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Social Cues, Social Bonds, and Digitally Mediated Interactions

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~ To My Drakes ~
Yes, DJ, I am finished with my dissertation.

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ABSTRACT OF THE DISSERTATION

Social Cues, Social Bonds,
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by

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Doctor of Philosophy, Graduate Program in Sociology
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Dr. Jan E. Stets, Chairperson

This study examined social relationships, digital communication, and the identity processes involved in developing social bonds with strangers. Utilizing identity theory, social exchange theory, I theorized, tested, and formulated a model for the development of social bonds. I focused on critical social psychological mechanisms involved in identity processes, identity verification, role-taking, certainty, and positive emotions. The cumulation of this model generates social solidarity between interaction partners. At issue, however, is how this model may be affected when access to social cues is digitally mediated in the interaction. To address this aim, I conduct an experiment in which two strangers interact as "co-workers" in a workplace setting across a computer network as well as in person. There are, however, debates regarding the impact of social technologies on social bonds. These arguments often contain a discussion of social cues, such as eye contact, facial expressions, and body language, with some arguing that the reduction of social cues available in the interaction negatively impacts our ability to form meaningful relationships. To test these competing perspectives, I develop counter hypotheses with

contrasting outcomes. On the one hand, I hypothesize that more social cues compared to less social cues will increase social bonds (H1a), transitioning into an interaction with more social cues will increase social bonds (H2a), and the effects of role-taking, identity verification, certainty, and positive emotions on social bonds will be stronger with more social cues compared to less social cues (H3a). On the other hand, I hypothesize that fewer social cues will increase bonds (H1b), transitioning into an interaction with fewer cues will increase social bonds (H2b), and that the processes leading up to social bonds will be stronger during interactions with fewer social cues (H3b). However, results do not support either sets of hypotheses. I did not find that decreasing or increasing access to social cues through digital interaction significantly affects the model depicted in Figure 1. Instead, I offer a third alternative perspective: people are adapting to fluctuations in the availability of social cues while technology is developing to bridge the absence of such cues.

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Chapter 1: Introduction

Relationships are the building blocks of society. They tie individuals together, forming an interconnected network. These ties make up the structure of society. Social bonds represent the connection between the micro social psychological mechanisms and macro societal mechanisms. Social bonds include feelings of cohesion, social solidarity, and unity between individuals (Kuwabara 2011). When individuals feel united, they develop groups, collectives, and even large-scale social structures, such as kinship with family units and religion through networks of worshipers (Turner and Maryanski 2008).

Sociologists George Herbert Mead (1934) saw social interaction as the basis of society and crucial to forming the self. Through social interaction and interpersonal dynamics, individuals understand how they see themselves and how others perceive them, tying them to each other and the larger social structure (Burke and Stets 2009). This study assesses the interpersonal mechanisms that sustain and generate social bonds between strangers. The process of identity, how people think of themselves, and how they use those meanings to guide their behavior is central to social interaction and the development of social bonds. So identity is an important focus of this dissertation.

Given the importance of social bonds, I explore the social psychological mechanisms that activate and maintain these bonds. In this study, I examine the development of social cohesion between strangers through identity processes, including role-taking, identity verification, certainty, and emotions. I formulate a theoretical model for the development of social bonds, including four direct paths and two indirect paths. I anticipate that role-taking will support social bonds directly and indirectly through identity verification (Stets

and Cast 2007), reduce uncertainty (Yamagishi and Yamagishi 1994), and increase positive emotions. I also anticipate that identity verification will have direct and indirect paths to social bonds (Burke and Stets 1999; Stets et al. 2018) by decreasing uncertainty (Swann 2011) and increasing positive emotions (Burke and Stets 2009). In turn, reduced uncertainty and increased positive emotions will directly increase social bonds (Lawler 2018; Swann 2011).

As society becomes more technologically advanced, the effects of social technology on social bonds are important to investigate. For Mead (1934), Cooley (1902), and Goffman (1959) face-to-face interaction is foundational to theorizing on the development of the self and social relationships. However, this perspective limits our understanding of the self and relationships as society becomes more and more technologically inclined, especially regarding social communication and networking online. I extend this theorizing by examining how these social psychological mechanisms affect social bonds across different digitally mediated communication mediums or interaction platforms (text messaging and audio/phone calling) and compare those interactions to a face-to-face interaction.

Theorizing on the self and social bonds to include social technology is important as an increasing amount of interaction between individuals is facilitated by social technologies (Davis 2016; Madden and Zickuhr 2011). For example, 97% of Americans own a cellphone of some type, and approximately 75% own a computer, all of which have the capacity for text messaging and phone calling (Pew Research Center 2021a). Internet use over time also has increased, with 93% of U.S. adults using the internet (Pew

Research Center 2021b). Most U.S. adults (72%) are using these technologies to communicate with friends and family by accessing social media platforms such as Facebook (69%), Instagram (40%), Snapchat (25%), and Twitter (23%) to communicate with others, and doing so daily (Pew Research Center 2021c). The internet also has steadily taken over how Americans meet their romantic partners, replacing traditional markets such as family, school, neighborhoods, and the workplace (Rosenfeld and Thomas 2012). The growth in these digitally mediated communication platforms may have ramifications for how individuals form relationships.

Therefore, this study examines the paths for developing social bonds and the impact of social technologies on those bonds. I test the social psychological mechanisms that maintain, support, and form social bonds between strangers, including role-taking, identity verification, certainty, and emotions. Using the framework of identity theory (Burke and Stets 2009), I add to prior research by testing the presence of social cues available to the dyad during the interaction on social bonds. I also study the transitional effects of dyads moving from a situation with more social cues (in-person, face-to-face) to a situation with less social cues (digitally mediated, phone call or text messaging) on bonds, and compare this with the opposite transitional experience (less social cues to more social cues). Further, I examine whether the process leading to social bonds is stronger or weaker when more or less cues are available to the dyad.

There are, debates regarding the impact of social technologies on social bonds. These arguments often contain a discussion of social cues, such as eye contact, facial expressions, and body language, with some arguing that the reduction of social cues

available in the interaction negatively impacts our ability to form meaningful relationships. These studies show that meeting in person, compared to over a computer network, increases affinity (Sprecher 2014), satisfaction (Mallen et al. 2003), intimacy (Bente et al. 2008), and positive impressions (Okdie et al. 2011). In-person interactions include auditory and visual cues not present during a digital interaction, including body language and facial expressions. These additional cues may provide information relevant to social bonds, helping to define the self, the other, and the situation. These additional cues may strengthen developing bonds by providing a smooth and effective exchange of information.

On the other hand, others argue that humans have adapted to this reduction and use it to their advantage when developing and maintaining relationships with others online. In this perspective, interaction and communication are improved with less social cues (Walther 1996, 2007), increasing intimacy and positive emotions (Dollev-Cohen and Barak 2012; Drouin and Landgraff 2012). Interacting digitally allows individuals to be comfortable and focused on the exchange of meanings without unnecessary distractions from other stimuli present in face-to-face interactions. Being focused and comfortable while interacting may allow for an efficient exchange of meanings between interactants, helping them define the self, the other, and the situation. Therefore, the lack of social cues may strengthen the developing bonds, providing a dedicated and efficient exchange.

To test these competing perspectives, I develop counter hypotheses with contrasting outcomes. On the one hand, I hypothesize that more social cues compared to less social cues will increase social bonds (H1a), transitioning into an interaction with more social

cues will increase social bonds (H2a), and the effects of role-taking, identity verification, certainty, and positive emotions on social bonds will be stronger with more social cues compared to less social cues (H3a). On the other hand, I hypothesize that fewer social cues will increase bonds (H1b), transitioning into an interaction with fewer cues will increase social bonds (H2b), and the processes leading up to social bonds will be stronger during interactions with fewer social cues (H3b).

To meet these research goals, I conduct an experiment in which two strangers interact as "co-workers" in a workplace setting across a computer network as well as in person. While there is evidence that social bonds can form in the absence of visual and auditory cues (Molm et al. 2007; Molm et al. 2012; Stets et al. 2018), I build on these prior studies by testing the competing views as to whether these bonds develop differently. Text messaging does not provide the auditory cues available in phone calling. Neither text nor phone provides the visual cues that face-to-face offers, which may be crucial in the development of social bonds.

The broader impact of this study is the advancement of sociological theories, especially theories of the self and identity, to include different types of communication platforms. Specifically, this study expands on the social psychology model of social bonds by 1) connecting critical social psychological mechanisms, demonstrating their collective contribution to developing social bonds, and 2) addressing the role of technology on those developing bonds. While studies show bonds continue to develop even in the absence of face-to-face interactions, this study will empirically test the effects of social cues on these bonds, the effect of social cues by phase, and the effect of social

cues on the process leading up to social bonds. This will allow me to assess the differences between platforms, and the effects, if any, of technology on the developing bonds.

Dissertation Outline

In Chapter 2, I present my theoretical argument for the development of social bonds and the conflicting arguments regarding social cues and technology's effect on those bonds. Drawing from identity theory and social exchange theory, I present my theoretical model for social bonds through role-taking, identity verification, reduced uncertainty, and positive emotions. In this chapter, I detail prior research and the theoretical framing around social bonds, incorporating social exchange theory's focus on developing bonds through a series of exchanges and identity theory's focus on the exchange of meanings during interaction. I then examine the arguments for and against digitally mediated interaction and its effects on social bonds and interpersonal dynamics. Finally, I present contrasting hypotheses to reflect these two perspectives.

Chapter 3 details my methodological approach, including my experimental protocol, survey measures, and analytical strategies. I detail the experiment setting of this study, including the four conditions and the three phases of the experiment. Participants in this study interact both in-person (more social cues) and over a computer network (either text messaging or phone calling, fewer social cues). Participants are randomly assigned to an initial medium of interaction, but all participants eventually interact both in-person and over a computer network. I also detail my measurement strategy for my constructs,

including social bonds, identity verification, role-taking, uncertainty, and emotions. I then briefly review the analytical strategy for the current study.

The results of this study are presented in Chapter 4. I investigate the identity processes involved in developing social bonds and the effects of technology on that process. This finding contributes to sociological social psychology research connecting role-taking and identity verification to the development of social bonds. I test three sets of hypotheses. I examine the effect of social cues on developing bonds, the effect of transitioning from a situation with more social cues (in-person, face-to-face) to a situation with less social cues (digitally mediated, phone call or text messaging), and I compare this with the opposite transitional experience (less social cues to more social cues). I then study whether the process leading to social bonds is stronger or weaker with more or less social cues. Results show no significant differences between in-person and digital interaction for the developing social bonds.

In Chapter 5, I discuss significant findings and relate those results to theoretical implications and prior studies. I review contrasting arguments for and against digital interaction, connecting those arguments to the results of this study. I then explore multiple explanations for the lack of significant differences between in-person and digital interactions found in this study, including limitations faced by the study, particularly the gender and age diversity of the sample, and the social context of interaction in this study compared to previous studies. In comparing arguments for and against digital communication on social bonds, I offer a third perspective. People are adapting to digital interactions, while technology is attempting to bridge the gap between online and offline

interaction, resulting in both positive and negative outcomes on the developing social bonds. I discuss how digital affordances benefit social interaction while still lacking the depth of information provided in an in-person interaction. Together, these positive and negative impacts on social bonds may explain why I find no differences between digital platforms and in-person interactions.

Chapter 6 presents concluding arguments, reviews the study's contribution and the implications of the impacts on social relationships as societies continue advance technologically. In this chapter, I further discuss limitations to the study, areas of future research, and connect the current study to prior research on social bonds, digital interaction, and the self. I explore individual differences that may affect dyadic outcomes, such as gender and status differences in perceptiveness to social cues, and postulate on possible future studies to address these differences. I then discuss digital affordances not present in this study, such as creating and personalizing a public profile, which is available on social media platforms and may foster social bonds, as well as identity verification, role-taking, happiness, and certainty. I conclude this chapter by reflecting on the study's findings, the impacts of COVID-19, and the future of technology, social bonds, and society.

In summary, I examine the development of social bonds through role-taking, identity verification, reduced uncertainty, and positive emotions. Given the advancement of social technologies and society's increasing dependency on digital communication to form and maintain relationships, this study also analyzes how social bonds may be affected by technology. When individuals interact face-to-face, they have access to multiple

perceptual cues that can be used to infer meaning regarding the self and the situation. The use of digitally mediated communication, such as text messaging or audio calls, which has less direct perceptual cues, may alter how individuals perceive information from their interaction partners. The effects of social cues on the development of social bonds are examined in this study to address how social bonds form, and how they differ when access to social cues is digitally altered.

Chapter 2: Theory

This study examines the mechanisms involved in the development of social bonds between strangers as well as the effects of social cues on those mechanisms and social bonds. Social cues refer to visual, auditory, and perceptual inputs that our physical body interprets during interactions and across situations. Social cues include eye contact, body language, facial expressions, as well as tone of voice and vocal inflection (Grossmann 2017; Seltzer et al. 2010). These social cues are either missing from a digital interaction or are prone to misinterpretation when interaction partners cannot hear or see one another (Carter and Ascensio 2018). Auditory or visual cues that are missing during digital interaction, such as vocal inflection or body language conveys meanings about the situation and the interaction partners (Ma and Agarwal 2007). Meanings about the self or the relationship may be misinterpreted without visual and auditory context. If these cues are missing or misinterpreted during interaction they may have negative consequences for the development of social bonds. This study aims to better understand the role of social cues in new and emerging relationships. I examine developing bonds, including unity, cohesion, and regard, across different platforms of interaction where access to social cues is altered between interactions, with some dyads experiencing an increase in social cues and others experiencing a decrease.

In order to address these research aims, this study draws on sociological social psychology, including symbolic interactionist theories of the self, social exchange, and identity theory. These theories are useful in examining the development of social bonds as they give particular attention to behavior that is developed through a process of

interaction, yielding cognitive and affectual outcomes (Stryker 1977). Researchers within this paradigm are particularly interested in components of the self and the social situation to better understand human behavior and social interaction.

To test how role-taking, identity verification, certainty, and emotions effect social bonds, this study draws primarily on identity theory (Burke and Stets 2009). Identity theory is a structural symbolic interactionist theory that focuses on how individuals apply meanings to themselves and use these meanings to guide their behavior (Stryker 1977, 2008). Consistent with symbolic interactionists, identity theorists are interested in how individuals derive meaning about social situations, themselves, and others from social interactions (House 1977; Stryker 2008). A central component of identity theory is identity verification, in which individuals reflect on whether others see them as they see themselves. This process involves communication and coordination between individuals by exchanging significant symbols, which hold shared meanings about the self and others in the situation (Mead 1934). By role-taking, individuals can understand and share these meanings during an interaction, thereby supporting identity verification (Stets and Cast 2007). In turn, identity verification facilitates social unity (Stets et al. 2018).

Many early symbolic interactionists focus especially on face-to-face interaction. At issue is how these social psychological mechanisms, particularly role-taking and identity verification, may be altered when access to social cues, such as facial expressions and tone of voice, is reduced compared to an in-person, face-to-face interaction. Therefore, this study examines the theoretical model discussed in this chapter across multiple interaction platforms.

In this chapter, I begin by presenting this study's theoretical model, I then discuss the theoretical foundations for the model and explicate the processes and the theoretical paths to social bonds through the different social psychological processes. I discuss how these constructs, especially identity verification, function to support social bonds between interaction partners. Next, I describe how technology, via access to social cues, may increase or decrease social unity, cohesion, and regard between strangers. I present competing arguments regarding the role of digital communication, social cues, and technology on relationship dynamics. Finally, I summarize the chapter by presenting formal hypotheses which are informed by prior research and theories of the self and social bonds. Guiding these hypotheses and this study is the central research aim: How do social bonds form, and how, if at all, are those bonds affected by the access of social cues via digital communication?

Theoretical Model for the Development of Social Bonds

I anticipate four direct paths to developing social bonds: role-taking, identity verification, certainty, and positive emotions. This theoretical model, illustrated in Figure 1 guides my current study. Apart from role-taking, this theoretical model has support in previous research, even in the absence of social cues available in an in-person, face-to-face interaction. The current study adds to this theoretical model by examining the role of social cues available to the dyad during the interaction, the transitional effects of dyads moving from a situation with more or less social cues, and whether the process leading to social bonds (role-taking, verification, certainty, emotions) is stronger or weaker when more or less cues are available in the interaction.

[Figure 1 about here]

As shown in Figure 1, I explore multiple direct and indirect paths to the development of social bonds. I anticipate that role-taking will support social bonds directly and indirectly through identity verification (Stets and Cast 2007), reduced uncertainty (Yamagishi and Yamagishi 1994), and positive emotions. When individuals feel they are better at role-taking with their partner, they are more likely to feel verified by their partner, feel less unstable in the situation, have more positive feelings, and increase their social bonds with their partner.

Figure 1, identity verification also influence social bonds directly and indirectly through uncertainty and positive emotions (Burke and Stets 1999). When individuals feel their partner sees them as they see themselves, they will likely feel a decrease in uncertainty (Swann 2011), an increase in positive emotions (Burke and Stets 2009), and more united and closer to their partner (Stets et al. 2018). Reduced uncertainty and positive emotions also are expected to increase social bonds. When individuals feel more certain about their situation, they are more likely to develop close ties toward those who facilitate that (Swann 1982, 2011). When individuals feel more positive emotions towards others, they may also feel more united by interacting more frequently with those others (Lawler 2018).

It is possible that as individuals form stronger bonds with the other, their role-taking, identity verification, certainty, and positive emotions also increase. However, this study does not examine such paths because the data are cross-sectional. I focus on the initial formation of relationships between individuals previously unacquainted to capture the

genesis of relationship formation. In addition, I control for the phase of the experiment (Phase 2 or Phase 3) to assess whether the length of the dyadic interaction affects the development of social bonds.

Identity Theory

To examine the development of social bonds between strangers, the theoretical framework for this research is grounded in identity theory (Burke and Stets 2009). Identity theory is a structural symbolic interactionist theory, focusing on social behavior and the exchange of significant symbols to define the self, the other, and the situation. A symbol is considered "significant" when the meanings are shared and understood between interaction partners during social interaction. Social interaction is then defined by individuals using these shared meanings (significant symbols) to understand the self (self-meanings) and the perspective of others in the situation (Mead 1934; Stets 2018). While interacting, individuals in the situation will respond to significant symbols (symbols that have a shared arbitrary meaning), self-reflect on those meanings, and relate them back to the situation, thus facilitating social interaction.

This process of social interaction, the exchange of significant symbols, and applying meanings to the self and others in a situation is foundational to the formation of social bonds, and subsequently, the basis of society (Mead 1934; Gallant and Kleinman 1983; Turner 2011). Through social interaction with others, individuals share an understanding of meanings associated with objects, including the self as an object. From this process of self-objectification, people develop a set of meanings, or identity standards, attributed to

the self (Burke and Stets 2009; Mead 1934; Stets 2018). Identities are then a collection of identity standards, or meanings, which are applied to the self as a stimulus (an object). This is a cognitive process, with individuals engaging in self-reflection of what it means to be "me" compared to "not me." The self is then shaped by this cognitive process via sharing and reflecting on significant symbols in a situation (Mead 1934; Stets 2018).

Identities are meanings which are internalized to the self and reflect the self as an occupant of a role, as a unique individual, or as a member of a group (Burke and Stets 2009). In this study, I focus on a specific role identity, the worker identity, in order to examine the identity process and its association with social cohesion. The worker identity is a role-based identity, involving interaction between less intimate others, typically involves a task orientation, and is rooted in an evaluation of the self as competent (Stets and Tsushima 2001). Role identities are relational identities in which individuals attribute meanings to themselves while in a particular role (Burke and Stets 2009). These roles are situated within a larger social structure and represent the individual's location within that structure (Stets 2018). For example, the worker identity represents an individual's employment status, their level of competency, and reflects some degree of agency within society. As a role-identity, the worker identity carries meanings such as competence, power, and agency (Stets and Harrod 2004).

The worker identity was chosen for this study due to the task-based meanings associated with it, which is important for the cover story in this study. In addition, the worker identity has been examined in multiple studies within the identity theory paradigm, as the theory was initially developed with a focus on role identities (Stets

2018). Given that the central components of identity theory, particularly the identity verification process, has previously been examined using the worker identity (Stets 2005; Stets and Harrod 2004; Stets and Tsushima 2001), it is a reliable and consistent identity to test the effects of social cues on the identity model.

The worker identity, in a workplace setting, also is a situated identity. When an identity becomes situated, it is primed in the situation, and individuals become more attentive to their behaviors, the behaviors of others, and the social psychological process between them, all within the situated meanings provided in the context, in this case, the worker identity (Alexander and Wiley 1990). This activation of an identity initiates the identity processes (Stets 2018). The exchange of meanings regarding the self and others and how those meanings are attributed to the self are central components to identity theory (Stryker 2008). Identities guide social behavior and interactions with others. Perceptions of social cues are then fundamental to the identity process. At issue is how the identity process produces social solidarity between interaction partners. This study addresses this issue by formulating a theoretical model of social bonds as it is generated from the identity process.

The Formation of Social Bonds

Sociological research on social bonds has been examined in social exchange theory, and recently, in identity theory. While social exchange theorists examine developing bonds through a series of exchanges between actors with a focus on the network structure in exchanges and its outcomes for exchange patterns (Savage and Whitham 2018), identity theorists look to the exchange of meanings during interaction, incorporating

individual and interpersonal processes. In this study, I examine these key social psychological processes, including identity verification, role-taking, uncertainty, and emotions, and I focus on those processes as they relate to developing bonds between actors.

Social bonds refer to the feeling of cohesion, social solidarity, and unity between individuals (Kuwabara 2011). It represents how connected people feel to one another, as well as how united they feel as a unit (Stets et al. 2018). Within the exchange framework, bonds develop through repeated interactions, with frequent interactions promoting an affinity between actors (Lawler 2018). Cohesion and unity also are fostered when individuals come together on a joint action (Kuwabara 2011), helping to reduce uncertainty (Molm 1994) and increase positive emotions (Lawler et al. 2000).

Social bonds are conceptualized as a multidimensional construct, including trust, affective regard, and social unity or cohesion (Molm et al. 2007; Molm et al. 2012; Stets et al. 2018). Trust refers to the expectation of goodwill and the belief that another will behave benevolently (Burke and Stets 1999; Yamagishi and Yamagishi 1994). Affective regard is how individuals feel about one another with respect to positive or negative evaluations (Molm et al. 2007; Molm et al. 2012). Social unity is the perception that individuals share goals or interests and evaluate the relationship as a unit (Molm et al. 2007). To have a strong bond with another means to have a strong sense of trust, positive evaluations, and feelings of unity.

The social exchange perspective focuses on the interaction between individuals, their contributions and benefits from interaction, and the larger social structure that governs

these interactions (Molm 2006). In this study, participants work together as a dyad, sharing a joint workplace assignment. This form of exchange is productive, in which actors' collective efforts are directed towards a joint activity (Savage and Whitham 2018). Productive exchanges generate strong emotional outcomes, which lead to feelings of cohesion and solidarity between actors (Lawler 2018; Sharp and Kidder 2013).

This study also focuses on relationship dynamics within dyads. Dyads are unlike larger groups in that interactions between two individuals become uniquely framed by interpersonal processes, with outcomes of the interaction focused on collective efforts of the pair (Hogg 2018). Because there are only two people involved in the interaction compared to a group with three or more people, the interaction becomes focused on the relationship. In a dyad, actors are focused on the other as an individual, compared to triads or larger groups, in which the group itself becomes a unique entity, external to the individuals involved (Yoon et al. 2013). Therefore, in this study, I examine how the joint contribution of both actors results in beneficial outcomes for the dyad. Particularly, I test how dyads develop social cohesion, as well as identity verification, role-taking, certainty, and positive emotions.

Exchange theorists also are particularly interested in the contexts, or structures, of interaction, with repeated exchanges between the same actor creating a basis of relation between them (Savage and Whitham 2018). This process of developing social bonds through interpersonal dynamics is also detailed in identity theory. While exchange theorists have examined the role of emotions and uncertainty (Hogg 2001; Lawler 2001) in exchanges, identity theorists build on these social psychological processes and give

particular attention to how these social psychological processes influence the self and relationships.

Within the identity framework, bonds develop through an exchange of meanings between individuals. While interacting, people exchange meanings in the situation regarding how they see themselves and one another (Burke and Stets 2009). The exchange of these meanings becomes central to the self and interaction, fostering role-taking (Davis and Love 2017), identity verification (Swann 2011), reducing uncertainty (Stets et al. 2018), and increasing positive emotions (Stets and Asencio 2008). Through this process, bonds are formed (Stets et al. 2018). In this chapter, I examine how self processes play a role in developing relationships, including social unity, affinity, and cohesion.

At issue is how access to cues, via technology, may influence self processes and the emerging bonds. In a typical experimental protocol within the social exchange and identity paradigms in which social bonds develop, participants do not meet their partner face-to-face, and instead, interact across a computer network (see, for example, research by Molm et al. 2012; Molm et al. 2007; Stets et al. 2018). Research on interaction through social media suggests a sense of "co-presence" is felt between online users, increasing feelings of positive emotions and intimacy (Alinejad 2019). Therefore, social bonds apparently can form void of in-person interactions and less social cues in the exchange.

However, we do not know how access to social cues impacts the path to social bonds by way of role-taking and identity verification. Given the abundance of social

technologies used to facilitate interaction (i.e., cellphones, computers, social media, e-mail), at issue is how these technologies affect the ability people have to perceive the self and others through digital communication. Digital interactions offer less social cues, such as eye contact and body language, which are typically available in an in-person interaction. With less social cues available in a digital interaction compared to an in-person interaction, there may be fewer perceived meanings exchanged in the situation, such as smiling or nodding to signal affirmation or approval, potentially affecting the bonds that may develop among individuals.

Therefore, this study also addresses how the development of social bonds is affected by more or less social cues during interaction via technology. The study also examines how changes to social cues during interaction create changes to the identity processes involved in developing bonds. In an era of digital cues and technological advancement, are relationships that form through less social cues mediated through technology weaker than those created with more social cues?

To specifically test the effects of social cues on the development of bonds, this study compares relationship outcomes between in-person, face-to-face interactions, which have all relevant social cues to interactions that are digitally mediated and less social cues. Participants' social bonds are compared between conditions in which they interacted with more social cues (in-person interaction) or less those cues (digital interaction). In addition, I test the transitional effects of dyads moving from a situation with more social cues to a situation with less social cues. I also test whether the process leading to social cues, including role-taking, identity verification, certainty, and emotions, is stronger or

weaker when more or less social cues are available to the dyad. Less social cues are created through a digital interaction via either audio/phone calling (hearing but not seeing their partner) or a text message-based interaction (neither seeing nor hearing their partner). These mediums are used to simulate the reduced social cues setting while also mirroring typical mediums of interaction.

This study also builds on previous research by examining the relationship between social bonds and identity verification, or the belief that others see you the way you see yourself, role-taking, or the ability to understand others' perspectives and emotional states, as well as the role of uncertainty and positive emotions. While these components (identity verification, role-taking, uncertainty, and emotions) are recognized in prior research (see, for example, Burke and Cast 1997; Stets et al. 2018; Stets and Cast 2007), the role that technology plays on these interactions has not been previously examined. Therefore, this study builds on those prior studies by accessing the relationship between technology, the availability of social cues, and social bonds. I seek to address how, if at all, social cues influence the development of social bonds, as well as its influence on each mechanism involved in the process.

The formation of social bonds is central to the evolution of human societies. Relationships are the building blocks to large-scale macro social institutions throughout human history, including kinship and religion, but also the economy and polity (Turner and Maryanski 2008). As humans embark on a new technological era, at issue is how social technologies may affect the ties that bind humanity. Through an identity

framework, this study addresses this concern, focusing on the availability of social cues, mediated by technology, and its possible effects on the development of new relationships.

Identity Verification

Once a situation calls forth a particular identity, given the meanings that are present in the situation and that match the meanings of an identity, the verification process is activated (Burke and Stets 2009). While interacting, individuals reflect on the meaning of who they are in the situation. They look for cues in the situation to determine if others see them the way they see themselves (Burke and Stets 2009).

The identity verification process operates as a feedback loop and has the components of an identity standard, input (based on reflected appraisals), a comparator, and behavioral outputs (Burke and Stets 2009). The identity standard is a set of meanings attached to a particular identity, and those meanings guide individuals during interaction to perform in specific ways that support the identity. For example, the worker identity may include meanings such as competent, agentic, and able. While interacting, individuals will behave in ways that reflect those meanings to align the meanings of their behaviors (outputs) with the meanings held by their identity (identity standards).

During interaction, individuals experience reflected appraisals, or feedback on their identity performances (Burke and Stets 2009). Reflected appraisals are an individual's perception of how others view the self within a particular situation based on an identity. How people think they are seen in the situation serves as the input in the feedback loop. People assess whether their evaluation of themselves based on the reflected appraisals

within an identity matches their identity standards for that identity (Stets 2018). This reflects activation of the comparator.

If individuals perceive that others see them as they see themselves, they feel positive and stable (Burke and Stets 2009). This is identity verification and is central to the development of the self, maintaining who one is within and across social situations. When individuals feel verified, they are drawn to more frequent exchanges with that partner, and in the present study, this can lead to increasing feelings of trust, unity, and affective regard (Burke and Stets 1999; Stets et al. 2018). If, however, the individual does not feel that others see them in the same way they see themselves, they experience identity non-verification and feel negative and uncertainty, pulling them away from the interaction partner (Burke and Stets 2009). The negative feelings may encourage individuals to modify their behavior (output) so that the meanings of (new) behaviors better match how they want to be seen by others, based on their identity standard meanings (Burke and Stets 2009).

Identity verification typically involves at least two individuals interacting to exchange the meanings relating to the self, their behaviors, and the situation. People want others to see them in the same way that they see themselves and will be motivated to seek out others who provide verification to produce a recurrent source of identity verification. This way, individuals are able to maintain a source of verification with selected others in their social networks. This recurrent source of identity verification encourages individuals to continue their interaction with the other, facilitating feelings of social unity and cohesion (Burke and Stets 1999). If both individuals provide verification for one

another's identities, they produce a mutual verification context or a situation in which behaviors between at least two individuals are jointly supporting the identity meanings of the other (Cast and Stets 2016).

Mutually verifying contexts can produce feelings of trust and commitment between interactants (Burke and Stets 1999). This, in turn, supports the relationship and guides behaviors that facilitate the verifying context. For example, two co-workers who are aligned on their identity standards of what it means to be a worker, may find it easier to work together as they give off, and seek out, the same perceptual cues regarding that identity. This may lead the two co-workers to favor interactions together, providing a source of verification for both. The formation of mutually verifying contexts and sustained verification from another is therefore expected to generate feelings of social cohesion, social solidarity, and unity between individuals.

Identity verification also can provide certainty by reaffirming a stable and consistent self-view that is accepted and understood by others (Burke and Cast 1997; Swann 2011). In turn, interactions with others who have clear expectations provide a predictable and stable situation, which can help facilitate trust between partners (Hogg 2011). The more predictable others appear, the more individuals come to trust them, promoting social bonds (Molm 1994).

Identity verification also produces positive emotions such as happiness and reduces negative emotions such as anger or sadness (Burke and Stets 2009; Stets and Burke 2014). When individuals feel that others see them as they see themselves, they feel good about themselves and the situation. Alternatively, if identity verification is not

experienced, negative emotions emerge, causing the individual to feel bad about the self and the situation. Prolonged and frequent discrepancies between identity standards (self-meanings) and meanings perceived by social cues from the interaction partner (reflected appraisals) result in more intense negative emotions (Stets and Tsushima 2001).

Given the feelings of increased uncertainty and negative emotions that identity non-verification generates, individuals actively seek to avoid or remove themselves from such contexts (Burke and Stets 2009). Reactions to non-verification include cognitive and behavioral practices to defuse negative feelings and uncertainty (Stets 2018). One strategy a person may engage in after perceiving non-verification includes avoiding interactions with others that regularly generate non-verification, as these interactions are bound to make the individual feel uncertain and negative. Individuals may be less likely to seek out interactions or seek out relationships with others which causes them to feel this way. In an attempt to reduce that uncertainty, individuals will seek out and bind themselves to others that provide stability (Hogg 2011). Therefore, through identity verification, reducing uncertainty and increasing positive emotions are expected to have a direct and indirect relationship with social bonds. The less uncertainty and the more positively the individuals feel, the more social cohesion develops between them.

Role-taking and the Development of Social Bonds

Role-taking is the process of understanding others' point of view, including their thoughts and feelings, thereby establishing a cognitive and empathetic link with others (Davis and Love 2017; Turner 2011). Mead (1934) argues that through the process of role-taking, individuals learn meanings associated with the self and others. Role-taking

facilitates smooth interaction by contextualizing another's actions, providing meaning and insight to their behaviors (Stets 1992; Turner 2011). Role-taking is conceptualized along a cognitive and affective dimension (Davis and Love 2017). Cognitive role-taking refers to *understanding* the perspective and feelings of another, while affective role-taking refers to *feeling* the same as the other. Role-taking is foundational to social interaction as it aids in the development of the self, supports interpersonal dynamics, and constitutes the basis of society (Gallant and Kleinman 1983; Mead 1934; Turner 2011).

Mead theorized that the self developed through a process of role-taking with a "community of attitudes," or the generalized other. Role-taking helps individuals think about how others may be perceiving them, reflecting on the self as an object situated within a larger community of expectations and norms. It is through this process that the self is constructed and understood through the perceived perspectives of others. Role-taking helps to facilitate identity verification and supports a smooth and successful interaction (Stets and Cast 2007). When interaction partners understand each other's perspective and emotional state, they may have insight into how each sees the other. Knowing how the other sees them can aid in the identity verification process.

Role-taking provides an initial orientation to another, which may, in turn, set the stage for viewing the other in the same way that the person views himself/herself, thereby verifying the other. This orientation towards the other can help coordinate interaction, reducing conflict between actors (Stets 1992), increase the frequency of interaction (Cast 2004), and help individuals form relationships (Galinsky et al. 2005). Understanding and

feeling what the other is thinking and feeling can increase the desire to interact with the other, forming and sustaining social bonds.

Obtaining identity verification in social interactions is facilitated by role-taking, as interactants can see one another's perspective and share a basis of understanding through the exchange of significant symbols. Mead (1934) argues that through the exchange of significant symbols and role-taking with multiple generalized others, the self is developed. Therefore, it is theorized in this study and supported by prior research (Stets and Cast 2007) that role-taking will generate a sense of unity, cohesion, and regard directly and indirectly via increasing identity verification. When people better understand one another's perspective and emotions, they are better suited to communicate and thereby better able to verify one another.

In addition, uncertainty and emotions are expected to be associated with role-taking. I anticipate role-taking will provide smoother interaction between individuals, which may increase certainty and positive emotions. Uncertainty is unpleasant for individuals and may stem from the inability to infer the intentions of others in interaction (Yamagishi and Yamagishi 1994). Role-taking can facilitate this by providing an orientation toward another. When individuals can infer the perspective, intentions, and emotions of another or role-take, they will likely feel more certainty. Likewise, this orientation towards another can help facilitate a successful interaction, making individuals feel positive emotions such as satisfaction and happiness.

Social Bonds, Certainty, and Emotions

Uncertainty reduction and positive emotions are central mechanisms for increasing bonds between individuals, with both constructs operating distinctively during interaction (Lawler 2001). As interactions between individuals increase in frequency, the uncertainty that surrounds that situation is reduced, with individuals becoming more familiar and acquainted with one another. Having knowledge and foresight regarding how the other may act helps to alleviate feelings of instability and unpredictability in the situation, especially when actors are exchanging on a joint task, requiring mutual decision making and negotiation (Molm 1994). Individuals can also reduce uncertainty and distress by knowing how to behave in a given social setting. Therefore, defining a situation, and its behavioral expectations provides a context by evoking affectual meanings associated with that situation, which in turn guides behavior, and reduces uncertainty (Smith-Lovin and Robinson 2006).When feelings of instability are reduced, individuals feel a stronger sense of cohesion and unity (Stets et al. 2018).

Likewise, positive emotions are foundational to relationships (Sharp and Kidder 2013; Turner 2000). When people feel good, they gravitate toward others who facilitate those good feelings and form relationships with them. When individuals feel more positive emotions towards others, they are drawn to more frequent interactions with them (Algeo et al. 2008; Lawler 2018) and feel a stronger connection (Armenta et al. 2017). In addition, positive emotions that may emerge from interacting often become attributed to the relationship itself, binding the actors together (Lawler 2001; Yoon et al. 2013). For example, if a worker is praised for her job well done on a particular task, she may feel

positive emotions about that task. Those positive feelings about the task may spillover onto her co-worker, who helped her accomplish the task.

Technology in the Development of Social Bonds

There are competing perspectives on how technology is associated with relationship dynamics and communication. Some argue that reducing social cues when using technology negatively affects relationship dynamics, creating worse outcomes than in-person interactions (Turkle 2012). Negative outcomes may include reduced liking for another and feeling unsatisfied with the interaction, as socially relevant cues such as body language, tone of voice, and facial expressions are lacking from the exchange. Others argue that digitally mediated communication can facilitate stronger and more positive relationship outcomes than face-to-face, such as increased intimacy by allowing individuals to feel comfortable and focused on the interaction rather than on exogenous or unrelated stimulus in the environment that may distract the person from the interaction (Dolev-Cohen and Barak 2012; Drouin and Landgraff 2012; Walther 1996, 2007). I briefly discuss each perspective below.

Technology and the Availability of Social Cues

The idea that technology negatively impacts social bonds is often rooted in the argument over the effects of reduced social cues available in digital interaction. Many theories of the self, social interaction, and society are based on the availability of social cues in face-to-face interactions. Social cues such as body language, facial expressions, and tone of voice convey meaning in interaction in terms of the thoughts and feelings of

interactants (Ekman and Friesen 1971; Kampe et al. 2003; Toma et al. 2018). These cues provide meaning by directing individuals towards the interaction, exchanging information in the situation, and convey understanding about the self and the other. For example, emotional states and attitudes can be conveyed through words. However, seeing the other's body language, their tone of voice, and their facial expressions provide additional information that would otherwise be lacking from the interaction, such as when a person is lying or being sarcastic. Therefore, the lack of social cues, especially visual and auditory cues, in a situation can negatively impact interpersonal dynamics and obstruct relationship development.

According to Goffman (1959), visual and auditory cues are "sign vehicles" or information cues used to manage one's impression to others. Sign vehicles such as how people look, what they are wearing, and how they move and talk are used in interactions to manage their impressions to form bonds with one another (Goffman 1959). These sign vehicles also convey meanings about the self, such as wearing a suit at work conveys meanings of professionalism and confidence. As discussed above, it is the exchange of these perceptual cues that facilitate the identity process. The meanings individuals attribute to themselves, or their identities, are expressed in a variety of ways during interaction. People express their self-meanings through self-description (telling others who they are) as well as nonverbal behavior, including body language, physical appearances, and emotional expressions which are often conveyed through vocal inflection and facial expressions (Ma and Agarwal 2007). With more inputs, or social cues, from the situation, the individual has more information to reflect on and interpret.

More information available in the situation may help create a smooth and efficient interaction, with interactants better able to understand and infer meaning from one another.

Visual behaviors such as eye contact and gazing at human faces are noted to be a central component of communication (Grossman 2017). Humans also are particularly captivated by a "social gaze" or eye contact during communication and exchange eye contact during the interaction in order to sustain and maintain the social interaction (Schilbach 2015). These visual cues are a valuable tool for acquiring information about interaction partners, communicating attentiveness in the situation, the emotional state of the actors involved (Ekman and Friesen 1971), and their intent to interact with each other (Kampe et al. 2003).

Auditory cues, such as hearing others' tone of voice and the inflection in their speech, also convey socially relevant information such as one's emotional state and intentions. For example, someone may say something seemingly rude, but the tone of voice and inflection may convey if they are instead being sarcastic or joking. The true meaning of the interaction may be lost without these auditory cues. In addition, hearing a loved one's voice can facilitate a feeling of closeness or co-presence (Baldassar 2008) and help to reduce stress responses in the brain (Seltzer et al. 2012).

Additionally, oxytocin, a neurohormone linked to promoting pro-social behavior and sociability among humans, is noted to be more likely to increase for individuals communicating in-person compared to digitally (Seltzer et al. 2012). Oxytocin increases when making eye contact during interaction (Carter 2014) and when hearing another's

voice (Seltzer et al. 2010, 2012). When oxytocin levels are increased in humans, it may decrease anxiety and aggression during interaction (Grossman 2017; Seltzer et al. 2012), increase feelings of trust (Kosfeld et al. 2005), and improve participants ability to infer the affective mental state of their interaction partner (Domes et al. 2007). It may be that oxytocin operates as a biological mechanism that accompanies the identity process, decreasing anxiety and uncertainty in the situation, while increasing positive feelings and social bonds between interactants.

On the other hand, fewer inputs, or social cues, from the situation may make the development of social bonds more difficult as the individual is less able to reflect and interpret the meanings available in a situation. With the lack of cues in the situation, the conceptualization of the "other" in the interaction becomes more difficult to establish and may alter how individuals perceive themselves as objects through the lens of the other (Zhao 2005). The self is constructed through a reflection of how we think others see us, or our "looking glass-self" (Cooley 1902). When the "other" is digital, we lose social cues regarding how others see us. We are unable to infer relevant social cues such as body language and facial expressions that infer information in the interaction.

There is evidence that fewer social cues, particularly auditory and visual cues, results in adverse outcomes for individuals and their perceptions of the interaction. Studies show that participants who meet over a computer network compared to in-person are less inclined to like their partner (Sprecher 2014), feel the interaction is less efficient, making it harder to maintain and sustain (Cummings et al. 2002), feel it is less satisfying (Mallen et al. 2003), less intimate (Bente et al. 2008), they report less positive impressions of their

partner (Okdie et al. 2011), and less interest, attentiveness, and engagement in the interaction (Ramirez and Burgoon 2004). In addition, people are less likely to identify social cues in the situation which are relevant to the conversation, such as the intentions and emotional states of the other, in the absence of in-person social cues (Kampe et al. 2003). Researchers argue that it is the lack of perceptual cues, especially visual and auditory cues, which are responsible for these differences in communication platforms.

Missing cues, such as facial expressions or tone of voice convey meanings about the self, the other, and the situation. Without those cues, digital interaction may not be as efficient as in-person interaction, affecting the transfer of social cues which are relevant to the identity process. For example, it may be more difficult for a worker to perceive the reflected appraisals of their co-worker while interacting digitally, because they cannot see their co-worker nod in approval or smile when the co-worker accomplishes a task. With a less efficient transfer of social cues, identity processes and relationship dynamics may be negatively affected.

Body language, facial expressions, tone of voice, and other social cues help individuals understand and define the situation, including emotional expressions and self-meanings (Ma and Agarwal 2007). The lack of such cues may create obstructions to possible inputs, or reflected appraisals, resulting in miscommunication with the interaction partner in the digital situation, thereby inhibiting the verification process. In other words, if reflected appraisals are obstructed in a digital space, the concern is that identity processes may be altered, negatively impacting the self (Hillis 1999). Ultimately, these barriers to the identity process, in turn, negatively impact the development of social

bonds as individuals experience less certainty, more negative emotions, and they feel less connected and understood by others.

In fact, the better the technology can replicate the cues available in face-to-face interaction by including visual and auditory cues, such as video calling, voice messages, and sharing images, the more concrete and tangible the interaction feels for individuals using it (Sundar et al. 2008), which may increase how connected individuals feel to others (Baldassar 2008). Therefore, this study compares differences in social bonds with more or less social cues during the interaction. With less cues available in a digital interaction (either text messaging or phone calling via a computer network), participants may experience a weaker effect on their relationship dynamics compared to participants who interact with more social cues available in the situation (in-person interaction). As the situation increases in the availability of social cues, participants can better assess their situation, themselves, and their partner by having additional information accessed in the situation via social cues. This assessment will provide the foundation for an exchange of meanings, facilitating role-taking, identity verification, and social bonds.

Technology and the Hyperpersonal Context

While scholars point to the adverse effects of technology on well-being and social bonds (see, for example, Turkle 2012), there is still a growing number of relationships budding online (Rosenfeld and Thomas 2012). In fact, 81% of U.S. adults report going online daily, with close to 30% reporting that they are online “almost constantly” (Perrin and Kumar 2019). There continues to be a growth in the integration of social life and technology, resulting in a fluidity of online and offline behavior and experiences (Davis

2016; Cummings et al. 2002). This constant overlap between online behavior and offline behavior may allow for a more seamless exchange of interaction, encouraging more self-disclosure (Antheunis et al 2007) while feeling while feeling intimate and comfortable (Dolev-Cohen and Barak 2012). Feeling familiar, comfortable, and engaged in conversation can help unite individuals, bringing them closer together and increasing affinity between them. Therefore, with the advancement of social technologies and people's continuous and often constant online activity, the modern self is constructed, in part, by those engagements with technology.

In fact, according to the Hyperpersonal Perspective, digital spaces provide a *stronger* platform for the development of social bonds because of the ease of access and comfortable setting that online interaction fosters (c.f. Walther 1996, 2007). Digital interactions allow individuals to have more control over their settings, as they can control how they present themselves and edit those presentations to others (Davis 2016). This perspective does not disregard the effects of social cues on social interaction and relationships. Instead, it argues that social technologies are designed in specific ways to adapt the user to fewer social cues allowing for a more comfortable and engaging interaction (Davis 2020). Rather than auditory and visual cues gathered in an in-person interaction, digital settings contain specific affordances, such as applications that organize and sort our conversations (e.g., SMS, Facebook Messenger, Watsapp), that allow the user to be more in control over their interactions and subsequently allowing for a more comfortable and easily accessed communication platform (Borowska 2015).

These affordances help to facilitate interpersonal dynamics, allowing individuals to focus on the relationship between them.

People may feel more comfortable with online communication due to their ability to edit their behavior and relax their physical body, allowing them to connect with others in a relaxed and focused setting, which involves fewer distractions via cues which are irrelevant to the interaction. For example, a worker who wants to show that she is "hard working" may do so by carefully editing her email exchanges with co-workers or masking her facial expressions during phone calls. In doing so, she can convey that she is competent, attentive, and capable of performing her work duties, without showing her physical appearance or revealing emotional reactions. If instead, she must interact in-person, she will need to engage in additional behaviors to modify her appearance (e.g., make-up, grooming, professional attire) and monitor her facial expressions and body language. These additional behaviors may not be necessary to convey that she sees herself as a hard worker, and instead may detract from her concentration on identity performances that tie more directly to her identity standards, such as completing tasks on time and coordinating with co-workers.

This focused attentiveness to the digital interaction may allow individuals to establish a cohesive relationship with relative ease. This ability to connect digitally, edit an email or a text message, and communicate while relaxing our physical bodies can thereby be a tool to facilitate social interaction online in a controlled and comfortable way for the user. In other words, external distractions such as one's physical appearance, tone of voice, or

facial expressions can be removed, allowing attention to be given the identity performances that the individual would prefer to demonstrate.

Additionally, Walther (2007) argues that digital communication is more focused on the self-image of individuals compared to face-to-face communication. When interacting online, the reduction of social cues in the conversation allows for a singular focus on the social exchange, self-presence, and situational evaluations. Individuals may be more successful at impression management online because they can concentrate on the digital interaction. This in turn may help individuals form stronger bonds, as they are able to focus on the exchange of meanings that are relevant to the relationship, such as how the other see's themselves and their emotional state while interacting. Digital interactions allow for a more relaxed and focused interaction, facilitating attentiveness to social bonds and an intimate interpersonal exchange of information.

Individuals can include edits to their self-presentation and interpretation of others' messages to present a self that enhances desired relationship expectations and outcomes (Walther 2007). It may be that the physical presence of others during interaction creates a cognitive burden on individuals, focusing their attention on their partners' presence and redirecting their awareness away from their own self-image (Okdie et al. 2011). The reduction of these distracting stimuli may help individuals spend more time focused on themselves while interacting digitally. This may *amplify* the identity process, with individuals more actively thinking about their self-meanings and their efforts to match that self-view. In turn, this amplified and focused identity process may allow for stronger social bonds.

The lack of social cues in digital interaction, rather than detract from behavior and communication, may offer a certain case of "affordances," or provide functions to users that allow them to interact with some object, in this case, technology, efficiently and purposefully (Davis 2020; Davis and Chouinard 2016). Affordances are cues (physical or digital) that signals an objects' function (Borowska 2015). In other words, technology is often created with the human as the center of the design: what functions will allow this product to be helpful to people? Communication, for example, is an essential experience for humans and central to the function of society. Technology can then be a tool to facilitate that goal, providing affordances through phone/video calling, e-mail, and instant messaging.

Affordances are designed to perform the same functions as nonverbal in-person cues (Borowska 2015) by providing information to the situation, regulating the interaction, and expressing emotions and intimacy (Derks et al. 2007). Therefore, digital affordances can be expected to facilitate the identity process and enhance social bonds by communicating affirmation, emotional states, and certainty. Text message affordances can be in the form of symbols such as the "thumbs up" icon, which can be given to indicate approval or support online. Emoticons are digital affordances that provide context on emotional expressions, allowing interaction partners to better express and interpret their emotions. In addition, digital affordances can offer more certainty during text-based communications via symbols which are displayed during text messaging, such as "…" indicating that the other is currently typing a message or the label "seen" indicating that the other has read the message.

Audio calls, either over a phone or a computer, offer some social cues available during in-person interactions, such as tone of voice, speech cadences, and real-time responses. At the same time, phone or audio calls offer digital affordances that can help with communication and turn taking while speaking. These digital affordances available during audio calls include the ability to mute oneself while the other is talking, which can limit distractions external to the conversation such as background noises. Phone or audio calls also provide digital cues that one person is talking, with that person's name appearing on screen or is highlighted onscreen, indicating that they are speaking, and others should wait to speak. Knowing who is speaking, when to speak, and limiting external noises by muting those who are not speaking can help maintain certainty and convey affirmation during communication. In addition, phone or audio calls typically attach the person's name, and in some cases the person's photo, to their voice while speaking, helping to connect a sense of familiarity each time someone speaks. These affordances, both in text messaging and phone calling, offer a digital cue to the user, allowing them to infer meanings, such as affirmation, emotional expressions, and certainty, in a new and adaptive way while engaging online.

Further, these affordances are inherently social as they are designed to enhance the user's experience while interacting and communicating online. Interactants can tailor their self-image, conceal facial reactions, and modify communication styles to direct the relationship towards a shared goal of sustainability and reciprocity. These affordances can help enhance online interaction by supporting the people who are using the digital tools to communicate. Those tools, such as instant messaging, emailing, and phone/audio

calls, have specific user-interface capabilities designed to support interaction online. Adaptiveness to those tools can help users interact and share information about the self that they wish to convey in communication.

Summary on Social Cues in Current Study

In sum, there are four anticipated direct paths to the development of social bonds: role-taking, identity verification, reduced uncertainty, and positive emotions. There also are multiple indirect paths to social bonds from role-taking by facilitating identity verification, reducing uncertainty, and increasing positive emotions. In addition, there also is an indirect path from identity verification through reduced uncertainty and positive emotions, resulting in social bonds.

Research within the social exchange and identity theory paradigms demonstrate that the identity process, particularly the verification process, is still operating, even within a digital platform. In a study examining the identity verification and digital interactions, nonverifying information produces negative emotions in both face-to-face and digitally mediated interactions, so long as the identity is activated in the situation and is a prominent identity for the individual (Carter and Asencio 2019). This demonstrates that identity processes are operating consistently across social situations, whether those situations be online or offline.

However, while identity processes are linked to social bonds, even when communication occurs only through a computer network (Stets et al. 2018), the mechanisms of those bonds, and the extent to which a more or less social cues affects them, has yet to be thoroughly examined. It may be that reduced cues create contexts that

are more difficult to infer meanings, as access to relevant information is limited, resulting in less role-taking and increasing uncertainty, and generating negative emotions. This, in turn, is likely to leave individuals feeling less united and more socially distant from one another. On the other hand, it may be that reduced cues create contexts that are easier to infer meanings, allowing individuals to be focused on the exchange during a relaxed and comfortable setting. In a digital interaction, individuals can directly edit and plan their identity performances, which may help others see them as they see themselves, facilitating social cohesion more easily than in-person. This study will examine both perspectives, assessing the relationship between role-taking, uncertainty, and emotions as they are related to the development of social cohesion between strangers.

To test this, my model is applied to different conditions in which the access to social cues is either reduced or increased compared to an in-person interaction. When individuals interact in person, they have access to multiple sources of perceptual cues, including visual and auditory cues from the physical environment and the interaction partner, that can be used to infer meaning regarding the self and the other. Digitally mediated communication has fewer relevant social cues and may alter how individuals perceive information. Less perceptual cues may result in less role-taking, less identity verification, increased uncertainty, and negative emotions, resulting in weaker social bonds.

Current Study and Hypotheses

This study examines the relationship between interpersonal dynamics, social bonds, and technology. Utilizing experimental methods, I study three central research questions:

1) the effect of social cues on relationships and 2) the experience of transitioning from more to less social cues, compared to less to more cues, during interaction and 3) the overall role of social cues on my model for the development of social bonds between strangers. Figure 1 diagrams the expected theoretical process of the development of social bonds through identity verification, role-taking, uncertainty, and emotions. This diagram is informed by the above research and guides my current study. The following hypotheses are formulated based on the theoretical foundation and prior research presented above. The results are presented in Chapter 4.

The model presented in this study demonstrates four direct and two indirect paths to the development of social bonds between strangers. At issue with this model is how access to social cues via digital interaction strengthens or weakens the development of social bonds. Given the conflicting evidence on the role of technology via reducing social cues in the interaction, this study seeks to test both perspectives on the development of social cohesion between strangers. Presenting competing hypotheses will allow me to engage with both possibilities: digital interaction, which offers fewer social cues than in person, may hinder, or foster social bonds.

To examine both possibilities, I set up two sets of opposing hypotheses. These hypotheses address the three main research questions: the effect of social cues on bonds, the transitional effect of changes in social cues available in the situation, and the effect of social cues on the overall model for developing bonds. For the argument that increased social cues are associated with positive relationship outcomes:

H1a: More social cues compared to less social cues available in the interaction will increase social bonds.

H2a: Transitioning into an interaction with more social cues compared to less social cues will increase social bonds.

H3a: The effects of role-taking, identity verification, uncertainty, and positive emotions on social bonds will be stronger with more social cues compared to less social cues.

For the argument that reduced social cues are associated with positive relationship outcomes:

H1b: Less social cues compared to more social cues available in the interaction will increase social bonds.

H2b Transitioning into an interaction with less social cues compared to more social cues will increase social bonds

H3b: The effects of role-taking, identity verification, uncertainty, and positive emotions on social bonds will be stronger with less social cues compared to more social cues.

The first hypotheses are tested by examining the role of social cues (more or less) on developing bonds. This will allow me to test if the availability of more or less social cues in the interaction increases or decreases unity. The second hypotheses are tested by testing interaction effects of available cues (more or less) and the phase of the experiment (Phase 2 or 3). Interactions between social cues and the phase will identity transitional effects, testing the effects of dyads moving from interactions with more cues to less cues

or less cues to more cues. For the third set of hypotheses, I examine group differences between interactions that take place in-person (more cues) with interactions that take place over a computer network (less cues). Finally, I also explore how the other social psychological constructs in my model, role-taking, identity verification, certainty, and emotions, are affected when access to social cues becomes digitally mediated.

In conclusion, this study analyzes the effect of technology on the development of social bonds by having individuals come together and interact directly on a digitally mediated platform and then compare the outcomes with those in face-to-face interactions. This study advances identity theory by introducing digitally mediated communication platforms and their role in developing bonds and the identity verification process. In addition, this study examines the divide in the literature regarding the benefits or detriments that technology has and how this will be associated with role-taking, identity verification, certainty, emotions, and ultimately the formation of social bonds.

Chapter 3: Methods

The Sample

Student recruitment took place at the University of California, Riverside (UCR). As shown in Table 1, participants come from a variety of colleges across the UCR campus, including humanities, arts, and social sciences (67%), natural sciences (18.5%), business (4%), engineering (3.6%), and other/undeclared colleges (7%). UCR is an ethnically diverse campus, with a significant number of Hispanics (41.5%) and Asians (33.8%) compared to whites (11%). The race/ethnicity of the participants included in the experiment mirrors the university. Of the 248 individuals, 107 (43.1%) are Hispanic/Latinx, 88 (35.5%) are Asian, 21 (8.5%) are white, 17 (6.9%) are multiracial (two or more races), 7 (2.8%) are African American/Black, and 8 individuals (3.2%) reported having a racial identity that was something other than these categories.

[Table 1 Here]

The average age of participants in this study is 20. Of the 124 dyads included in the experiment, 88 dyads are women, and 36 dyads are men. Unfortunately, COVID-19 halted data collection on strangers in same-sex male dyads. Thus, this research is predominately of strangers in same-sex female dyads, with 70% of the 248 participants women.

Procedures

Participants first complete an online survey (see Appendix A), which asks them about their use of social technologies, their social and educational background, and then instructs participants to sign up for the in-person experiment. Participants are scheduled

into same-sex pairs to control for any possible status or gender effects. The pairs are randomly selected to one of four conditions, detailed below in Figure 2. All conditions include face-to-face in-person interaction and interaction over a computer network equipped for simulating either audio communication (phone calling) or text messaging. Given that the frequency of interaction with a partner is associated with increases in relational cohesion and reductions in uncertainty (see Lawler 2018 for review), this study manipulates the order in which participants interact face-to-face or digitally to control for which comes first in the sequence of interaction.

[Figure 2 Here]

Once the dyads arrive in the laboratory, each person is greeted by a research assistant and ushered into separate rooms. Each participant is placed in a private room and given consent forms. Once consent forms are reviewed and signed by the participant with the researcher, the research assistant assists the participant with using the computer, is given a tour of the participant's private room, and then instructs the participant to complete a survey reporting how s/he is currently feeling (baseline emotions, Phase 0). After completing this brief survey, each participant is ushered into a larger room where they meet the other (one's co-worker). This interaction is Phase 1 of the experiment (see Figure 2).

Once participants are together in the larger room, they are given additional instructions on the experiment. The research assistant reads a script (see Appendix B) stating that the pair are selected to work together as "co-workers" on an event having to do with planning a "healthy eating" forum on campus. Before the event planning (Joint

Task 1 and 2, detailed below), participants are told they will complete a "Getting to Know You" activity (Stets 2005, see Appendix B). This activity will give participants a chance to communicate and share information about themselves, including their favorite musical artist, activity, animal, and their thoughts on what makes a good co-worker. These questions are characteristic of how interactions typically form in-person and online and provide a baseline of communication that includes expectations about the identity assessed in this study (the worker identity). Participants are given 10 minutes to discuss as many questions as they feel needed for the activity to help each get to know their co-worker before the event planning.

After completing the "Getting to Know You" activity, the research assistant concludes the activity and ushers the participants, one at a time, back to their private rooms. Participants are given a brief survey (Survey #1) which takes about 1–2 minutes to complete. This first survey captures each participants' perception of role-taking with their co-workers, their current feelings, and how they think their co-workers feel. Once participants complete this survey, they are instructed on their first event planning task: Joint Task #1 (See Appendix B).

In Phase 2 of the experiment, participants complete a joint task and then complete a second survey independently. In Joint Task #1, dyads are instructed to plan a one-day student event on campus addressing healthy eating on campus. They are to design the student event, including finding a speaker for the topic, a campus venue, and an advertisement plan. As shown in Figure 2 above, half of the dyads meet in-person in the larger room, while the other half meet over a computer network. Among those who meet

over a computer, half of those communicate only by audio, and the other half communicate only by text. All pairs are given instructions on how to use the computer for this first task.

The pairs that complete the task together in-person are given instructions on operating a shared computer to report their event plans. The pairs that complete the task together, but over a computer network, are given instructions on using the computer to write their event plans and communicate through the computer. Dyads who communicate only by audio are connected to a Skype phone call. Skype is set only to allow participants to hear one another but not see each other. Dyads who communicate only by text are connected to an instant messenger application via Skype. In this condition, Skype is set to only allow communication via the text messenger system. Participants in this condition are instructed on how to use the keyboard to type messages to her/his co-worker as well as how to send emojis, gifs, and links from the internet. All dyads, regardless of condition, are given a brief demonstration on how to report their event plans on an online form. They are provided with an open search browser to navigate the internet to aid in the planning. Participants are given 20 minutes to complete this activity.

Following Joint Task #1, participants are disengaged from communication with their co-workers by either returning to their private rooms or closing the communication application on the computer. Each participant is then asked to take a second brief survey (Survey #2, see Appendix A) regarding their experience working with their co-workers. Survey #2 includes the same questions as Survey #1, with questions on their perception of verification of the worker identity, feelings of uncertainty in the interaction, and

experience of developing social bonds with their co-worker. This survey concludes Phase 2 of the experiment.

In Phase 3 of the experiment, participants complete a second joint task and a third survey independently. Joint Task #2 takes place on a different platform from Joint Task #1 with the same co-worker. This interaction will compare dyadic relationship outcomes between digitally mediated interactions and face-to-face interactions with the same partner. During this last task, participants are asked to plan additional matters associated with the student event, such as transportation to and from the airport and student event site, lodging for their speaker, and any local leisure activities that student attendees can engage in before or after the event.

Participants who had previously met in-person to complete Joint Task #1 now meet their co-worker over a computer network (either texting or audio-only). Participants who had previously met over a computer network (either texting or audio-only) will now meet their co-worker in-person. All participants are given the same instructions detailed above regarding navigating Skype for audio or text communication and navigating the internet to complete the online event planning form. Appendix B contains the entire script of instructions provided to participants at the time of the experiment. Participants are given another 20 minutes to complete Joint Task #2. After this activity, they are separated again, given Survey #3, which is the same as Survey #2. Participants are then debriefed and dismissed. This survey concludes Phase 3 of the experiment.

Measures

All items for all measures are shown in the survey guide (See Appendix A). Survey #1 includes only items related to role-taking, as it is conceptualized as the foundation of the development of social bonds and emotions. In Survey #1, participants are first asked for their perceptions of role-taking, followed by their current emotions. Survey #2 and #3 include items from Survey #1 and additional items addressing identity verification, certainty, and social bonds. In these last two surveys, participants are first asked for their perceptions of role-taking, followed by perceptions of identity verification, social bonds with their co-worker, feelings of uncertainty in the situation, and finally they are asked to report their current emotions.

Social bonds. The development of social bonds is conceptualized in this study as a multi-dimensional measure: trust, affective regard, and social unity. Items are measured in a way that is consistent with prior research. Social bonds are measured during Survey #2 and #3, following Joint Task #1 and again following Joint Task #2. Trust is measured by asking participants, “how much did you trust your co-worker during your interaction?” Responses range from 1–7, with 1 being "Very Little," 4 being "Somewhat," and 7 being "Very Much” (Stets et al. 2018). For affective regard, participants are asked “describe your co-worker according to the following characteristics: (1) awful to (7) nice; (1) positive to (7) negative; and (1) uncooperative to (7) cooperative” (Molm et al. 2007; Molm et al. 2012; Stets et al. 2018). Items are recoded and added so that higher scores represent higher affective regard for her/his co-worker. Affective regard items are strongly correlated at Survey #2 (nice/awful and

positive/negative r = .68, nice/awful and cooperative/uncooperative r = .68, and positive/negative and cooperative/uncooperative r = .66), and the correlations are stronger at Survey #3 (nice/awful and positive/negative r = .77, nice/awful and cooperative/uncooperative r = .74, and positive/negative and cooperative/uncooperative r = .72).

For social unity, participants are asked, "describe your interaction with your co-worker according to the following characteristics: (1) united to (7) divided; (1) harmonious to (7) conflictual; (1) partners to (7) adversaries" (Molm et al. 2007). Items are recoded and added so that higher scores represent higher feelings of unity between co-workers. Unity items are moderately correlated at Survey #2 (united/divided and harmonious/conflictual r = .76, united/divided and partners/adversaries r = .40, and harmonious/conflictual and partners/adversaries r = .47), and they maintain their moderate correlation at Survey #3 (united/divided and harmonious/conflictual r = .66, united/divided and partners/adversaries r = .37, and harmonious/conflictual and partners/adversaries r = .56). Trust, affective regard, and unity are then added to create a single scale of social bonds, with higher scores indicating more positive social bonds.

The three sets of items are moderately correlated at Survey #2 (trust and affective regard r = .42, rust and unity r = .50, affective regard and unity r = .41), and the correlations increase at Survey #3 (trust and affective regard r = .58, trust and unity r = .64, affective regard and unity r = .61). Further, the set of seven items that comprise social bonds (trust, the three items of affective regard, and the three items of unity) factor into a single scale at Survey #2 (eigenvalue = 3.10) and Survey #3 (eigenvalue = 3.81).

Overall, the measure for social bonds at Survey #2 has a standardized, average internal correlation of $r = .42$ and an omega reliability coefficient of $\Omega = .90$. The relationship between these seven items strengthens by the end of the experiment, with Survey 3# demonstrating a standardized, average internal correlation of $r = .53$ and an omega reliability coefficient of $\Omega = .93$. Table 2 below demonstrates the internal correlation and factor loadings for all items comprised in social bonds.

[Table 2 here]

Role-taking. Studies that utilize role-taking often adapt and modify measures for use in the specific study (Davis and Love 2017). This study employs a newly adapted scale of perceived role-taking modified from previous work (Stets 1992; Stets and Cast 2007). The scale includes seven items which ask participants to reflect on their prior interaction (the "Get to Know You" activity, Joint Task #1 or Joint Task #2) and "describe your interactions with your co-worker: My co-worker's feelings affected how I felt, I understood my co-worker's feelings, My co-worker could feel what I was feeling, My co-worker, understood my feelings, My feelings affected how my co-worker felt, My co-worker understood my viewpoint, and I could feel what my co-worker was feeling." Response options include "Never" (1), "Seldom" (2), "Sometimes" (3), "Fairly Often" (4), "Very Often" (5). Items are summed so that higher values represent higher perceived role-taking with the co-worker.

These items have a strong internal correlation across the three phases of the experiment. Table 3 demonstrates the results of the internal correlation and factor loadings for all items comprised in the role-taking measure. The strength of the

association between these seven items increases across each phase of the experiment with an Eigenvalue of 2.70 (phase 1), 3.67 (phase 2), and 4.07 (phase 3). Likewise, the Ω reliability increases from .89 (phase 1), to .92 (phase 2), to .95 (phase 3).

[Table 3 here]

Identity Verification. Identity verification is measured by asking participants to reflect on themselves and how they think their partners see them. They are asked to "think about how you see yourself as a worker," and "how much do you think your co-worker sees you this way?" Response categories range from 0–10, with 0 being "not at all," 10 being "completely," and 5 being "in the middle." Higher scores on this item indicate verification or the perception that their partners see them as they see themselves. In contrast, low scores, or nonverification, are shown by participants thinking that their partners *do not* see them as they see themselves. This measure of verification has been used in the General Social Survey (GSS) Identity Module (2014) and is used in other studies (Hunt and Reichelmann 2019; Keicolt et al. 2019; Stets and Fares 2019).

Positive Emotions. Three primary emotions are measured (Turner and Stets 2005) and reflect the methods used in prior research (Stets et al. 2018): happy, sad, and anger. Participants are asked to report how they are feeling as either (1) not at all experiencing the emotion to (7) very intensely experiencing the emotion (see Appendix A). Participants are asked to report their emotions at multiple phases of the experiment. First, they are asked to record their emotions immediately after the consent process but before seeing or meeting their co-worker (phase 0). Next, participants are asked to record their emotions after each interaction with their co-worker, following the "Get to Know You"

activity (phase 1), Joint Task #1 (phase 2), and Joint Task #2 (phase 3). The three emotion items are recoded and summed so that higher scores indicate stronger positive emotions and weaker negative emotions.

Positive emotions have a moderate internal correlation and reliability at phase 0 (average internal correlation $r = .27$, $\Omega = .70$). As seen in Table 4, the internal correlation and factor loading for positive emotions increase over the experiment. In phase 1, emotion items have a moderate internal correlation ($r = .33$) and reliability ($\Omega = .69$). In phase 2, emotion items continue to have a moderate internal correlation ($r = .34$) and reliability ($\Omega = .68$). In phase 3, the final stage of the experiment, the emotion items maintain their moderate internal correlation ($r = .37$) and reliability ($\Omega = .67$). Table 4 demonstrates the results of the internal correlation and reliability scores for all items comprised in the positive emotions measure.

[Table 4 Here]

Uncertainty. Participants are asked to identify how certain or uncertain their interaction with their co-workers made them feel across 3 dimensions (Schaefer and Kornienko 2009; Stets et al. 2018). They are asked, "please describe your interaction with your co-worker according to the following characteristics: (1) certain to (7) uncertain; (1) stable to (7) unstable; and (1) predictable to (7) unpredictable" (see pg. 15). Participants are asked to report their feelings of uncertainty following each Joint Task (phase 2 and 3). Items are summed together with higher scores indicating more uncertainty with their interaction. These items have a moderate internal correlation and reliability at phase 2 (average internal correlation $r = .36$, $\Omega = .69$), but they increase after phase 3 (average

internal correlation $r = .44$, $\Omega = .73$). Table 4 demonstrates the internal correlation and factor loadings for all items comprised in the uncertainty measure.

[Table 5 here]

Digital Platforms/Conditions. As detailed in Figure 2 and the experimental protocols above, this study contains 4 distinct experimental conditions. Both the platform of interaction (texting and audio communication) and the order of interaction are manipulated across the four conditions. In condition 1, participants meet face-to-face for Joint Task #1 and then meet over a text message only computer network for Joint Task #2. Condition 1 is coded as 1. In condition 2, participants meet face-to-face again for Joint Task #1, but they meet over an audio/phone computer network for Joint Task #2. Condition 2 is coded as 2. Conditions 3 and 4 mirror that of 1 and 2 but reverse the order of interactions. In condition 3 (coded 3), participants meet over a text message only computer network for Joint Task #1, then face-to-face for Joint Task #2. In condition 4 (coded 4), participants meet over an audio/phone computer network for Joint Task #1, then face-to-face for Joint Task #2.

Experimental Phase. In my analysis I control for the experimental phase by including the variable *phase* in my model. Phase is coded 0 for Phase 2 and coded 1 for Phase 3.

Social Cues. I constructed a dummy variable for the availability of social cues for the with less cues (texting and phone calling) coded 0 and more cues (face-to-face) coded 1. I will use this variable to test whether social cues influence social bonds, whether the social cues by phase matters, and whether the process leading to social bonds is stronger or weaker when more or less cues are available to the dyad.

I also constructed an alternative variable to explore whether texting and phone calling should be separated into distinct categories, since one is neither seeing or hearing the other (texting) and in the other, one is hearing but not seeing the other (phone calling). To explore this, I constructed two dummy variables. In the first dummy variable, phone calling is coded 1 and face-to-face is coded 0. In the second dummy variable, text messaging is coded 1 and face-to-face is coded 0. Both of these dummies are used to estimate the equations presented in Figure 1 and to test the effect of social cues on social bonds (H1) and the transition effects of social cues on social bonds, social cues x phase (H2). To test whether the effects of my model on social bonds differ by more or less social cues (H3), I estimate a three-group model instead of a two-group model. This three-group model examines whether face-to-face interactions, texting, or phone calling differs in terms of the processes leading up to social bonds.

Transitional Effects. By multiplying the social cues (0/1) and experimental phase (0/1), I construct an interaction variable for the transitional effect of social cues. In this study, dyads either transition from an interaction with less cues into an interaction with more cues (computer interaction to in-person; coded 1) or from an interaction with more cues to less cues (in-person to computer interaction; coded 0).

Background Factors. I obtained background information on participants to provide a profile of the participants included in this study. I captured respondents' gender, race, and socio-economic background. Gender was coded 0 for women and 1 for men. Race was self-reported by the participants and constructed into dummy variables. Response categories included White, Black/African American, Hispanic/Latinx, Asian, Multiracial,

or another racial category. If a participant reported they were multiracial or of another racial category, they were prompted to elaborate. If a participant was partnered with another participant of the same race, same-race dyad was coded as a 1. If the participant was partnered with someone of a different race, the same-race dyad variable was coded as a 0.

For socio-economic status, respondents reported the highest education of their mother and father as well as their parent's combined family income. Response categories included no formal education, some grade school, completed grade school, some high school, completed high school/GED, some college, college degree, some graduate work, graduate degree (coded 1–9). The correlation between mothers' and fathers' education was high ($r = .69$, $p < .01$). Therefore, I calculated the average education of respondents' parents. Respondents parental income included < $10,000, $10,000 – $14,999, $15,000 – $24,999, $25,000 – $34,999, $35,000 – $49,999, $50,000 – $74,999, $75,000 – $99,999, and $100,000 or more (coded 1–8).

Pretest and Analysis

Pretesting was implemented to evaluate the protocol and measures with previously unacquainted participants ($N = 50$). These procedures were pretested for face validity to determine if participants were (1) able to use and communicate via the computer network and (2) feel comfortable designing a student event. Participants were briefed on using the computer to communicate and were successful and enthusiastic in designing their events, with many students providing rich details on each prompt. Data from the pretesting also involved a factor analysis on the items making up each variable to determine their

reliability. The pretest also permitted an assessment of the length of each task and its feasibility for students.

Chapter 4: Results

This chapter investigates the effect of social cues given the theoretical model presented in Chapter 2 and in Figure 1. Two different digitally mediated contexts are investigated: reducing access to social cues and increasing access to social cues. I investigate the effects of cues on social bonds, and I also explore how cues effect the factors leading up to social bonds. I examine the four anticipated direct paths to the development of social bonds: role-taking, identity verification, reduced uncertainty, and positive emotions, as well as the role of social cues. I also examine the indirect paths of role-taking and identity verification on social bonds.

This chapter tests Hypotheses 1 – 3 as presented in Chapter 2. Hypothesis 1 tests the effect of cues available to the dyad during the interaction. Hypothesis 2 tests the transitional effects of dyads moving from a situation with more social cues (in-person, face-to-face) to a situation with less social cues (digitally mediated, phone call or text messaging) and compares this with the opposite transitional experience (less social cues to more social cues). This is the cues*phase interaction effect. Hypothesis 3 tests whether the process leading to social bonds, including role-taking, identity verification, certainty, and emotions, is stronger or weaker when more or less cues are available to the dyad. This hypothesis is examined through a groups model.

Given the conflicting arguments regarding the effect of social cues and whether more or less cues are important in the development of social bonds, I present contrasting hypotheses. On the one hand, research shows that meeting in-person, compared to over a computer network, increases affinity (Sprecher 2014), satisfaction (Mallen et al. 2003),

intimacy (Bente et al. 2008), and positive impressions (Okdie et al. 2011). In-person communication provides auditory and visual cues not present during digital interaction, such as body language and facial expressions. These additional cues provide information relevant to social interaction and help define the self, the other, and the situation. These additional cues may strengthen the developing bonds, helping the exchange of information, providing a smooth and effective exchange.

Alternatively, others argue that interaction and communication is improved with less social cues available in the situation (Walther 1996, 2007), increasing intimacy and positive emotions (Dolev-Cohen and Barak 2012; Drouin and Landgraff 2012). Interaction over a computer network allows individuals to be focused on the exchange of meanings, without external distractions such as other people, objects, or noises that might be present in face-to-face interactions, while feeling relaxed and comfortable. This focused attention on the exchange allows for efficiency and awareness while interactants communicate, while still working together to define the self, one another, and the situation. The lack of social cues may strength the developing bonds, providing a dedicated and efficient exchange.

Based on these conflicting arguments, I hypothesize the following contrasting outcomes:

H1a: *More social cues compared to less social cues available in the interaction will increase social bonds.*

H1b: *Less social cues compared to more social cues available in the interaction will increase social bonds.*

H2a: *Transitioning into an interaction with more social cues compared to less social cues will increase social bonds.*

H2b: *Transitioning into an interaction with less social cues compared to more social cues will increase social bonds.*

H3a: *The effects of role-taking, identity verification, certainty, and positive emotion on social bonds will be stronger with more social cues compared to less social cues.*

H3b: *The effects of role-taking, identity verification, certainty, and positive emotion on social bonds will be stronger with less social cues compared to more social cues*.

Analytical Strategy: Model Development

I use a structural equation model to examine the direct and indirect paths in developing social bonds between strangers as theorized in Figure 1. Structural equation modeling allows for multiple related equations, providing results that examine the inter-related associations between each construct. Structural equation models also allow for model testing and the ability to access the best fitting model of the associated variables.

I test the multiple paths at the dyadic level by taking the average score on each construct and creating a dyadic response for each group in the study. I also considered the time-ordered sequences across the model and its paths. For example, social bonds are theorized to be the cumulation of role-taking, identity verification, reduced uncertainty, and positive emotions. Each of these mechanisms is theorized to influence the development of social bonds between strangers directly, and for some factors (role-taking and identity verification), indirectly. In addition, I utilize the MLMV option, or the

maximum likelihood missing values procedure to maintain the full dataset and avoid dropping any cases with partial or missing values.

Further, I control for the phase of the experiment by including it as a control variable in the model. This would identify if time spent in the experiment (Phase 2 or Phase 3) has any relationship with the development of social bonds. The dyad is the unit of analysis, with the data stacked by phase. This method will allow me to examine the effects of the social cues available among dyads, while controlling for the phase that the interaction took place.

Stacking the dataset by phase results in a doubling of dyads in Table 8, with each dyad represented in each phase. I use the cluster option to take into account responses that are correlated across phases. I also allow the errors between emotions and uncertainty to be correlated, given that the variables that influence emotions may also influence uncertainty. I also test direct and indirect effects across the model.

Overall, this chapter tests critical social psychological processes, including *perceived role-taking* and *identity verification* as they relate to social bonds. I also test how these key processes are related to social bonds through uncertainty and positive emotions. I examine how social cues, and transitioning to more or less social cues, effects the development of social bonds, as well as whether the development of social bonds may be different depending on the availability of social cues. The results are shown in Table 8 and Table 9. The primary model discussed in this chapter has an overall $R^2 = .11$ and a RMSEA of $p < .001$. I report coefficients as standardized betas.

Finally, I explore whether texting and phone calling should be collapsed into one category, or whether they should be separated into distinct categories. To explore this, I create two dummy variables to test Hypotheses 1 and 2. To test Hypotheses 3, I use a three-group variable comparing texting and phone calling as distinctive from face-to-face interactions. Results of these additional analyses show no significant differences on social bonds, although there are a couple effects on emotions that I briefly note below. Given these results, I collapse the two categories into a single construct of social cues: more vs. less social cues.

Descriptive Statistics

When participants first enter the study, their emotions are measured prior to interacting with their co-worker. Baseline emotions were moderately happy, not angry, and not sad ($\bar{x}$ = 16.71, SD = 2.54). In Phase 1 dyads meet each other in-person, face-to-face and complete a Get to Know You Activity, followed by a survey about their perceived role-taking and current emotions (see Figure 2 for experimental design). At this point, dyads continue to report feeling positive ($\bar{x}$ = 18.00, SD = 2.16) and begin to feel they can role-take with each other ($\bar{x}$ = 26.51, SD = 3.98).

The main focus of this analysis takes place during Phase 2 and 3, when dyads work together as co-workers on a joint task. Table 6 shows the means, standard deviations, and ranges for the variables in Phase 2 and Phase 3 of the experiment at the dyadic level. Following each phase and activity, participants are presented with the same survey for comparison between the phases. Participants are asked about their feelings of unity, trust, and regard (social bonds), as well as their current emotions, perceived role-taking,

perception of identity verification, and feelings of uncertainty. Overall, dyads reported feeling close, with a relatively high and stable feeling of unity, trust, and regard for one another. A t-test demonstrates this feeling to be stable across the experiment, with no significant mean differences between Phase 2 ($\bar{x}$ = 44.97) and Phase 3 ($\bar{x}$ = 45.12; t = .30; p = .76).

[Table 6 About Here]

Across the experiment, the dyads' emotions are consistently positive in Phase 2 ($\bar{x}$ = 18.23, SD = 2.01) and Phase 3 ($\bar{x}$ = 18.34, SD = 1.63). A t-test demonstrates no significant mean difference between the dyads' average happiness between the two phases (t = .52; p = .60). Participants feel happy, not sad, and not angry while working together as co-workers.

Uncertainty is moderate, with the average close to the midpoint at both Phase 2 ($\bar{x}$ = 7.68, SD = 2.38) and Phase 3 ($\bar{x}$ = 6.64, SD = 2.41). Notably, feeling uncertain, unstable, and unable to predict the situation significantly decreases across the two tasks (t = 3.41, p < .001). Stronger feelings of certainty are likely due to participants feeling more comfortable with one another and the setting.

Identity verification for the worker identity is moderately high and remains stable from Phase 2 ($\bar{x}$ = 7.82, SD = 1.07) to Phase 3 ($\bar{x}$ = 8.06, SD = 1.19). On average, the dyads felt their co-workers saw them as workers in the same way they saw themselves. Results from t-test analysis demonstrate no significant mean difference between the phases on identity verification (t = 1.66, p = .10).

Dyads also are assessed for their perception of role-taking. Perceived role-taking remains moderate and stable across the 2 phases: Phase 2 ($\bar{x}$ = 26.84, SD = 3.82) and Phase 3 ($\bar{x}$ = 26.67, SD = 4.44). A t-test demonstrates that the means for role-taking across Phase 2 and Phase 3 are not statistically different from one another (t = .32; p = .75).

Also shown in Table 6 are the mean differences between each construct and social cues (more or less cues). A t-test shows no significant mean difference between situations with more or less social cues for bonds, identity verification, uncertainty, or emotions. In other words, dyads interacting in-person (more cues) or over a computer network (phone calling or text messaging) did not differ on average for their feeling of unity, perceived verification, feelings of uncertainty, or their emotional state. Regardless of the cues available in the situation, the average reported scores for these constructs are the same across the dyads.

However, role-taking averages differ by the cues available during the interaction. When dyads interact in-person, they reported higher averages of role-taking ($\bar{x}$ = 27.46, SD = 3.83) compared to interactions that took place over a computer network ($\bar{x}$ = 26.06, SD = 4.32; t = 2.70, $p < .01$). This may suggest that the availability of cues helps to facilitate an interaction where partners feel they can understand one another's perspectives and emotional states.

Table 6 also shows means for each construct across different experimental conditions. Results of the t-tests reveals no mean differences between transitioning from more social cues to less social cues for feelings of cohesion, identity verification, uncertainty, or

emotions. Whether dyads transitioned from a computer interaction to an in-person interaction or from an in-person interaction to a computer interaction, their average reported responses to these constructs are the same. However, role-taking once again shows a significant mean difference, with dyads who transitioned from less social cues (a computer interaction) to more social cues (an in-person interaction) reporting stronger role-taking averages ($\bar{x}$ = 27.87, SD = 3.81) compared to dyads who transitioned from more to less social cues ($\bar{x}$ = 25.50, SD = 4.73; t = 3.06, $p < .01$). This may suggest role-taking is stronger when dyads transitioned into an in-person, face-to-face interaction, providing additional social cues in the situation, which were used to see each other's perspectives better and understand each other's emotional states.

Correlations across the experimental phases are shown in Table 7. Social bonds are strongly and positively correlated with each measure (role-taking r = .51, $p < .01$; verification r = .41 $p < .01$; emotions r = .44, $p < .01$) and negatively correlated with uncertainty (r = –.61, $p < .01$). However, social bonds are not significantly associated with the availability of social cues (more or less) in the situation (r = .06, $p > .05$) or with the phase of the experiment (r = .02, $p > .05$).

[Table 7 About Here]

In addition, role-taking is positively related to each measure (verification: r = .30 $p < .01$; emotions r = .49, $p < .01$), negatively related to uncertainty (r = –.39, $p < .01$), and positively related to the availability of cues in the situation (r = .17, $p < .01$), with more cues related to higher perceived role-taking. However, role-taking is not significantly correlated with the phase of the experiment (r = –.02, $p > .05$). Identity verification is

positively correlated with each measure (emotions: $r = .41$ $p < .01$), negatively correlated with uncertainty ($r = –.38$, $p < .01$), but not correlated with the more social cues ($r = .02$, $p > .05$) or the phase ($r = .11$, $p > .05$). Uncertainty is negatively associated with each measure (emotions: $r = –.61$, $p < .01$) as well as the phase of the experiment ($r = –.21$, $p < .01$), but not with having more or less cues in the situation ($r = –.01$, $p > .05$). Finally, while emotions are positively related to each measure, and negatively related to uncertainty, it is not significantly related to social cues ($r = .06$, $p > .05$) or with the phase of the experiment ($r = .03$, $p > .05$).

The Effect of Social Cues on the Development of Social Bonds

To test the first set of contrasting hypotheses, recall that a structural equation model is estimated that reflects the multiple paths to developing social bonds through role-taking, identity verification, uncertainty, and emotions. In Hypothesis 1a, I posit that *more*, rather than less, social cues will be positively associated with social bonds. Alternatively, Hypothesis 1b presents the opposite: *Less*, rather than more, social cues will be positively associated with social bonds. I test the effect of cues while also exploring how the phase of the experiment effect these factors.

Table 8 Model 1 shows the outcomes of role-taking, verification, uncertainty, and emotions on emerging social relationships, as well as the role of social cues and controls for the phase of the experiment. As anticipated, social bonds are associated with higher levels of perceived role-taking ($\beta = .19$, $p < .01$), perceived identity verification ($\beta = .13$, $p < .01$), reduced uncertainty ($\beta = –.45$, $p < .01$), and increased positive emotions ($\beta =$

.21, $p < .01$). Dyads who can role-take, verify each other, feel less unstable in the situation, and are in a better emotional state report feeling closer.

[Table 8 About Here]

In addition, while social cues in the situation is not significantly associated with social bonds, the phase of the experiment is significant ($\beta = -.09$, $p < .01$). Dyads during the 3rd phase of the experiment report feeling less united and less connected. It may be that when participants first meet, their initial impressions of each other are high but then level off after a second interaction. This may be a result of the different activities dyads completed together. During Phase 1 of the experiment, dyads completed the "Get to Know You" activity and then transitioned into a "worker" dynamic during Phase 2 and 3. The shift from a socio-emotional interaction (friendly, social activity) to a workplace interaction (task-oriented activity) may influence dyads to be less enthusiastic in developing a relationship, given that it has turned task-based. As the interaction shifts from a social activity to a work activity, dyads may become less interested in the interaction.

In addition, dyads did not know how many tasks they would be required to complete during the study. It may be that after completing the first task, dyads were surprised by having to complete a second task. Not knowing this may have made them frustrated, and this frustration may have spilled over to their feelings for one another. If dyads felt reluctant to continue working after Phase 2 (Joint Task #1), they might have shifted their negative feelings towards the activity onto their relationship (Hogg 2018; Lawler 2001; Yoon et al. 2013).

Overall, these results do not support Hypothesis 1a, nor do they support the counter Hypotheses 1b. Social cues available in the situation neither increases nor decreases social bonds. Regardless of whether the dyads interact in-person or over a computer network, so long as they feel verified, that they can role-take together, are certain in the situation, and feel positive, they report being closer and more united.

In results not shown here, I tested the alternative effects of social cues by investigating whether texting and phone calling should be separated into distinct categories. The results of this analysis is consistent with the results presented in Table 8, Model 1, with no significant effect of social cues (either via texting or phone calling compared to face-to-face) across the equations. Social bonds continue to develop through identity verification, role-taking, certainty, and positive emotions, irrespective of whether dyads interacted by text messaging, phone calling, or in-person.

Paths to Social Bonds: Identity Verification

As shown in Figure 1, role-taking is expected to positively influence identity verification, and identity verification is predicted to reduce uncertainty, increase positive emotions among the participants, and increase social bonds. In addition to these direct paths, indirect paths of role-taking and identity verification are examined in this model. Results in Table 8, Model 1 show a significant effect of identity verification on social solidarity.

Higher perceived role-taking is related to higher identity verification between the partners ($\beta = .31$, $p < .01$) and identity verification increases as the interaction continues ($\beta = .11$, $p < .01$), as revealed in the effect of phase. When dyads feel that they can see the

perspective and understand the emotions of each other, and they have more experience interacting, they are more likely to feel verified. However, verification is not associated with the availability of social cues during the interaction. Regardless of access to social cues, verification increases when dyads can role-take with each other.

In addition to increasing social bonds, identity verification is expected to decrease uncertainty and increase positive emotions. These results are shown in Table 8 Model 1, with identity verification reducing uncertainty (β = –.27, p < .01) and increasing positive emotions (β = .13, p < .05). The more participants feel their co-workers see them in the same way as they see themselves, in terms of their worker identity, the less unstable and the more positively they feel in the situation.

Finally, significant indirect paths are found from identity verification to social bonds through reduced uncertainty and increased positive emotions (β = .51, p < .01). When dyads feel verified, they also feel more stable and positive, increasing their bonds. Therefore, verification, directly and indirectly, increases social bonds.

In sum, verification, directly and indirectly, increases social bonds, as well as reduces uncertainty and increases positive emotions. When participants feel verified by their co-workers, they feel less unstable in the situation and feel happier, less sad, and less angry. A sense of predictability and happiness, in turn, facilitates and sustains social solidarity. Verification operates as a critical mechanism to social bonds by fostering certainty and positive feelings.

Paths to Social Bonds: Role-taking

As shown in Figure 1, role-taking is theorized to positively influence the development of social solidarity. Role-taking is expected to facilitate identity verification, reduce uncertainty, and increase positive emotions. These outcomes are supported and reported in Table 8, Model 1. Additional analysis regarding direct and indirect effects also is tested, demonstrating role-taking's pivotal role in the development of social bonds.

Role-taking is not associated with the experimental phase but is related to the availability of social cues in the interaction (β = .17 p < .01). As noted above, a mean difference is reported between role-taking that takes place in-person (more cues) and role-taking that takes place over a computer network (less cues). This result persists even when controlling for phase. When dyads interact in person, with more social cues, they feel better able to role-take. The availability of more social cues likely allows for a smoother interaction, providing individuals with more information to better interpret the meanings attributed to oneself, each other, and the situation.

As previously discussed, role-taking directly increases social bonds (β = . 19, p < .01) and identity verification (β = .31, p < .01). In addition, role-taking also decreases uncertainty (β = –.33, p < .01) and increases positive emotions (β = .41, p < .01). When dyads feel they can role-take with one another, not only did they feel a stronger sense of unity, but they also feel verified, certain, and positive.

There is a significant indirect path of role-taking increasing social bonds through identity verification, reduced uncertainty, and increased positive emotions (β = .30, p < .01). When dyads feel they can role-take, they are more likely to feel verified, stable, and

positive. In turn, identity verification, reduced uncertainty, and positive emotions increase social bonds. Therefore, role-taking indirectly increases social bonds through these three key constructs.

In sum, role-taking, directly and indirectly, increases feelings of unity between the dyads. Higher levels of role-taking also increase social unity, identity verification, reduce uncertainty, and increase positive emotions. In turn, these three components (verification, uncertainty, emotions) increase social bonds across the model.

Paths to Social Bonds: Certainty and Emotions

As demonstrated above and shown in Figure 1 and Table 8, Model 1, role-taking and identity verification reduce uncertainty and increase positive emotions among the dyads. Reducing uncertainty in the situation (β = –.45, p < .01) and increasing positive emotions (β = .21, p < .01) directly increases social bonds between the dyads. Further, as previously discussed, identity verification and role-taking indirectly increase social bonds by reducing uncertainty and increasing positive emotions.

In addition, higher identity verification (β = –.27, p < .01), higher role-taking (β = –.33, p < .01), as well as the phase of the experiment (β = –.19, p < .01) decreases uncertainty. As an interaction progresses, dyads felt less unstable, less uncertain, and less unpredictable compared to earlier. Likewise, identity verification increases positive emotions (β = .13, p < .01) and role-taking increases positive emotions (β = .41, p < .01) but emotions are not associated with the availability of social cues or with the phase of the experiment.

The effects of reducing uncertainty and increasing positive emotions are evident across the model. Dyads that feel the interaction is more predictable, certain, and stable feel closer. Likewise, when dyads feel happier, less sad, and less angry, they feel more united. Even when controlling for all other factors in the model, feeling certain and positive in the situation continues to be a mechanism for emerging social relationships. If an individual feels unhappy or that the interaction is unstable, unpredictable, or uncertain at any time, they will experience lower feelings of unity and solidarity with their co-worker.

Transitional Effects of Social Cues on the Development of Social Bonds

Overall, the first model presented in Table 8 shows almost no association between the available social cues in the situation and the development of social bonds, verification, certainty, or emotions. At issue with this model is how the transition from more to less cues (from in-person to interaction over the computer) or less to more cues (from interaction over the computer to in-person) may affect the development of social bonds. The model presented in Table 8, Model 2 examines the competing set of hypotheses (H2a and H2b) by testing the transitional effect of social cues on the development of social bonds. This is the social cues x phase interaction.

Results in Table 8, Model 2 show that the interaction is not significant across the equations. Transitioning into an interaction from less cues to more cues or more cues to less cues is not associated with changes in social bonds, feelings of verification, role-taking, feeling stable in the situation, or emotions. Regardless of the cue transition, bonds

continue to develop, and dyads can continue to feel verified, stable, and happy and can role-take.

In other results not shown, when I separated texting and phone calling into distinct categories, dyads that transitioned from an in-person interaction to a text message conversation reported feeling happier, less sad, and less angry ($\beta = .23$, $p < .01$) compared to dyads that transitioned from a text message interaction to an in-person interaction. This is not the case for dyads that transitioned between a phone call and in-person interaction. It is not clear whether this result suggests something meaningful or is simply a random occurrence.

Overall Effect of More or Less Cues in the Situation

The third hypothesis tests whether the process that leads to greater social bonds is different for more cues compared to less cues. Given the conflicting perspectives on the availability of social cues and relationship dynamics discussed above and in Chapter 2, I test if any differences emerge across the model depending on the social cues in the situation. Hypothesis 3a comes from the perspective that the availability of social cues will improve relationship dynamics, arguing that the effects of role-taking, identity verification, certainty, and positive emotion on social bonds will be *stronger* with more social cues (in-person interactions) compared to less cues. Alternatively, Hypothesis 3b comes from the perspective that the availability of social cues hampers relationship dynamics and effects of role-taking, identity verification, certainty, and positive emotion on social bonds will be *weaker* with more social cues compared to interactions with less social cues (a computer network).

Model 3 in Table 8 shows the results of the group analysis between less social cues (text messaging and phone calling) and more social cues (in-person) on the development of social bonds. The effect of social cues on this model is examined by constructing a groups analysis between interactions that took place with more social cues (face-to-face, in-person) and with less social cues (over the computer, text messaging or phone calling). Group differences between the coefficients are tested to determine if interactions with more social cues have stronger or weaker coefficients compared to interactions with less social cues.

This analysis shows no significant coefficient differences between the two groups, suggesting no difference between having more or less cues in the situation and the development of bonds. The strength of each coefficient in the model for developing social bonds does not differ between the two groups. Therefore, neither Hypotheses 3a, nor Hypotheses 3b are supported in this analysis. Bonds, verification, role-taking, certainty, and emotions are neither stronger nor weaker in the group of interactions with more social cues.

In other results not shown, I examined the model of social bonds by separating texting and phone calling into distinct categories. Using structural equation modeling, I set up a three group model: face-to-face, phone calling, and text messaging. Results are consistent, with almost no significant differences between the three. However, the model predicting positive emotions significantly varies in strength between in-person interactions and text messaging, but only with respect to the phase of the experiment. The length of time interacting has a stronger effect on emotions for dyads who interact by text

messaging (β = .27, p < .01) compared to in-person interactions (β = –.06, p = .24). In other words, the strength of this transition is stronger among dyads who interacted by text messaging compared to when dyads interacted in-person. Phone calling and in-person interactions do not differ in strength across the model. Once again, it is unclear, if this result suggests something meaningful or is simply a random effect.

Summary Results: The Development of Social Bonds

In conclusion, this study examined four paths to the development of social relationships between strangers. Table 8 show that bonds increase when dyads feel verified, can role-take, feel stable, and feel positively. Indirect paths also are demonstrated in this analysis in developing bonds. Identity verification, by reducing uncertainty and increasing positive emotions, indirectly increases unity. Likewise, role-taking, by increasing verification, reducing uncertainty, and increasing positive emotions, indirectly increases unity.

In addition, this analysis also examines the relationship between social cues and developing social bonds. Conflicting hypotheses are presented to test two perspectives on the role of cues on interaction. However, neither set of hypotheses are supported. Rather than arguing social cues increase or decrease, this study finds that social cues *have little to no association with the development of social bonds.*

These results suggest an alternative perspective: humans adapt to digital interaction to supplement interaction needs, while technology also is purposefully developed to meet those needs. In other words, technology is rapidly developing to meet the socio-emotional needs of humans, while humans are simultaneously becoming adapted to the affordances

designed across technology. For example, people actively seek out perceptual cues from their interaction partners to interpret the situation and how best to proceed with communication (Burke and Stets 2009). Some information, such as emotional expressions which are often convey through tone of voice and facial expressions (Ma and Agarwal 2007), may not be immediately available in a text-based conversation. However, technology has advanced to meet this need, by creating emoticons, which are used to provide emotional expression and affectual context to text-based interactions. The cumulation of human adaptation and purposeful technological advancement results in a null hypothesis: *The availability of social cues is not associated with social bonds.*

In addition, participants in this study are largely young adults, with an average age of 20. It may be that younger generations are more adapted to digital interactions, and the affordances designed to accommodate their socio-emotional needs. For example, younger generations may be more familiar with the range of emotional expressions conveyed with emoticons compared to older generations. Therefore, future research can build on this study by examining differences across age and generations to better understand the role of social cues on developing relationships. However, it may also be that the manipulation in this study was not powerful enough to reveal differences. It may be that the differences in the availability of social cues across these conditions were too subtle, allowing dyads to easily adjust to each situation regardless of the platform of interaction.

In sum, relationship dynamics examined in this study are largely not associated with the availability of social cues, the phase of the experiment, or the transition effect. Regardless of access to social cues or changes in the availability of cues from one stage

to another, relationships are influenced by the social-psychological mechanisms (verification, role-taking, certainty, emotions) more than the availability of social cues. In the following chapter, I further discuss the implications of these results and discuss possible explanations for the future of relationships and technology.

Chapter 5: Discussion

This study seeks to better understand the interpersonal dynamics, particularly the identity processes, involved with the development of social bonds. This study draws on research and theories on the self and social interaction to develop a model of social bonds via identity processes. Specifically, this study utilizes identity theory and social exchange theory to examine how relationships emerge between newly acquainted individuals. I am particularly interested in studying the self and the social situation to better understand human behavior and social interaction. Moreover, my focus on interpersonal dynamics, including identity verification, role-taking, certainty, and emotions, makes these theories best suited for generating a theoretical model for the development of social bonds.

Using identity theory and social exchange theory, I explore the paths for developing relationships. These theories are useful in examining the developing bonds, as they give particular attention to behaviors within social interactions and the emotional and cognitive outcomes associated with those interactions. From the identity theory perspective, I examine how bonds form through an exchange of meanings during interaction, including individual and interpersonal processes. From the social exchange perspective, I examine how bonds form through series of exchanges between equal status actors. With these perspectives, I find four direct paths to developing relationships, including role-taking, identity verification, certainty, and positive emotions. I also find two indirect paths, from role-taking and identity verification through certainty and positive emotions to developing social bonds.

I also investigate the role of technology in the development of social cohesion. I test Hypotheses 1 – 3 as presented in Chapter 2. Hypothesis 1 tests the effect of cues available to the dyad during interaction. Hypothesis 2 tests the transitional effects of dyads moving from a situation with more social cues (in-person, face-to-face) to a situation with less social cues (digitally mediated, phone call or text messaging) and compares this with the opposite transitional experience (less social cues to more social cues). Hypotheses 3 tests whether the process leading to social bonds, including role-taking, identity verification, certainty, and emotions, is stronger or weaker when more or less cues are available to the dyad.

Given the conflicting arguments regarding the effect of social cues and whether more or less cues are important to the development of social bonds (presented in Chapter 2), I test contrasting hypotheses. One the one hand, I test if additional cues available during interaction strengthen social bonds (H1a, H2a, H3a). More social cues, especially visual and auditory cues, which are available during in-person interaction provide information relevant to social interaction, helping to define the self, the other, and the situation. These additional cues may strengthen the developing bonds by supporting the exchange of information and providing a smooth and effective exchange.

On the other hand, I test if fewer social cues available during interaction strengthen social bonds (H1b, H2b, H3b). Digital interaction allows individuals to be focused on the exchange of meanings, without distractions from external actors or objects. Digital interactions also allow individuals to feel relaxed and comfortable, shifting their focus from physical appearances to the exchange of information. This focused attention on one

another may allow for a more efficient interaction, with interactants continuing to define the self, one another, and the situation across a digital space. In this way, the lack of social cues may strengthen the developing bonds.

To test how social cues affect this process, I conduct an experiment in which individuals interact as co-workers to complete work-related tasks together. The results of the experimental design detailed in this study do not support either set of hypotheses. Instead, this study finds that social bonds are largely not associated with the availability of social cues, not associated with having more or less cues available in each phase of the experiment, and more or less cues where not differently related to the processes leading up to the social bonds. Regardless of access to social cues or changes in the availability of cues from one phase to another, the process leading to relationships is the same: relationships are influenced by the social-psychological mechanisms, including identity verification, role-taking, certainty, and emotions, and not the availability of social cues. In this chapter, I discuss multiple explanations for these null results, including limitations faced by the study, differences between this study and prior research, and the costs and benefits of digital interaction compared to in-person interaction.

Identity Processes and Social Bonds

As shown in Chapter 4, Table 8, bonds increase when dyads feel verified, can role-take, feel stable, and feel positive. Indirect paths also are demonstrated via identity verification and role-taking. Identity verification, by reducing uncertainty and increasing positive emotions, indirectly increases bonds. In addition, role-taking, by increasing

verification, reducing uncertainty, and increasing positive emotions, indirectly increases bonds.

As expected, when individuals can role-take, verify each other, feel less unstable in the situation, and are in a better emotional state, they report feeling closer, more united, and have a stronger affinity for each other. These results are consistent with prior research discussed in Chapter 2. Identity verification is demonstrated to produce social bonds (Stets et al. 2018), increase positive emotions (Stets and Trettevik 2015), and reduce uncertainty (Swann 2011). In addition, prior research shows role-taking increases social bonds through identity verification (Stets and Cast 2007) and reduces uncertainty (Yamagishi and Yamagishi 1994). Likewise, reducing uncertainty and increasing positive emotions increase social bonds (Lawler 2018; Swann 2011).

I find that role-taking directly increases social bonds, identity verification, and positive emotions, while reducing uncertainty. Role-taking also indirectly increases social bonds through identity verification, certainty, and emotions. In other words, role-taking creates an orientation towards the other in which each interaction partner understands the viewpoint and feelings of the other. This orientation towards the other helps individuals understand the shared meanings regarding the self, the other, and the situation, that is exchanged during an interaction. When meanings in the situation are understood and shared between interaction partners, identity verification is more easily accessible, and ambiguity regarding behaviors and their interpretations is reduced and positive emotions increase. These elements, in turn, increase social bonds.

In sum, this study finds social bonds to be the result of identity verification, role-taking, certainty, and positive emotions. However, at issue with this model is how technology and digital interaction, in which people may have less access to social cues, affects the model's development. Given this issue and competing viewpoints, this study's primary aim was to better understand the role of technology in developing social bonds between strangers. While these components have been previously tested, what has not been demonstrated is how these social-psychological mechanisms may be affected when access to relevant social cues is digitally mediated. Given the abundance of social technologies used to facilitate interaction, this study's primary focus addresses how technology affects the ability people have to perceive the self and others through a digital interaction.

Technology and the Availability of Social Cues

Many studies within social exchange theory and identity theory are conducted without participants ever meeting one another in-person, and instead include interaction over a computer network (for example Molm et al. 2012; Molm et al. 2007; Stets et al. 2018). These studies demonstrate that social bonds can form void of in-person interactions, with less social cues in the exchange. However, these studies do not test differences between the mediums of communication, or interaction platforms (e.g., text message, audio/phone call). It is possible that the effects found (e.g., identity verification increasing social bonds) may be weaker or stronger if access to social cues was manipulated during interaction. Therefore, the issue remains how access to social cues impacts the path to, and the strength of, social bonds.

In Chapter 4, I test the effect of social cues on the developing social bonds, and its social psychological mechanisms involved in producing those bonds. The results presented in Table 8 show three models which test the three sets of contrasting hypotheses: the effect of social cues is tested in Model 1 (H1a and H1b), the transitional effect of social cues is tested in Model 2 (H2a and H2b), and the effect of social cues on the overall model of social bonds is tested in Model 3 (H3a and H3b).

Overall, the results in Table 8 do not support either set of hypotheses. Social cues available in the situation neither increases nor decreases social bonds. Transitioning into an interaction from less cues to more cues or more cues to less cues also is not associated with changes in social bonds, feelings of verification, role-taking, certainty, or emotions. Likewise, the effect of social cues on the processes involved in the development of social bonds showed no differences between having more or less cues available in the situation. So long as dyads feel verified, that they can role-take together, are certain in the situation, and feel positive, they report being closer and more united, regardless of whether they interact in-person or over a computer network.

There are several explanations for why I find no differences in the role of social cues. These explanations include limitations of this study, particularly the gender and age diversity of the sample, and the social context of interaction in this study compared to previous studies. However, it may also be that there are positive and negative features associated with the platforms examined in this study, cumulating in no differences in developing bonds between in-person interactions and digital interactions.

Gender and Social Cues

Limitations of this study may have contributed to the lack of differences between the platforms. Unfortunately, COVID-19 affected data collection, and subsequently, the gender diversity in the study. As a result, this study did not collect an equal distribution of Men-Men dyads and did not collect data on mixed-sex dyads.

This study initially aimed to address possible gender differences between same sex dyads (W-W and M-M). However, due to the pandemic, I was unable to complete my data collection on men. Thus, this study contains a majority of women dyads (~70%). As a result, there remains the issue of gender-related dynamics in the development of social bonds. It may be that men interact with one another differently than how women interact with each other, resulting in differences in the formation of bonds when access to social cues are altered during interaction. Gendered differences in communication styles including expressing and interpreting verbal and nonverbal cues may produce differences in role-taking, identity verification, and the development of social bonds with respect to men and women.

For example, women may be more perceptive of subtle, nonverbal cues, such as tone of voice (Brody and Hall 2010), which may help them infer the intentions of other women more easily than men inferring the intentions of other men. If women are better able to adapt to interactions with subtle social cues, such as picking up on the tone of voice during phone calling or identifying emotion cues during texting, their development of social bonds may not be as affected as men's might be by the interaction platforms presented in this study. The lack of differences in this study may be a result of the

majority women dyads, who are better able to identify and thus adapt to interactions where verbal or visual cues are limited. If women are better able to identify and adapt to social cues during interaction, then two women interacting together may be less affected by interactions with limited social cues compared to two men, or even a woman and a man.

Exploratory analysis finds suggestive evidence that men may need additional social cues to form stronger social bonds. A group analysis between woman and men shows no significant effects of social cues on developing bonds or significant differences in the strength of the overall process leading to bonds. However, when men transition from an interaction with fewer social cues to an interaction with more social cues, their social bonds significantly increase ($\beta = .31$, $p < .05$). This may suggest that men benefit from in-person interactions more so than woman. Future research can further explore this effect by examining a larger sample of Men-Men dyads than what I was able to collect in this study (N = 36 dyads).

Women and men are socialized in different ways, framing their social relationships and behaviors (Ridgeway 2011). Gender, and the associated gendered expectations and norms, is often a starting point for social interaction, framing how people see each other and how they respond to the information given during interaction (Ridgeway and Bourg 2004). From a young age, women and men tend to socialize in same-sex settings, pulling them towards different social worlds, equipped with different gendered communication styles and preferences (Smith-Lovin and McPherson 1993). These different socialization contexts may prepare individuals to better anticipate how others of the same sex will act.

If women have a proclivity to pick up social cues more easily than men, then they may be more likely to adapt to the different platforms and social cues with other women compared to men interacting with other men.

Age and Social Cues

It may also be that younger generations are more adapted to digital interactions and the overlap with offline and online behaviors. In this study, participants were young adults with an average age of 20 years old. Young adults in this age category may have more experience using social technologies compared to older generations. For example, older adults in the U.S are more likely to report never using the internet (25% of 65 years and older) compared to younger generations (1% of 18–29 years old; Perrin and Atske 2021). Among teenagers, the rate of technology adoption is higher, with 95% of U.S. teens owning a smartphone and 45% of those teens reporting to be online almost constantly throughout their day (Anderson and Jiang 2018). Teenagers are using their smartphones for entertainment, connecting with friends and family, and learning new things online (Schaeffer 2019). For younger generations, being online and communicating via technology does not take away from their in-person, offline social interactions. Regardless of their higher rates of online activity, younger generations are just as likely to socialize with friends offline as they are online, with some teens reporting even more offline interaction the more they socialize online (Jiang 2018).

In other words, younger generations have emerged into early adulthood alongside technological advancement. Younger generations are comfortable and familiar with using technology to communicate, building on their offline relations rather than detracting from

them. In fact, those who better disclose themselves in online settings may be more likely to bring digital interpersonal skills into their offline interactions, helping to sustain and maintain their online and offline relationships (McKenna et al. 2002). This may translate to better adaption to utilizing technology during interaction, allowing bonds to form regardless of the availability of social cues. Therefore, it is possible that this study finds no difference between more or less social cues on the developing bonds, because those bonds are among young adults who are already accustomed to digital interaction. It does not matter if younger individuals are online (with fewer social cues) or offline (in-person, with more social cues), they are able to navigate through either interaction. If this study examined older generations, there may be a digital divide between developing social bonds, with older adults less familiar and comfortable with digital communication and fewer social cues.

The Social Context and Social Cues

Another explanation for these null results may be due to the nature of the study and the platforms tested. While this study utilized digital interaction for communication, elements are missing from the digital interaction experienced in this study compared to digital interaction in everyday life. Digital interaction typically involves more tools that were not present in this study. For example, some platforms allow users to post photos, construct an avatar representing themselves, or share video and audio clips to respond and interact with others online. This study allowed participants to exchange some digital cues, such as emoticons, but typical online interaction would include many more features not captured in this study. It may be that these platforms did not offer a strong enough

manipulation to check the availability of social cues and their effects on developing relationships. If participants were able to use these additional features, such as constructing an online profile or exchanging photos and videos, they may have been better able to infer meanings and exchange information about the self and the situation. These additional features may have fostered social bonds, and may have enriched the identity process, producing stronger social bonds in the absence of in-person social cues (Walther 2007).

Still another reason for the lack of effects of the social cues may be because all dyads initially met face-to-face. The information learned about each other during that interaction may have transferred over to subsequent interactions. As a result, they may have been able to bridge any potential communication gaps in few social cues by relying on in-person cues from the initial interactions. More social cues may not have mattered as they may have been primarily influenced by the initial face-to-face interaction.

Another notable difference in the context of this study compared to previous studies is not only that participants initially met face-to-face, but also there was a lack of competition between the dyads and there was equal status between actors. Prior studies that examine developing bonds within the social exchange and identity frameworks often do not allow participants to initially meet, they utilize a point-based system, and actors negotiate over the distribution of points between them (see, for example, Molm et al 2009; Schaefer and Kornienko 2006; Stets et al. 2018). These points are often tied to the actors' participation benefits, such as bargaining over points that will be exchanged for money or extra credit (Molm et al. 2007; Stets et al. 2018). Additionally, some studies

feature power imbalances, with actors negotiating with others who may have more resources (more points) than they do (Schaefer and Kornienko 2009). Negotiations over point distributions may foster competition, and inequality may be generated when actors have unequal access to resources within a network (Savage et al. 2019).

In the current study, dyads collaborated on a joint task that offered the same benefit to each partner, regardless of the quality of their work, reducing the perception of inequality and competition. Participants in this study were told they would be working collaboratively with their partner. Given that the nature of the current experiment was different compared to previous studies, with many features that now vary between them, it is difficult to compare the current findings with prior findings. While bonds developed in the absence of social cues in prior research, the reasons as to why cues were not relevant in this study may be for different reasons. For example, perhaps working on a joint task among status equals who initially met each other in-person, as previously mentioned, may have made social cues less relevant to the developing bonds.

The Benefits, and Costs, of Digital Interaction

Beyond the limitations faced in this study and differences in this study compared to previous studies, there may still be another explanation to these null findings: humans are adapting to digital interactions to meet their social needs, while technology is attempting to bridge the gap between online and offline interaction, resulting in both positive and negative outcomes. Adaptation to digital interactions may be due to an ongoing overlap between offline and online behavior, helping individuals become accustomed to fluctuations in social cues during interaction (Davis 2016; Cummings et al. 2002). At the

same time, there are positives and negatives associated with digital interaction. On the one hand, social technologies are rapidly developing to meet social-psychological needs during interaction (Borowska 2015; Davis 2020; Davis and Chouinard 2016). However, digital interaction is still void of critical information, such as body language and facial expressions, that convey meaning about the self, the other, and the situation. While technology is attempting to bridge this gap in the transfer of critical information, there remains a disconnect between humans' need for information and the digital affordances offered.

Adaptation to social technologies comes from experience, with more and more people getting online and remaining there "almost constantly" (Perrin and Atske 2021). People transition between interaction platforms throughout the day, altering between text messaging, emailing, audio/phone calls, and in-person conversations. This overlap allows individuals to adapt to changes in social cues during interaction. And, as discussed above, this may be especially true among younger generations and is likely to continue with each new generation more enmeshed in social technologies and digital communication than the last. As interaction becomes more and more digitally mediated in society, people become accustomed to engaging with these digital platforms to develop and generate new relationships. Therefore, it is likely that the dyads in this study felt comfortable interacting both in person and over a computer network, as they would regularly do in their own workplace or with friends and family members.

At the same time that people are maneuvering between digital and in-person interactions, technology is adapting to meet the needs of human users through digital

affordances (Borowska 2015). Humans need social cues to develop relationships, understand themselves, and understand one another. Therefore, digital features, or affordances, are purposefully designed to meet humans' social-psychological needs and replace what is lost from an in-person interaction. Affordances, which are any (physical or digital) object that cues users to its functionality, are developed with the user's needs at its center. Affordances are any cues that signal to the user what this object's use is intended for. For example, affordances can come in the form of an "add to cart" button on e-commerce websites or a "like" button on a social media website (Coyle 2015). These digital buttons, or other digital objects, signal to the user their functions and help guide behavior online towards the users' goals. These goals may be to make purchases ("add to cart") or to signal affirmation to a friend ("like"). Regardless, the design of these digital affordances is purposeful and uniquely designed to facilitate a seamless and rewarding online experience (Borowska 2015; Davis 2020).

The use of digital affordances to provide social cues during interaction may provide a positive experience for interactants, facilitating identity processes and developing social bonds. Digital affordances such as emoticons, text-based images, and digital icons guide social behavior online and are developed to mimic the same information conveyed in person. For example, in person, an individual can infer that their interaction partner is happy by watching them smile and laugh. While the laughter may not be heard during a text-based interaction and the smile is not seen during an audio-based interaction, digital affordances bridge this with emoticons, gifs, and audio/video clips. If an individual sees herself as "funny" and tells a joke while text messaging, her friends and family can verify

that self-meaning by sending a laughing emoticon, laughing gifs, or even an audio/video clip of them laughing at the joke. In addition, audio calling over a computer may not allow interactants to see one another and infer who is speaking and when to stop speaking themselves. However, these audio platforms provide icons or highlight names as the person is speaking, helping to promote turn taking and facilitate a smooth interaction.

In this study, dyads were able to send emoticons and "thumbs up" icons to express their feelings and approval, assisting role-taking and identity verification. Uncertainty may be reduced when they were able to see when the other received, read, and is typing to reply to their messages. While communicating with a digital audio call, dyads were able to see the name of their partner, be cued when the other is speaking, and receive real-time auditory feedback to their behaviors by inferring information through tone of voice and vocal inflection. These cues may be different than in-person cues, but they are explicitly designed to meet the social needs of their users and increase connectivity between people.

However, digital interaction still contains costs to individuals when compared to in-person interactions. Digital communication suffers from longer waits for replies and pauses between interactions, with interactants not present to witness all feedback to their identity performance. On the other hand, in-person interactions are instantaneous, and information is exchange in real-time. In-person interactions also contain more social cues, including body language, facial expressions, and tone of voice, which are critical in assessing information exchanged in the situation. As people alternate between digital interactions and in-person interactions, they likely take the benefits, and costs, from both

contexts. In turn, social bonds develop, but with no differing effects by access to social cues or to the overall identity processes involved.

Therefore, it is possible that these positive and negative effects associated with digital interactions canceled each other out in this study, resulting in no differences between the platforms. Digital communication may offer fewer social cues during an interaction (e.g., tone of voice, facial expressions), but the technology is designed through user research and app development to account for, and overcome, this absence in social cues (Davis 2020). However, this study did not find that these affordances enhanced social bonds. Instead, bonds were just as likely to develop, and at the same rate, as in-person communication. While the affordances mentioned above may have benefited the relationship, the consequences of reduced social cues may still have negatively impacted the developing bonds. The negatives associated with digital interaction likely negated the positives that were afforded through digital features.

Overall, the results of this chapter did not add support for either set of contrasting hypotheses. I did not find that changes in access to social cues negatively or positively impacts the development of social bonds between strangers. Instead, I find that social bonds developed even in the absence of those cues. My model of social bonds, depicted in Figure 1, remains unaffected by fluctuating access to social cues across interactions. Regardless of the interaction platform, bonds developed through identity verification, role-taking, certainty, and positive emotions. These findings may be a result of limitations faced by the study, such as the limited gender and age diversity of the participants. It may also be that the focus on cooperation rather than negotiations, status

equal dyads rather than status unequal dyads, and meeting face-to-face prior to the joint tasks, negated any difference between the platforms.

However, it may also be that these results represent a cumulation of positive and negative factors associated with digital platforms, which may negate the overall effects of social cues on developing bonds. Positive factors discussed include digital affordances, or technology that is purposefully developed to meet the socio-emotional needs for forming bonds, such as emoticons to signify emotional expressions, “thumbs up” to signify approval, and mute/unmute to signify turn taking while speaking. These digital affordances allow the exchange of information during digital interaction and may increase unity between strangers.

On the other hand, these digital platforms do not contain the same extent of information provided in an in-person interaction. Without these additional face-to-face social cues, such as body language and facial expressions, information regarding emotional expressions, approval, and turn-taking may be lost or misinterpreted during digital interactions, reducing unity. Together, these positive and negative impacts to social bonds, may explain why this study finds no differences between digital platforms and in-person interactions.

Chapter 6: Conclusion

This study examined one of the building blocks of society, the development of social bonds. Utilizing identity theory and social exchange theory, I theorized, tested, and formulated a model of social bonds by focusing on critical social psychological mechanisms including identity verification, role-taking, certainty, and positive emotions. These mechanisms foster solidarity between interaction partners.

When people are able to see the perspective and emotional state of their partners, they are better able to verify one another, feel stable, and feel positive. Once verified, people feel a sense of security, predictability, and certainty in the situation, and they feel good. Role-taking, identity verification, reduced uncertainty, and positive emotions, directly increase social unity, cohesion, and solidarity. I also find two indirect paths to social bonds from role-taking and identity verification through certainty and emotions.

An important focus of this study was examining how these social psychological mechanisms operate across situations in which access to social cues is mediated by technology. I tested three sets of hypotheses to address the role of social cues on developing bonds. The results showed no effect of social cues on the development of social bonds, no effect of changes in the availability of social cues during interaction, and no effect of social cues influencing the processes related to the development of social bonds. As discussed in Chapter 2, some researchers argue that meeting in-person, compared to over a computer network will increase social bonds (Turkle 2012). Other researchers argue that digital interaction will increase social bonds compared to an in-

person interaction (Walther 1996, 2007). Since the results did not support either sets of hypotheses, I offered various explanations in Chapter 5 as to the lack of effects.

There are, however, additional limitations and areas of further exploration that may result in no differences between the interaction platforms. For example, individual differences, such as gender, status, and race, may affect the dyadic relationship between interactants. In addition, this study did not explore additional digital affordances which are typically available to people while interacting online which may help facilitate social bonds, especially those available on social media, such as editing a profile, sharing calendar invites with friends, and exchanging personal content with others. Finally, given the costs and benefits to digital interaction, as well as ongoing technological advances, the question remains if technology will be able to bridge these costs of digital interaction in the future. Technological advances in social media and online communication may offer new platforms of interaction that are better equipped with affordances to meet the social needs of humans across society. These issues are discussed below.

Limitations and Future Research

As discussed in Chapter 5, data collection was limited due to the COVID-19 pandemic, resulting in a predominantly female sample. In addition, this study only included same-sex dyads who were relatively young. Therefore, future studies should build from this research by including more male same-sex dyads, mixed-sex dyads, and older participants. Including a more diverse sample can help address nuances in interpersonal dynamics or responses to differences in social cues which may be gender or age based. There may be additional individual differences, such as gender differences in

communication, status differences between the dyads, and the race of the individuals within the dyad. These individual differences may alter the developing dyadic bonds, especially when access to social cues is digitally mediated.

Exploratory analysis in Chapter 5 suggests that men may need additional social cues to develop bonds with other men. Given that men may need additional social cues during interaction with other men, it is possible that men will need these additional social cues when interacting with women. If a man is less perceptive of social cues while interacting with a woman, who is more perceptive, it may disrupt clear communication, resulting in weaker bonds between them. The social cues that men are missing, may be important for exchanging meanings about the self and the other, thereby disrupting role-taking and identity verification, and reducing social bonds. If women's greater sensitivity to social cues fosters an increase in social bonds, and men's reduced sensitivity to social cues hinders developing social bonds when men and women interact, the effects of each may cancel out the other, resulting in no difference between access to social cues and developing social bonds at the dyad level.

To control for possible gender differences in perception of social cues, this study only focuses on same-sex dyads. This is in line with prior research examining social bonds in laboratory settings, with some studies only examining same-sex dyads (Kuwabara 2011; Lawler et al. 2000; Molm et al. 2009) and other studies concealing the gender of the other by using a gender-neutral simulated actor (Molm et al. 2007; Stets et al. 2018). Introducing mixed sex dyads, ironically, may produce the same results of social cues on social bonds, but for different reasons.

Mixed-sex dyads also may introduce status differences between the individuals. Some research suggests that there may be status in role-taking (Love and Davis 2014). Lower status actors may be more attentive to social cues as they are often in a position where they need to evaluate the thoughts and feelings of those in higher statuses. This study controls for possible individual status differences by framing interactants as "co-workers," implying equal status between them. The lack of significant differences between platforms may be a result of equal statuses between interaction partners. It may be that in this study, status equals did not have to be as attentive to social cues as would unequal status actors.

If one partner is of a higher status, for example the "supervisor" to an "employee," they may be less attentive to subtle or fewer social cues, making them less attentive to information regarding the self and the other that is exchanged over a digital platform. This information may be relevant to understanding the perspectives and thoughts of the lower status. Because higher status actors may be less attentive to the emotional and cognitive state of their lower status partner (Love and Davis 2014), this may result in a more difficult path to identity verification, and subsequently reducing social bonds.

On the other hand, lower status actors may be actively searching for meanings and reflected appraisals from their higher status partner, resulting in greater attention to any social cues available during interaction. If lower status actors are more attentive to social cues, then they may be better equipped at role-taking and accessing identity verification than their higher status partner, resulting in stronger bonds for the lower status actor. Therefore, while at the individual level, higher status actors may feel less united to their

lower status partner, the lower status partner may feel more united to their higher status partner. The resulting effects on the dyad may be that the effects produced by social cues on social bonds for lower status actors may be canceled out by the effects produced by social cues in social bonds for higher status actors. Future studies should examine the effects of status differences on digitally mediated communication and developing social bonds.

Relatedly, this study did not control for racial or ethnic differences that may arise from interactions with a same-race partner compared to a different-race partner. Individual differences associated with race and cultural background in communication may influence the dyads developing relationship. It is possible that differences in responses to social cues arise for those who are paired with someone of the same race compared to individuals paired with someone of a different race. Familiarity and comfort when interacting with similar others may not only foster relationship dynamics, but may also make the exchange of meanings easier, even in the absence of social cues. People who come from the same cultural or ethnic background may adapt more easily to fewer cues as they are able to pick up on subtle cues that they have been similarly socialized to understand. While similarities between interaction partners may increase social bonds, differences in cultural background and familiarity with others may result in a decrease in bonds, especially when the interaction is digitally mediated.

In this study, dyads were partnered with another same-sex participant, but the race of participants was randomly assigned. Racial distributions were representative of the university that participants were recruited from, resulting in a majority Latina (43%) and

Asian (36%) sample. As a result of random assignment, just over a third of the dyads in this study were same-race (23% Latina-Latina and 15% Asian-Asian). It may be that when interacting with another of the same race, familiarity and comfort with a similar other helps to create a smooth and efficient communication both in-person or over a computer network.

However, exploratory analysis does not show any differences between same-race dyads and different-race dyads in this study. A group analysis between same-race and mixed-race dyads shows no effect of social cues on developing bonds, no effect of transitioning from more to less social cues, or from less to more social cues, and no overall effect of social cues on the social psychological processes related to the development of social bonds. This suggests that individual racial differences in developing bonds do not impact the dyadic bonds, regardless of the availability of social cues in the situation. Future research should further explore this effect by examining a larger sample of same-race dyads than what I was able to collect in this study (N = 48 dyads).

Beyond individual differences associated with gender, status, and race, limitations associated with the available social cues and digital affordances may have impacted the lack of significant differences found in this study. Technology offers many more digital affordances that are not captured in this study, especially digital affordances available on social media platforms. Social media offers additional ways of focusing on the self, defining the situation, and generating sources of identity verification (Davis 2016). On social media, people can directly edit their self-presentations, explore different avenues

of self-expression, and express their identities by constructing tailored online profiles (Gunduz 2017). Social media also allows people to maintain contact lists of friends and family, coordinate social events with others, and share personalized content to a large audience of interaction partners. These digital affordances available on social media may encourage individuals to share more information with others, as they have more control over their self-presentation through customization and personalization of this digital information.

In addition, given the social nature of these platforms, the affordances available on social media websites, such as following friends and editing profiles, may operate to foster social bonds more effectively than text messaging or phone calling. The focus on building relationships, connecting online, and communicating with others gives social media platforms an advantage when it comes to developing bonds. These online tools available on social media provide a new way to ensure an overlap between self-meanings, self-presentation, and behavior online (Toma et al. 2018). Social media, compared to texting or phone calling, provides multiple avenues to express more dimensions of meanings about the self. Text messaging and phone calling only provide situational and limited self expression, which may result in a narrower set of meanings exchanged between interaction partners.

By creating online profiles and exchanging personalized content (photos and videos), individuals can use technology to better facilitate information as to who they are and how they want to be portrayed. These tools may provide additional dimensions of self-meanings, which may foster role-taking and identity verification due to others knowing

more information about the self. These additional meanings may be hidden or not communicated as efficiently on audio calls or text messaging. Therefore, social media provides additional tools and strategies to develop the self and exchange a depth of information not available on other platforms, strengthening role-taking and identity verification. If individuals are able to use these digital affordances to define themselves, and share that definition with others, they also may be able to develop stronger bonds with them.

Creating and editing online behaviors also allows individuals to construct themselves in a way that they believe best matches their identity standards. Thus, the social cues available in digital space are more malleable to the individual, allowing them more control over their self-presentation and who may be viewing those presentations, providing more opportunities for identity verification and role-taking. For example, if an individual holds an identity standard as a "hard worker," they can create and edit their online profiles and create online content that reflects a worker identity. The goal of identity verification continues to guide behavior online and offline, and social media offers tools that can help facilitate the exchange of relevant self-meanings. If identity verification is more easily achievable on social media, due to the broader expression of self, then individuals may feel happier and more certain while interacting over social media compared to other platforms, including in-person interactions. The depth of information available on social media may increase social cohesion by facilitating a smoother and more robust exchange of meanings and identity processes. Therefore, future research should build from this study by including affordances available on social

media, especially those affordances that allow the editing and exchanging of self meanings, behaviors, and personal expression.

Another limitation of this study is that I only examined relationships that developed within the context of the study. Whether or not these relationships were sustainable or enjoyable to the participants, in the long run, is not measured in this study. While participants in this study showed enthusiasm over their new relationship, often waiting for one another after the study's conclusion and even reporting plans to continue to interact with their partners at a later date, it is not known if the dyads continued to feel as united as they reported feeling in this study. The positive effects of the new relationship and the experience of participating in a study together may have declined over time. Therefore, future research would benefit from longitudinal data that examines bonds over extended periods. This will allow for an assessment as to how bonds formed online compare to bonds formed offline, and how they may differ in their sustainability over time.

Finally, it is important to address the implications of COVID-19 not only on this study but on society's relationship to technology. The recent pandemic and social distancing guidelines across the globe have created a surge in digital technology usage and social interaction online (De, Pandey, and Pal 2020). In conjunction with the reduced in-person interactions and health-related fears, the results of this digital surge have stemmed into a global mental and physical health crisis (The World Health Organization 2020). Across the world, individuals are getting online to supplement all forms of interaction, including connecting with friends and family, but also working from home,

attending religious services, serving jury duty, and meeting with health professionals. Being forced to limit *all* social interaction to a digital platform has had adverse mental health outcomes, including increases in loneliness, anxiety, depression, drug and alcohol abuse, and even increases in self-harm and suicidal ideation and behaviors (Kumar and Nayar 2020). In short, the effects of this physical isolation have been grave on the human population.

Given the adverse effects of the pandemic on society's collective wellbeing, it is important to reflect on these results and their implications moving forward with social technologies. This study designed an experiment to reflect social interaction in everyday life. This included a fluctuation in online *and* offline behaviors. It was not intended to examine social outcomes as a result of total isolation. While this study shows optimistic hope for a future of technology, with social bonds developing across multiple contexts, with differing access to social cues, it is important to remember that participants could still meet one another in person. It may be that when coupled with isolation, the costs associated with fewer social cues during a digital interaction are more adverse than seen in this current study. Indeed, technology offers affordances that can mimic some social cues necessary in the development of social bonds, but, as of yet, it is not able to completely replace the benefits of in-person, face-to-face social interaction. Future research should examine how digital interactions can overcome these costs, through advancing digital affordances and combining in-person features to simulate a feeling of co-presence.

In conclusion, this study helps us better understand the effects of technology on social relationships. I examined competing views regarding the role of social cues on developing social bonds and offer an alternative perspective: humans may be adapting to communication with fewer social cues, while at the same time, technological advancements offer both benefits (creating digital cues, or "affordances") and costs (missing critical social cues, such as body language and tone of voice) to developing new bonds. While digital affordances may have benefited the developing bonds, the lack of in-person social cues hurt those bonds. As technology advances, developing new, adaptive, digital cues, at issue is how humans may adapt to these features offered by digital communication, and whether digital affordances can overcome the associated costs of digital communication.

REFERENCES

Alexander, Norman, C., and Mary Glenn Wiley. 1990. "Situated Activity and Identity Formation" Pp. 269 – 89 in *Social Psychology,* Routledge: New York.

Algeo, Sara B., Jonathan Haidt, and Shelly L. Gable. 2008. "Beyond Reciprocity: Gratitude and Relationships in Everyday Life." *Emotion* 8(3):425–29.

Alinejad, Donya. 2019. "Careful Co-presence: The Transnational Mediation of Emotional Intimacy." *Social Media + Society* 5(2): 1–11.

Anderson and Jiang. 2018. "Teens, Social Media and Technology 2018." *Pew Research Center* Retrieved August 18th, 2021.

Antheunis, Marjolijn, Jochen Peter, and Patti M. Valkenburg. 2007. "Computer-Mediated Communication and Interpersonal Attraction: An Experimental Test of Two Explanatory Hypotheses." *CyberPsychology Behavior* 10(6):831–35.

Armenta, Christina N., Megan M. Fritz, and Sonja Lyubomirsky. 2017. "Functions of Positive Emotions: Gratitude as a Motivator of Self-Improvement and Positive Change." *Emotion Review* 9(3):183–90.

Baldassar, Loretta. 2008. "Missing Kin and Longing to be Together: Emotions and the Construction of Co-presence in Transnational Relationships." *Journal of Intercultural Studies* 29(3):247–66.

Bente, Gary, Sabine Rüggenberg, Nicole C. Krämer, and Felix Eschenburg. 2008. "Avatar Mediated Networking: Increasing Social Presence and Interpersonal Trust in Net-Based Collaborations." *Human Communication Research* 34(2008):287–318.

Berger, Charles R., and Richard J. Calabrese. 1975. "Some Explorations in Initial Interactions and Beyond: Toward a Developmental Theory of Interpersonal Communication" *Human Communication Research* 1: 99-112.

Borowska, Paula. 2015. "6 Types of Digital Affordance that Impact Your UX." *Web Designer Depot* Retrieved May 10th 2021. (https://www.webdesignerdepot.com/2015/04/6-types-of-digital-affordance-that-impact-your-ux/).

Brody, Leslie R., and Judith A. Hall. 2010. "Gender, Emotion, and Socialization." Pp. 429–454 in *Handbook of Gender Research in Psychology,* edited by J.C. Chrisler and D.R. McCreary. New York: Springer Science & Business Media.

Burke, Peter J., and Alicia D. Cast. 1997. "Stability and Change in the Gender Identities of Newly Married Couples." *Social Psychology Quarterly* 60(4):277–90.

Burke, Peter J. and Donald C. Reitzes. 1981. "The Link between Identity and Role Performance." *Social Psychology Quarterly* 44: 83-92.

Burke, Peter J., and Jan E. Stets. 2009. *Identity Theory*. New York: Oxford University Press.

Burke, Peter J., and Jan E. Stets. 1999. "Trust and Commitment through Self-Verification." *Social Psychology Quarterly* 62(4):347–66.

Carter, C. Sue. 2014. "Oxytocin Pathways and the Evolution of Human Behavior." *Annual Review of Psychology* 65(1):17–39.

Carter, Michael J., and Emily K. Ascensio. 2018. "Identity Processes in Face-to-Face and Digitally Mediated Environments." *Sociological Perspectives* 62(2): 220–39.

Cast, Alicia D. 2004. "Role-Taking and Interaction." *Social Psychology Quarterly* 67(3):296–309.

Cast, Alicia D. and Jan E. Stets. 2016. "The Self." Pp. 343–65 in *Handbook of Contemporary Sociological Theory*, edited by Seth Abrutyn. New York: Springer.

Cook, Karen Schweers. 2005. "Networks, Norms, and Trust: The Social Psychology of Social Capital 2004 Cooley Mead Award Address" *Social Psychology Quarterly* 68(1): 4–14.

Cooley, Charles Horton. 1964 [1902]. *Human Nature and the Social Order*. New York: Schocken Books.

Coyle, Andrew. 2015. "The Evolution of Digital Affordances." *The UX Collective* Retrieved June 17th 2021.

Cummings, Jonathon N., Brian Butler, and Robert Kraut. 2002. "The Quality of Online Social Relationships." *Communications of the ACM* 45(7):103–08.

Davis, Jenny L. 2020. *How Artifacts Afford: The Power and Politics of Everyday Things*. MIT Press.

Davis, Jenny L. 2016. "Identity Theory in a Digital Age." Pp. 137–64 in *New Directions in Identity Theory and Research,* edited by Jan E. Stets and Richard T. Serpe. New York: Oxford.

Davis, Jenny L. 2014. “Triangulating the Self: Identity Processes in a Connected Era” *Symbolic Interaction* 37: 500–23.

Davis, Jenny L., and James B. Chouinard. 2016. “Theorizing Affordances: From Request to Refuse.” *Bulletin of Science, Technology & Society* 36(4): 241–48.

Davis, Jenny L., and Tony P. Love. 2017. “Self-in-Self, Mind-in-Mind, Heart-in-Heart: The Future of Role-Taking, Perspective Taking, and Empathy.” *Advances in Group Processes* 34(1):151–74.

Derks, Daantje, Arjan E.R. Bos, and Jasper von Grumbkow. 2007. “Emoticons and Social Interaction on the Internet: The Importance of Social Context.” *Computers in Human Behavior* 23(2007): 842–49.

Dolev-Cohen, Michal, and Azy Barak. 2012. “Adolescents’ Use of Instant Messaging as Means of Emotional Relief.” *Computers in Human Behavior* 29(2013):58–63.

Domes, Gregor, Markus Heinrichs, Andre Michel, Christoph Berger, and Sabine C. Herpertz. 2007. “Oxytocin Improves “Mind-Reading” in Humans.” *Biological Psychiatry* 61(1):731–33.

Drouin, Michelle, and Carly Landgraff. 2017. “Texting, Sexting, and Attachment in College Students’ Romantic Relationships.” *Computers in Human Behavior* 28(2012):444–49.

Ekman, Paul, and Wallace V. Friesen. 1971. “Constants Across Cultures in the Face and Emotions.” *Journal of Personality and Social Psychology* 17(2):124–29.

Gallant, M., and S. Kleinman. 1983. "Symbolic Interactionism vs. Ethnomethodology." *Symbolic Interaction* 6.

Galinsky, Adam D., Gillian Ku, and Cynthia S. Wang. 2005. “Perspective-Taking and Self-Other Overlap: Fostering Social Bonds and Facilitating Social Coordination.” *Group Processes & Intergroup Relations* 8(2):109–24.

Goffman, Erving. 1959. *The Presentation of Self in Everyday Life*. New York: Anchor Books, Doubleday.

Green, Melanie C., Jessica Hilken, Hayley Friedman, Karly Grossman, Josephine Gasiewski, Rob Adler, and John Sabini. 2005. “Communication via Instant Messenger: Short- and Long-Term Effects.” Journal of Applied Social Psychology 35(3):445–62.

Grossman, Tobias. 2017. “The Eyes as Windows into Other Minds: An Integrative Perspective” *Perspectives on Psychological Sciences* 12(1):107–21.

Gunduz, Ugur. 2017. “The Effect of Social Media on Identity Construction.” *Mediterranean Journal of Social Sciences* 8(5): 85–92.

Hillis, Ken. 1999. *Digital Sensations: Space, Identity, and Embodiment in Virtual Reality*. University of Minnesota Press.

House, James S. 1977. "The Three Faces of Social Psychology." *Sociometry* 40:161–77.

Hogg, Michael A. 2018. “Social Identity Theory.” In *Contemporary Social Psychological Theories, 2nd Edition,* edited by Peter J. Burke. Stanford: Stanford University Press.

Hogg, Michael A. 2011. “Uncertainty-Identity Theory.” Pp. 62–80 in *Handbook of Theories of Social Psychology* edited by P. A. M. Van Lange, A. W. Kruglanski, and E. T. Higgins. Thousand Oaks, CA: Sage Publications Ltd.

Hogg, Michael A. 2001. “A Social Identity Theory of Leadership.” *Personality and Social Psychology Review 5*(3): 184–200.

Hunt, Matthew O., and Ashley V. Reichelmann. 2019. “Racial Identity and Racial Attitudes among White Americans.” in *Identities in Everyday Life* edited by J. E. Stets and R. T. Serpe. New York: Oxford University Press.

Jiang, Jingjing. 2018. “Teens who are Constantly Online are Just as Likely to Socialize with their Friends Online.” *Pew Research Center* Retrieved August 16th, 2021.

Kampe, Knut K. W., Chris D. Frith, and Uta Frith. 2003. “’Hey John’: Signals Conveying Communicative Intention toward the Self Activate Brian Regions Associated with “Mentalizing,” Regardless of Modality.” *The Journal of Neuroscience* 23(12):5258–63.

Kellermann, Kathy and Rodney Reynolds. 1990. “When Ignorance is Bliss: The Role of Motivation Reduction Uncertainty in Uncertainty Reduction Theory” *Human Communication Research* 17: 5–75.

Keicolt, K. Jill, Michael Hughes, and Hans Momplaisir. 2019. “Gender Identity Among U.S. Adults.” Pp. 195–217 in *Identities in Everyday Life,* edited by J. E. Stets and R. T. Serpe. New York: Oxford University Press.

Kosfeld, Michael, Markus Heinrichs, Paul J. Zak, Urs Fischbacher, and Ernst Fehr. 2005. “Oxytocin Increases Trust in Humans.” *Nature* 435(2):673–76.

Kuwabara, Ko. 2011. "Cohesion, Cooperation, and the Value of Doing Things Together: How Economic Exchange Creates Relational Bonds." *American Sociological Review* 76:560–80.

Lawler, Edward J. 2018. “The Affect Theory of Social Exchange.” Pp. 225–48 in *Contemporary Social Psychological Theories, 2nd Edition,* edited by Peter J. Burke. Stanford: Stanford University Press.

Lawler, Edward J. 2001. "An Affect Theory of Social Exchange." *American Journal of Sociology* 107(2):321–52.

Love, Tony P., and Jenny L. Davis. 2014. “The Effect of Status on Role-taking Accuracy.” *American Sociological Review* 79(5):848–65.

Ma, Meng, and Ritu Agarwal. 2007. “Through a Glass Darkly: Information Technology Design, Identity Verification, and Knowledge Contribution in Online Communities.” *Information Systems Research* 18(1): 42–67.

Mallen, Michael J., Susan X. Day, and Melinda A. Green. 2003. “Online versus Face-to-Face Conversations: An Examination of Relational and Discourse Variables.” *Psychotherapy: Theory, Research, Practice, Training* 40(1/2):155–63.

Madden, Mary, and Kathryn Zickuhr. 2011. “65% of Online Adults use Social Networking Sites.” *Pew Research Center Internet & Technology* Retrieved Oct 19, 2018 (http://www.pewinternet.org/2011/08/26/65-of-online-adults-use-social-networking-sites/)

McKenna, Katelyn. Y. A., Amie S. Green, and Marci E. J. Gleason. 2002. “Relationship Formation on the Internet: What’s the Big Attraction?” *Journal of Social Issues* 58(1): 9–31.

Mead, George H. 1934. *Mind, Self, and Society*. Chicago: University of Chicago Press.

Molm, Linda D. 1994. “Dependence and Risk: Transforming the Structure of Social Exchange.” *Social Psychology Quarterly* 57(3): 163–76.

Molm, Linda D., Monica M. Whitham, and David Melamed. 2012. “Forms of Exchange and Integrative Bonds: Effects of History and Embeddedness.” *American Sociological Review* 77(1):141–65.

Molm, Linda D., Jessica L. Collett, and David R. Schaefer. 2007. “Building Solidarity through Generalized Exchange: A Theory of Reciprocity.” *American Journal of Sociology* 113(1):205–42.

Okdie, Bradley M., Rosanna E. Guadagno, Frank J. Bernieri, Andrew L. Geers, and Amber R. Mclarney-Vesotski. 2011. "Getting to Know You: Face-to-Face Versus Online Interactions." *Computers in Human Behavior* 27(2011):153–59.

Perrin, Andrew, and Atske. 2021. "About Three-in-ten U.S. Adults Say They Are 'Almost Constantly' Online." *Pew Research Center* Retrieved August 18th, 2021.

Perrin, Andrew, and Madhu Kumar. 2019. "About Three-in-Ten U.S. Adults Say They are "Almost Constantly' Online." *Pew Research Center* Retrieved Sept 25, 2019.

Pew Research Center. 2021a. "Mobile Fact Sheet." Retrieved May 10, 2021. (http://www.pewinternet.org/fact-sheet/mobile/)

Pew Research Center. 2021b. "Social Media Fact Sheet." Retrieved May 10, 2021. (https://www.pewresearch.org/internet/fact-sheet/internet-broadband/).

Pew Research Center. 2021c. "Social Media Fact Sheet." Retrieved May 10, 2021. (http://www.pewinternet.org/fact-sheet/social-media/).

Ramirez, Artemio Jr., and Judee K. Burgoon. 2004. "The Effect of Interactivity on Initial Interactions: The influence of Information Valence and Modality and Information Richness on Computer-Mediated Interaction." *Communication Monographs* 71(4):422–47.

Ridgeway, Cecilia L. 2011. *Framed by Gender*. New York: Oxford University Press.

Ridgeway, Cecilia L., and Chris Bourg. 2004. "Gender as Status: An Expectation States Theory Approach." Pp. 217–241 in *The Psychology of Gender*, edited by A. H. Eagly, A. E. Beall, and R. J. Sternberg. New York: The Guilford Press

Rosenfeld, Michael J., and Reuben J. Thomas. 2012. "Searching for a Mate: The Rise of the Internet as a Social Intermediary." *American Sociological Review* 77(4): 523–47.

Savage, Scott V., and Monica M. Whitham. 2018. "The Social Exchange Perspective." In *Contemporary Social Psychological Theories, 2nd Edition,* edited by Peter J. Burke. Stanford: Stanford University Press.

Schaeffer, Katherine. 2019. "Most U.S. Teens Who Use Cellphones do it to Pass Time, Connect with Others, Learn New Things." *Pew Research Center* Retrieved August 18th, 2021.

Schaefer, David R., and Olga Kornienko. 2009. "Building Cohesion in Positively Connected Exchange Networks." *Social Psychology Quarterly* 72(4): 384–402.

Schilbach, Leonhard. 2015. “Eye to Eye, Face to Face, and Brain to Brain: Novel Approaches to Study the Behavioral Dynamics and Neural Mechanisms of Social Interactions.” *Current Opinion in Behavioral Sciences* 3(1): 130–35.

Seltzer, Leslie J., Ashley R. Prososki, Toni E. Ziegler, and Seth D. Pollak. 2012. “Instant Messages vs. Speech: Hormones and Why We Still Need to Hear Each Other.” *Evolution and Human Behavior* 33(2012):42–45.

Seltzer, Leslie J., Toni E. Ziegler, and Seth D. Pollak. 2010. “Social Vocalizations Can Release Oxytocin in Humans.” *Proceedings of The Royal Society B* 277(1):2661–66.

Sharp, Shane, and Jeffrey L. Kidder. 2013. “Emotions.” Pp. 341–67 In *Handbook of Social Psychology*, edited by J. DeLamater and A. Ward. New York: Springer.

Smith-Lovin, Lynn, and Miller J. McPherson. 1993. “You are Who you Know: A Network Approach to Gender.” Pp 223–51 in *Theory on Gender, Feminism on Theory*, edited by P. England. Piscataway, NJ: Transaction Publishers

Smith-Lovin, Lynn, and Dawn T. Robinson. 2006. "Control Theories of Identity, Action, and Emotion: In Search of Testable Differences Between Affect Control Theory and Identity Control Theory." Pp. 163–88 in *Purpose, Meaning, and Action: Control Systems Theories in Sociology*, edited by K. A. McClelland and T. J. Fararo. New York: Palgrave Macmillan.

Sprecher, Susan. 2014. “Initial Interactions Online-Text, Online-Audio, Online-Video, or Face-to-Face: Effects of Modality on Liking, Closeness, and Other Interpersonal Outcomes.” *Computers in Human Behavior* 31(2014):190–97.

Stets, Jan E. 2018. “Identity Theory.” Pp. 81–111 in *Contemporary Social Psychological Theories, 2nd Edition*, edited by Peter J. Burke. Stanford: Stanford University Press. Springer.

Stets, Jan E. 2005. “Examining Emotions in Identity Theory.” *Social Psychology Quarterly* 68(1):39–74.

Stets, Jan E. 1992. “Interactive Processes in Dating Aggression: A National Study.” *Journal of Marriage and Family* 54(1):165–77.

Stets, Jan E., and Emily K. Asencio. 2008. "Consistency and Enhancement Processes in Understanding Emotions." *Social Forces* 86:1055–58.

Stets, Jan E., and Peter J. Burke. 2014. “The Development of Identity Theory.” *Advances in Group Processes* 31: 57–97.

Stets, Jan E., and Peter J. Burke. 1996. “Gender, Control, and Interaction.” *Social Psychology Quarterly* 59(3): 193–220.

Stets, Jan E., Peter J. Burke, and Scott V. Savage. 2018. “Exchange, Identity Verification, and Social Bonds.” *Social Psychology Quarterly* 81(3):207–27.

Stets, Jan E., and Alicia D. Cast. 2007. "Resources and Identity Verification from an Identity Theory Perspective." *Sociological Perspectives* 50(4):517–43.

Stets, Jan E., and Phoenicia Fares. 2019. “The Effects of Race/Ethnicity and Racial/Ethnic Identification on General Trust.” *Social Science Research* 80(1):1–14.

Stets, Jan E., and Michael M. Harrod. 2004. "Verification across Multiple Identities: The Role of Status." *Social Psychology Quarterly* 67:155–71.

Stets, Jan E., and Teresa Tsushima. 2001. "Negative Emotion and Coping Responses within Identity Control Theory." *Social Psychology Quarterly* 64:283–95.

Stryker, Sheldon. 2008. “From Mead to a Structural Symbolic Interactionism and Beyond” *Annual Review of Sociology* 34:15-31.

Stryker, Sheldon. 1997. “In the Beginning there is Society: Lessons from a Sociological Social Psychology.” Pp. 315–27 in *The Message of Social Psychology: Perspectives on Mind in Society*, edited by C. McGarty, and S. A. Haslam. Cambridge, MA: Blackwell.

Stryker, Sheldon, and Peter J. Burke. 2000. “The Past, Present, and Future of an Identity Theory” *Social Psychology Quarterly* 63:284–97.

Swann, William B. Jr. 2011. “Self-Verification Theory.” Pp. 24–42 in *Theories of Social Psychology*, Volume 2, edited by P. A. M. Van Lange, A. W. Kruglanski, and E. T. Higgins. Los Angeles: Sage.

Swann, William B. Jr. 1982. “The Self” *Science* 218: 33–66.

Toma, Catalina L., Crystal Jiang, and Jeffrey T. Hancock. 2018. “Lies in the Eye of the Beholder: Asymmetric Beliefs about One’s Own and Others’ Deceptiveness in Mediated and Face-to-Face Communication.” *Communication Research* 45(8): 1167–92.

Turkle, Sherry. 2012. “The Flight from Conversation.” *The New York Times*, April 21. Retrieved October 19, 2018

Turner, Jonathan H. 2000. *On the Origins of Human Emotions: A Sociological Inquiry into the Evolution of Human Affect*. Stanford, CA: Stanford University Press.

Turner, Jonathan H. 2011. "Extending the Symbolic Interactionist Theory of Interaction Process: A Conceptual Outline." *Symbolic Interaction* 34(3):330–39.

Turner, Jonathan H., and Alexandra Maryanski. 2008. *On the Origin of Societies by Natural Selection*

Turner, Jonathan H., and Jan E. Stets. 2005. *Sociology of Emotions*. New York: Cambridge University Press.

Walther, Joseph B. 2007. "Selective Self-Presentation in Computer-Mediated Communication: Hyperpersonal Dimensions of Technology, Language, and Cognition." *Computers in Human Behavior* 23(2007):2538–57.

Walther, Joseph B. 1996. "Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction." *Communication Research* 23(1):3–43.

Yamagishi, Toshio, and Midori Yamagishi. 1994. "Trust and Commitment in the United States and Japan." *Motivation and Emotion* 18(2):129–66.

Yoon, Jeongkoo, Shane R. Thye, and Edward J. Lawler. 2013. "Exchange and Cohesion in Dyads and Triads: A Test of Simmel's Hypothesis." *Social Science Research* 42(2013): 1457–66.

Zhao, Shanyang. 2005. "The Digital Self: Through the Looking Glass of Telecopresent Others." *Symbolic Interaction* 28(3): 387–405.

Appendix A: Tables and Figures

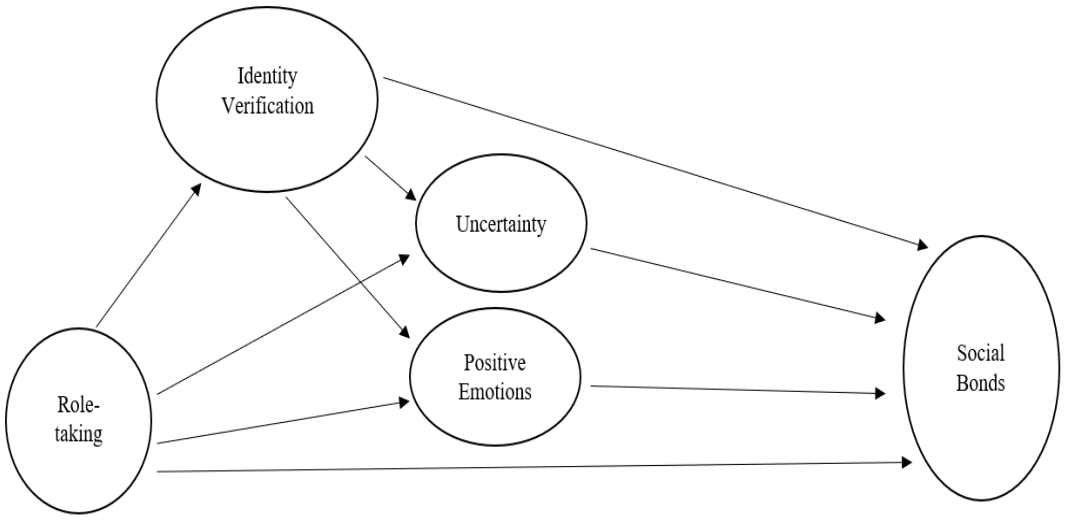

Figure 1. The Theoretical Model for the Development of Social Bonds

Activity	Get to Know	Survey #1	Joint Task #1	Survey #2	Joint Task #2	Survey #3
Time	10 mins	1 min	20 mins	2 mins	20 mins	2 mins
Condition 1	Face-to-face	Alone	Face-to-face	Alone	Text	Alone
Condition 2	Face-to-face	Alone	Face-to-face	Alone	Phone	Alone
Condition 3	Face-to-face	Alone	Text	Alone	Face-to-face	Alone
Condition 4	Face-to-face	Alone	Phone	Alone	Face-to-face	Alone
Phase	Phase 1		Phase 2		Phase 3	

Total time in laboratory: ~55 minutes

Figure 2. Laboratory Protocol Timeline

Table 1. Means and Standard Deviations for Demographics (N = 248)

Variables	Mean	SD	Range
Women	.71	.46	0 – 1
Hispanic/Latinx	.43	.50	0 – 1
Asian	.36	.48	0 – 1
White	.09	.28	0 – 1
Multiracial	.07	.25	0 – 1
African American/Black	.03	.17	0 – 1
Middle Eastern/Arab	.02	.14	0 – 1
Age	20.11	2.36	18 – 37
Freshmen	.20	.40	0 – 1
Sophomore	.32	.47	0 – 1
Junior	.17	.38	0 – 1
Senior	.31	.46	0 – 1
Humanities, Arts, and Social Sciences	.67	.47	0 – 1
Natural & Agricultural Sciences	.19	.39	0 – 1
Engineering	.04	.19	0 – 1
Other Colleges	.11	.31	0 – 1
Heterosexual/Straight	.87	.34	0 – 1
Homosexual/Gay/Lesbian	.04	.19	0 – 1
Bisexual	.07	.25	0 – 1
Other Sexual Identity	.02	.15	0 – 1
Mother’s Education	5.47	2.12	1 – 9
Father’s Education	5.24	2.16	1 – 9
Parent’s Income	4.92	2.21	1 – 8
Currently Employed	.44	.50	0 – 1
Hours Working Per Week	17.63	8.51	6 – 40

Table 2. Correlations and Factor Loadings for Social Bonds (N = 248)

Survey 2 (After Task 1)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Loading
1. Trust	1.00							.58
2. Nice	.40**	1.00						.70
3. Positive	.35**	.68**	1.00					.69
4. Cooperative	.36**	.68**	.66**	1.00				.75
5. United	.44**	.31**	.36**	.39**	1.00			.70
6. Harmony	.48**	.36**	.37**	.49**	.76**	1.00		.77
7. Partners	.33**	.13*	.14*	.20*	.40**	.47**	1.00	.41
Eigenvalue								3.10
Ω								.90
Survey 3 (After Task 2)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Loading
1. Trust	1.00							.71
2. Nice	.51**	1.00						.81
3. Positive	.55**	.77**	1.00					.82
4. Cooperative	.50**	.74**	.72**	1.00				.76
5. United	.55**	.50**	.48**	.45**	1.00			.68
6. Harmony	.64**	.56**	.58**	.51**	.66**	1.00		.80
7. Partners	.42**	.38**	.39**	.32**	.37**	.56**	1.00	.54
Eigenvalue								3.81
Ω								.93

* $p \leq .05$; ** $p \leq .01$

Affective Regard = Nice, Positive, Cooperative

Social Unity = United, Harmony, Partners

Social Bonds = Trust, Affective Regard, Social Unity

Table 3. Correlations and Factor Loadings for Role Taking (N = 248)

Survey 1 (After Get to Know You Activity)								
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	Loading
1. My co-worker's feelings affected how I felt	1.00							.46
2. I understood my co-worker's feelings	.20**	1.00						.68
3. My co-worker could feel what I was feeling	.29**	.54**	1.00					.73
5. My co-worker understood my feelings	.21**	.51**	.57**	1.00				.71
6. My feelings affected how my co-worker felt	.59**	.15*	.31**	.19**	1.00			.47
7. My co-worker understood my viewpoint	.13*	.43**	.36**	.48**	.23**	1.00		.53
8. I could feel what my co-worker was feeling	.33**	.54**	.55**	.53**	.31**	.29**	1.00	.71
Eigenvalue								2.70
Ω								.89
Survey 2 (After Joint Task #1)								
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	Loading
1. My co-worker's feelings affected how I felt	1.00							.55
2. I understood my co-worker's feelings	.40**	1.00						.81
3. My co-worker could feel what I was feeling	.40**	.71**	1.00					.82
5. My co-worker understood my feelings	.37**	.70**	.70**	1.00				.83
6. My feelings affected how my co-worker felt	.63**	.40**	.45**	.47**	1.00			.61
7. My co-worker understood my viewpoint	.23**	.48**	.46**	.56**	.29**	1.00		.59
8. I could feel what my co-worker was feeling	.40**	.69**	.69**	.66**	.45**	.50**	1.00	.80
Eigenvalue								3.67
Ω								.92
Survey 3 (After Joint Task #2)								
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	Loading
1. My co-worker's feelings affected how I felt	1.00							.66
2. I understood my co-worker's feelings	.36**	1.00						.83
3. My co-worker could feel what I was feeling	.47**	.78**	1.00					.86
5. My co-worker understood my feelings	.45**	.74**	.74**	1.00				.81
6. My feelings affected how my co-worker felt	.82**	.40**	.52**	.49**	1.00			.71
7. My co-worker understood my viewpoint	.28**	.61**	.56**	.58**	.35**	1.00		.63
8. I could feel what my co-worker was feeling	.49**	.72**	.75**	.64**	.53**	.50**	1.00	.81
Eigenvalue								4.07
Ω								.95

* $p \leq .05$; ** $p \leq .01$

Table 4. Correlations and Factor Loadings for Positive Emotions (N = 248)

Survey 0 (Before Get to Know You Activity)			
	(1)	(2)	(3)
1. Not Sad	1.00		
2. Happy	.23**	1.00	
3. Not Angry	.57**	.01	1.00
Ω			.70
Survey 1 (After Get to Know You Activity)			
	(1)	(2)	(3)
1. Not Sad	1.00		
2. Happy	.35**	1.00	
3. Not Angry	.49**	.14*	1.00
Ω			.69
Survey 2 (After Joint Task #1)			
	(1)	(2)	(3)
1. Not Sad	1.00		
2. Happy	.27**	1.00	
3. Not Angry	.57**	.18**	1.00
Ω			.68
Survey 3 (After Joint Task #2)			
	(1)	(2)	(3)
1. Not Sad	1.00		
2. Happy	.25**	1.00	
3. Not Angry	.57**	.28**	1.00
Ω			.67

* $p \leq .05$; ** $p \leq .01$

Table 5. Correlations and Factor Loadings for Uncertainty (N = 248)

Survey 2 (After Task 1)			
	(1)	(2)	(3)
1. Uncertain	1.00		
2. Unstable	.33**	1.00	
3. Unpredictable	.20**	.54**	1.00
Ω			.69
Survey 3 (After Task 2)			
	(1)	(2)	(3)
1. Uncertain	1.00		
2. Unstable	.52**	1.00	
3. Unpredictable	.32**	.47**	1.00
Ω			.73

* $p \leq .05$; ** $p \leq .01$

Table 6. Means and Standard Deviations for the Development of Social Bonds

	Mean	SD	Range	Mean	SD	Range
	Phase 2 (N = 124)			Phase 3 (N = 124)		
Social bonds	44.97	5.02	31.50 – 49	45.12	4.00	31.50 – 49
Emotions	18.23	2.01	12 – 21	18.34	1.63	11 – 21
Uncertainty	7.68**	2.38	3.50 – 13.50	6.64**	2.41	3 – 13.50
Identity Verification	7.82	1.07	5 – 10	8.06	1.19	3 – 10
Role-taking	26.84	3.82	15 – 35	26.67	4.44	14.50 – 35
	Less Social Cues (N = 124)			More Social Cues (N = 124)		
Social bonds	44.79	4.02	31.50 – 49	45.30	3.83	31.50 – 49
Emotions	18.19	1.57	13 – 21	18.39	1.60	11 – 21
Uncertainty	7.17	2.51	3 – 13.50	7.16	2.38	3 – 13.50
Identity Verification	7.92	1.64	4.50 – 10	7.96	1.11	3 – 10
Role-taking	26.06**	4.32	14.50 – 35	27.46**	3.82	19.50 – 35
	Transitioning More Social Cues to Less (N = 62)			Transitioning Less Social Cues to More (N = 62)		
Social bonds	44.64	3.97	31.50 – 49	45.61	4.02	31.50 – 49
Emotions	18.31	1.63	13.50 – 21	18.36	1.65	11 – 21
Uncertainty	6.87	2.52	3 – 13	6.41	2.28	3 – 13.50
Identity Verification	7.95	1.20	4.50 – 10	8.16	1.19	3 – 10
Role-taking	25.50**	4.73	14.50 – 35	27.87**	3.81	20.50 – 35

** $p \leq .01$

T-test examines differences between phases or between interactions with fewer or more social cues.

Table 7. Correlations for the Development of Social Bonds among Dyads (N = 248)

Variables	Role-taking	Verification	Uncertainty	Emotions	Social Bonds	Social Cues	Phase
Role-taking	1.00						
Verification	.30**	1.00					
Uncertainty	–.39**	–.38**	1.00				
Emotions	.49**	.26**	–.24**	1.00			
Social Bonds	.51**	.41**	–.61**	.44**	1.00		
Social Cues	.17**	.02	–.01	.06	.06	1.00	
Phase	–.02	.11	–.21**	.03	.02	.01	1.00

** $p \leq .01$

Table 8. Standardized Estimates for The Development of Social Bonds[a]

Model 1: Main Effects of Social Cues (N = 248)

Source	Role-Taking	Verification	Uncertainty	Emotions	Social Bonds
Role Taking		.31**	–.33**	.41**	.19**
Verification			–.27**	.13*	.13**
Uncertainty					–.45**
Positive Emotions					.21**
Social Cues	.17**	–.03	.06	–.01	.02
Phase	–.02	.11**	–.19**	.03	–.09**
R^2	.03	.10	.27	.22	.52

Model 2: Transition Effects of Social Cues (N = 248)

Source	Role-Taking	Verification	Uncertainty	Emotions	Social Bonds
Role Taking		.30**	–.32**	.42**	.19**
Verification			–.26**	.14*	.13*
Uncertainty					–.45**
Positive Emotions					.21**
Social Cues	.05	–.07	.09	.10	.02
Phase	–.14	.07	–.16*	.13	–.09
Cues*Phase	.20	.07	.06	–.19	–.01
R^2	.04	.11	.27	.23	.52

Model 3: Effect of Social Cues on the Identity Process and Social Bonds[b]

	Less Social Cues (N = 124)					More Social Cues (N = 124)				
Source	Role-Taking	Verification	Uncertainty	Emotions	Social Bonds	Role-Taking	Verification	Uncertainty	Emotions	Social Bonds
Role Taking		.28**	–.37**	.46**	.15		.33**	–.26**	.38**	.22**
Verification			–.28**	.17*	.11			–.25**	.11	.14
Uncertainty					–.48**					–.43**
Positive Emotions					.22**					.21**
Phase	–.13	.07	–.16*	.14	–.09	–.11	.15	–.24**	.08	–.10
R^2	.02	.11	.29	.28	.53	.01	.14	.26	.18	.49

** p ≤ .01, * p ≤ .05; All Models RMSEA ≤ .0001;

Model 1 Overall R^2 = .11; Model 2 Overall R^2 = .14; Model 3 Overall $R^2_{\text{Fewer Cues}}$ = .09, $R^2_{\text{More Cues}}$ = .13

[a] Analysis is across all interactions in both Phase 2 and Phase 3, resulting in a doubling of sample sizes as each dyad is represented by two interactions.

[b] Test of the coefficients shows no significant difference between the two groups.

Appendix B: Online and Laboratory Survey Guide

Sign-up Survey (Given 1 Week Prior to Laboratory Participation)
I want to first ask you about the technological devices you currently use, specifically your phone and computer to communicate with others and access social media. Regarding a phone device, a smartphone is a mobile device that includes internet access, allowing users to connect to WIFI, access emails, and download applications. A cellphone does not have these capabilities.

Phone usage

1. Do you currently use a smartphone? Yes_____ No _____
If NO, please skip to question 3.

2. At what age did you start using a smartphone? _____ Age

3. Do you currently use a cellphone? Yes_____ No _____
If NO, please skip to question 5.

4. At what age did you start using a cellphone? _____ Age

5. If NO to questions 1 and 3, please skip to question 9, otherwise, continue with question 6.

6. How many hours a day do you spend talking with others by phone (voice/audio calling, excluding texting) on your phone? _____ hrs.

7. How many hours a day do you spend texting others (excluding voice/audio calling or video calling) on your phone? _____ hrs.

8. How many hours a day do you spend video calling with others on your phone? __ hrs.

9. How many hours a day do you spend accessing social media (e.g. Twitter, Facebook, Snapchat etc.) on your phone? _____ hrs.

Computer usage

10. Do you currently use your computer to communicate with others by voice/audio calling?
Yes _____ No _____
If NO, please skip to question 12.

11. How many hours a day do you spend talking by phone (voice/audio calling, excluding texting or video calling) on your computer? _____ hrs.

12. Do you currently use your computer to communicate with others by texting?
Yes _____ No _____
If NO, please skip to question 14.

13. How many hours a day do you spend texting (excluding voice/audio calling or video calling) on your computer? _____ hrs.

14. Do you currently use your computer to communicate with others by video calling?
Yes _____ No _____
If NO, please skip to question 16.

15. How many hours a day do you spend video calling on your computer? _____ hrs.

16. Do you currently use your computer to access social media (e.g. Twitter, Facebook, Snapchat etc.)? Yes _____ No _____
If NO, please skip to question 18.

17. How many hours a day do you spend accessing social media on your computer?__hrs.

Now, I would like to ask you a little about your background.
18. Please indicate your current age. _____ age

19. Please indicate your sex.
(a) Male (b) Female (c) Something else, please explain (___)

20. What is your current class standing?
(a) Freshman (b) Sophomore (c) Junior (d) Senior
(e) Something else, please explain (___)

21. Are you employed? ( ) Yes ( ) No
IF NO, please skip to question 23.

22. Please indicate the number of hours per week you work on average? _____ hrs.

23. Please select the racial/ethnic group with which you identify. Please select one.
(a) White (b) Black or African American
(c) Hispanic/Latinx (d) Asian
(e) American Indian or Alaska Native (f) Native Hawaiian/Pacific Islander
(g) Multi-Racial, please explain (___) (h) Something else, please explain(_)

24. Which category best describes your parents' income last year? Please select one.
(a) Less than $10,000 (b) $10,000 - $14,999
(c) $15,000 - $24,999 (d) $25,000 - $34,999
(e) $35,000 - $49,999 (f) $50,000 - $74,999
(g) $75,000 - $99,999 (h) $100,000 or more

25. What is the highest grade in school your mother completed? Please select one.
    (a) No Formal Education (b) Some Grade School
    (c) Completed Grade School (d) Some High School
    (e) Completed High School/GED (f) Some College
    (g) Completed 4-year college degree (h) Some Graduate Work
    (i) Completed Graduate Degree

26. What is the highest grade in school your father completed? Please select one.
    (a) No Formal Education (b) Some Grade School
    (c) Completed Grade School (d) Some High School
    (e) Completed High School/GED (f) Some College
    (g) Completed 4-year college degree (h) Some Graduate Work
    (i) Completed Graduate Degree

Baseline Emotions (Collected prior to interacting with co-worker)

1. For the following, please indicate on a scale of 1-7 how intensely you currently are feeling each of the following emotions, where 1 reflects "Not at All" feeling the emotion, 4 reflects "Somewhat" feeling the emotion, and 7 reflects feeling the emotion "Very Intensely." Please select one response for each emotion.

		I feel…					
a.	Sad: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
b.	Angry: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
c.	Happy: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
d.	Depress: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
e.	Prideful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
f.	Fearful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense

Laboratory Survey #1 (Given after the "Getting to Know You" activity)

1. During the "Getting to Know You" activity, how often did each of the following statements describe your interaction with your co-worker. Please select one response for each statement.
    a. My co-worker's feelings affected how I felt.
       () Never () Seldom () Sometimes () Fairly Often () Very often
    b. I understood my co-worker's feelings.
       () Never () Seldom () Sometimes () Fairly Often () Very often
    c. My co-worker could feel what I was feeling.
       () Never () Seldom () Sometimes () Fairly Often () Very often
    d. My co-worker did things I did not understand.
       () Never () Seldom () Sometimes () Fairly Often () Very often
    e. My co-worker understood my feelings.
       () Never () Seldom () Sometimes () Fairly Often () Very often
    f. My feelings affected how my co-worker felt.
       () Never () Seldom () Sometimes () Fairly Often () Very often

g. My co-worker understood my viewpoint.
() Never () Seldom () Sometimes () Fairly Often () Very often
h. I could feel what my co-worker was feeling.
() Never () Seldom () Sometimes () Fairly Often () Very often

2. For the following, please indicate on a scale of 1-7 how intensely you currently are feeling each of the following emotions, where 1 reflects "Not at All" feeling the emotion, 4 reflects "Somewhat" feeling the emotion, and 7 reflects feeling the emotion "Very Intensely." Please select one response for each emotion.

I feel…

a. Sad: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
b. Angry: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
c. Happy: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
d. Depress: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
e. Prideful: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
f. Fearful: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense

3. For the following, please indicate on a scale of 1-7 how intensely you think your co-worker currently is feeling the following emotions, where 1 reflects "Not at All" feeling the emotion, 4 reflects "Somewhat" feeling the emotion, and 7 reflects feeling the emotion "Very Intensely." Please select one response for each emotion.

My Co-worker is feeling...

a. Sad: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
b. Angry: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
c. Happy: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
d. Depress: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
e. Prideful: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense
f. Fearful: Not at all (1) (2) (3) (4) (5) (6) (7) Very Intense

Laboratory Survey #2 & #3 (Given after each joint task)

1. While planning the student event, how often did each of the following statements describe your interaction with your co-worker. Please select one response for each statement.

a. My co-worker's feelings affected how I felt.
() Never () Seldom () Sometimes () Fairly Often () Very often
b. I understood my co-worker's feelings.
() Never () Seldom () Sometimes () Fairly Often () Very often
c. My co-worker could feel what I was feeling.
() Never () Seldom () Sometimes () Fairly Often () Very often

d. My co-worker did things I did not understand.
() Never () Seldom () Sometimes () Fairly Often () Very often
e. My co-worker understood my feelings.
() Never () Seldom () Sometimes () Fairly Often () Very often
f. My feelings affected how my co-worker felt.
() Never () Seldom () Sometimes () Fairly Often () Very often
g. My co-worker understood my viewpoint.
() Never () Seldom () Sometimes () Fairly Often () Very often
h. I could feel what my co-worker was feeling.
() Never () Seldom () Sometimes () Fairly Often () Very often

2. Think about how you see yourself as a worker. On a scale of 0–10, with 0 being "Not at All," and 10 being "Completely," how much do you think your co-worker sees you this way? Please select one response.

Not at All (0) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) Completely

3. On a scale of 1–7, with 1 being "Very Little," 4 being "Somewhat," and 7 being "Very Much," how much did you trust your co-worker during your interaction? Please select one response.

Very Little (1) (2) (3) (4) (5) (6) (7) Very Much

4. On a scale of 1–7, where 1 is at one end of the continuum, 7 is at the other end, and 4 is between the two extremes, please describe your interaction with your co-worker according to the following characteristics. Please select one response for each characteristic.

a.	Certain	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Uncertain
b.	Stable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Unstable
c.	Predictable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Unpredictable

5. On a scale of 1–7, where 1 is at one end of the continuum, 7 is at the other end, and 4 is between the two extremes, please describe your interaction with your co-worker according to the following characteristics. Please select one response for each characteristic.

a.	United	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Divided
b.	Harmonious	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Conflictual
c.	Partners	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Adversaries

6. On a scale of 1–7, where 1 is at one end of the continuum, 7 is at the other end, and 4 is between the two extremes, please describe your co-worker according to the following characteristics. Please select one response for each characteristic.

a.	Awful	(1)	(2)	(3)	(4)	(5)	(6)	(7) Nice
b.	Uncooperative	(1)	(2)	(3)	(4)	(5)	(6)	(7) Cooperative
c.	Negative	(1)	(2)	(3)	(4)	(5)	(6)	(7) Positive

7. For the following, please indicate on a scale of 1–7 how intensely you currently are feeling each of the following emotions, where 1 reflects "Not at all" feeling the emotion, 4 reflects "Somewhat" feeling the emotion, and 7 reflects feeling the emotion "Very Intensely." Please select one response for each emotion.

I feel…

a.	Sad: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
b.	Angry: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
c.	Happy: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
d.	Depress: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
e.	Prideful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
f.	Fearful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense

8. For the following, please indicate on a scale of 1–7 how intensely you think your co-worker currently is feeling the following emotions, where 1 reflects "Not at all" feeling the emotion, at all, 4 reflects "Somewhat" feeling the emotion, and 7 reflects feeling the emotion "Very Intensely." Please select one response for each emotion.

My Co-worker is feeling...

a.	Sad: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
b.	Angry: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
c.	Happy: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
d.	Depress: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
e.	Prideful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense
f.	Fearful: Not at all (1)	(2)	(3)	(4)	(5)	(6)	(7) Very Intense

Appendix C: Experimental Materials, Scripts, and Procedures

"Getting to Know You" Activity (In-person, following Baseline Emotions)

Instructions. Please take turns answering the following questions to one another. You will have 10 minutes to walk yourselves through these questions. These questions are designed to help you get to know your co-worker a little before we start the event planning. You may spend as much time on each question as you feel is needed. If you run out of questions during the 10 minutes, feel free to ask additional questions of the other that you think would help you get to know your co-worker a little more.

1. What is your name?
2. Where are you from?
3. Who is your favorite musical artist or group?
4. What is your favorite activity?
5. What is your favorite animal?
6. If you could travel anywhere in the world for two weeks where would it be? Why?
7. List the 3 famous people that you most admire (they can be from the present or the past). Why do you admire these people?
8. Out of all the people that you know personally, who do you most admire? Why?
9. Describe an experience from your life that made you feel very happy. What was so special about that experience?
10. Describe an embarrassing experience in your life. What was so uncomfortable about that experience?
11. What are the qualities that make for a good co-worker?

Joint Task #1 (In-person or over computer network, following Survey #1)

Instructions. You and the person you have been assigned to work with today, that is, your co-worker, are to work as a team on a student committee regarding access to healthy food on campus. Your committee would like to raise awareness about this topic by designing a full day student event on campus. You and your co-worker have been given the responsibility to design this student event. This student event must include: a campus **location**, a **speaker** for the topic, and a way to **advertise** the event across campus (for example, a flyer, social media outreach, email announcement for circulation) for the one-day student event. For the computer you are using, you and your co-worker may find the internet helpful for giving you ideas.

You may select any speaker, location, or advertisement plan for the one-day event. The two of you have 20 minutes to complete this activity. If you complete the tasks in less than 20 minutes, please use the remaining time to add anything else to the event that you

think will make it a success. If you have any questions, please do not hesitate to press the blue button on the wall to page the researcher.

When you and your co-worker have agreed, please briefly describe your one-day student body event in the following spaces provided:

Question 1: Who will speak at your one-day student event "Healthy Eating on Campus?" In the space below, please provide as much detail as you think is needed.

_____

Question 2: Where on campus will your student event "Healthy Eating on Campus" be located? In the space below, please provide as much detail as needed.

_____

Question 3: How will you advertise for the "Healthy Eating on Campus" event? In the space below, please provide as much detail as needed.

_____

Question 4: If you complete the above 3 tasks and still have time left over, please identify any additional tasks you think would be necessary to address in order to have a successful student event on campus. In the space below, please provide as much additional details to your event as needed.

_____

Joint Task #2 (In-person or over computer network, following Survey #2)

Instructions. Working together with your co-worker, we would like you to add some additional activities to your 1-day student event, "Healthy Eating on Campus." Your student event must include: **transportation** for your speaker to and from the airport and event site, **lodging/hotel** for your speaker, and any local off-site **fun activities** that the speaker and student attendees can engage in either before or after the event.

For the computer you are using, you and your co-worker may find the internet helpful for giving you ideas. You may select any type of transportation, lodging/hotel, or advertisement plan for the one-day event. The two of you have 20 minutes to complete this activity. If you complete the tasks in less than 20 minutes, please use the remaining time to add anything else to the event that you think will make it a success. If you have any questions, please do not hesitate to press the blue button on the wall to page the researcher.

When you and your co-worker have agreed, please briefly describe your one-day student body event in the following spaces provided:

Question 1: How will your speaker travel to and from campus for your student event "Healthy Eating on Campus" and a local airport? In the space below, please provide as much detail as you think is needed.

_____

Question 2: What lodging or hotel option will you set up for your speaker while he/she participates in your student event "Healthy Eating on Campus?" In the space below, please provide as much detail as needed.

_____

Question 3: What local off-site fun activities will you recommend to your attendees and speaker to do before or after your student event "Healthy Eating on Campus?" In the space below, please provide as much detail as needed.

_____

Question 4: If you complete the above 3 tasks and still have time left over, please identify any additional tasks you think would be necessary to address in order to have a successful student event on campus. In the space below, please provide as much additional details to your event as needed.

_____

Experimental Script

Italicized text give instructions to research assistant

Greet Participants & Sign in

Welcome to the "Connecting with Others Study!" My name is ___, can I get your name?
Check roster & confirm participant is in the right room and time
Okay, we will get started soon. Please have a seat and we will be back as soon as we are ready to start. For the study, we ask that you please silence your phone.
When both participants are here, check with Phoenicia, then seat them one at a time
Hi [participant], you will be participating next door, so I'm going to take you there now.

Consent Process

Bring the participant into the assigned solo-cubicle
Please take a seat and I will read you some instructions. Please take a moment and put away your belongings and turn your phone on silent/off. We ask that you not use your phone or other items during the experiment. Please also remain in the room until the experiment is over.
Give a tour of the room: the computer, the blue button, and the papers in the room
Just to remind you, this is a study in which you will be interacting with another person over the computer as well as in person. Your interactions will involve working together

on designing a student event. Once we are ready to begin, the researcher, Phoenicia, will come in and talk to you about these consent forms. While you are waiting for her, please take a moment and look over these consent forms.
Phoenicia: consent forms & Survey 0 (Baseline Emotions)
When participant is finished with Survey 0, usher them to the larger room

Now, we are going to go next door and meet your study partner for a short activity.
Usher both participants, one at a time, to the larger room together.

Get to Know You Activity (In-Person)

Welcome to the "Connecting with Others" study. Today you will work together on an experimental event having to do with planning a "healthy eating" forum on campus. For this study, you both have been selected to work together as co-workers on this event. So, we will refer to your study partner as your "co-worker." Before we get to the event planning, we would like for you to complete a "getting to know you" activity.
Give participants activity sheet

Please take turns answering the following questions to one another. You will have 10 minutes to walk yourselves through these questions. These questions are designed to help you get to know your co-worker a little before we start the event planning. You may spend as much time on each question as you feel is needed. If you run out of questions during the 10 minutes, feel free to ask additional questions of the other that you think would help you get to know your co-worker. Do you have any questions? If you do, there is a blue button in this room you can press and page the researcher.
Demonstrate blue button and leave for 10 minutes

Survey #1

Return to large room after 10 minutes
For the next part of the study, you and your co-worker will return to your original rooms for an individual task. Please follow me…*usher participants one at a time to original solo-cubicle.*

Once both participants are in solo-cubicle read:
Now that you have completed the "getting to know you" activity with your co-worker, we ask you to take a brief survey, on the computer, regarding your initial thoughts on your co-worker. Further instructions for this survey will be displayed on your computer screen.

Do you have any questions? We will be in the hall if you need anything.

Joint-Task #1

Close Survey #1, open Joint Task #1

Thank you for completing the brief survey about your experience with your co-worker. You will now work together with your co-worker by **[phone calling only][text messaging only][in-person]** to design a one-day student event. After we go through some instructions, **[I will now bring you to a larger room where you will meet your co-worker again.][I will now connect you to your co-worker].**

Read below instructions, which are also displayed on the computer, to each participant.
You and your co-worker are to work as a team on an experimental event that will plan a "Healthy Eating on Campus" forum. The forum should be designed to raise awareness about this topic. You and your co-worker have been given the responsibility to design this one-day student event. Please report your decision in this form.
You have 20 minutes.

This student event must include: a campus location, a speaker for the topic, and a way to advertise the one-day event across campus, for example, a flyer, social media outreach, email announcement for circulation.

For the computer you are using, you and your co-worker may find the internet helpful for generating ideas. You may select any speaker, location, or advertisement plan for the one-day event. If you complete the tasks in less than 20 minutes, please use the remaining time to add anything else to the event that you think will make it a success.
If you have any questions, please do not hesitate to press the blue button on the wall to page the researcher. *Demonstrate the blue button*

Survey #2

Return after 20 minutes, close Joint Task #1, open Survey #2, usher participants to private room

Thank you for completing that activity. Now, you will take another brief survey about your reflections working with your co-worker. Do you have any questions? We will be in the hall if you need anything.

Joint-Task #2

Thank you for completing the brief survey about your experience working with your co-worker. Now, the two of you will be working on further designing your student event "Healthy Eating on Campus." This time, you will interact by **[phone calling only][text messaging only][in-person]** with your co-worker.
[I will now bring you to a larger room where you will meet your co-worker again.][I will now connect you to your co-worker].

Working together with your co-worker, we would like you to add some additional activities to your one-day student event, "Healthy Eating on Campus."

Your student event must include: transportation for your speaker to and from the airport and event site, lodging/hotel for your speaker, and any local off-site fun activities that the speaker and student attendees can engage in either before or after the event.

Again, for the computer you are using, you and your co-worker may find the internet helpful for generating ideas. You may select any type of transportation, lodging/hotel, or fun activities for the one-day event. You have 20 minutes to fill out this form. If you complete the activity in less than 20 minutes, please use the remaining time to add anything else to the event that you think will make it a success.

If you have any questions, please do not hesitate to press the blue button on the wall to page the researcher. *demonstrate the blue button*

Survey#3

Return after 20 minutes, close Joint Task #2, open Survey #3, usher participants to private room
Once again, we would like you to take a brief survey regarding your reflections on your co-worker. Do you have any questions? We will be in the hall if you need anything.

Debriefing Script

Bring exit information sheet and read to participant then dismiss participant

Exit Information

Before you leave, we would like to explain a little about the nature of this study. The study was designed to examine how people might interact differently over the computer compared to face-to-face.

We want to reassure you that your name will never be associated with your responses, so no one will be able to know how you responded. We are very committed to maintaining confidentiality; indeed, it is one of our highest priorities in this study.
Given that participants for this research study come from the same class (SOC 110), you may have known the identity of your interaction partner today. We ask that you respect the privacy of others by not discussing what was said by your interaction partner for this research study.

Any further questions you have on the study we will be able to answer for you after all of the data are collected. This is estimated to be June 2020. Give the scientific enterprise that we are engaged in, we are sure you understand how important it is that you do not disclose any information about the study to anybody. If others come into the study with knowledge about what is going to occur or what the study is about, their behavior will likely change for the study and it will compromise our scientific work.

If you have further questions, the researcher for this study can be reached in the Department of Sociology by email at phoenicia.fares@ucr.edu. The faculty advisor for this dissertation research project is Dr. Jan E. Stets in the sociology department at the University of California, Riverside.

If you have questions about your rights or complaints as a research subject, please contact the IRB Chairperson at (951) 827 - 4802 during business hours, or to contact them by email at irb@ucr.edu.

Thank you very much for your participation!