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RESEARCH ARTICLE

VIRTUAL FIRST IMPRESSIONS MATTER: THE EFFECT OF ENTERPRISE SOCIAL NETWORKING SITES ON IMPRESSION FORMATION IN VIRTUAL TEAMS[1]

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Social media has changed the way many team members "meet" for the first time. Due to the increased use of virtual environments, it is now common for team members to examine each other's profile on a firm's enterprise social networking site (ESNS) in lieu of an initial face-to-face meeting. This study examines how the information provided in an ESNS impacts impression formation at the initial formation of a virtual team, specifically perceptions of social capital (i.e., relational, structural, and cognitive). To examine social capital perceptions, the elaboration likelihood model (ELM) is utilized to understand how not only information impacts these perceptions but the way in which the user processes information to form the perceptions. Toulmin's model of argumentation is used in conjunction with ELM to understand the strength of the argument presented. Results suggest that users evaluate ESNS information differently depending on the type of processing (heuristic or systematic) and that these social capital perceptions influence preferences for different team members.

Keywords: Enterprise social networking sites, enterprise social media, ELM, Toulmin's theory of argumentation, social capital, virtual teams

Introduction

"*You never get a second chance to make a first impression.*" *(Anonymous)*

This statement has taken on new meaning with the rise of social media that dramatically changes how individuals interact and perceive each other. Enterprise investment in social media will reach $3.5 billion by 2019, both for social media designed to reach customers, as well as that intended solely for internal use by employees (Thompson 2015). A potential key enterprise use of social media is helping to alleviate social issues found in virtual work. Most organizations use virtual teams and between 30% and 45% of employees work remotely on a regular basis (Minton-Eversole 2012). Some virtual teams are formally created, but employees also self-assemble *ad hoc* virtual teams (Zhao and Chen 2013).

One challenge in virtual work is the elimination of face-to-face meetings that help team members build interpersonal relationships and form impressions of others. One potential solution is enterprise social networking sites (ESNSs). ESNS include many of the same components found in public social networking sites (SNSs) (e.g., connecting with others, sharing personal information, including photos and videos, sending/receiving messages, and providing status updates) which go

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well beyond traditional enterprise applications such as Outlook (DiMicco and Millen 2008). Most sites allow information generated by others (i.e., connections) to appear on the profile owner's page through wall posts or recommendations.

Many large firms such as SAS, IBM, and 3M have installed ESNSs for internal use by their employees and their use is spreading rapidly[2] (Thompson 2015). For example, IBM introduced their ESNSs in 2007 and, within a year, over 50,000 employees were using it (approximately 15% of the company) (Steinfield et al. 2009). Since ESNSs are used in the workplace, one might expect that employees would provide less information than on public SNSs such as Facebook. Surprisingly, DiMicco and Millen (2008) found that employees supplied more personal information on ESNSs than on public SNSs, because employees felt that the information on the internal ESNS was more secure than a public SNS. With an ESNS, employees can engage in social browsing, viewing employee profiles, and using information in these profiles to form perceptions and meaning, a process often referred to as sensemaking (Weick 1995). For many employees, the ESNS has taken the place of an initial face-to-face meeting as the means to form initial impressions of other team members prior to working together.

These first impressions are formed based on information in the ESNS profile which may be text (e.g., description of work history) or images (e.g., profile picture). Users examine these pieces of information to form initial opinions of others, with this information tending to be remembered longer compared to information presented later (Fiske and Taylor 1991). First impressions often have distal effects in which initial impressions formed do not significantly change over time (Gregg et al. 2006). In other words, first impressions can have an anchoring effect on individuals so that future observations and interactions are affected by this initial impression (Good and Gambetti 1988; Petty and Cacioppo 1986). These impressions often set the basis for future team interactions (e.g., team cohesiveness, decision making, and project success; see Tidwell and Walther 2002; Walther 1996) and influence how team members understand and interpret others' behavior (Dennis et al. 2012). Thus, understanding how information within the ESNS influences initial impressions is important.

Our research examines (1) the impact of information appearing in the ESNS on perceptions of future team members and (2) how these perceptions influence team member preferences. As our study shows, not all information has equal value; information generated by one's connections often has greater impact than self-generated information. Our study also shows that the way in which people process information (systematic process or heuristic processing) is as important to impression formation as the information itself.

Social Networking Sites and Impression Formation

Our focus is on initial impression formation in a virtual team environment. Team members often have little knowledge of other team members in newly formed, virtual teams (Jarvenpaa and Leidner 1999). Traditionally, members form perceptions of others through an initial face-to-face encounter. From these direct encounters, individuals interpret "cues" into attributes of the person (Donath 2007). These interpretations set the basis for future interactions, affecting team cohesiveness, decision making and, ultimately, the overall success of the project (Tidwell and Walther 2002; Walther 1996).

In mediated environments, individuals employ sensemaking and base their perceptions on whatever cues are available to them (Hancock and Dunham 2001; Weick 1995), which may mean simply "googling" team members (Tong et al. 2008). When actual performance measures are absent, people rely on whatever information is available, even information that is weakly correlated to future performance (Donath 2007).

The introduction of the ESNS is changing initial impression formation because they provide more information than previous technologies. Large companies (e.g., IBM) have specifically designed their ESNSs to encourage employees to learn more about fellow colleagues (DiMicco et al. 2009). Rightly or wrongly, users generally treat profile information in the same manner as cues obtained through personal interactions (Walther et al. 2008).

This study examines how information in the ESNS influences initial perceptions, specifically perceptions of an individual's social capital. Social capital evaluates how embedded an individual is their social structure and the resources that an individual can access or mobilize for action (Coleman 1990; Nahapiet and Ghoshal 1998). We focus on social capital because it has been linked both theoretically and empirically to numerous aspects of collaboration including information exchange, cooperative behavior, knowledge contribution, innovation, and team effectiveness (Adler and Kwon 2002; Coleman 1990; Sun et al. 2012; Wasko and Faraj 2005).

[2]See the customer list of a popular ESNS offered by VMWare (http://www.socialcast.com/customers).

Social Capital

Social capital is defined as those resources (both actual and potential) derived through an individual's network of relationships (Nahapiet and Ghoshal 1998). The underlying argument is that social ties may be leveraged to improve performance (Adler and Kwon 2002; Sun et al. 2012). Social capital is comprised of three separate but interrelated dimensions: relational capital, cognitive capital, and structural capital.

The relational dimension of social capital is concerned with the affective nature of relationships (Nahapiet and Ghoshal 1998). It focuses on the personal relationships an individual develops with others (Granovetter 1992). Relational capital exists when members identify strongly within their social structure, trust other members, and follow cooperative norms (Lewicki and Bunker 1996; Wasko and Faraj 2005). Norms are formed through ongoing interaction (Coleman 1988; Dierdorff et al. 2011). This study focuses on the initial phases of team formation so we examine perceptions of trust and identification as these help to reduce social ambiguity in this early phase of team formation (Kozlowski et al. 1999).

Trust is a judgment made by individuals about their willingness to be vulnerable to the actions of others (Robert et al. 2009). Trust is often the product of knowledge of the person, but research on virtual teams shows that it also can be conferred *a priori* with little knowledge of the other person (Mayer et al. 1995; McKnight et al. 1998). When trust is low, problems occur including poor decision making, conflict, and misunderstandings, all leading to poor performance (Haikkinen 2004).

Identification is the degree to which individuals see themselves as one with another person or a group of people (Nahapiet and Ghoshal 1998). Identification with others can be influenced by a feeling of similarity to reduce uncertainty about an individual (Fiol and O'Connor 2005). Thus, perceived similarity can form the basis for identification, creating a sense of belonging within the team and its members (Fiol and O'Connor 2005). Evidence suggests that the existence of salient identification may increase information exchange and cooperation (Lewicki and Bunker 1996).

The second dimension of social capital, cognitive capital, refers to the resources that enable individuals to share interpretations of meaning to help parties engage in meaningful exchanges (Nahapiet and Ghoshal 1998). One route to increasing cognitive capital may be "war stories" or a story/narrative of a previous personal experience that is shared on one's profile. These war stories may increase cognitive capital as the information in theses narratives helps the user interpret a prior event's relevancy to the current situation as well as creating common context among members, allowing better communication and a common understanding (Lesser 2000).

Cognitive capital develops over time as people work together, creating an understanding of who holds what knowledge (Nahapiet and Ghoshal 1998). Wasko and Faraj (2005) argue that a common understanding can be gained through similar experience without direct contact. Operating room personnel, for example, seldom work with the same individuals, yet have high cognitive capital because they have similar backgrounds and have experienced the same situations (Boland and Tenkasi 1995). Thus, individuals can interpret the cognitive capital of others from a common background (Wasko and Faraj 2005).

The final dimension, structural capital, focuses on the properties of an individual's social system through the relationship patterns between actors (Nahapiet and Ghoshal 1998). Structural social capital, represented by an individual's connections to others within their social structure, provides benefits such as increased knowledge access and higher cooperation within virtual teams (Robert et al. 2008; Wasko and Faraj 2005).

Structural social capital can be examined by analyzing an individual's network ties and the network configuration of their social structure (Nahapiet and Ghoshal 1998; Wasko and Faraj 2005). Network ties are the actual relationships between individuals (Adler and Kwon 2002) while network configuration involves the pattern of linkages among network members (Inkpen and Tsang 2005). These relationships provide both direct and indirect ties to individuals who can provide support that can be mobilized through their networks (Granovetter 1992).

Each of the three dimensions are separate and distinct, but also are interrelated (Nahapiet and Ghoshal 1998; Sun et al. 2012). Structural capital is in some sense an enabler of relational and cognitive capital, in that without structural connections, relational and cognitive capital cannot be developed (Sun et al. 2012). The social interaction that arises from structural capital is the mechanism by which relational and cognitive capital develop, thus structural capital influences relational and cognitive capital (Sun et al. 2012). Likewise, cognitive capital influences relational capital because the shared cognitive models influence perceptions of ability, which is one core element of trust (Nahapiet and Ghoshal 1998; Sun et al. 2012).

Theoretical Model Overview

We argue that the information presented in an ESNS profile influences the impressions that individuals form about the

profile owner's social capital, and that this, in turn, influences their preferences for team members. Individuals may process ESNS information in different ways. In some cases, individuals may be motivated to exert the cognitive effort needed to systematically consider the strength of the information presented in the ESNS profile. For example, an individual may focus on recommendations or work history to form perceptions of cognitive social capital. Conversely, individuals may be less motivated to exert cognitive effort, and in this case, information may trigger simple heuristics that influence an impression (Walther et al. 2008). Figure 1 presents the theoretical model in which the information in the ESNS profile (argument strength) as well as how individuals process that information (i.e., heuristically or systematically) can impact perceptions of social capital and affect which may subsequently impact team member preference.

The focus of our research is on an individual's examination of information in an ESNS, so we need to understand how individuals process information. For this, we use the theoretical lens of dual process theories of cognition. Two complementary dual process theories of cognition emerged independently in the 1980s to explain how individuals process information: the heuristic–systematic model (HSM) (Chaiken 1980) and the elaboration likelihood model (ELM) (Cacioppo and Petty 1984). Although there are minor distinctions between them, they both theorize that there are two cognitive processes by which attitudes are formed, and that these two processes differ in the amount of cognitive processing (i.e., a quantitative difference) and the cognitive approach used to evaluate information (i.e., a qualitative difference). The systematic route uses extensive cognitive processing that focuses on the key merits of the information, while the heuristic route involves less intensive cognitive processing of situational cues through the use of simple decision-making heuristics (Chaiken et al. 1999; Petty and Wegener 1999; Petty et al. 1999).

The two types of processing were originally considered separate, but research now suggests a continuum with systematic processing on one end and heuristic processing on the other (Carpenter 2015). The use of systematic and heuristic processing fluctuates based on situational factors that influence the motivation to expend cognitive effort (Bhattacherjee and Sanford 2006; Ho and Bodoff 2014). When an issue is highly relevant, an individual is more likely to use systematic processing, so the strength of the factual arguments has the greatest impact on perceptions (Carpenter 2015; Schumann et al. 2012). When an issue is less relevant, heuristic processing is more likely (Petty et al. 1987; Schumann et al. 2012). We consider each processing type in turn.

Systematic Processing

Systematic processing is effortful, because individuals carefully consider the available information (O'Keefe 2008), so it only occurs when the individual is motivated to expend cognitive effort (Petty and Cacioppo 1986). When systematic processing is used, available information is scrutinized and a "strong argument/message" is more likely to influence the outcomes than a "weak argument/message" (Petty et al. 1987).

One of the most enduring theoretical models of argument strength is Toulmin's (1958) model. It has been shown to be effective in examining strong versus weak manipulations of argument quality (Ricco 2008), and has been used in research examining information presentation in online environments (Kim and Benbasat 2006, 2009). The model posits that the strength and persuasiveness of an argument is dependent upon the inclusion of specific elements, principally a claim, data, and backing (Toulmin 1958). The strength of an argument increases as elements are added, so an argument that has a claim, data, and backing is stronger than an argument with just a claim and data, which in turn is stronger than a claim alone. The model does not propose that an individual will be aware that a claim, data, and backing are present within a given argument; it only argues that the strength of an argument increases when additional elements are present. Figure 2 provides an example ESNS argument which we decompose into claim, data, and backing below.

Claims are self-generated assertions that an individual is asking the reader to accept (i.e., the conclusion whose merits we are seeking to establish) (Toulmin 1958; Ye and Johnson 1995). For example, a claim appearing in LinkedIn may be "I am experienced in the area of networking by leading numerous projects in this area." However, a simple claim alone is often not sufficient as it provides no proof to support it (Toulmin 1958; VerLinden 1998).

Data that directly support the claim makes the argument stronger (VerLinden 1998). Data include additional facts or evidence used to prove the claim (Toulmin 1958; VerLinden 1998). Within an ESNS, data may take on different forms including previous experience, professional affiliations, and connections. In Figure 2, data supporting the claim could be professional experience as a network administrator. However, individuals may be suspicious of a claim even when supported by data, since both the claim and data are written by the individuals themselves with no independent verification (Gilovich 1987). DiMicco and Millen (2008) found many ESNS users exaggerate information about themselves.

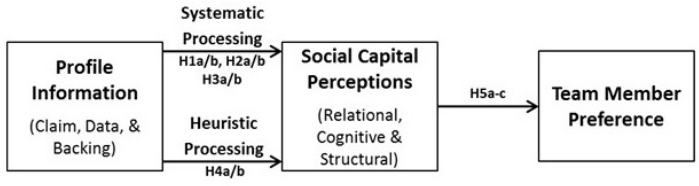

Figure 1. Theoretical Model

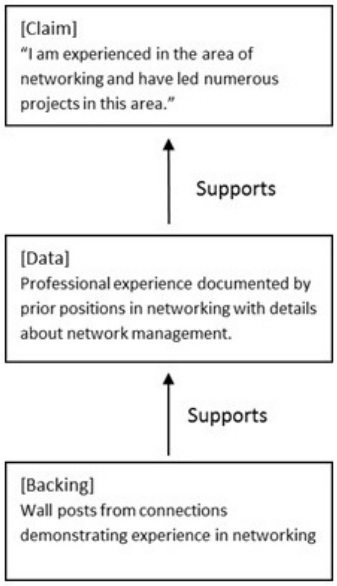

Figure 2. Model of Argumentation—Sample Argument

Backing provides support that the data itself is true and should be accepted (Toulmin 1958; VerLinden 1998). It is a data verifier or "expressed or unexpressed indicators that provide justification for the acceptance of data" (VerLinden 1998, p. 4). Information in an ESNS can be self-generated or connection-generated[3] (Tong et al. 2008). For example, claims and some data (e.g., education and work experience) are self-generated, which may be subject to self-manipulation. Connection-generated information is more immune to manipulation (Walther and Parks 2002) and thus provides better support that the information is credible (Walther et al. 2008). Thus, in Figure 2, connection-generated information such as recommendations or wall posts saying that the profile owner is a good network administrator provide backing to support the self-generated data. In this section, we consider systematic processing and how argument strength may affect social capital. We consider heuristic processing in a later section.

Relational Social Capital

Relational capital focuses on identification and trust. A prominent profile component in most ESNSs is the "summary" or "about" section which is an area to describe skills, experience, etc. It is used extensively in professional SNSs (e.g., LinkedIn) and ESNSs as a way of introducing oneself, and highlighting general skills and background (DiMicco et al. 2009). Under Toulmin's (1958) model, this section can be a claim that provides initial statements made by an individual arguing that he/she has credibility to be trusted or identify with others.

[3]Some information is cocreated by both the profile owner and a connection (e.g., the link between the owner and the connection because both have to agree before the link is created). For simplicity, we will use the term connection-generated information to refer to both information generated solely by a connection, and information cogenerated by a connection and the profile owner working together.

Providing data beyond the claim that establishes a common ground between individuals can create a stronger argument (Lampe et al. 2007). Examples include a similar education, hobbies, backgrounds (e.g. lived in the same state), etc., that help individuals make a connection with one another. Similarities have not only been shown to increase identification with another individual but also can serve as the basis for trust (Lewicki and Bunker 1996).

Backing to support the claim and data will increase the strength of the argument. Information provided by other individuals having direct contact with the person being assessed can affect perceptions (Donath 2007). The ESNS recommendation component can provide backing for a claim and data by posts from connections that support and strengthen them. By examining how the profile owner interacted with others in prior projects, an individual can transfer this information to the project at hand. Trust research calls this trust transfer when a trustor ascribes trust to an unfamiliar person based on information from another party, such as a colleague or common friend (Lim et al. 2006; Stewart 2003).

Therefore, we argue that a profile displaying a relational claim with data and backing will have a greater influence on perceptions of relational capital compared to a profile containing only a claim and data. Furthermore, a profile containing both data and a claim will elicit higher perceptions of relational capital compared to a profile containing only a claim.

H1a: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of trust and identification that contain a claim, data, and backing will result in higher perceptions of relational social capital than a profile with only a claim and data.

H1b: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of trust and identification that contain a claim and data will result in higher perceptions of relational social capital than a profile with a claim only.

Cognitive Social Capital

One of the challenges with forming a perception of cognitive capital is getting sufficient information about the individual. There tends to be little information for individuals to judge whether a person you have not met has similar interpretations of the meanings of events. Within an ESNS, a profile owner's background and cognitive ability may serve as a basis on which judgments can be made about his/her knowledge and expertise that will lead to assessments of shared meaning (i.e., they will have similar understandings of the current project).

Similar to relational social capital, a claim of cognitive social capital would consist of a self-generated statement within the profile summary describing one's knowledge and expertise. Data supporting this claim appears in the profile with information such as specific prior work experience and group affiliation, such as prior successful projects. This may not directly translate to a shared understanding in the current situation but it does suggest that the person would be able to develop a shared understanding once collaboration occurs. Additionally, membership within a community (e.g., an ESNS group) signals both generic and/or specific knowledge concerning that group's context, which can be used as a common reference by others assessing shared understanding (Clark 1992). However, this information is still self-generated, which has the potential to be manipulated or misrepresented by the profile owner (Tong et al. 2008). The inclusion of information such as a connection-generated recommendation can provide additional backing and verification that the profile owner does indeed have the experience presented in the data (Walther et al. 2008). Thus, a profile containing a claim, data, and backing will elicit higher perceptions of cognitive social capital than a profile consisting of a claim and data only and a profile having a claim and data will elicit higher perceptions compared to claim-only profiles.

H2a: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of a shared meaning that contain a claim, data and backing will result in higher perceptions of cognitive social capital than a profile with only a claim and data.

H2b: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of a shared meaning that contain a claim and data will result in higher perceptions of cognitive social capital than a profile with a claim only.

Structural Social Capital

A distinct aspect of an ESNS is that members are all within the same organization, creating an environment where connections are limited to the organization. Thus, connectivity becomes important since individuals have a higher likelihood of knowing connections listed on an individual's profile. While density has been examined as a component of

structural social capital, density research focuses on network diversity, primarily concerned with a network containing few redundant contacts (Burt 1992). Thus, density is more challenging to examine because ESNSs are closed environments with lower diversity of connections. We adopt Bolino et al.'s (2002) view of structural social capital which, is assessed by the extent to which an individual is connected, rather than density.

Similar to prior dimensions, the self-generated claim for the structural dimension is in the summary or "about" section. An individual might make reference to specific connections or the overall network of connections across functional areas or departments. For example, the employee may state how they are actively involved in organizational groups across different business units that have grown his network of relationships within the organization. By providing these types of statements concerning connectedness and organizational involvement, the individual is making claims that they have a high structural social capital with a large number of resources available.

Data supporting the original claim would include the "connections" component which lists network ties represented as the number and types of connections with other ESNS members (Ahuja et al. 2003). As most ESNS require a bidirectional confirmation of connection (i.e., both the connector and connectee must agree), this confirmation between parties confirms a relationship exists, thus providing the additional data to support the claim.

Yet, the inclusion of a list of connections might not be sufficient to judge another as having high structural capital. An individual may have hundreds of "friends," but these friends may be acquaintances or weak ties and cannot be considered to be a strong connection in the traditional sense (boyd and Ellison 2008). One signal of strong connections are messages posted by others that demonstrate regular contact (Wasko and Faraj 2005). These serve as backing that signifies the sender and receiver are indeed connected (Donath and boyd 2004). One of the tenets of structural capital is the frequency of communication among the actors in one's network (Nahapiet and Ghoshal 1998). Therefore, the inclusion of "wall posts" or "comments" from connections will strengthen one's actual connection to others as well as providing backing of an individual's connectedness that can increase perceptions of structural capital. Thus,

H3a: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of network connectedness that contain a claim, data, and backing will result in higher perceptions of structural social capital than a profile with only a claim and data.

H3b: When evaluated using systematic processing, profiles displaying ESNS components designed to elicit perceptions of network connectedness that contain a claim and data will result in higher perceptions of structural social capital than a profile with a claim only.

Heuristic Processing

When users are not motivated to expend higher cognitive effort, they are less likely to use systematic processing and more likely to use heuristic processing (Cacioppo and Petty 1984; Carpenter 2015; Chen and Chaiken 1999). Under heuristic processing, strong arguments (i.e., a claim, data, and backing) do not have the same effect as they do under systematic processing because they are not deeply considered (Carpenter 2015; Petty and Cacioppo 1986). Individuals are less likely to be influenced by strong arguments that include data and backing when they use heuristic processing versus systematic processing (Carpenter 2015).

Instead, they use simple heuristics to evaluate information (Petty and Cacioppo 1986). For example, when forming perceptions of cognitive social capital, a claim of expertise may be sufficient to evoke a "credibility" heuristic and make the claim believable (O'Keefe 2008). Additional "data" in the form of experience and "backing" in the form of connection-generated information (both of which make for stronger arguments that are important for systematic processing) are likely to be ignored because they require cognitive effort to process, and less motivated individuals using heuristic processing are unlikely to expend the needed effort (Cacioppo and Petty 1984; Carpenter 2015). Likewise, perceptions of relational capital may involve the use of a "liking" heuristic based on claims of being trustworthy with additional information in the form of data and backing being overlooked. For structural capital, a self-generated claim about having many connections, or having a good number of connections with no backing in the form of wall posts to show they are "real" may be sufficient to trigger a heuristic about structural capital (Tong et al. 2008).

In summary, with heuristic processing, the data and backing that comprise a strong argument will have little impact beyond a simple claim because they will not be considered. Thus, there will be no differences among profiles containing claim, claim/data, and claim/data/backing:

H4a: When evaluated using heuristic processing, profiles will be perceived to have equivalent levels of relational, cognitive, and structural social capital when claim, data and backing is present in the profile compared to a profile with claim and data.

H4b: *When evaluated using heuristic processing, profiles will be perceived to have equivalent levels of relational, cognitive, and structural social capital when claim and data is present in the profile compared to a profile with a claim only.*

Social Capital Impressions and Member Preference

The selection of team members can have lasting implications for team performance and effectiveness (Jones et al. 1999). This is especially important when employee self-selection of virtual teams is becoming common (Zhao and Chen 2013). Positive perceptions of team members are associated with a number of positive outcomes such as cooperation and initial performance (Dierdorff et al. 2011). As characteristics are more salient in ESNSs (e.g., previous positions and skills listed within the profile), they have the potential to impact the perceptions of an individual's social capital and, subsequently, team member preference and selection (D'Souza and Colarelli 2010).

Preference is defined as an affinity or positive characterization toward team members often resulting in individuals willing to align themselves with that member (Jackson et al. 2006). Preferences tend to form early in the formation of teams when members are trying to understand one another (Kozlowski et al. 1999). This is particularly true for teams in which self-selection enables individuals to make choices (Jones et al. 1999). Little research has examined perceptions of social capital formed prior to team interaction, so we do not know how social capital affects individuals' preferences for whom they will work with in the future.

Perceptions of an individual's relational capital (especially trustworthiness and obligations) can influence an individual's willingness to be part of a team (Kiffin-Petersen and Cordery 2003). Trust is the extent to which one believes in and is willing to depend upon another individual (McKnight et al. 1998; Sun et al. 2012). Trust helps minimize the risk and uncertainty surrounding obligations for reciprocity in information sharing, which in turn helps users fulfill business needs through knowledge exchange and integration (Mcknight et al. 1998). Relational capital also reinforces collective identification (Nahapiet and Ghoshal 1998), which in turn contributes to their in-group perception of each; people generally attribute more positive characteristics to in-group members than to out-group members (Hardin and Conley 2000).

Perceptions of an individual's cognitive capital can also influence an individual's preference (Kollmann et al. 2009). Shared meaning is associated with shared perceptions of an activity, which reduce the amount of effort required to perform tasks (Hardin and Conley 2000; Sun et al. 2012), and ultimately facilitate the fulfillment of users' business needs (Au et al. 2008). Cognitive capital strengthens individuals' appraisal of each other (Hardin and Conley 2000), and is important in forming positive impressions.

Perceptions of an individual's structural capital can impact preference because individuals are more likely to seek out others with strong networks for advice (Sparrowe et al. 2001). High structural capital means the individual has access to resources that can be applied to the team's task and thus makes them a useful asset (Nahapiet and Ghoshal 1998; Wasko and Faraj 2005). Individuals with strong networks perform better than those without strong networks, and thus tend to be sought out as team members (Sparrowe et al. 2001).

In summary, an individual's perceptions of other team member's social capital will influence whether they would prefer or prefer not to work with them. Thus.

H5: Team member preference will be influenced by (1) relational, (2) cognitive, and (3) structural social capital.

Method

Participants

Data was collected at a large, state university using participants drawn from an undergraduate business course. Participation was voluntary and they received course credit for participating. Each participant was randomly assigned to one of six treatments. The average age was 20 years with 60% being male. Their average length of SNS usage was 6.5 years.

Task

A vignette was used to place participants in a scenario in which they would be interacting with a newly formed virtual team. Vignettes "present subjects with written descriptions of realistic situations and then request responses on a number of rating scales that measure the dependent variables of interest" (Trevino 1992, pp.127-128). The use of vignettes was chosen to provide control by placing all subjects in the same scenario with the only change being the manipulation of the ESNS profile. This ensured that the participants' perceptions were less contaminated as may be the case in traditional experiments (Greenberg and Eskew 1993). This method has been proven to effectively capture team collaboration and individual perceptions similar to those currently being assessed, such

as trust (Jackson et al. 2006; Robert et al. 2008). Research comparing vignettes with non-vignette has drawn the same conclusions (De Cremer et al. 2007; Shaw et al. 2003).

The vignette placed participants as members of a new virtual team beginning work on a new project. Participants were presented with the ESNS profiles for three fictitious potential team members (with profiles varying based on the treatment) and asked to assess the social capital possessed by each.

Independent Variables

A 2 × 3 design was used varying the processing route (systematic, heuristic) and the argument type/source (claim, claim/data, claim/data/backing). Processing route (either systematic or heuristic) was manipulated by using outcome dependency to alter individual motivation to evaluate information closely (Flink and Park 1991; Kaplan et al. 2009). Prior research shows that users have the ability to process information presented within an online environment (Kim and Benbasat 2009), so the focus is on manipulating the motivation to process information. Motivation has been shown to be influenced by outcome dependency (Neuberg and Fiske 1987). When someone believes their performance is dependent upon the efforts of other team members, they are more motivated to understand and select those team members carefully, and thus are more likely to use systematic processing (Wentzel 2009). Conversely, when someone believes their performance is not dependent on others, they are less motivated and thus are more likely to use heuristic processing (Wentzel 2009). The vignettes were written to make the participant's performance evaluation on the fictitious project dependent on all team members within the group (systematic) or measured individually (heuristic).

Argument type was manipulated by changing the components in the profile (i.e., its information) to provide either a claim, a claim plus data, or a claim plus data and backing related to relational, cognitive, or structural capital. For a complete description of the treatments, see Appendix A.

Three manipulation checks were conducted; see Appendix B. The first was to ensure that the treatment components designed to influence one social capital dimension did not have an unintended impact on the other social capital dimensions. The second manipulation check was to ensure processing type (systematic versus heuristic) was manipulated correctly and to evaluate participant recognition of arguments present. For this manipulation check, we measured whether subjects identified that performance within the vignette was outcome dependent, as has been done in prior research (Flink and Park 1991; Kaplan et al. 2009). Following this manipulation check, the final sample size for the study was 168 participants. The third manipulation check assessed the extent to which subjects noticed the information presented and used it in forming their opinions. All remaining participants passed this manipulation check.

Dependent Variables

There were four dependent variables (relational capital, cognitive capital, structural capital, and member preference), which were measured via a questionnaire using a 1 (strongly disagree) to 7 (strongly agree) scale; see Appendix C. Relational capital used prior scales, adapted for the current study to assess both individual trust in others (Jarvenpaa and Leidner 1999) and identification with team members (Brown et al. 1986; Henry et al. 1999). For cognitive social capital, items based on Wasko and Faraj's (2005) measures of cognitive capital were adapted to assess an individual's tenure in the field and expertise (Kirsch et al. 2009). Other items for cognitive capital were developed based on the conceptual definition and scales from prior research for shared meaning and values (Nahapiet and Ghoshal 1998; van den Hooff and Huysman 2009). Structural capital items were developed using both a prior scale that assessed overall structural social capital within a team (van den Hooff and Huysman 2009) and the conceptual definition of structural capital (Nahapiet and Ghoshal 1998). Member preference was assessed using items developed to understand an individual's preference to work with one individual over another (Dierdorff et al. 2011; Jackson et al. 2006).

Control Variables

We included six control variables that might influence the formation of social capital. Three pertained to SNS experience (duration of SNS use, frequency of SNS use, and SNS Intensity ($\alpha = 0.88$) (Steinfield et al. 2009)). Two were demographic (gender, age). We also included disposition to trust ($\alpha = 0.77$), a personal trait found to impact perceptions of others (Jarvenpaa and Leidner 1999). Also, for our assessment of team member preference, the perceptions of the likeability ($\alpha = 0.89$) of each ESNS profile (drawn from Wayne and Ferris 1990) was used as a control to measure affect. See Appendix C for measures.

Procedures

The study started with participants completing an initial questionnaire containing demographic and control variables. Participants were then randomly assigned to one of two condi-

tions: outcome dependent (systematic) or outcome independent (heuristic). After the task description, participants were randomly assigned to one argument type treatment (claim; claim and data; or claim, data, and backing). They examined the SNS profiles of three fictitious team members, in random order, with one profile focused on relational capital, one on cognitive capital, and one on structural capital. They then evaluated each potential team member on the three dimensions of social capital and preference. Then, a post-experimental questionnaire was given to assess the manipulation checks.

Analysis and Results

A confirmatory factor analysis was conducted using AMOS 16 to validate the measures. The model was tested for both the reliability of measures and model validity using the recommendations outlined by Hair et al. (2010) and Fornell and Larcker (1981). Reliability indicates measurement accuracy and precision, and can be assessed by examining composite reliability (CR) to ensure it is greater than the average variance extracted (AVE). Validity measures the extent to which the concept of interest is accurately represented in the measurement scale. For validity, both convergent (scale is correlated with other known measures) and discriminant (scale is sufficiently different or distinct) is examined to ensure overall validity of the model. Results from the analysis (see Appendix D) indicate both validity and reliability for the constructs being evaluated. Factor loadings for all constructs were strong and significant with composite reliability (CR) greater than the average variance extracted (AVE) as well as an AVE above the recommended minimum of 0.50 suggesting convergent validity in the current model (Fornell and Larcker 1981; Hair et al. 2010). To evaluate discriminant validity, the square roots of the shared variance between constructs were found to be greater than correlation across constructs providing support for discriminant validity (Fornell and Larcker 1981). Additionally, maximum shared squared variance (MSV) and average shared squared variance (ASV) were both less than AVE for each construct further suggesting discriminant validity (Hair et al. 2010). Finally, a MANOVA found no significant differences among treatments with respect to the control variables of age, gender, SNS experience (duration and frequency), trust disposition, and SNS intensity ($F = 0.480$, $p > 0.10$).

Model Testing

We examined H1, H2, H3, and H4 using SPSS 18 MANCOVA. All assumptions were analyzed including distribution normality and homogeneity of variance (using Leving's test of equality variance) (Hair et al. 2010). Tables 1 and 2 show the number of participants in each treatment. The power to detect a medium effect size difference ($f^2 = .25$) in the between-subjects argument treatment was adequate for both systematic processing (.87) and heuristic processing (.83) (calculated using G*Power; Faul et al. 2007).

Results showed that argument (Wilks' $\lambda = 0.71$, $F(6,312) = 9.83$, $p = 0.000$) was significant across all the dimensions of social capital (i.e., relational, cognitive, structural) while processing type (Wilks' $\lambda = 0.99$, $F(3,156) = 0.781$, $p = 0.506$) was not significant. However, the argument by processing type interaction was significant (Wilks' $\lambda = 0.91$, $F(6,312) = 2.45$, $p = 0.025$) suggesting the impact of argument strength is related to the processing type when assessing social capital dimensions (see Figure 3). The control variables of gender, age, SNS intensity, and SNS use (frequency and duration) were all nonsignificant ($p > 0.05$). Trust disposition was significant (Wilks' $\lambda = 0.92$, $F(3,156) = 4.83$, $p = 0.003$) but only for relational social capital which is expected as relational capital deals with trust. Because the hypotheses used different sets of argument types for the two different processing types, we analyzed the data separately (i.e., one analysis for systematic processing and one for heuristic processing).

Systematic Processing of Argument Strength

H1, H2, and H3 examine the difference in social capital perceptions for profiles with varying argument strength: a *claim only*, a *claim/data*, or a *claim/data/backing*. Table 1 provides descriptive statistics for the argument strength across social capital dimension (with the means representing the profile containing only that treatment). For example, the mean for relational *claim only* in Table 1 is the average perceptions for the profile containing the relational claim and no other profile components.

Because argument strength was varied across participants, a between-subjects MANOVA was conducted to assess systematic processing of profile information based upon argument strength. The results indicate that there are significant perception differences for all social capital dimensions due to argument strength (Wilks' $\lambda = 0.56$, $F(6,176) = 9.90$, $p = 0.000$). This provides partial support for H1, H2, and H3; however, to understand these differences, follow-up ANOVAs were conducted to understand the mean difference across these argument strengths; see Table 1.

The ANOVAs found significant differences for all three dimensions of social capital suggesting that when argument

Table 1. Systematic Processing of Argument Strength

	n	Relational Social Capital	Cognitive Social Capital	Structural Social Capital
Claim	29	**4.07**[a] (1.11)	**5.12**[a] (0.86)	**4.10**[a] (1.04)
Claim/Data	31	**4.75**[b] (0.69)	**5.41**[b] (0.76)	**5.51**[b] (1.02)
Claim/Data/Backing	33	**5.40**[c] (0.82)	**5.62**[b] (0.71)	**5.53**[b] (0.89)
		F	***F***	***F***
F-Value		**17.28****	**3.15***	**20.85****

Note: The values above represent the mean argument strength (and standard deviation) for profiles that contain the arguments for their respective social capital only. Differing letters across treatments indicate signi cant differences (Ryan-Einot-Gabriel-Welsch F, $p < 0.05$).
*$p < 0.05$, **$p < 0.01$.

Table 2. Heuristic Processing of Argument Strength

	n	Relational Social Capital	Cognitive Social Capital	Structural Social Capital
Claim	25	**4.24**[a] (0.97)	5.68 (0.74)	4.61 (1.22)
Claim/Data	25	**5.25**[b] (0.76)	5.60 (0.82)	5.40 (1.27)
Claim/Data/Backing	25	**5.06**[b] (1.03)	5.45 (1.02)	5.17 (1.07)
		F	***F***	***F***
F-Value		**8.27****	0.46	2.88

Note: The values above represent the mean argument strength (and standard deviation) for profiles that contain the arguments for their respective social capital only. Differing letters across treatments indicate signi cant differences (Ryan-Einot-Gabriel-Welsch F, $p < 0.05$).
*$p < 0.05$, **$p < 0.01$.

strength increases so does the perception of each dimension of social capital. A *post hoc* Ryan-Einot-Gabriel-Welsch F test was done to understand how the specific treatments were different from one another. For relational social capital (H1a and H1b), the *post hoc* analysis found that *claim/data/backing* was significantly different from *claim/data* resulting in higher perceptions of relational capital, which supports H1a. Additionally, for H1b, *claim/data* was significantly different from *claim only* with claim only resulting in the lowest perceptions of relational social capital. Thus, H1b is also supported (see Figure 4).

For cognitive social capital (H2a and H1b, the *post hoc* analysis found that a profile with *claim/data/backing* was not significantly different from a *claim/data* profile resulting in no support for H2a. However, there was support for H2b, in which a profile containing *claim/data* elicited higher perceptions of cognitive social capital compared to *claim only* (see Figure 4).

Finally, structural social capital *post hoc* results (H3a and H3b) found that while both *claim/data/backing* and *claim/data* resulted in higher structural social capital when compared to *claim only* profiles, there was no difference from profiles containing *claim/data/backing* compared to *claim/data*. Thus, H3b was supported while H3a was not (see Figure 4).

Heuristic Processing of Argument Strength

H4a and H4b state that under heuristic processing, an individual will be perceived to have equivalent levels of social capital perceptions when *claim/data/backing* is present compared to *claim/data* (H4a) and *claim/data* is equivalent to *claim only* (H4b). The MANOVA results suggested a significant difference (Wilks' $\lambda = 0.75$, $F(6,140) = 3.68$, $p < 0.01$) between argument type and the social capital. However, the *post hoc* analysis (using Ryan-Einot-Gabriel-Welsch F test) found the only significant difference was between claim and claim/data for relational social capital (see Table 2).

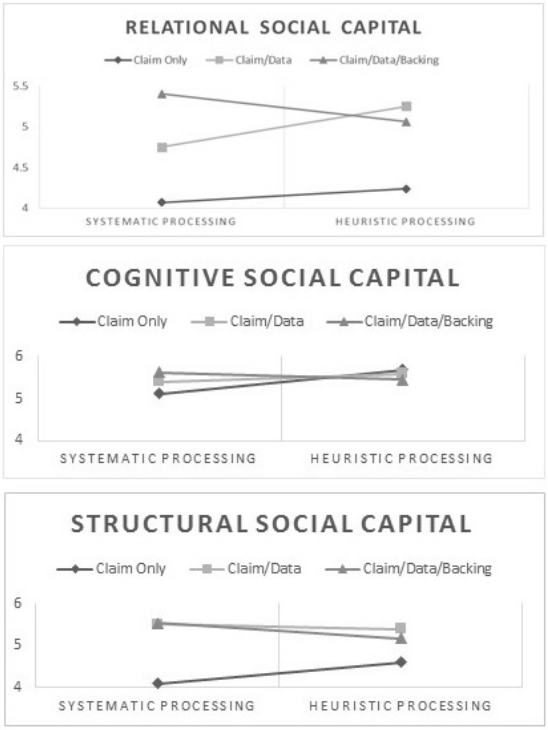

Figure 3. Argument × Processing Interaction Effects

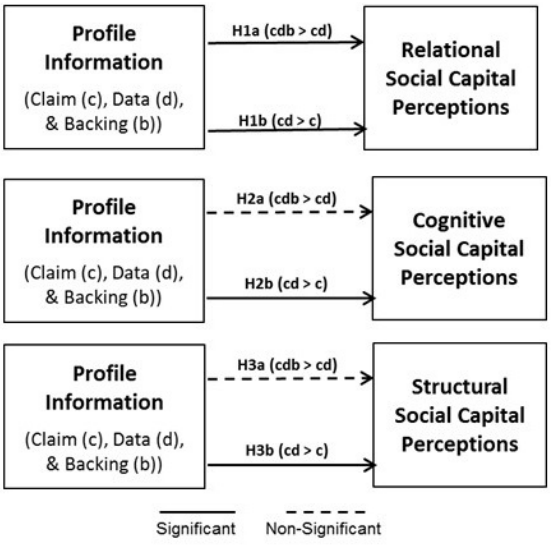

Figure 4. Systematic Processing of Argument Strength

There was no significant difference between *claim/data/backing* and *claim/data* for any of the social capital profiles. Thus, H4a is supported which compares *claim/data/backing* profiles to *claim/data* profiles while H4b is only partially supported due to the insignificant results for relational social capital (see Figure 5).

Team Member Preference

H5 argues the impact of perceptions on overall preference of team members. A preference measure was taken for each team member profile (e.g., a separate preference measure for the cognitive social capital profile, the relational profile,and the structural profile). Given the data analyzed is across multiple levels (argument strength and processing type at the individual level and three types of social capital within each individual), HLM was chosen to evaluate H5. As part of the model, we examined both the argument strength and social capital dimensions' impact on preference. For argument strength (i.e., claim, claim/data, claim/data/backing), all of the profiles tested were insignificant (p-values were all greater than $p = 0.28$). This suggests that impact on preference is fully mediated by social capital dimension. Additionally, processing type was not found to influence team member preference ($t(164) = 1.21$, $p = 0.229$) indicating that the type of processing (heuristic or systematic) did not impact preference. The standardized parameter estimates are included in Table 3.

H5a, H5b, and H5c argue that perceptions of all three dimensions of social capital will influence team member preference of the profile owners. Results suggest that relational capital ($t(496) = 9.31$, $p < 0.001$) and cognitive capital ($t(496) = 4.73$, $p < 0.001$) significantly influenced team member preference, but structural capital did not ($t(496) = 1.33$, $p = 0.186$). Thus, H5a and H5b were supported while H5c was not supported. *Post hoc* comparisons of the betas ($Z = (beta_1 - beta_2)/ Sqroot(stderr_1^2 + stderr_2^2)$) indicate that relational capital had a stronger effect (i.e., higher beta) than cognitive capital ($t(495) = 4.00$, $p=.000$) or structural capital ($t(495) = 7.41$, $p = .000$), and that cognitive capital had a stronger effect than structural capital ($t(495) = 3.51$, $p = .000$).

Discussion

Many members of virtual teams have little knowledge of each other prior to team formation. This study shows that information in an ESNS and the different ways of using it influence initial perception formation when individuals have little knowledge of other potential team members. Our findings suggest that both the strength of argument (i.e., information presented in profiles) and processing type (i.e., systematic or heuristic) affect perceptions of social capital. These social capital perceptions in turn influence preferences for team members, suggesting ESNSs may be effective for building initial relationships much like their public counterparts (DiMicco and Millen 2008; Ellison et al. 2007). Our research provides initial insights about the impact of a previously hedonic technology on the impression formation process.

When users systematically process information in an ESNS profile, the strength of arguments (i.e., claim, data, and backing) presented in the profile influences social capital perceptions. However, not all social capital perceptions are influenced in the same way as the strength of argument increases. Perceptions of relational social capital are highest when a fully composed argument (claim/data/backing) is included in a profile, with claim/data being the next highest and claim only the lowest. Recommendations from connections have the strongest impact, with self-generated claim with data having a stronger impact than just a self-generated claim. This supports Walther and Parks (2002), which suggests that making judgments about individuals encountered online is similar to making judgments about individuals encountered in person, in that information from other people (e.g., recommendations from coworkers) has more impact than information from the individuals themselves (i.e., self-generated claim/data) alone.

However, the pattern was different for cognitive and structural capital. The inclusion of *backing* from connections (e.g., recommendations or wall posts) did not significantly change overall cognitive or structural perceptions when compared to a profile containing self-generated *claim/data*. The self-generated claim with supporting data was sufficient to increase perceptions above a claim only, and the addition of connection-generated backing did not significantly change perceptions, which is counter to prior research (Walther et al. 2008). Cognitive social capital is primarily concerned with developing a shared understanding with another individual (Nahapiet and Ghoshal 1998). Because this shared meaning is between the participant and the individual, additional information from unknown external sources discussing their past experience with the individual may have little impact (see Latané 1996). As for structural capital, prior research suggests that the size of one's network (which is the *data*) may be enough to trigger positive social judgments (Kleck et al. 2007) because a new ESNS connection requires acknowledgment from the individual receiving the request (i.e., the individual receiving an invite for a new connection).

When ESNS users process profiles heuristically, a self-generated claim often is as powerful as a self-generated claim/

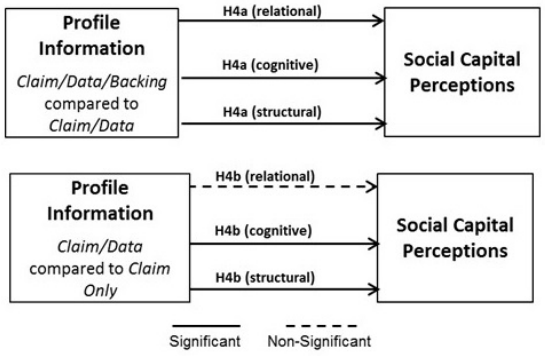

Figure 5. Heuristic Processing of Argument Strength

Table 3. Standardized Parameter Estimates for Analysis of Preference

Parameter	Parameter Estimated	*p*-Value
Relational Capital	0.60	0.000
Cognitive Capital	0.25	0.000
Structural Capital	0.04	0.186
Heuristic Processing	-0.08	0.229
Likeability	0.21	0.000

data and even a claim/data plus connection-generated backing. Individuals using heuristic processing did not distinguish among these for cognitive and structural social capital, but did for relational social capital. This suggests that claims may be sufficient in making judgements concerning a profile owner's connectedness and knowledge. This is compared to perceptions of relational capital (i.e., identification and trust), which may require additional information from the profile owner in the form of data and backing.

Results from both systematic and heuristic processing suggest that individuals forming perceptions may have a differential demand for information across the social capital dimensions. Early research on impression formation in computer mediated communication suggested that different factors are needed to form impressions of a communicator (e.g., personality) (Hancock and Dunham 2001). In other words, the amount of information presented may be sufficient to form impressions of some personalities over others. Our findings suggest similar results in an ESN environment. The demand for information in forming perceptions of cognitive and structural capital (e.g., claim and data) may be less compared to relational capital (e.g., claim, data, and backing). Studies have shown that traits and relevancy can impact impressions and this can vary depending on the type of impression being formed (Köpetz and Kruglanski 2008). The differential demand of user needs to be explored further in future research to understand the implications this may have on perception formation.

Finally, the analysis of team member preferences provided results generally consistent with our hypotheses. Perceptions of relational and cognitive social capital based on the information provided in ESNS profiles influenced preferences for team members, with relational capital perceptions having the greatest influence. Individuals often base their preference on similarities between themselves and the future team member (Granovetter 1992; Walther and Trasselli 2003). Teams in the initial stage of formation tend to focus on social relationships (Kozlowski et al. 1999), especially identification with other members, a key component of relational capital (Jarvenpaa et al. 2004; Nahapiet and Ghoshal 1998).

Interestingly, perceptions of structural capital did not influence preferences. The effects of structural capital may be fully mediated by relational and cognitive capital because it is not the presence of structural links that matter but rather how those links influence the social interaction that plays out through relational and cognitive capital (Sun et al. 2012). We found that structural capital was correlated with both relational capital ($r = .172$, $p = .000$) and cognitive capital ($r = .135$, $p = .000$), but the magnitudes were not large (R^2 of less than 3%). This suggests that although the effects of structural

capital may be fully mediated, they are noticeably less important to team member preferences during team formation than relational capital and cognitive capital.

This research suffers from the usual limitations of experimental research. We studied undergraduate students performing a short-duration task. First, to provide control, a scenario-based vignette task was used in lieu of an actual situation in organizations (Greenberg and Eskew 1993); research comparing vignette-based research to non-vignette-based research suggest both produce conclusions for research examining individual beliefs and reactions (De Cremer et al. 2007; Shaw et al. 2003). Second, while some argue student populations can differ when compared to nonstudents (Sears 1986), the goal of our research was to explore ESNSs with a sample that has some familiarity with social networking. We feel that students are reasonable participants as they have more experience with social networking sites than the general public. Another potential limitation was the outcome dependent (i.e. systematic/heuristic processing) manipulation. While the manipulation was drawn from prior research (see Appendix B), it was effective for only about 81% of our participants. Further research is needed to examine the manipulation to improve its effectiveness.

Implications for Research

Virtual team effectiveness is often reduced by relationship issues brought on by the lack of socio-emotional connections with team members (Raghuram et al. 2010). Many authors suggest teams should meet face-to-face or via video conferencing early in their life to get to know each other better so they can begin to form stronger relationships (Kirkman et al. 2004). Compared to the information in a reasonable ESNS profile, such face-to-face or video meetings provide sparse information, especially information about social capital. In the age of ESNSs, is a face-to-face meeting a meaningful way to get to know each other? To what extent does the creation of strong relationships in virtual teams depend on surface issues such as physical appearance and social presentation versus deep issues such as social capital (which are perhaps better assessed using ESNSs)? We need more theory and research to understand how and why team members develop relationships so we can better understand the role that the ESNS should play.

We have little theory or research on how social capital affects virtual teams. Our study suggests that relational capital and cognitive capital are more important than structural capital in influencing initial preferences, but offers no insight on their relative importance as team members begin to work together. Some initial research suggests that social capital is important to knowledge integration and can also have a direct effect on outcomes (Robert et al. 2008). We need more theory to link the different components of social capital to different team processes and outcomes.

Previous social capital theory and research suggests that relational, cognitive, and structural capital are developed over time through ongoing interaction (Lee 2009). Yet, our research shows that perceptions of relational, cognitive, and structural capital can develop through the use of ESNSs before individuals interact. Perhaps social capital is like trust: for many years, trust was believed to be built over time, but research in virtual teams demonstrated that trust was often granted *ex ante* or presumptively before teams interacted (Jarvenpaa et al. 1998). Much like trust, social capital may be granted *ex ante*. We need more theory and research on social capital to better understand the extent to which social capital is developed over time from personal interactions versus granted *ex ante* based on ESNS profiles.

Our study also presents some troubling implications for theory and research on the use of information from Internet sources. Our participants did not do a particularly good job of discriminating between an unsubstantiated claim with no supporting data, a claim with self-supporting data only from the author, and a claim well supported by data plus backing from an independent source. Those in the heuristic processing treatment missed these distinctions most of the time, only once noticing the distinction between an unsupported claim and a self-supported/well-supported claim. Those in the systematic processing treatment performed better, noticing the distinction between an unsupported claim and the other claims all three times, but twice failing to recognize the difference between a self-supported claim and a well-supported claim. In the era of fake news on the Internet, perhaps we should not be surprised. We believe this calls for more theory and research on the processing of Internet information.

Minimal research has examined the model of argumentation (Toulmin 1958) within online environments (see Kim and Benbasat 2006, 2009). This research expands on the model of argumentation by showing that strength of argument is significant in social media; specifically, the different strengths (e.g., claim, data, or backing) can be categorized by the creation of the argument (i.e., self-created claim and data with connection-generated backing). Results suggest that the argumentation model provides a framework to understand the perception formation process when information is provided online. Thus, this model provides an effective way to frame the type of information provided (i.e., claim and data being self-generated, while backing is created through connection-generated information). This study suggests that connection-

generated information can influence social capital, especially relational capital. Furthermore, the current study expands on the role of arguments in online environments and suggests that information in social networking sites can have varying value. For example, a strong argument (i.e., *claim/data/backing)* can influence perceptions of relational capital while cognitive and structural capital may only need additional *data* to support *claims*.

The results also suggest there could be implications for design science research concerning the development of ESNSs. Since SNSs began in the social domain, ESNSs are often designed to have a similar look and feel as public sites such as Facebook. However, sites like Facebook were originally designed for one use (e.g., enjoyment or other hedonic purposes) while ESNSs are used for a considerably different purpose (e.g., forming perceptions of social capital or other utilitarian purposes). This has two potential implications: how are perceptions influenced by the location of claim, data, and backing within the profile, and how are they influenced by the overall ESNS design (e.g., inclusion of specific features). This research examines profiles that have claim, data, and backing in specific locations on the profile. LinkedIn now allows users to customize profiles so they can position information in different places in the profile. The location of claim, data, and backing may have an influence on perceptions of social capital, especially when those perceptions are formed using heuristic processing. Future research examining location of claim, data, and backing is needed to understand how location may influence perceptions.

Additionally, the overall design and layout of an ESNS could be changed to emphasize certain characteristics that would be helpful in an organizational environment. For example, when launching an ESNS, organizations may put increased emphasis on recommendations/wall posts that increase perceptions of relational capital. This would provide employees a better understanding of their future team member, which our study has shown to have significant impact on team member preference. Additionally, past experience of the employee should be emphasized as this has the most significant impact on cognitive capital. Results suggest that certain features (e.g., number of connections) could be de-emphasized as structural capital has a minimal impact on preference. Future research should examine different layouts to understand the implications of placing more emphasis on one feature (e.g., wall posts) than others (e.g., summary statements).

Finally, this research raises some intriguing questions surrounding social capital. Our study focuses on social capital impressions before team members meet. Further research is needed to assess changes to social capital over time as the team continues to work on a project. For example, as groups interact and engage, the information provided in *data and backing* may have a greater impact for some dimensions of social capital and less impact for others. Backing may have a greater impact on structural capital as it is concerned with both a person's resources (i.e., connections) and the ability to mobilize those resources if necessary. While resources are easily understood initially (e.g., connections are prominent), it may be difficult for an individual to understand if these connections are strong (e.g., interact with these resources through ESNSs) and whether they can be mobilized if needed. Thus, understanding the strength of a profile owner's connections may become important as the need to leverage connections may arise. The opposite may be true for relational social capital. Once the team member becomes familiar with a team mate, the need for backing to increase trust may decline over time. Therefore, providing profiles before and after interactions may result in significantly different findings depending on how users change their focus on specific components.

The contents of the profiles presented in this study were all positive, which is typical of research using Toulmin's model. Future research needs to examine the impact of negative information presented in the profiles. The information provided to participants in the current study was chosen to elicit positive perceptions of the social capital dimension. However, this does not account for information that may lead to negative feelings concerning the profile owner. For example, the recommendation and wall posts included positive comments about the profile owner. Would negative comments (i.e., comments that do not provide positive *backing*) be detrimental? Additional research is needed to address this concern and fully understand if ESNS information can be detrimental to impression formation in organizations.

Finally, the research presented here raises some intriguing questions about impressions over time and the content presented that have yet to be answered. While our study focuses on impressions before team members meet, further research is needed to assess changes to social capital over time as the team continues to work on a project. For example, as groups interact and engage, the information provided in *data and backing* may have a greater impact for some dimensions of social capital and less impact for others. Backing may have a greater impact on structural capital as it is concerned with both a person's resources (i.e., connections) and the ability to mobilize those resources if necessary. While resources are easily understood initially (e.g., connections are prominent), it may be difficult for an individual to understand if these connections are strong (e.g., interact with these resources through the ESNS) and whether they can be mobilized if needed. Thus, understanding the strength of a profile owner's connections may become important as the need to leverage connections may arise. The opposite may be true for rela-

tional social capital. Once the team member becomes familiar with a teammate, the need for backing to increase trust may decline over time. Therefore, providing profiles before and after interactions may result in significantly different findings depending on how users may change their focus on specific components.

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Implications for Practice

The results from this study have a number of implications for both the users of ESNS (i.e., employees) and the organizations choosing to implement them. The information provided on ESNS can significantly impact how employees are perceived by coworkers. Results suggest that individuals use various components included in the profile to form perceptions of other employees, especially prior to interaction with those employees in a team environment. More importantly, the results suggest that individuals may process information differently depending upon how cognitively engaged they are during evaluation (i.e., processing information either systematically or heuristically). While profile owners may not know which processing individuals viewing the profile are employing, the findings suggest that users can focus their effort and time on certain features over others. For example, trying to get additional recommendations from colleagues appears not to impact cognitive social capital perceptions while listing details for projects has greater impact. By knowing how certain information can influence social capital perceptions, employees can be more aware of how they should tailor their online representation more effectively.

Most employees use impression management to enhance their image at an organization. Users of an ESNS need to focus on the design of their profile for both those who process the information systematically as well as heuristically. For those who employ systematic processing, employees should emphasize their backgrounds (e.g., *data* such as projects or education) as this information increase the perceptions of all three forms of social capital over a simple claim. Employees also should encourage former and current coworkers to provide wall posts that discuss their relational capital (e.g., character) because relational capital is affected by such posts; posts focusing on cognitive or structural capital has no effect beyond the employee's own information. For those who process profile information heuristically, only relational social capital is affected by information beyond a simple claim, so employees should focus on relational capital and include some basic data; adding additional information for cognitive or structural capital is likely to have little impact. Finally, relational capital and cognitive capital influence preference formation while structural capital does not, so employees should focus on these aspects of their profile, not on adding more connections.

From the team perspective, the ESNS may be a useful tool in overcoming some of the issues currently plaguing virtual teams. Virtual teams often know minimal information about their team members (Jarvenpaa and Leidner 1999), which reduces the socio-emotional process of relationship development (Martins et al. 2004). Reduced relationship development has been shown to impact performance and collaboration in the virtual environment (Powell et al. 2004). The findings from our study suggest the use of an ESNS can help in forming initial impressions that may help in building relationships during early interactions with team members. Thus, employees should both include information in their personal profiles that would help the relationship building process (e.g., education, previous project work) as well as use the ESNS to learn more about future team members.

From an organizational perspective, managers can better understand how their employees interact and translate signals within ESNSs. Results suggest that, with newly formed teams, employees have a greater preference for team members who are both cognitively and relationally similar. This may impact a manager's decision when forming groups now that he/she has the ability to examine team members to see if they have similar backgrounds that would lead to higher social capital at the onset of group formation. Therefore, a manager may want to use the ESNS in creating teams with similar backgrounds that have complementary skills since results showed that both relational and cognitive social capital impacts preference to work with team members. However, managers should also be aware that others are forming perceptions primarily on self-generated features (i.e., claim and data). Thus, managers may want to use an ESNS as a starting point and not as the ending point.

Conclusion

ESNSs can have profound organizational implications when employees use them to "meet" team members for the first time. Our results show that ESNS profiles influence the perceptions of social capital, which in turn influences preferences for team members. Attitudes formed online are often stronger than those formed through memories of a prior, short interaction with an individual (Bizer et al. 2006), suggesting that we need a much deeper understanding of how a traditionally hedonic technology like social networking can play an important utilitarian role within organizations.

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MIS Quarterly

RESEARCH ARTICLE

VIRTUAL FIRST IMPRESSIONS MATTER: THE EFFECT OF ENTERPRISE SOCIAL NETWORKING SITES ON IMPRESSION FORMATION IN VIRTUAL TEAMS

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Appendix A

Description of Treatments and Manipulations

Table A1 provides a detailed description of the treatments including how the character's information will vary as well as the processing type. This is followed by a further discussion in the manipulation for processing route and argument strength.

Table A1. Experimental Treatments

		Systematic Processing	Heuristic Processing
Self- & Co-Generated	Claim Only	Character A – Relational Claim Character B – Cognitive Claim Character C – Structural Claim	Character A – Relational Claim Character B – Cognitive Claim Character C – Structural Claim
	Claim + Data (CD)	Character A – Relational (CD) Character B – Cognitive (CD) Character C – Structural (CD)	Character A – Relational (CD) Character B – Cognitive (CD) Character C – Structural (CD)
Connection Generated	Claim + Data + Backing (CDB)	Character A – Relational (CDB) Character B – Cognitive (CDB) Character C – Structural (CDB)	Character A – Relational (CDB) Character B – Cognitive (CDB) Character C – Structural (CDB)

Previous research has found both gender and photos may impact a person's interpretation of SNS profiles (Walther et al. 2001; Walther et al. 2008). Therefore, one gender was chosen for all fictitious team members (male) and their pictures were chosen to provide similar appearances (e.g., age, race, dress). A pilot test was conducted in which a separate set of participants drawn from the same subject pool reviewed a number of pictures and rated them based on similarity, attractiveness, and social capital features (e.g. trustworthiness, shared understanding, connectedness, etc.). To minimize any bias based on the individuals used for the profile picture, pictures with similar feature ratings were

chosen for testing argument strength. For example, to ensure the profile picture would not influence relational capital, every picture for this part of the experiment had the same rating for trustworthiness.

Processing Route

To induce systematic processing, a manipulation of outcome dependency (i.e. a participant's performance on the task is dependent upon team members' performance) was used. According to expectancy theory, motivation to evaluate information in more detail increases when expected outcome is tied to group performance (Leon and Wahba 1975). Therefore, with motivation being a primary driver of increased elaboration likelihood (Cacioppo et al. 1985), the outcome dependency manipulation drives increased attention to the detailed examination of individual information (Erber and Fiske 1984; Flink and Park 1991; Kaplan et al. 2009). For heuristic processing, any language referencing team member dependence was removed from the vignette with emphasis being placed on performance being evaluated independently of fellow team members. Both vignettes can be found at the end of this appendix under the title "Experiment Materials."

Argument Type and Information Source

Argument type was varied to include a focus on the strength of the argument (conducive to systematic processing). To limit any potential confounds from profile presentation order (Saris and Gallhofer 2014), the ordering varied randomly across the manipulations so that one individual saw the structural profile (Character A) first followed by relational (Character B) and so on, while another participant may have seen the relational profile (Character B) first followed by the cognitive profile (Character C), etc.

For strength of argument, Toulmin's (2003) model of argumentation was used in which a claim and data are represented through self- and system-created profile information while backing is represented through connection-created profile information. Each profile was built with specific elements and information related to the dimension of social capital being assessed. For example, a profile for relational capital included a claim under profile summary. Data is represented by information provided by the user that may elicit similarities between the user and the profile owner. There is a variety of information that could be used for data in our context, including hobbies, interests, employment background (same company), or education background (such as attending the same college or a college in the same state). Given the participant pool in the current study, hometown and education were used for data. Finally, backing is presented in the form "recommendations" on the profile. Presentation of information that may elicit perceptions of a different dimension of social capital not being assessed was controlled for. Because the model of argumentation is primarily used to provide support for a given argument, all of the content included in the above components is positive to elicit agreement that the profile owners are high in their respective social capital dimension. A complete list of the profile information manipulated is provided in Table A2.

Table A2. Profile Information Manipulated across Social Capital Dimensions

Dimension	Claim	Data	Backing
Relational	Profile Summary Statement	Education; Hometown	Recommendations (trust specific)
Cognitive	Profile Summary Statement	Prior Experience; Current Tenure	Recommendations (tenure/experience specific)
Structural	Profile Summary Statement	# of Connections	Wall Posts linking connections with owner (e.g., previous working with or interacting with employee in the profile)

Experiment Materials

Sample Vignette for Systematic Processing

For the current study, you have just joined a website design company. One of your first projects is to design a website with a team of fellow colleagues. Imagine you are in the following situation:

Company XYZ is a multinational technology and consulting firm with over 50,000 employees worldwide. They offer a variety of services including designing, coding, and hosting websites for multiple companies worldwide. You have just joined the company and been assigned to your first project for a large retail store (e.g., a company similar to Target or WalMart).

Because of the size and complexity of the project, you will be working within a virtual team, with members spread throughout the company. Your team will consist of Joe, Greg, and Jim, who are located at various offices around the country. This will require you to communicate virtually (i.e., by e-mail, etc.). You will be working closely with your team members to complete the project.

The project requires your team to design, build, and implement a website to promote the products available for sale at your client's retail store. The goal is to have this website available to online users within 3 months. Your career and future compensation are both tied to the successful completion of the project on time. Because you will be working with a team, the success of this project will be judged by the final product the team creates (i.e., your success is tied to how your team does as a whole).

Because the successful completion of this project is tied closely with the performance of your team as a whole, Company XYZ wants you to get to know your team members better. Recently, XYZ has created a social networking site called XYZ Connections, allowing employees to create profiles and connections with other employees. This site is limited to the use of current XYZ employees so only those who are part of the company will be able to view this information. Currently, there are over 10,000 users of the system with more joining every day. Since this is new for the company, member profiles may not be completely filled out so you may see some members with only general information contained in their profile (e.g., name, title, and general information kept by the company).

Sample Vignette for Heuristic Processing

For the current study, you have just joined a website design company. One of your first projects is to design a website with a team of fellow colleagues. Imagine you are in the following situation:

Company XYZ is a multinational technology and consulting firm with over 50,000 employees worldwide. They offer a variety of services including designing, coding, and hosting websites for multiple companies worldwide. You have just joined the company and been assigned to your first project for a large retail store (e.g., a company similar to Target or WalMart).

Because of the size and complexity of the project, you will be working within a virtual team, with members spread throughout the company. Your team will consist of Joe, Greg, and Jim, who are located at various offices around the country. This will require you to communicate virtually (i.e., by e-mail, etc.). You will be working closely with your team members to complete the project.

The project requires your team to design, build, and implement a website to promote the products available for sale at your client's retail store. The goal is to have this website available to online users within 3 months. Both your career and future compensation are tied to the successful completion of the project on time. You will be judged on your contribution to the team while the other team members will be judged separately (i.e., your success on the project is **not** tied to how your team does as a whole).

Company XYZ wants you to get to know your team members better. Recently, XYZ has created a social networking site called XYZ Connections, allowing employees to create profiles and connections with other employees. This site is limited to the use of current XYZ employees, so only those who are part of the company will be able to view this information. Currently, there are over 10,000 users of the system with more joining every day. Since this is new for the company, member profiles may not be completely filled out so you may see some members with only general information contained in their profile (e.g., name, title, and general information kept by the company).

Appendix B

Precision of Treatments Manipulation Check

For each profile presented to participants, measures of all social capital dimensions were taken. These measures were then analyzed to see if the changes to the profiles had residual effects on other social capital dimensions. For example, the profile manipulating structural capital asked participants to rate this person on not only the structural scale items, but the relational and cognitive items as well. This was done for each argument type treatment (claim, claim/data, and claim/data/backing).

The results provided from this analysis would ensure all treatments accurately impacted their targeted dimension. For example, if the argument included in the backing for relational capital caused a significant increase in cognitive social capital, it would suggest that the backing meant to increase perceptions of relational social capital impacted cognitive as well.

A series of between-subjects MANOVAs were performed to understand if components intended to elicit greater perceptions of one social capital dimension unintentionally altered perceptions of the other dimensions (i.e., did the relational treatments cause changes in the perceptions of structural and/or cognitive capital). Only the social capital dimensions not being manipulated (in the above example, this would be the structural and cognitive capital measures) were included in the MANOVA. Table B1 shows the MANOVA results across the three dimensions of social capital (e.g., "Relational Manipulation" in the table had only the cognitive and structural dimensions in the MANOVA). These results show that, for argument strength, there was no unintended impact to the other social capital dimensions.

Table B1. MANOVA Results for Non-manipulated Dimensions (Argument Strength)

Relational Manipulation	Wilks' $\lambda = 0.95$ $F(2,178) = 1.21$, $p = 0.31$
Cognitive Manipulation	Wilks' $\lambda = 0.99$ $F(2,178) = 0.34$, $p = 0.87$
Structural Manipulation	Wilks' $\lambda = 0.95$ $F(2,178) = 1.10$, $p = 0.36$

Type of Processing (Systematic and Heuristic)

A manipulation check was included to ensure participants recognized how their performance on the task presented in the vignette would be measured (either as a whole group for systematic processing or individually for heuristic processing). As previously described, a vignette was used describing a scenario in which performance would be based on overall team performance to trigger detailed evaluation of information (systematic processing) or performance based on individual contribution, which triggers higher level, less detailed processing of available information (heuristic processing). This was based on prior research suggesting outcome dependency (i.e., team or individual) can drive individuals to process information in greater detail (Flink and Park 1991; Kaplan et al. 2009).

Overall, results suggest that the manipulations were 81% effective across both processing types (see Table B2 for complete details). This check is critical to the current study as the hypotheses being tested are concerned with how individuals process information, either heuristically or systematically. If participants did not correctly recognize how they were being assessed, then it is unclear whether they used heuristic or systematic processing. Therefore, participants who did not accurately recognize how performance was assessed were discarded. While this did result in excluding a number of participants, a number of studies using motivation and outcome dependency manipulation have found similar effectiveness from 85% to 92% (Devine et al. 1989; Meffert et al. 2006; Neuberg and Fiske 1987) Thus, the sample for the current study is 168 participants.

Table B2. Processing Type Manipulation Check		
	Project Success (based on Performance)	
	Assessed Individually (Heuristic Processing)	**Assessed as a Team (Systematic Processing)**
Systematic Manipulation[1]	3	**93**
Heuristic Manipulation[2]	**75**	36

[1]Participants in this manipulation should recognize they are assessed as a team.
[2]Participants in this manipulation should recognize they are assessed individually.

Profile Components and Argument Strength

The argument strength must be assessed to ensure participants recognized (at a minimum) the presence of the additional information related to the argument. This involved examining the post-experiment questions which asked participants to say whether or not they saw the profile elements that were being included for the different treatments. The post-experiment questionnaire asked participants if they "did not notice," "noticed," or "noticed and read" the additional information presented in the profile (see Appendix A). For example, the *data* treatment for relational social capital included information about education that was not present in the *claim only*. The questions would then ask participants to mark if this information was presented in the profiles based on the aforementioned scale. This procedure is similar to prior research examining argument strength in an online environment (Kim and Benbasat 2006, 2009).

For each social capital dimension treatment, results show that participants either noticed or noticed and read at least one of the SNS profile components that corresponds to the argument for that profile. This indicates that every participant, at a minimum, recognized the inclusion of the additional profile components that were meant to change argument strength. Thus, participants placed across the various treatments recognized the presence of the appropriate argument information.

Verification Questions to Assess Argument Use

Please recall the previous profiles you reviewed in the experiment. Read through the list below to see if you read this piece of information or not. Try to answer all questions below. If you are unsure of an answer, please give your best opinion.

Example: If you did not notice John had been employed by Indiana University, you would respond to the question by checking the "Did Not Notice" column below.

At least one profile had information in the:

Information (Argument)	**Did Not Notice**	**Noticed**	**Noticed and Read**
Hometown Information	○	○	○
"Profile Summary" Section	○	○	○
"Education" Section	○	○	○
……..	…	…	…

Meanings of Available Choices:

Did Not Notice: I did not notice the additional information included in these profiles.
Noticed: I noticed the presence of additional information in these profiles.
Noticed and Read: I read the additional information in these profiles.

Appendix C

Measurement Items

Model Variables

Trust (Jarvenpaa et al.1998; McAllister 1995)	
Trust1	Given this person's track record, I see no reason to doubt his/her competence and preparation for the job
Trust2	I feel I can rely on this person not to make my job more difficult by careless work.
Trust3	This person appears to approach his/her job with professionalism and dedication.
Trust4	I would be comfortable giving this person complete responsibility for completion of this project.
Trust5	I would trust this person while working on this project.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Identification (Brown et al. 1986; Henry et al. 1999; Hogg and Hains 1996)	
ID1	In general, I share similar attitudes and beliefs with this person.
ID2	I feel I would fit well into a team with this person.
ID3	I identify myself as being similar to this person.
ID4	I would be glad to be on a team with this person.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Structural SC (Nahapiet and Ghoshal 1998; van den Hooff and Huysman 2009)	
SC1	This person appears to be well connected within the organization.
SC2	If needed, I believe this person can use his relationships for help with the current project.
SC3	This person has a large network of connections.
SC4	This person appears to have a working relationship with his/her network of relationships.
SC5	This person appears to be good at building relationships with others.
SC6	This person has a well-developed network through which support can be leveraged.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Cognitive SC (Nahapiet and Ghoshal 1998; van den Hooff and Huysman 2009)	
CC1	It would be easy to discuss the problem at hand with this person.
CC2	I feel this person and me would “speak” the same language.
CC3	It would be easy to discuss the project because I feel we would share an understanding about the project.
CC4	Given the current project, it would be easy to form a similar understanding with this person of what needs to be done.
CC5	This person and I would share an understanding of how the project should be handled.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Preference (Dierdorff et al. 2011; Jackson et al. 2006)	
PREF1	I would prefer to work with this person on the project.
PREF2	Working with this person would be beneficial for the project.
PREF3	I want to work with this person on the project.
PREF4	I would enjoy working with this person on the project.
Scale of items: 1 = strongly disagree to 7 = strongly agree	

Demographics and Control Variables

General Demographic and Usage Questions	
Gender	Male/Female
Age	*1-99*
Duration of SNS Use	*(in years)*
Frequency of SNS Use	Text Entry
SNS Intensity (Ellison et al. 2007)	
Intensity1	Using a social networking site is part of my everyday activity.
Intensity2	I am proud to tell people I'm on a social networking site.
Intensity3	Using a social networking site has become part of my daily routine.
Intensity4	I feel out of touch when I haven't logged onto my social networking site for a while.
Intensity5	I feel I am part of my social networking site community.
Intensity6	I would be sorry if my social networking site shut down.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Likeability (Wayne and Ferris 1990)	
Like1	I think this employee would make a good friend.
Like2	I would get along well with this employee.
Like3	I feel I would like this employee very much.
Scale of items: 1 = strongly disagree to 7 = strongly agree	
Disposition to Trust (Jarvenpaa et al. 1998; Robert et al. 2009)	
Disposition1	Most people are honest in describing their experience and abilities.
Disposition2	Most people tell the truth about the limits of their knowledge.
Disposition3	Most people can be counted on to do what they say they will do.
Disposition4	Most people answer personal questions honestly.
Scale of items: 1 = strongly disagree to 7 = strongly agree	

Appendix D

Instrument Validity

A confirmatory factor analysis was conducted using AMOS 16 to further validate the measures used in the model. Results from the analysis (see Table D1) indicate both validity and reliability for the constructs evaluated. Factor loadings for all constructs were strong and significant with composite reliability (CR) greater than the average variance extracted (AVE) as well as an AVE above the recommended minimum of 0.50 suggesting convergent validity in the current model (Hair et al. 2010). To evaluate discriminant validity, the square roots of the shared variance between constructs were found to be greater than the correlation across constructs providing support for discriminant validity (Hair et al. 2010). Additionally, maximum shared squared variance (MSV) and average shared squared variance (ASV) were both less than the AVE for each construct further suggesting discriminant validity for the current model (Hair et al. 2010).

Table D1. Correlations, Reliability, and Validity Measures

					Correlation Matrix[1]			
	CR	**AVE**	**MSV**	**ASV**	**Preference**	**Structural**	**Cognitive**	**Relational**
Preference	0.94	0.79	0.10	0.05	0.89			
Structural	0.92	0.65	0.19	0.13	0.32	0.80		
Cognitive	0.93	0.72	0.35	0.16	0.05	0.34	0.85	
Relational	0.93	0.60	0.35	0.20	0.23	0.43	0.59	0.78

[1]Square root of the average variance shared are across diagonal with the off-diagonal elements being correlations between constructs. Diagonal elements should be larger than off-diagonal elements for discriminant validity.

As suggested by Hair et al (2010) and Bagozzi (1988), an analysis of the factor loading was conducted and found that the loadings were all greater than .70 for all constructs, with all other cross-loadings being lower than .30 (see Table D2). This suggests overall discriminant validity for the constructs used within our model. Finally, the goodness of fit indices (comparative fit index (CFI), root-mean-square error of approximation (RMSEA) and standardized root-mean residual (SRMR)) suggested a relatively good fit of the model with data (Hu and Bentler 1999). Item loadings and model fit can be found in Table D2.

Table D2. Summary of CFA (Item Loadings and Model Fit)

Construct and Items	Standardized Estimates
Relational Social Capital	**0.93**
Trust1	0.78
Trust2	0.72
Trust3	0.73
Trust5	0.67
Trust7	0.86
ID1	0.78
ID2	0.84
ID3	0.74
ID4	0.85
Cognitive Social Capital	**0.93**
CC3	0.81
CC4	0.79
CC5	0.91
CC6	0.90
CC7	0.84
Structural Social Capital	**0.92**
SC1	0.73
SC2	0.77
SC3	0.77
SC4	0.80
SC6	0.87
SC7	0.87
Preference	**0.94**
PREF1	0.91
PREF2	0.88
PREF3	0.95
PREF4	0.80
Chi-Square & Model Fit Indices	
χ^2	252.60
CFI	0.96
RMSEA	0.06
SRMR	0.04

Note: Numbers in bold above represent the average variance extracted for each construct.

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