive of this circumstance. If there are only a few options, and those options are subject to disappear, there may be a greater feeling of relief upon return to find that an option remains. However, it is also possible that the presence of more options can indicate a more active dating website or greater competition. In such a scenario, there may also be a great feeling of relief upon finding a particular dater remains available. Hence, we pose a final research question:

RQ 4: Is there a relationship between amount of choice and selection from impermanent options on online dater satisfaction with choice, one week after the initial selection when the dater finds that the selection remains?

Behavioral Consequences of Choice Overload: Message Construction

Thus far, research on choice overload has focused primarily on the outcomes of satisfaction judgments and the act of selection. This make sense given the previous focus on consumer products. However, dating does not end with a purchase or taste – dating is a process that begins with first contact and moves forward. As such, this work gives us the unique opportunity to examine how conditions of choice may affect communicative behaviors.

One important area that may be affected is the initial message of an online dater. This is a noteworthy outcome for two reasons. First, it is likely to be personally important to the composer – a selection of jam may be arbitrary, an email to a potential lover not so much. Moreover, in the asymmetry of the communication and ability to edit and revise, there is room for careful construction and conscious language choice. Second, the initial message is the most foundational step of a relationship. It provides the recipient with a first impression beyond the profile, which can have an influential impact, as individuals are likely to interpret later communications in a manner that makes it consistent with their first impression (Asch, 1946; Jones, Rock, Shaver, Goethals, & Ward, 1968; Tetlock, 1983). Hence, we wonder if the presentation of online dating options can have a significant impact on that initial message composition.

Moving the analytic lens to how an individual communicates can be insightful, as cognitive states often leak into language. This particular notion, that how people talk, as opposed to what they say, reflects their underlying psychological processes is well supported (Chung & Pennebaker, 2007). Linguistic cues have been linked to psychological states such as negative

emotions including nervousness, anxiety, and sadness (e.g. Kahn, Tobin, Massey, & Anderson, 2007; Newman, Pennebaker, Berry, & Richards, 2003; Zhou, Burgooon, Nunamaker, & Twitchell, 2004) and positive emotions including amusement, positive affect, and motivation (e.g. Bono & Ilies, 2006; Kahn et al, 2007; Johnsen, Vambheim, Wynn, & Wangberg, 2014). Hence, the specific words that individuals use can provide much information about that individual, the motives behind their communication, the target of their communication, and the context in which the communication is taking place (Slatcher, Vazire, & Pennebaker, 2008).

Recall that we predicted small selection pools will cause increased satisfaction, and large pools decreased among online daters. Psychologically, higher satisfaction may lead to greater relational investment and more effortful message construction. Hence, we would expect individuals who selected from fewer choices to display linguistic marker evidence of more careful message construction and more politeness. Added effort is often productive, as skilled writers tend to attract more contacts in online dating (Shtatfeld & Barak, 2009) and online daters often look to spelling and grammar as reliable signals of education (Ellison & Hancock, 2013). We would expect daters who feel more positively toward their communicative target to strive to produce a message with more formal language and less netspeak (text message language). Most online daters should know that “It is nice to meet you” comes across much more positively and effortful than “Nice 2 meet u!” as netspeak is considered by many not a form of real writing and perceived as lazy (Lenhart, Arafeh, Smith, & Macgill, 2008). Hence, reflecting the choice maker’s efforts to put the best possible first impression forward, we posit the following hypothesis:

H3: Online daters who choose from a small pool of choices will use fewer (a) informal and (b) netspeak words when constructing a message to their dater than online daters who choose from a large pool.

Another marker of careful message construction would be the avoidance of second person singular pronouns (i.e., "you"). The utilization of you language (e. g. "you", "your") is generally negatively perceived by others, indicates less social cohesion and greater separateness between people, and is related to negative relational outcomes (Hallgren & McCrady, 2016, Robbins, Mehl, Smith, & Weihs, 2013; Seider, Hirschberger, Nelson, & Levenson, 2009; Sillars, Shellen, McIntosh, & Pomegranate, 1997; Slatcher, Vazire, & Pennebaker, 2008; Williams-Baucom, Atkins, Sevier, Eldridge, & Christensen, 2010). Even in contexts where individuals are meeting for a first time, those interacting in a truly collaborative style avoid the word "you" (Ranganath, Jurafsky, & McFarland, 2013). In line with the reasoning on careful message construction and a desire to put the best foot forward, we believe online daters will develop messages that reflect these well documented findings on the use of "you" words. Hence, we posit the following hypothesis:

H4: Online daters who choose from a small pool of choices will use fewer you words when constructing a message to their dater than online daters who choose from a large pool.

Finally, an online dater carefully constructing a message may be attuned to highlighting their own credibility, for deception is a well-known and worrisome aspect of online dating (e.g., Hall, Park, Song, & Cody, 2010; Toma, Hancock, & Ellison, 2008; Toma & Hancock, 2012). Hence, for those daters who are presented with fewer choices, and experience increased psychological investment, we may see steps to enhance the perceived credibility of a message. One strategy that online communicators use " to increase a partner's confidence in one's self-

descriptions" is to provide an online partner with connection to one's offline-network (Walther, 2011, p. 466), an action already evidenced in the information online daters list in their activities (Ellison, Heino, & Gibbs, 2006). It is likely we will see just this in message construction as well. Specifically, for those selecting from a small group, we would expect more affiliation words. These words, which reference others or suggest a group membership (e.g., "friend," "volunteer"), may presumably serve to warrant the claims presented by the decision maker and messenger. Rather than simply saying "I'm interested in animal rights", an interested dater would likely try to support this claim by stating "I volunteer at the Humane Society every other Sunday." Hence, we posit the following hypothesis:

H5: Online daters who choose from a small pool of choices will use more affiliation words when constructing a message to an online dater than online daters who choose from a large pool.

Methods

The methods of this experiment, apart from measurements and one experimental manipulation, were the same as those laid forth by D'Angelo & Toma (2017). This strategy was implemented for two main reasons. First, this study is a direct follow-up to this prior research in order to replicate findings and investigate the mechanism behind these findings. In such situations, it is advised to utilize the same participant recruitment, instructions, and stimuli (Brandt et al., 2014). Second, the main stimuli (the online dating website) demonstrated external validity: In the previous experiment, participants ostensibly viewed and interacted with the website in a veracious nature.

Participants and Recruitment

Participants (*N*= 142; 73% women; 70% Caucasian, 23% Asian, 4% African American; age *M* = 20.25, *SD* = 1.89) were undergraduate students at the University of Wisconsin-Madison who were single interested in meeting a new romantic partner through online dating. Participants were recruited through online advertisements placed on the department's research participation website and were compensated with extra-credit in their Communication courses.

These online recruitments asked for volunteers interested in piloting an actual online dating website (Badgerdate) in development by the University. It stated that individuals would test the beta version of the website and would be matched with a potential date and additionally compensated with extra credit. It also noted that feedback would be requested from the participants to help evaluate the success of the online dating system. Given that this experiment is a replication of a different but similar experiment utilizing Badgerdate, recruitment was limited to individuals who had not participated in the first experiment.

Of the 143 participants who initiated the survey at Time 1, 131 returned to complete the survey at Time 2, resulting in a loss of 12 participants. Additionally, 25 participants were eliminated due to failing the manipulation check manipulation check (see Procedure and Design). Finally, three participants were removed because they were identified by research assistants as acting suspiciously (completing the survey too quickly and hypothesis guessing) and one older non-traditional student was removed as the online dating options were designed for individuals of traditional college student age. Eliminated participants were randomly distributed across experimental conditions. The loss of these participants reduced the effective sample size to *N* = 102. This 29% attrition rate is consistent with similar longitudinal research, in participants failed to complete the experiment or responded inconsistently (D'Angelo & Toma, 2017; Gilbert & Ebert, 2002).

Procedure and Design

The study used a 2 (quantity of choice: six vs. 24) x 2 (impermanent options: impermanent vs. control) experimental design. The quantity of profiles for the small and large pools were selected to be consistent with prior research on choice overload (e.g., D'Angelo & Toma, 2017; Iyngar & Lepper, 2000). Participants were randomly assigned to their condition via randomization software.

Participants were required to come to the lab for two separate appointments (Time 1 and Time 2), spaced exactly one week apart. Participants were told at Time 1 that they would be allowed to select a potential dater and that at Time 2 they would return to confirm their selection and potentially contact them. Participants were also told that they would remain anonymous to their selected partner through these early online dating stages.

At Time 1, participants filled out a short survey with demographic and personality measures. Participants were told that this information was used to match them with suitable partners. Then, participants were presented with a selection of either six (i.e., small choice set) or 24 matches (i.e., large choice set), and were prompted to examine them and select one person whom they would like to contact and go on a date with. Prior to accessing the pool of potential daters, those in the impermanent options condition were also told: "Please be advised that, since this is a live dating website, it is possible that the individual you select, or any of the other daters you were matched with, will no longer be available on Badgerdate next week" and that "When you return to the lab next week, we will put you in touch with this person, if they are still available." Those in the control condition were told: "When you return to the lab next week, we'll put you in touch with this person." After making their selection, participants completed an additional survey regarding their satisfaction with their choice and the cognitive burden

associated with making their decision. Upon the conclusion of the survey at Time 1, participants in the impermanent condition were again reminded that they would be able to confirm their choice and make contact at Time 2 only if the individual was still available in the system. Participants in the permanent condition were again told that at Time 2 they would be able to confirm their choice and be put in contact with the individuals they select.

Each participant was given a username and password to the online dating system. During the week between Time 1 and Time 2, participants were allowed to access the system at their discretion to review their choice and the partners they had discarded.

At Time 2, participants came to the lab and were asked to log into the online dating system and review the profile of the person they selected. Participants in the impermanent options condition were first reminded that their selection might no longer be available on the website. Upon logging in, all participants were able to see that their choice remained. After reviewing their selection, participants reported their satisfaction with their choice using the same satisfaction questionnaire they filled out at Time 1, along with some distraction questions. Upon completion of these survey items, participants were given the option of composing an initial message to their selected dater. At the completion of the survey and message, participants were asked to recall whether the online system instructed them that their choice might not be present at Time 2. This question was intended as a manipulation check. Participants who answered incorrectly were eliminated from the analyses.

Stimuli

The online dating system used in this experiment was the same as in D'Angelo & Toma (2017). The only significant alteration was the text preceding the display of, and following the display of, the impermanent condition options. The dating system appeared visually similar to

any popular dating website (match.com, okcupid), in which participants viewed a pool of subjects via thumbnail pictures, and were able to click on these pictures to view profiles complete with text typical of online dating website profiles. To ensure that the attractiveness of the profiles did not confound the experiment, two steps were taken. First, the six profiles presented in the small pool were a subset of those presented in the large pool. Second, the profiles were previously rated for dating attractiveness and we used these judgments to ensure that the overall average attractiveness of the pool of six was equal to the overall average attractiveness of the pool of 24. (For a more detailed description of the stimuli, see Study 1).

Dependent Measures

The dependent variable was satisfaction with the choice of a dating partner, and was measured using a 10-item satisfaction scale at both Time 1 ($\alpha = .82$) and Time 2 ($\alpha = .86$) similar to previous research on choice overload (D'Angelo & Toma, 2017; Iyngar & Lepper, 2000). The scale contained items such as: "How much do you like the individual whose profile you selected?", "How satisfied are you with the dater you chose?", and "I am confident that I made the right choice." Each item was measured using a 7-point Likert scale, from 1 (not at all) to 7 (extremely).

A total of 78 individuals (77% of participants) chose to send their selected dater a message. Linguistic cues contained in the initial contact message composed by participants at Time 2 were extracted using Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, & Francis, 2007). LIWC is a text analysis software that counts words within a text and assigns them to psychological meaningful categories, such as function words (e.g. pronouns, prepositions), social words (e.g., family, friends), core drives and needs (e.g., affiliation, achievement), and informal speech (e.g., swearwords, netspeak). To accomplish this process, the software

compared the words present in each message to its internal dictionary of over 6,400 words, word stems, and emoticons. LIWC has been validated in a range of experimental contexts (Tausczik & Pennebaker, 2010) including online dating messages (Schoendienst & Dang-Xuan, 2011; Toma & Hancock, 2012).

Mediators

Surfing activity was quantified by profile views. A profile view refers to each time a participant clicked on a profile thumbnail and viewed the complete profile of a dating option prior to participants selecting a choice at Time 1. These were recorded automatically by the system. For example, if a participant logged onto the system to view the full page of profile thumbnails, clicked on a profile to examine it more closely, returned to the homepage, and then clicked on another user, this would be two profile views. Each unique view was counted, so if the individual in this example then returned to view the first profile they selected, that would be counted as three profile views. We had also intended to consider page views over the course of the week in this research (i.e. each unique click including photographs, profiles, etc.), but experienced a technological failure in recording this use data. The Java script developed to track this data recorded the page that users were on at random intervals, stead of each page change, resulting in indiscriminate data.

Cognitive burden was assessed after individuals made their choice at Time 1. It was measured with a five-item semantic differential scale ($\alpha = .86$) adapted from previous research on decision complexity (Shiloh, Koren, & Zakay, 2001). Participants were asked to rate the difficulty of their decision by differentiating between concepts such as simple and intricate and easy to difficult on a 7-point scale.

Controls

Consistent with prior research (D'Angelo & Toma, 2017) a series of covariates that might affect choice satisfaction were collected. Gender was collected as women can be more selective when choosing a romantic partner (Grammer, Kruck, Juette, & Fink, 2000). Ethnicity was collected as much research finds that individuals are attracted to those similar to themselves (e.g., Atkinson & Glass, 1985) and while our website has a diverse set of ethnicities, not all were represented equally. We also assessed Relationship interest ("What kind of relationship are you interested in?") and seriousness ("If you meet the right person, what is your current level of interest in a serious relationship?"), because the intensity of desire for a relationship may impact the cognitive burden associated with the choice or resulting satisfaction regarding that choice. Tendency for romantic idealization (e.g., "Do you believe in soul mates?") was measured, as it has been shown to lead to more positive illusions, and consequently more satisfaction, with mates (Murray, Holmes, & Griffin, 1996). Previous relationship experience ("How many committed romantic relationships have you had to date?") was collected, as this can affect perceptions of new partners (Furman, Brown, & Feiring, 1999). Finally, we evaluated romantic ability ("How confident are you in your abilities to attract a romantic partner?"), for those not confident in their romantic ability may be affected by more choice or impermanent options differently than those of high confidence in attracting a mate.

Results

We first probed the effect of choice overload and impermanent options immediately after selection. Recall that we did not expect an effect of choice overload, and posed research questions about the effect of impermanent options and the interaction between the two. These questions were assessed through an ANCOVA with choice satisfaction at Time 1 as the dependent variable and quantity of choice and impermanent options condition as the between-

subjects factors. All of the previously mentioned the covariates were included in all analyses presented. The covariate of relationship seriousness was significantly related to decision satisfaction $F(1, 91) = 5.97$, $p < .05$, partial $\eta 2 = .10$; those who were more serious about finding a partner were generally more satisfied. The non-significant covariates included gender $F(1, 91) = 3.29$, $p = .08$, romantic ability $F(1, 91) = 1.38$, $p = .25$, relationship interest $F(1, 91) = 3.23$, $p = .08$, ethnicity $F(1, 91) = .86$, $p = .36$, previous relationship experience $F(1, 91) = 2.20$, $p = .14$, and romantic idealization $F(1, 91) = 1.96$, $p = .17$. The omnibus test was significant, $F(10, 91) = 2.98$, $p < .01$, partial $\eta 2 = .25$. As expected, the main effect of quantity of choice was not significant, $F(1, 91) = 1.55$, $p = .22$. Individuals with fewer choices ($M = 4.70$, $SE = .11$) were equally satisfied as those with more choices ($M = 4.50$, $SE = .11$). The main effect for impermanent options was also not significant $F(1, 91) = 1.12$, $p = .29$. Participants who were told that their choice may disappear ($M = 4.51$, $SE = .12$) were no less satisfied than those who were told their choice would be present at Time 2 ($M = 4.68$, $SE = .11$). (See Table 3 for decision satisfaction descriptives at Time 1 and Time 2, as well as mediator descriptives.)

However, a significant interaction between amount of choice and impermanent choice emerged, $F(1, 91) = 5.03$, $p < .05$, partial $\eta 2 = .05$. Simple-effects tests (Field, 2013) suggested that this interaction was driven by differences in satisfaction among those in the impermanent options condition, where individuals with fewer choices ($M = 4.79$, $SE = .17$) were more satisfied than those with more choices ($M = 4.22$, $SE = .17$). There was no difference in satisfaction, regardless of choice set size, for those in the control condition $F(1, 91) = .51$, $p = .48$, with those in the presented with the small pool ($M = 4.60$, $SE = .16$) as satisfied as those who were presented with the large pool of daters ($M = 4.76$, $SE = .14$). Participants in the large choice condition also differed significantly $F(1, 91) = 5.58$, $p < .05$, partial $\eta 2 = .06$, with those provided

with impermanent options (M = 4.22, SE = .17) less satisfied than those in the control condition (M = 4.76, SE = .14). Participants in the small choice condition did not differ significantly based on whether they were provided impermanent options or not $F(1, 91) = .64$, p =.43, with those provided with impermanent options (M = 4.79, SE = .17) as satisfied as those in the normal condition (M = 4.60, SE = .17). Put simply, at Time 1, those in the overload and impermanent condition experienced significantly less satisfaction with their choice than those in the other three conditions. (See Table 2 and Figure 1 for Time 1 results.)

We hypothesized that, one week after selection, daters in the large choice set condition would be less satisfied with their choice than those in the small choice set condition (H1) and asked whether daters who selected from a pool of impermanent options and found that the option remains one week would be more satisfied with their choice than those who choose from a control condition (RQ 3). Further, we asked whether there exists a relationship between amount of choice and impermanent options on online dater satisfaction with choice one week after the initial selection (RQ 4). These predictions were tested through an ANCOVA with choice satisfaction at Time 2 as the dependent variable, quantity of choice and impermanent option conditions as the between-subjects factors, and all the covariates mentioned earlier. Once again, the covariate of relationship seriousness was significantly related to decision satisfaction $F(1, 91) = 6.99$, $p < .05$, partial $\eta 2 = .07$, with those who were more serious indicating higher satisfaction. Similarly, at time 2 the type of relationship one was interested in (i.e. short-term, long-term) was related to decision satisfaction $F(1, 91) = 5.53$, $p < .05$, partial $\eta 2 = .02$. Additionally, the covariate of romantic ability played a role at Time 2 $F(1, 91) = 4.64$, $p < .05$, partial $\eta 2 = .05$, with those who were more confidant in their ability to attract a mate generally indicating greater satisfaction with their selection. Gender was marginally significant, $F(1, 91) = 3.55$, $p = .06$,

partial η2 = .04, with males generally more satisfied than females. The non-significant covariates included ethnicity F(1, 91) = 2.30, p = .11, previous relationship experience F(1, 91) = 3.00, p = .09, and romantic idealization F(1, 91) = 2.43, p = .12. The omnibus test was significant, $F(10, 91) = 3.20$, $p < .01$, partial η2 = .26. The main effect of quantity of choice was significant, $F(1, 91) = 4.95$, $p < .05$, partial η2 = .05; participants in the large choice set condition ($M = 4.41$, $SE = .11$), were less satisfied with their selection than those in the small choice set condition ($M = 4.77$, $SE = .12$) providing support for Hypothesis 1. The main effect for impermanent options was not significant $F(1, 91) = .29$, $p = .59$, as there was no difference in choice satisfaction between the participants who were told that their choice may disappear at time 2, and those who were not given this information. Thus, RQ3 was met with null findings.

In response to RQ4, we found marginal evidence of an interaction between amount of choice and impermanent choice on dater satisfaction, $F(1, 91) = 2.10$, $p = .07$, partial η2 = .04. There were differences in satisfaction among those in the impermanent options condition $F(1, 91) = 7.51$, $p < .01$, partial η2 = .08, where individuals with fewer choices ($M = 4.88$, $SE = .17$) were more satisfied than those who were presented with more options ($M = 4.22$, $SE = .18$). There was no difference in satisfaction, regardless of choice set size, for those in the control condition $F(1, 91) = .11$, p = .74, with those in the small choice condition ($M = 4.68$, $SE = .17$) as satisfied as those who were presented with more options ($M = 4.60$, $SE = .14$). Participants in the large choice condition did not differ, based on whether they were presented with impermanent options or not $F(1, 91) = 2.84$, $p = .10$, nor did those in the small choice condition $F(1, 91) = .76$, $p = .38$. (See Table 2 and Figure 2 for the Time 2 results.)

Hypothesis 2 predicted a double mediation whereby more choice leads to more profile views, which leads to greater cognitive burden, and in turn less satisfaction. The mediation

analyses were conducted using the PROCESS Macro in SPSS (Hayes, 2013). The indirect effect from choice condition to satisfaction through both profile views and cognitive burden was significant, β = -.11, BCa CI [-.2211, -.0357], providing support to H3. There were significant direct effects indicating that those presented with a small pool viewed fewer profiles (*M* = 6.12, *SE* 1.01) than those presented with a large pool (*M* = 10.53, *SE* = .96) at Time 1 (β = 4.41, *p* <.05); more profile views led to greater cognitive burden with the decision at Time 1 (β = .10, *p* <.001); and greater cognitive burden at Time 1 lead to decreased satisfaction at Time 2 (β = -.26, *p* <.001). The overall model was significant, R^2 = .30, *F*(10, 91) = 3.9, *p* < .001. Of note, the indirect paths from amount of choice to decision satisfaction at Time 2 through profile views β = -.01, BCa CI [-.0223, .2128] and cognitive burden β = -.03, BCa CI [-.1877, .0918] were not statistically significant, indicating that profile views and cognitive burden did not individually mediate the relationship between choice and satisfaction. (See Figure 3 below for the full model and Table 3 for the descriptive statistics.)

Hypotheses regarding linguistic cues were tested through separate ANCOVA's for each cue, with quantity of choice as the between-subjects factors, and all the covariates mentioned earlier with the addition of impermanent condition. (Recall, that in this particular study, no hypotheses or research questions were proposed regarding the effect of impermanence on messaging outcomes.) Online daters who chose from a small pool of choices used fewer informal words *F*(1, 91) = 3.98, *p* < .05, partial η2 = .04, and netspeak words *F*(1, 91) = 8.35, *p* < .01, partial η2 = .08, providing support for H3. Hypothesis 4, which predicted that online daters who chose from a small pool used fewer you words, received marginal support *F*(1, 91) = 3.76, *p* = .06, partial η2 = .04. Finally, consistent with Hypothesis 5, online daters who chose from a small pool of choices used more affiliation words when constructing a message to their online dater

than those who selected from an large pool $F(1, 91) = 4.63$, $p = .03$, partial $\eta 2 = .05$. (See Table 4 for means and standard deviations.)

Discussion

Online dating has fundamentally changed the romantic coupling process in the United States by providing individuals a widespread and efficient way to meet others (Finkel et al., 2012). The goal of this research was to better understand the effect of this very recent, and radical, shift in human mating. While the benefits of online dating are undeniable, the sheer abundance of online dating can have some drawbacks: Daters who were presented with large (i.e.24) as opposed to small (i.e., 6) pools of potential partners visited more profiles, experienced more cognitive burden with their decision, and indicated lower satisfaction with their choice one week following their selection. Daters presented with more options also wrote initial messages that were more informal and less effortful. Moreover, daters presented with greater choice and a reminder that their option may be impermanent, a condition that most closely resembles reality, experienced lower satisfaction at the time of their initial selection.

These results offer theoretical contributions to our understanding of the role of virtual architecture in online dating. First, we have again provided empirical evidence of the effects of choice overload in online dating: providing dates more options will leave them less satisfied. Importantly, as we do so we illuminate the mechanism behind this effect. Second, we illustrate that choice overload affects not just judgements of satisfaction – it is also discernible in communicative behaviors. This expands both the scope of choice overload as a theory and our understanding of the role it plays in online dating. Finally, we identify how conditions of impermanent choice affect online dating and illuminate the unique manner in which

impermanence affects large and small choice differently. These contributions are further discussed below.

Refining Our Understanding of Choice Overload in Online Dating

The choice overload framework is a source of ongoing debate an investigation among social scientists. Even in meta-analyses, some argue that there is an overall effect of amount of choice on satisfaction measures even when accounting for moderating variables (Chernev, Bockenholt, & Goodman, 2015), whereas others argue that no such generalizable effect exists (Scheibehenne et al., 2010). Some argue that there is an effect, but it may appear only in particular consumer contexts (Moser, Phelan, Resnick, Schoenebeck, & Reinecke, 2017; Scheibehenne, et al., 2010). Similarly, there exists ongoing debate on the mechanism behind this effect (e.g. Chernev, et al., 2014; Scheibehenne et al., 2009). The results here should inform this debate by offering evidence that the choice overload effect does indeed occur in online dating, and one of the mechanisms driving it is cognitive burden.

First, the results here build on the previous argument of D'Angelo & Toma (2017) again showing that choice overload affects online daters and that this effect requires time. This replication is important because previous literature has suggested both that there is no choice overload effect in online dating (Lenton & Stewart, 2008), nor in e-commerce at all (Moser et al., 2017). However, attending to this argument carefully suggests one key factor: Time. Those studies that fail to find choice overload in online dating or in consumer purchases online measure satisfaction immediately after item selection. This is in fact consistent with our findings – there is no evidence of choice overload at Time 1. It is only after online daters are given one week to think about their decision that we see satisfaction drop among those present with more choice.

The second theoretical contribution in this area comes in our ability to explain why satisfaction drops. The results here show that more choice leads to more profile views before an initial selection, which leads to greater cognitive burden associated with that selection, and in turn less satisfaction one week later. It is possible that online daters first engage in an information gathering process, looking at all of their available options. With the first selection, having access to all of the information, they are aware that the decision is hard and even that they may not have been able to carefully attend to all of the information available (Scheibehenne et al., 2010). Hence, at Time 1 individuals do feel the cognitive burden associated with the decision. However, it is not until individuals can truly ruminate on all of the information that they have gathered, not until they reflect on their choice of one potential dater over another, that they experience decreased satisfaction at Time 2.

This finding is consistent with prior research which has established both that online daters with more choice engage in more searching (Wu & Chiou, 2009; Yang & Chiou, 2010) and that cognitive burden is one possible mechanism behind the effects of choice overload (Botti & Iyengar, 2006; Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009). Cognitive burden is a particularly likely mechanism in the context of online dating because of the multifaceted nature of the "item" one is selecting. Some argue that choice overload only occurs when there is cognitive burden inducing choice set complexity; with options characterized by having many attributes (Greifender et al., 2010; Reutskaja & Hogarth, 2009). Many online dating websites, like the one used in this experiment, are characterized not only by a photograph and a name, but many attributes on which to judge an individual ranging from height to favorite music.

Other mechanisms associated with choice overload seem less likely to operate in this context. Counterfactual thinking, considering what life would have been like with a different selection (and consequently experiencing reduced satisfaction), should increase with the number of options (Hafner et al., 2012; Hafner et al., 2016). However, counterfactual thinking is also supposed to reduce over time (Gilovich & Medvec, 1994; Gilovich & Medvec, 1995; Gilovich, Medvec & Chen, 1995; Kinnier & Metha, 1989). Hence, we would expect online daters to experience greater counterfactual thinking immediately after a selection and fewer counterfactual thoughts later, which is not consistent with our satisfaction data. Expectation disconfirmation, the idea that a large pool will lead to higher (and unachievable) ideals for an item, is plausible in online dating. It is possible that the daters in this experiment who perceived a small pool immediately tempered their expectations, only to be pleasantly surprised, and vice versa for those presented the large pool. However, here again we would expect satisfaction differences immediately after a selection (Diehl & Pynor, 2010) – if one's high expectation is unmet, the reduced satisfaction should be detectable immediately after a selection. Once more, this is not consistent with our data.

Salient to this discussion is the fact that profile views and cognitive burden were measured at Time 1, satisfaction at Time 2. It is only over the course of time, as daters likely experienced an ongoing cognitive burden with their decision, that we see satisfaction drop. While previous research has linked cognitive burden to an immediate drop in satisfaction with selection (Botti & Iyengar, 2006; Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009), it is also possible that cognitive burden affects satisfaction only over time. This idea is consistent with recent research that argues that cognitive burden and rumination are likely the same phenomenon and can leave an individual in a lasting exploitatory state (Baror & Bar,

2016). It is possible that at time 1 decision makers become aware that, unable to consider all of the necessary information, they did not make the best possible decision and over time this continued burden produced negative trends in satisfaction.

Choice Overload and Communication Effects

We have also expanded theoretical boundaries by identifying a new outcome of choice overload in online dating. Much research on choice overload focuses on an individual's ratings of satisfaction toward a selected item (Chernev 2003a; Chernev 2003b; Chernev 2006; Deihl & Poynor, 2010; Fasolo et al., 2009; Gourville & Soman, 2005; Greifender et al., 2010; Haynes, 2009; Iyengar & Leppar, 2000; Mogilner et al., 2008; Oppewal & Koelemeijer, 2005; Scheibehenne et al., 2009; Shah & Wolford, 2007). While there are some measurements of actual behavior, most of these remain focused on the decision making process itself including aspects such as an individual's likelihood of switching after they make an initial selection (Chernev, 2003b), their decisions to forgo or defer any choice at all (Chernev, 2005; Iyengar & Lepper, 2000; Morrin et al., 2012; Scheibehenne et al., 2009; Shah & Wolford, 2007; Townsend & Kahn, 2014), or the decision to actually select an option (Chernev, 2003a; Gourville & Soman, 2005; Sela et al., 2009). Our results here are important because they show that differences in amount of choice result in different *communicative behaviors:* Online daters with fewer choices use fewer informal words, fewer netspeak words, and more affiliation words.

This finding is a significant theoretical contribution to both behavioral economic and computer-mediated communication theory. For the former, we show that conditions of choice have consequential outcomes beyond simply making the choice or one's satisfaction with the choice. Choice overload may produce differences in how an individual interacts with their choice. Put simply, the scope of impact for theories of choice has been expanded in a notable

way. Advancing CMC's understanding of pre-interaction judgments, we show that the way choices are presented online, the virtual architecture of an online dating website, can significantly shape the very action of contact between online daters. Previous research has shown that individuals provided with positive information about their future online communication partner engaged in more positive behaviors when interacting with that partner and rated him/her as more socially attractive (Tong & Walther, 2012). Here we show that the virtual choice architecture of the online context, in addition to specific personality traits or personal images, trigger consequential communication processes.

Additionally, our findings add to a line of research that argues that it is possible to extract psychological information from the evidence that individuals provide online (e.g., Back et al., 2010; Golbeck, Robles, & Turner, K, 2011; Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Moreno et al., 2012). More specifically, here we show that linguistic traces contained in online messages may be used to assess daters' interest in a potential partner. This is consistent with previous research that has suggested linguistic cues are informative of how romantic partners may feel towards each other (Bradac, 1983; Ireland et al., 2011; Slatcher, Vazire, & Pennebaker, 2008). What is noteworthy about our work here, as stated before, is that the presentation of choice can direct these feelings and linguistic outcomes in predictable ways.

Online Dating and Impermanent Options

The final theoretical contribution of this paper comes in the application of the construct of impermanence on choice. This research was inspired by the budding loss of options framework (Patalano et al., 2015) and the notion that impermanence of choice is a commonplace yet overlooked condition of online dating. Hence, this was one of the first studies to apply this framework and the only study to date to consider the very real effects of impermanent option on

online daters. While we found that potentially losing an option, and returning to find no loss of an option, had no overall effect on online daters, impermanence interacted with amount of choice in a noteworthy way.

Our data suggests that being presented with an option that may disappear, and selecting that option out of a large pool, has a distinctly negative effect on satisfaction ratings. That is, at Time 1, daters presented with many choices, and told that the choice may not remain at Time 2, rated their selection with less satisfaction compared to daters who selected from fewer options and those who were not told of any potential loss. This is in fact similar to the interaction found by D'Angelo & Toma's (2017) previous online dating research, where conditions of reversibility and overload produced the least satisfied daters. Returning to the explanation behind that effect can perhaps provide insight here.

D'Angelo & Toma (2017) offered a different way to think about how presentations of choice can affect satisfaction. They assume that with any complex decision, an individual is likely to receive support from their psychological immune system. The "psychological immune system" is said to activate given a threat to emotional well-being. It is an umbrella term that refers to coping strategies such as motivated reasoning and positive illusions (Antonovsky, 1987; Gilbert & Ebert, 2002; Gilbert et al. 1998.; Taylor & Stanton, 2007; Taylor & Armor, 1996; Creswell et al., 2007; Hoerger, 2012). It is said to protect us from experiencing constant worry, tension, and anxiety in our everyday lives (Bhardwaj & Agrawal, 2015). Importantly, there are circumstances in which the psychological immune system is unable to start operating such as facing greater choice (Bullens, et al., 2013; Gilber & Ebert, 2002; Rachman, 2016) and manners in which it can be primed (Rachman, 2016) such as making a decision irreversible (Bullens, et al., 2011).

D'Angelo & Toma (2017) reasoned that in a choice-making scenario where there is more than one option, placements of constraints helped prime the psychological immune system. A constraint is any structure that limits choice. Individuals selecting from more options compared to fewer experience a freeing of choice constraints (they have lots of options to choose from), which in turn sets in motion a variety of negative psychological processes (e.g., feelings of regret, cognitive burden with decision) that lower satisfaction. Those who have their choice constrained (by limiting the number of options) have a line of defense against these noxious processes, keeping satisfaction high. The constraint helps activate the psychological immune system which makes individuals more likely to perceive information in a self-protective manner (Antonovsky, 1987; Gilbert & Ebert, 2002; Gilbert et al. 1998). Additionally, D'Angelo & Toma (2017) argue that choice constraints are not additive and they activate to *prevent* loss of satisfaction. That is, having choice restrained in more than one way will not make one especially satisfied with their selection. Rather, the argument is that having at least one distinct constraint will serve to activate the psychological immune system and keep satisfaction with selection high. Metaphorically, having at least one constraint may act as a buoy to hang onto when facing the deep water of a complex and varied decision.

Now consider the four conditions present in the current experiment. The limited condition presents daters with a constraint on choice. By providing only six profiles, individuals may be able to review all of the profiles and make a decision where, even if a choice were to disappear, they know that they have selected the best option. (The fact that daters in the limited choice condition visited an average of 6.12 profiles lends support to this idea.) In the large choice condition individuals do not have such a luxury (visiting 10.53 profiles on average). Moreover, those in this large choice condition and faced with impermanence, and those who are not, likely

have very different experiences. Those who are told their selection will remain in a week are provided with a sort of constraint on choice - they do not have to worry that their selection may disappear. However, those who are told their selection may disappear are likely to experience a freeing of constraint – not only do they select from a large pool; they have to worry whether they will need to make a selection again. For this particular group there is no thoroughness and no finality that may accompany the choices with other groups. Perhaps this is why we see the drop in satisfaction for that particular group.

Moving on, a key to understanding this constraint interpretation is to consider the difference between Time 1 and Time 2 for those presented with a large pool. At Time 1, there was a difference in satisfaction between those presented with impermanent options and those told their option would return. At Time 2, not only was there only marginal evidence of an interaction, there was no difference between those who returned to find their "impermanent" option remained and those who were told their choice would be present regardless. This finding suggests that those in the impermanent group who return to find their selection remains, may experience the psychological benefit of a constraint rebuilt – they may continue to suffer from the choice overload, but they no longer have to worry about making their selection once again. While this explanation is speculative at this time, future research in online dating would benefit from continuing to work on understanding the role of constraints when presenting choice to online daters. It provides an appealing heuristic for future testing in research and website development.

Finally, the constraint argument offers potential insight into previous loss of options research. Patalano et al. (2015) presented students with a simulation where they selected classes over a course of days, and each day classes could disappear or new ones could appear.

Maximizers, or individuals who typically search more before selecting an option, actually considered fewer alternatives before making a selection in this context. Patalano et al. (2015) suggested this might occur because maximizers are prone to regret (Schwartz et al., 2002); they selected an option sooner because the regret of losing a current option was more salient than regret from missing a potentially forthcoming opportunity. The maximizer took an action to prevent the most salient regret – in a sense they limited the amount of regret that they can feel to that of missing a possible future option. Put another way, by choosing, these individuals cognitively constrained their regret to what is known. In a way, this may be similar to the effect of providing individuals with fewer options. In both situations, the opportunity to experience regret (and cognitive burden) has been constrained. Daters presented with fewer options know that they have selected the best option even if a choice were to disappear, unlike those with many options. Students who select a class earlier know that they have constrained their regret to the less salient regret of missing a future opportunity. In situations of continued or abundant choice, constraining one's options may be beneficial.

Practical Implications

This research reaffirms the importance of design considerations for online dating website developers. However, more than simply taking away the idiom "less is more," designers might pay attention to the nuance of our findings. These findings suggest that it is profile views and the associated cognitive burden that drive down satisfaction ratings. If designers can find a way to keep online dating efficient and reduce burden, satisfaction has a better chance of staying high in the face of pronounced choice. While potentially a coincidence, the fastest growing online dating website in recent years, Tinder (Stanton, 2017), takes design steps that may curtail both surfing and cognitive burden. First, the app only allows individuals to present pictures and a short self-

description. The profile itself is succinct compared to most other online dating websites. This alone may serve to reduce cognitive load, as more complexity in options has been found to lead to the effects of choice overload (Greifeneder et al., 2010; Reutskaja & Hogarth, 2009). Second, the swiping (selection) feature plays a large role in this app. Online daters "swipe" left or right to indicate whether they are interested in an individual or not. Once daters indicate that they are not interested in a potential partner, that option is not presented again. This serves to reduce the overall amount of surfing or profile viewing available. Initial decisions are made quickly and very much by a gut reaction – there is no method to go back and reconsider if liking country music actually justifies immediate rejection.

The second design consideration comes from the impermanent options findings. When daters are presented with many choices, and these choices are characterized as impermanent, daters are less satisfied with their choice. Many websites now have cues that may highlight impermanence, from statements of response rate to indications of how active a user is. While these cues may serve to highlight those users who are in fact most likely transitory and offer messaging daters insight into the fact a message might not be responded to, cues of impermanence will also lead to immediate reductions of satisfaction as individuals judge potential dates. Perhaps the clearest message is to active online daters: take steps to avoid presenting cues of impermanence (respond, log on regularly) to avoid judgements characterized by negative satisfaction.

Limitations and Future Research

This research utilized an artificial online dating website in a lab setting. While individuals had access to the website at home and perceived their activity to be a part of the development of an authentic online dating website, the most important activities (Time 1 initial choice

consideration and selection, Time 2 choice confirmation and messaging) were conducted in the lab. We suggest that future research aim to not only utilize acting online dating systems, but also to allow users to experience the website, make decisions, and take actions, in natural settings. Additionally, while online dating websites can indeed present as few as six options (based on location and other selection criteria), the upper limit for dating choice can be much higher than 24. Future research would benefit from more consideration of how choice overload applies to increasing numbers of dating options. Likewise, online dating website seldom limit individuals to the selection of just one mate: future research would benefit from exploration into what happens to satisfaction and other outcomes when individuals can select more than one potential partner.

Discussion of a more authentic online dating experiment also highlights the limitations of our impermanent options manipulation. While our system verbally instructed participants that their initial choice could be lost, and later highlighted the fact that their choice did indeed remain, this manipulation could have been stronger. At this time we chose to avoid actually removing options, as this would change the nature of our decision making experiment: Effects of choice overload might have been affected as options disappeared and the overall number of options decreased. Future research would benefit from further exploring this condition of choice by having options actually disappear creating a stronger atmosphere of impermanence, and by examining the effects of actually losing an option on satisfaction with a second option.

Finally, future research should continue to strive for authenticity by assessing actual use data. While profile views are insightful to online activity, they do not tell the whole story. Page views, which would include counts of specific picture views, would provide a more precise account of surfing activity. As stated, we had intended to consider page views over the course of

the week in this research, but experienced a technological failure in recording this use data. More detailed use data might even allow researchers to assess whether surfing online dating profile self-disclosures or pictures leads to greater cognitive burden.

Conclusion

Online dating may be a paradox, but it is not a wholly impenetrable one. While this research discusses some of the good, and highlights some of the bad, we by no means conclude with this binary vision of the new technology. Rather, this research should highlight both the capacity of the new technology and the insight theory offers. Our study shows that how potential mates are presented on a dating website can have distinct implications on dater judgments of satisfaction, and the first communicative actions of a potential relationship. Future online dating website development can profit from our findings, and future research should benefit from our theoretical advances.

CHAPTER 4

GENERAL DISCUSSION

New technology is often perceived and described as having both "magical and destructive powers" even though such description is often an overly simplistic binary (Sturken & Thomas, 2004, pg. 1). The popular commentary surrounding online dating falls into this same pattern, as it is often described by either its great efficiency (Ferdman, 2016) or the unhappiness its abundance can cause (Nickelsberg, 2016). The studies presented here have played into the latter framework. However, that is not the intention, nor the conclusion. Rather, this research offers evidence of ways in which we can better frame the presentation of abundance in order to increase online daters' initial satisfaction with their romantic selection.

Taken together, these two studies begin to paint a consistent picture of how the presentation of choice affects online daters. Amount of choice seems to be the single most important element of online dating virtual choice architecture – in both studies having more options reduced satisfaction with a selection. Importantly, the effect is not immediately detectible, but rather emerges over time as daters likely ruminate over their decision. Notions of reversibility and impermanence seem to matter less. In fact, they only matter under conditions of greater choice. However, this is noteworthy because, as stated, the most striking aspect of online dating is indeed greater choice.

The results of this investigation into the effects of access and abundance in online dating offer a number of theoretical contributions to both computer-mediated communication research and behavioral economic research, as well as important practical implications. Perhaps just as important, this research cultivated fertile ground for future research and theoretical development. Some of these contributions, implications, and future directions were detailed in the individual studies contained within this research. However, taken together at a macro-theoretic level, the

novelty of these contributions become more apparent. These overarching contributions are discussed below.

"Supposedly Irrelevant Factors"

In discussing the past, present, and future of behavioral economics, Thaler (2016) points to the importance of identifying "supposedly irrelevant factors." These are variables that seem as if they are unlikely to matter, such as the order in which options are displayed or the presence of prior sunk costs, but in fact do affect choices. In this research, we contribute to this effort of behavioral economics in two ways.

First, to the best of our knowledge, we were the first to investigate the concept of impermanent options. This research suggests that facing impermanent options can have a deleterious effect on satisfaction when individuals are selecting from a large pool of unique options. While the concept may have less robust application in marketplace scenarios, there are a few instances where it might lead to poignant insights: those making selections in the housing market or in online auctions often face a scenario where they may make a bid not knowing if the bid will ever be entertained. The findings here are consistent with the observation that a potential homeowner will often indicate, "I'm trying not to get my hopes up," after they bid for a house in a tough market.

Second, this research finds that, in the context of online dating, some supposedly irrelevant factors have effects only when present in a large choice pool. That is, when individuals select items that are reversible or impermanent out of a large pool, they are less satisfied with those options than those selecting non-reversible or seemingly permanent options. However, if individuals select items that are reversible or impermanent out of a small pool they experience no difference in satisfaction compared to those selecting non-reversible or seemingly permanent

options. This is an important finding because it indicates that some supposedly irrelevant factors are not only supposedly irrelevant, they are sometimes contingent as well. Hence, theoretically the path forward for behavioral economics likely involves identifying both factors that at first seem innocuous and factors that are temperamental in nature.

It is important to note that these contributions to behavioral economics come from applying behavioral economic perspectives onto the communication phenomenon of online dating. It is not surprising that communication research and behavioral economic theory coincide well. James W. Carey (1988, p. 24) writes that "There is truth in Marshal McLuhan's assertion that the one thing of which the fish is unaware is water, the very medium that forms its ambience and supports its existence. Similarly, communication, through language and other forms, comprises the ambiance of human experience." Communication research has always been focused on those factors that may go unnoticed, but nonetheless have consequence – communication has always been interested in supposedly irrelevant factors.

New Theoretical Concepts in CMC: Virtual Choice Architecture and Constraints

One of the enduring challenges of researching computer-mediated communication is that the technology continues to rapidly advance. As such, Walther (2011, p. 472) argues that we should both consider whether it is time to retire old theories of CMC and "develop new theoretical concepts to describe the functional attributes of groups of technologies." While Walther (2011) may be more pleased with the development of a CMC-specific theory, we have indeed taken a step towards this conceptual goal. In describing *The Virtual Choice Architecture of Online Dating* as virtual features responsible for how choice is presented we have introduced a new framework for systematic analysis. While individual features of choice have been examined in online market places and different manners of supporting decision have been discussed (e. g.,

Bollen, et al., 2010; Haubl & Trifts, 2000), no coherent framework has been applied to a communication space. In this research alone, we have highlighted how amount of choice, reversibility, and impermanence can individually and jointly affect online daters' satisfaction and communication.

To this framework, we have also added a conceptual tool, the notion of constraints, to help predict the effects of virtual architecture. We defined a constraint as any factor that limits individuals' choices. When a constraint is put into place, as opposed to freed, it serves to keep individuals more satisfied compared to those who experience more decision opportunity. In this research, individuals who were told they could not reverse a decision were more satisfied than those who were told they could make a different choice, and consequently faced the potential of deciding again. Individuals who were told their selected dater would be present the following week were more satisfied than those who were told that their dater may or may not be present, and consequently faced the potential of deciding again. Importantly, constraints only appear to have an effect when choice is greater. If individuals' select from a small group neither reversibility nor impermanence has an effect – potentially because there is already a constraint in place in the form of the more limited pool of daters from which to choose.

The framework of virtual choice architecture and the notion of constraints are potentially rewarding theoretical concepts in that they provide a systematic way to continue to investigate computer-mediated communication. The internet offers an abundance of choice, from who to date, to what product to buy, to what game to play. Moreover, these choices are offered in many different ways: just as online dating websites may differ in the amount of choices provided to members, online shopping venues have different return policies (reversibility). As will be

discussed when we address future directions below, this framework provides a unique tool to make predictions about how different virtual choice architectures affect decision makers.

Virtual Choice Architecture, Messages, and the Influence of the Background

A second contribution to CMC theory emerges from an additional consideration of the finding that the number of options a dater selects from can affect their communication behaviors with their selection. Individuals presented with more choice actually wrote initial messages with more words that are informal, more netspeak words, and fewer credibility-earning affiliation words. Taken together, this suggests that individuals presented with great choice are less effortful and less polite than those presented with fewer choices.

This is an important contribution because it highlights the fact that virtual choice architecture plays a role in both impressions *and* interactions. Previous research has suggested that online perceptions can influence subsequent communications. For instance, individuals provided with positive information about their future online communication partner engaged in more positive behaviors when interacting with that partner and rated him/her as more socially attractive (Tong & Walther, 2012). Here, we show that the virtual choice architecture of the online context, in addition to specific personality traits or personal images, can trigger similar communication processes.

This, in turn, creates an intriguing situation when considering the well-documented behavioral confirmation processes in CMC. Behavioral confirmation and self-fulfilling prophecies are a staple of computer-mediated communication (e. g., Van Der Heide, Schumaker, Peterson, & Jones, 2012; Walther, 2007; Yee, Bailenson, & Ducheneaut, 2009): individuals often adopt a belief about a target based on initial perceptions of available information, interact with the individual based on this belief, causing the target of the communication to assimilate their

behavior to the partner, thus causing the partner to view the target's communication as a confirmation of their initial perceptions (Snyder, Tanke, & Berscheid, 1997). It is possible that in online dating, decisions such as presenting fewer potential partners can create a loop through which social interactions and even eventual romantic outcomes may be shaped.

This contribution also serves to highlight a potentially understudied element of computer-mediated communication: the background. This is a unique perspective, because when it comes to understanding how individuals are judged online, a typical focus is on the cues (bits of personality information) presented or not presented by a target. These are self-generated cues. Indeed, in a survey of computer-mediated communication theories, the focus is often on salient interpersonal cues. A whole category of CMC theories can fall under the description as "cues filtered out" - theories that consider the impact of those cues not present (Culnan & Markus, 1987). Social information processing theory (Walther, 1992), a popular framework that researchers apply to understand how individuals are perceived over CMC (see Walther, 2011), argues that essentially people "filter in" particular cues to help judge a target individual (Walther & Parks, 2002). Finally, theories like warranting (Walther & Parks, 2002) and signaling theory (Donath, 1999) focus on exactly what type of personality information is presented. By considering the background, one attends to system-generated cues. These are characteristics that the target has no control over, but rather an outcome of design decisions including aspects such as virtual architecture, website nomenclature, and other cues that visually sit behind self-presented user cues.

Hence, the studies presented here join a nascent line of research that argues the often-unnoticed background, against which information is placed, can drive our thoughts and behavior in important ways. Previous research has argued that the interpretation of any personality cue by

a perceiver is contingent upon the background against which it is placed (D'Angelo, Schumaker, & Van Der Heide, 2011; D'Angelo & Van Der Heide, 2016, D'Angelo, Zhang, Eickhoff, & Moreno, 2014; Van Der Heide, D'Angelo & Schumaker, 2012). Here, again, the argument is about background: a dater's profile will be judged differently and communicated to differently based on the choice architecture it is presented within.

Practical Contributions

One of the consequences of focusing on supposedly irrelevant factors is that those very factors become quite relevant and useful. Hence, just as behavioral economic theory has the power to help individuals make better financial decisions when implemented correctly (Thaler, 2016), the research presented here suggests another important outcome: it can help lead to more satisfied romantic choices. For online dating website development, what emerges from this dissertation is best described as a rule of thumb, two important caveats to that rule of thumb, and some interesting but wandering conceptual findings.

The rule is simple: providing online daters more choice leads to reduced satisfaction and linguistic cue differences in messaging. Two experiments confirmed that online dating websites might benefit from presenting fewer choices to online daters if they are interested in greater dater satisfaction and more polite messaging. This, however, might be a hard sell because individuals generally prefer more choice (Patall et al., 2008) and economic theory actually suggests that more choice will provide individuals greater opportunity to find a match that meets their preferences (Mas-Colell, et al., 1995; Perloff, 2010). It is hard to imagine a dating website advertising the effectiveness of providing fewer choices. Looking to the two caveats to our rule of thumb provide a clearer opening for online designers to benefit from this research.

First, more choice means reduced satisfaction only after one week has passed. Both of the experiments presented here indicate that it is only with the passage of time that we see choice overload effects. Thus, if online dating websites find ways to encourage individuals to meet sooner it may negate the effects of choice. This implication is also consistent with suggestions that emerge from the hyperpersonal model (Walther, 1996). Finkel et al. (2012) argue that individuals that meet online should attempt to move to face-to-face communication quickly; otherwise, the effects of the hyperpersonal model may set them up for expectation disconfirmation. That is, individuals may quickly develop an intense online relationship to the degree that meeting offline is a let-down. The advice remains the same: faster to face-to-face is better. While there is no good way to force individuals to meet each other sooner, it is noteworthy that at the time of this writing online dating websites are beginning to implement video on their websites. This medium is as close to a face-to-face connection as technology will currently allow.

The second caveat to the finding that more choice reduces satisfaction is that it does so due to more profile views and increase cognitive burden. This is consistent with prior research which established that when daters have more options they search more and pick worse (Wu & Chiou, 2009; Yang & Chiou, 2010) and that increased cognitive burden drives the effects of choice overload (Botti & Iyengar, 2006; Greifeneder et al., 2010; Mogilner et al., 2008; Reutskaja & Hogarth, 2009). The take home point here is that making the choice of online partners easier through the use of categories (Mogilner et al., 2008) or reducing the number of attributes for each choice (Greifeneder al., 2010) will likely be beneficial to dater satisfaction. In other words, online dating websites should keep profiles simple and allow users to search by

categories. Again, it is noteworthy that the most popular online dating website of the recent past, Tinder (Stanton, 2017), takes exactly these steps.

Lastly, our interesting, but potentially wandering, findings on reversibility and impermanence provide less clear contributions to online dating. The findings on reversibility suggest that highlighting reversibility, when combined with providing great choice, has a negative effect on satisfaction. Again, there is no way to force a dater to only have eyes for one initial individual, but it may be beneficial to avoid highlighting the notion that you can always ditch your date for another. Where Tinder succeeds in reducing cognitive burden, it likely fails in reversibility. Rather, new online dating apps, such as "Once – the slow dating app", which provide only one match per day come closer to reducing perceptions of reversibility. The findings on impermanence suggest that indications such as low response rates or activity on profiles may have negative effects. Interestingly, reducing this cue aligns with the overall notion that fewer profile cues and attributes might be beneficial to dater choice satisfaction.

Limitations and Future Directions

The work presented here, more than anything, begins an argument about how virtual choice architecture can affect individuals. With this foundation, the possibilities for future research are bountiful. Below, we discuss some potential lines of research that continue to investigate the intersection of behavioral economics and computer-mediated communication.

Replication?

Attending carefully to Study 2 from above one might notice that while an aim of the study was to replicate the choice overload effect in online dating, no strong claim of replication could be made upon considering the results. While both Study 1 and Study 2 indicate a main effect of amount of choice on dater satisfaction, the marginal interaction at Time 2 in Study 2

limits our claims of replication. Attending to this interaction, one sees that there is actually no statistical difference between selecting from a small group and selecting from a large group for the control conditions. Though the control groups descriptively trend in the directions we would expect, the interaction seems to be driven by differences in the impermanent condition. Those who selected from a small pool and were told that their choice may disappear, but return to find it still exists, were more satisfied than those who selected from a large pool with the same experience of choice impermanence.

There may be some explanation to this finding. It is possible that returning to find choice still remains is a uniquely positive experience for daters when there are few choices, whereas there is little or no effect if one already has plenty of choices. Attending to the satisfaction ratings in Table 2 supports this notion – those in the impermanent condition see a small rise in satisfaction from Time 1 to Time 2 leaving them with the highest overall satisfaction, whereas there is no change in the overload condition. Attending to Study 1, one can note that the main effect of amount of choice is indeed a small one. It is possible that the exclusive effect of amount of choice in online dating does not reliably appear, or it may at times rely on seemingly innocuous factors such as choice impermanence. However, it this interpretation and the questions around replication should be interpreted carefully – the interaction itself that brings our attention to this matter only reaches *marginal* significance. Hence, although there is evidence of choice overload in online dating, future research needs to continue to work to clarify under what conditions the effect will consistently emerge.

Alternative Hypotheses Regarding Time

A second area where our claims must be muted is in discussion of the effects of time. While we have evidence that participants in the large choice group experienced cognitive burden

with their initial decisions, and have lower satisfaction one week later, we can only hypothesize that it is rumination over the course of the week that reduces satisfaction with selection. Future research needs to continue to investigate what processes occur over the course of that week. Moreover, future research would benefit from ruling out alternative hypotheses.

It is possible that choice overload does not require time to emerge in online dating, but rather imminence of an actual encounter triggers the effect. In both studies, it is possible that at Time 1 participants viewed their decision with little concern and felt little consequence from the selection of a dater – they wouldn't be meeting the dater anytime soon. However, at Time 2 participants were told it was the final step before they had the ability to contact the dater and potentially engage in communication and an actual encounter. This newfound sense of immediacy may in fact be what produced choice overload effects. It is possible that if there is no real situational demand for a decision to be made, the decision making process may not be truly initiated (Harren, 1979). Put another way, individuals at Time 1 may not have even felt as if they made a decision. The limitation to this counterargument is that there is evidence of differing levels of cognitive burden associated with this decision. Regardless, future research in this area of decision-making should control for immanence of the decision (Pitz & Harren, 1980).

A second potential, but less compelling, argument is that participants experienced a non-binding agreement at Time 1 and a binding agreement at Time 2. One might argue that the effects of choice overload were only experienced when, at Time 2, individuals confirmed their choice. However, one can look to the Study 1 non-reversible condition for insight into this argument. In this condition, when individuals selected a dater it was made clear that they could not change their selection. Hence, they should have experienced it as a binding decision. If it is in-fact making a binding decision that drives choice overload in online dating, we would have

seen differences in the non-reversible large and small groups at Time 1 in Study 1. There was no difference at this time. Thus, this latter alternative hypothesis, while reasonable, is less compelling in this situation. It also becomes a less compelling argument when considering the fact that studies utilizing hypothetical outcomes, such as selecting imaginary vacation packages (Park & Jang, 2013) and an imaginary microwave oven (Gourville & Soman, 2005), also produce choice overload effects. One would imagine that selecting an imaginary microwave oven is hardly experienced as a binding decision. Regardless, research in choice overload and online dating should continue to clarify the role of time and rule out alternative explanations.

Other-Selected Dates

One fascinating aspect of online dating is that it can be a group decision activity. A common phenomenon that often occurs when discussing the topic is hearing stories of friends who go on each other's profiles, or select dates for each other. Future research would benefit from considering the effects of this scenario. Research on framing and psychological distance suggests that when a choice is made a greater psychological distance from the decision, it is more likely to be framed in terms of the chosen option as opposed to the unchosen alternatives (Valenti & Libby, 2017). It follows that if a friend makes the decision for a dater, the dater would frame the decision more in terms of the qualities of the chosen mate than the unchosen alternatives. If this were the case, we would likely see the effects of choice overload reduced, as the unchosen alternatives would be less salient, potentially negating experiences of cognitive burden. In fact, such a route may be best for both parties involved. Research has indicated that when an individual makes a choice for another, the effects of choice overload are reversed – people who make choices for others are more satisfied when they select from a larger pool

(Polman, 2012). Hence, future research should explore whether this effect also emerges in online dating.

Selecting More Than One Option

Moving more directly to online dating, choice overload research should consider the impact of multiple choices. Though some online daters may prefer to contact one individual at a time, one might guess that there are also those who prefer to cast a wide net. As such, it is important to understand what the impact of amount of choice is when individuals can select as many potential daters as they want. At the time of this writing, it appears that the effect of multiple choices on choice overload has not been examined in any context. This too might be a phenomenon considered in a broader context. It is not uncommon for individuals to order many shoes from Zappos, try each, and then return what they do not want.

Impression Formation and Amount of Choice

Another intersection of interest might consider the interaction between amount of choice and impression formation. Previous research has indicated that certain types of information, including photographs, other-generated information, and non-normative information, are most salient when individuals view profiles (e.g., D'Angelo & Van Der Heide, 2016; D'Angelo, et al., 2014; Van Der Heide, et al., 2012; Walther, Van Der Heide, Hamel, & Shulman, 2009). However, much of this research was done by just exposing individuals to one, or at most, a few profiles for comparison purposes. It is possible that cue salience in impression formation may depend on virtual architecture as well. Cue valence may be reduced when there are more cues from which to judge. For instance, in a context of choice overload, non-normativity may be a much more powerful cue. If there are 23 profiles populated by males indicating that they enjoy being outside and craft beer, and one profile where the self-disclosure is a sestina, it is likely that

the latter will stand out, whether it be positively or negatively. Perceivers of the latter profile will likely weight that textual self-disclosure heaviest when considering their personality, even more so than any photograph. However, in a pool where there are 5 nature-loving beer drinkers, and 1 clever writer, it is likely that the latter will stand out to a lesser degree. In this second scenario perceivers may consider profile photos more insightful for their judgments. Theoretically, the choice overload conditions of the first scenario would favor nonnormative cues (D'Angelo & Van Der Heide, 2016), while the limited choice condition would favor visual primacy (Van Der Heide et al., 2012).

Relational Development and Choice Architecture

As noted above, it is possible that online dating choice architecture can impact initial perceptions and communication, which may in turn trigger behavioral confirmation processes. Hence, an interesting line of research would be to continue to follow these effects. We have already established that daters who are presented fewer options write more effortful letters. Behavioral confirmation processes would suggest that receivers should respond with similar effort (Snyder et al., 2007), creating a positive feedback loop. This, in turn, might lead to quicker or more successful relational development. It is possible that variations in how choices are presented to online daters do not lead to merely subtle effects on satisfaction, but as our findings on messaging suggest, these variations might act as a catalyst leading many aspects of relational development in a particular direction.

There's Always Another

Finally, research would benefit from a test of the combined effects of choice overload and reversibility on online products with time as a factor. The theoretical contribution of such an examination would only be expansion of boundaries, but replicating the findings of the first

study with relation to online products would help us better understand the role of time. Moreover, it would be a test of choice overload that more closely replicates the conditions of online commerce where individuals do not actually get to access their purchase until days later. There may be no immediate choice overload effect in e-commerce, as some have recently suggested (Moser et al., 2017). Rather, the fact that there is always another option may affect individuals over time.

Conclusion

Borrowing theory from a different field of research can be difficult, but can lead to significant and rewarding theoretical contributions (Whetten, 1989). This research continued a history of such interdisciplinary action in the field of communication (Peters, 2008) by joining perspectives from communication research and behavioral economic research. As a result, the work presented here described a number of novel theoretical and practical contributions that help to explain the unique experience of online daters and provided a foundation for future research on virtual choice architecture in computer-mediated communication.

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Table 1

Study 1, Planned Contrast Coefficients, Means, and Standard Deviations

	Large choice set, Reversible decision	Large choice set, Non-reversible decision	Small choice set, Reversible decision	Small choice set, Non-reversible decision
Planned Contrast Weights	-3	1	1	1
Satisfaction ratings at Time 2 (H3).	*M* = 4.45, *SD* = 0.88	*M* = 4.59, *SD* = 0.75	*M* = 5.02, *SD* = 0.74	*M* = 4.75, *SD* = 1.14
Planned Contrast Weights	-3	1	1	1
Difference in satisfaction ratings from Time 1 to Time 2 (H4)	*M* = -0.19, *SD* = .78	*M* = 0.09, *SD* = 0.55	*M* = 0.14, *SD* = 0.50	*M* = 0.07, *SD* = 0.84

Table 2

Study 2 Interactions, Decision Satisfaction Means and Standard Errors

	Small choice set, Impermanent	Small choice set, Control	Large choice set, Impermanent	Large choice set, Control
Satisfaction ratings at Time 1	*M* = 4.79, *SE* = 0.17	*M* = 4.60, *SE* = 0.16	*M* = 4.22, *SE* = 0.17	*M* = 4.76, *SE* = 0.14
Satisfaction ratings Time 2	*M* = 4.88, *SE* = .17	*M* = 4.68, *SE* = 0.17	*M* = 4.22, *SE* = 0.18	*M* = 4.60, *SE* = 0.14

Table 3

Study 3 Mechanisms and Main Effects, Means and Standard Errors

	Small choice set	Large choice set
Profile Views before Initial Selection	*M* = 6.12, *SE* = 0.96	*M* = 10.53, *SE* = 0.96
Cognitive Burden at Time 1	*M* = 4.26, *SE* = 0.20	*M* = 4.81, *SE* = 0.18
Satisfaction ratings at Time 1	*M* = 4.70, *SE* = 0.17	*M* = 4.50, *SE* = 0.11
Satisfaction ratings Time 2	*M* = 4.77, *SE* = .12	*M* = 4.41, *SE* = 0.11

Table 4

Study 2 Linguistic Cues, Means and Standard Deviations

Linguistic Cue	Small Choice Set		Large Choice Set	
	M	*SD*	*M*	*SD*
Informal words	1.20	2.21	2.40	3.90
Netspeak	0.0	0.0	.81	1.85
You	3.27	3.88	5.10	4.86
Affiliation	11.0	21.30	5.51	6.20

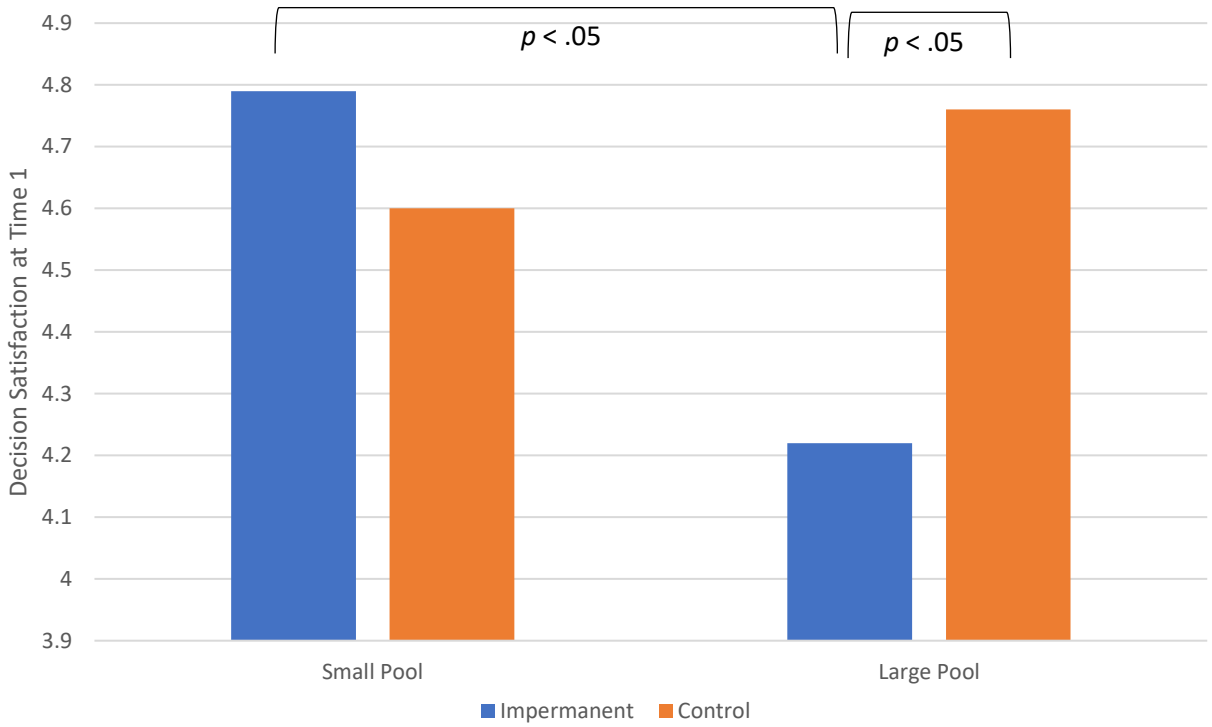

Figure 1: Study 2, Decision Satisfaction at Time 1 Interaction.

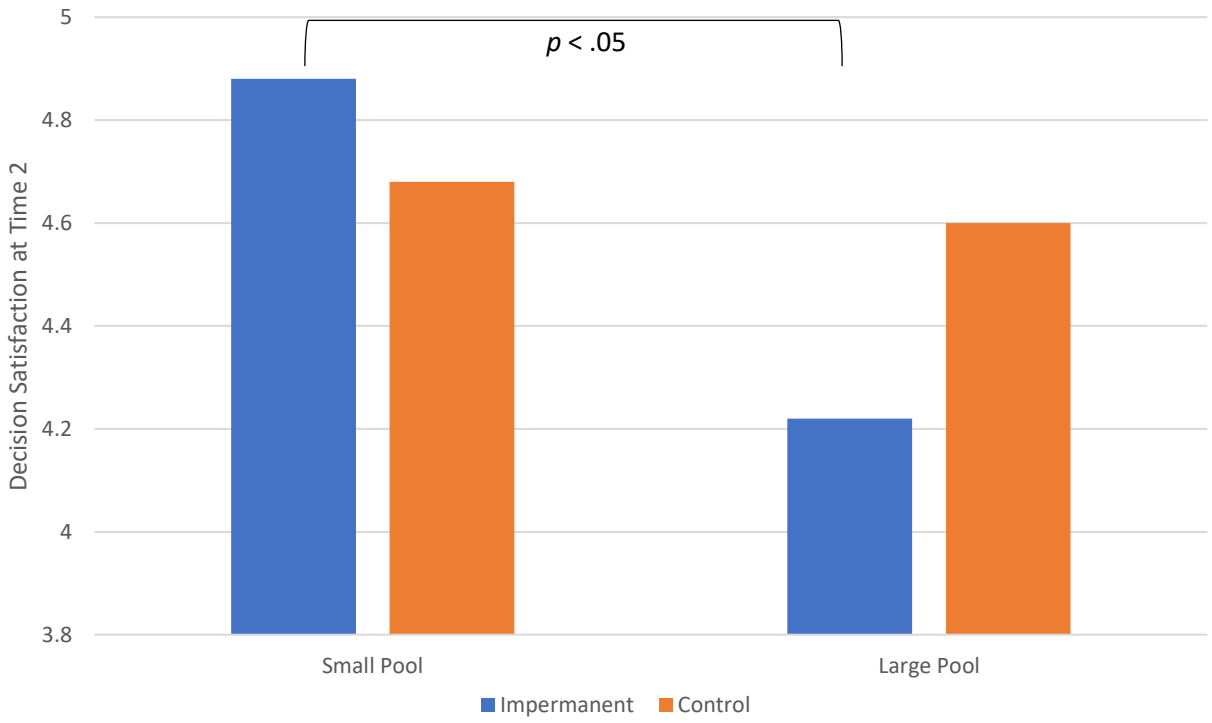

Figure 2: Study 2, Decision Satisfaction at Time 2 Interaction.

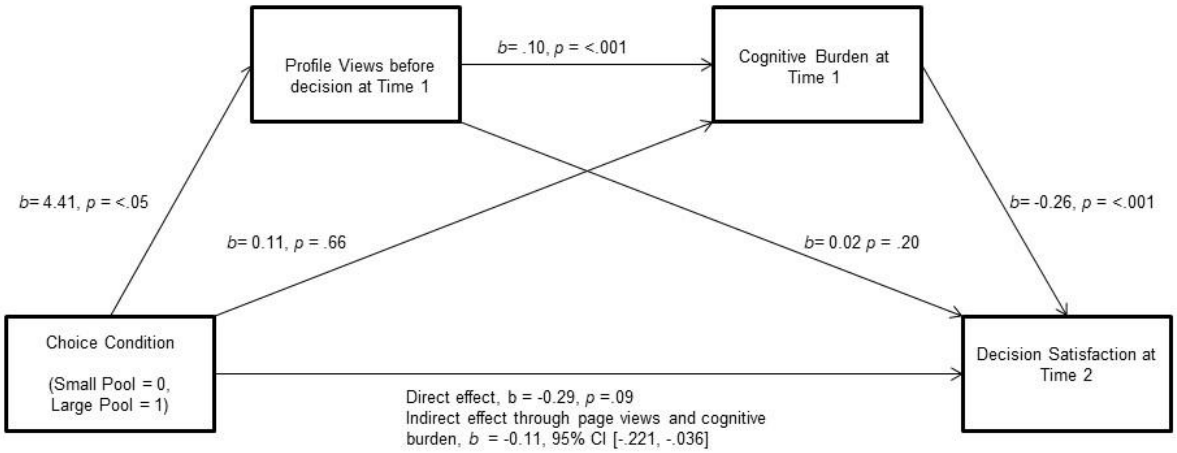

Figure 3: Double Mediation Model.