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Spontaneous Behavioral Coordination: the Impact of Achieved and Desired Interpersonal Closeness on Synchrony and Mimicry

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SPONTANEOUS BEHAVIORAL COORDINATION: THE IMPACT OF ACHIEVED AND DESIRED INTERPERSONAL CLOSENESS ON SYNCHRONY AND MIMICRY

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An Abstract of the Dissertation Presented
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The purpose of the present dissertation was to examine the impact of interpersonal closeness and the desire for interpersonal closeness on displays of behavioral synchrony and mimicry, simultaneously. Groups of two strangers (*N* = 182 participants, *N* = 91 dyads) were randomly assigned to complete a "closeness-inducing" task where partners took turns asking and answering intimate questions or a comparison "small-talk" task where partners asked and answered less-intimate questions. Additionally, dyads were randomly assigned to complete these tasks in real time over Zoom, or by reading and responding to the task's questions over text. These tasks were intended to generate varying levels of interpersonal closeness among participants or to prevent participants from feeling close and instead inspire the desire for closeness. Then, all participants, regardless of prior experimental condition assignment, completed a second problem-solving task where their behavioral synchrony and mimicry were measured using multiple methodological approaches. Specifically, synchrony was measured using global impression ratings whereas mimicry for gestures and postural displays was measured using global impression ratings and molecular coding approaches to allow for discriminant and convergent validity analyses. The effects of the experimental conditions on participants' reported feelings of closeness and the desire for closeness after their first interaction were examined along with the effect of these experimental conditions on participants' displays of behavioral synchrony and mimicry in a subsequent interaction. Then, collapsing across experimental condition, the effect of participants' feeling of closeness with their partner after their first interaction on their behavioral synchrony during their second interaction was tested alongside the effect of participants' desire for closeness with their partner after their first interaction on their behavioral mimicry. Results generally supported that the more participants reported feeling close with one another, the more they synchronized their behavior during a subsequent interaction. Additionally, the less close participants felt to their partner, but the more they desired to feel close, the more participants mimicked their partner in a subsequent interaction. These results are discussed in relation to understanding the differing nomological networks of behavioral synchrony and mimicry and recommendations for future measurement approaches are made.

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TABLE OF CONTENTS

Chapter 4

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

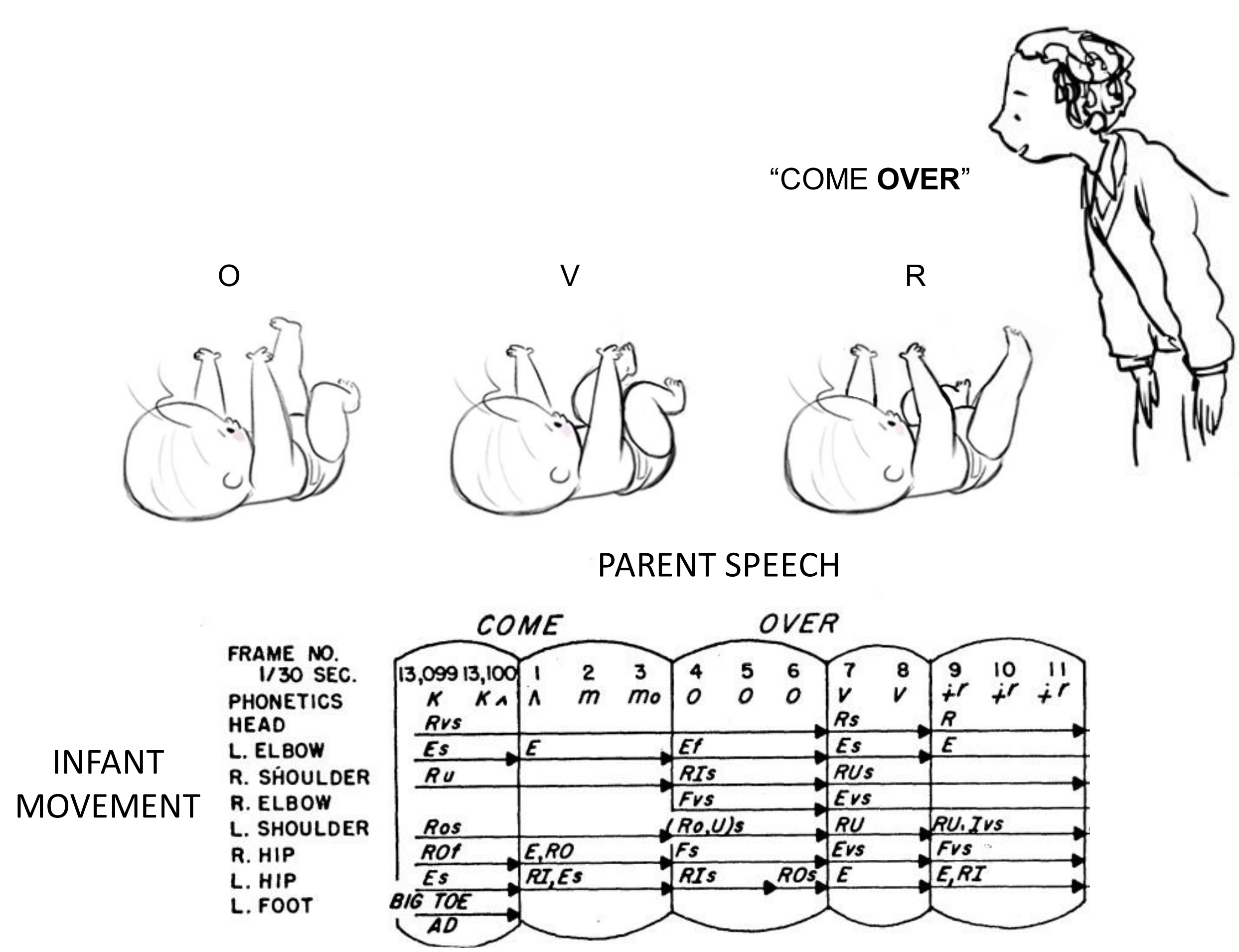
INTRODUCTION

During the 17th century, Christiaan Huygens, a Dutch astronomer and mathematician, patented the first pendulum clock which was set to greatly improve timekeeping in comparison to the spring-driven clocks of that era. While testing these pendulum clocks at home in his bedroom, Huygens was perplexed to find that when he hung two pendulum clocks from the same wooden beam and started them at different times, the two inanimate clocks would begin to tick in time after approximately 30 minutes. When Huygens separated the two clocks, they returned to their asynchronous ticking frequencies. In a letter to the Royal Society of London describing these pendulums (Huygens, 1665), Huygens postulated that the culprit of this “odd kind of sympathy” was the wooden beam that the two pendulum clocks hung from. This, he thought, allowed the clocks to communicate with each other by exerting a tiny force on one clock with every “tick” made by the other clock, nudging each pendulum’s frequency closer to that of the other’s - later described in his published treatise in *Horologium Oscillatorium* (Huygens, 1673).

Approximately 300 years later, researchers Codon and Ogston (1966) and Condon and Sander (1974) remarkably extended this discovery to human behavior. Video recordings of two-day old infants interacting with their parents in hospital nurseries slowed down to 1/30th of a second revealed that the infants moved in precise and sustained segments that were timed exactly with the structure of their parent’s speech (Figure 1). Although there was no visible wooden beam connecting infant to parent, something about their interaction was still allowing them to adopt each other’s behavioral phases, frequencies, and amplitudes. Condon and Ogston (1966) called this precise and patterned behavioral linkage between two interacting persons “interactional synchrony” (p. 342).

Figure 1

Infant Moving in Precise Synchrony with Adult Saying "Come Over."



Note. Adapted from Figure 1 in Condon, W. S., & Sander, L. W. (1974). Neonate movement is synchronized with adult speech: Interactional participation and language acquisition. *Science*, *183* (4120), 99-101. Infant movement: F = forward or flex (depending on body part), H = hold, D = down, E = extend, C = close, RI = rotate inward, RO = rotate outward, AD = adduct, and U = up. Lower case letters refer to speed: s = slight, f = fast, and vs = very slight.

Since then, researchers have discovered many ways in which humans spontaneously coordinate their behavior in systematic, patterned, and rhythmic ways. People tend to unconsciously align their walking patterns (van Uelzen et al., 2008), have been documented rhythmically synchronizing their applause in crowded concert halls after a performance (Néda et al., 2000), and often display the same dynamic facial expressions of those whom they are interacting with (Sato & Yoshikawa, 2007). In light of these observations, some have argued the drive to coordinate is fundamental to human behavior (Strogatz, 2012) and some believe understanding this phenomenon may be "the key to understanding the social brain" (Schirmer et al., 2021, p. 1).

A large question that remains to be thoroughly understood is *when* is behavioral coordination likely to occur among people? Early theory has suggested that certain interpersonal coordination behaviors may reflect the achieved interpersonal closeness between two people, whereas other interpersonal coordination behaviors may reflect of the interpersonal closeness one person desires or is motivated to have with another (LaFrance & Ickes, 1981; Tickle-Degnen & Rosenthal, 1987). Specifically, it may be that when individuals feel close to one another, their behaviors naturally fall into an exact rhythmic alignment (*behavioral synchrony*). When an individual *does not* feel close to another, but instead desires and feels motivated to become close, they may imitate or copy that person's behaviors (*behavioral mimicry*). However, this exact theoretical notion has yet to be empirically tested. Being able to understand the interpersonal states that help facilitate behavioral synchrony and mimicry will greatly enhance theoretical frameworks regarding interpersonal coordination.

The purpose of the present dissertation was to examine the impact of achieved interpersonal closeness and the desire to achieve interpersonal closeness on displays of behavioral synchrony and mimicry, simultaneously. To investigate this question, unacquainted dyads were randomly assigned to complete a "closeness-inducing" task where partners took turns asking and answering intimate questions, or a comparison "small-talk" task where partners asked and answered less-intimate questions. Additionally, dyads were randomly assigned to complete these tasks in real time over Zoom, or by reading and responding to the task's questions over text. Thus, a full factorial design was employed that allowed for the comparison of four separate experimental conditions. I hypothesized that dyads who were given the opportunity to disclose open and vulnerable information and who were allowed to directly respond to one another (i.e., dyads who completed the closeness-inducing task over Zoom) would feel the most *achieved* interpersonal closeness in comparison to the other conditions and would thus display the most behavioral *synchrony* together during a subsequent task. Additionally, I hypothesized that dyads who were given the opportunity to self-disclose personal and intimate information to their partner but did not receive responsivity from their partner (i.e., dyads who completed the closeness-inducing task over text) would feel less interpersonal closeness, but instead a greater *desire* for interpersonal closeness in comparison to dyads in the other conditions and would thus display the most behavioral *mimicry* together during a subsequent task.

I begin by comparing the defining features and measurement approaches of behavioral synchrony and mimicry and describing some components of their existing nomological networks. Then, I introduce the construct of interpersonal closeness and a widely validated experimental approach for generating interpersonal closeness between two unacquainted individuals. Finally, I incorporate a discussion of computer-mediated communication and theorize how restricting interpersonal interactions to various communication platforms (e.g., over videoconferencing and over text) may impact interpersonal closeness and thus manifestations of behavioral synchrony and mimicry.

Interpersonal Coordination

While interpersonal coordination broadly describes "the degree to which the behaviors in an interaction are nonrandom, patterned, or synchronized in both timing and form" (Bernieri & Rosenthal, 1991, p. 403), researchers in this field tend to focus their empirical work either on the manifestation of coordination as *behavioral synchrony* or as *behavioral mimicry*, sibling constructs under the parent construct of interpersonal coordination (Lawson & Robins, 2021). Expanded upon in detail below, behavioral synchrony can be defined as the rhythmic and simultaneous coordination of behaviors and movements between two or more individuals. Behavioral mimicry can be defined as one person imitating, mirroring, or matching another person's discrete behaviors or body configurations. Although behavioral synchrony and mimicry share many features, they are conceptually distinct, are likely driven by separate neural mechanisms (e.g., mimicry by the motor cortex, Gallese et al., 2004; Rizzolatti & Craighero, 2004; synchrony by the cerebellum, Chauvigné et al., 2014; Ivry & Spencer, 2004; Ivry et al., 2002; Kasdan et al., 2022), and may be antecedents or consequences of disparate interpersonal phenomena.

Nonetheless, many researchers in the field still use the two terms interchangeably, and sometimes even employ an operationalization of synchrony or mimicry that does not precisely match the definition provided by the authors themselves (e.g., measuring synchrony and naming it mimicry). Additionally, researchers rarely investigate the two constructs simultaneously (for a few notable exceptions, see Bernieri, 1988; Fujiwara & Diabo, 2022; Kuszynski, 2015), preventing researchers from thoroughly understanding the degree and nature of the empirical overlap between them. To begin clarifying the important similarities and differences between behavioral synchrony and mimicry, the following section will compare and contrast these two forms of interpersonal coordination and review some interpersonal phenomena theoretically and empirically associated with both constructs.

Comparing and Contrasting Behavioral Synchrony and Mimicry

Behavioral Synchrony: How, Why, and When. Although synchrony and mimicry are two ways that individuals can coordinate their behaviors, researchers have proposed distinct theoretical models that describe the processes that predict how, why, and when this type of behavioral coordination occurs. Some of the first researchers to attempt to model the mechanisms that predict how spontaneous synchrony occurs between two or more interacting systems were mathematicians. According to their dynamical systems theory (DST), mathematical equations can model the extent to which the behavior of two independent and dynamic systems may become synchronized over time (e.g., the Kuramoto model; Kuramoto, 1975). Specifically, spontaneous synchronization is theorized to arise within two or more systems when oscillators (alternating waveforms that repeat) share information via a coupling device, which causes them to adapt to each other's phases, frequencies, or amplitudes (Palmer & Demos, 2022). Although the initial systems that were the foundation for the conceptualization of this mathematical theory were planetary and electronic orbits, this theory has since been applied to biological systems, such as humans (Schuster, 1984; Thompson & Stewart, 1990). Biologists have long known, for example, that the human body can synchronize to external cues (sometimes called zeitgebers, a German word which translates to "time givers" or "time cues"; Ehlers et al., 1988). Our sleep-wake cycle is synchronized to the 24-hour solar day. Some researchers even suggest that women's menstrual cycles will start to cycle together if they spend enough time with one another (McClintock, 1971), although this evidence is less robust. Only recently since the development of DST have researchers begun applying these theoretical models to understanding how humans' behaviors and movements can spontaneously align *with one another* (Vallacher & Nowak, 1994, 1997).

In human behavior, the process by which two or more individuals adopt each other's behavioral phases, frequencies, or amplitudes could take place through a myriad of external stimuli, or zeitgebers. For instance, on opening day of London's Millennium Bridge, a strange phenomenon occurred as the excited crowd of pedestrians who streamed onto the bridge soon fell into spontaneous step with one another as the bridges' side-to-side sway caused the crowd to collectively move in sync (Strogatz et al., 2005). In such an instance, the bridge itself may be considered the zeitgeber, as it was the stimulus acting to couple, or synchronize the crowd of pedestrians together by providing rhythmic/timing cues. Individuals at a concert may begin collectively swaying to the groove of the music, in which case the music may be considered the zeitgeber, providing timing cues to the crowd through beats and syncopations. What is remarkable, however, is when individuals engaged in an interpersonal interaction become each other's zeitgebers by naturally emitting vocal, visual, and tactile cues that allow for the interactants to spontaneously and subconsciously synchronize their behaviors and movements to one another. The result of this process, then, is an emergent temporal phenomenon of a group that transcends any one individual. In other words, observing synchrony at any one point in time should *not* allow for any meaningful person-level differentiations between the two synchronized individuals, such as who is the "leader" and who is the "follower", even if the process by which synchrony was achieved involved one individual adapting more strongly to the behaviors, rhythms, and patterns of another.[1]

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[1] For instance, human's sleep-wake cycle is synchronized to the 24-hour solar day through the sole adaptation of human's sleep patterns to the cycles of the sun – there is no such adaptation of the sun's cycles to humans' sleep patterns. Nevertheless, the achieved state is a pattern of synchrony between the two systems. Some researchers, however, highlight that person-level differentiations in behavioral synchrony *can* be determined by modeling how

It is important to clarify here that the term synchrony itself does not describe the *process* by which two or more individuals' movements and behaviors align with one another, but instead describes the *outcome* of that alignment (i.e., synchronized movement). Regardless of whether the zeitgeber is a piece of groovy music, a shaky bridge, or another person's rhythmic prosodic and phonological vocal characteristics, if the outcome is the alignment of a group of people's behavior and movements, then it is behavioral synchrony. In fact, it is accurate to describe two individuals who are competing in a ballroom dance competition with an entirely choreographed routine as having high behavioral synchrony. Of course, it is quite likely that the process by which synchrony is achieved (e.g., by adhering to a choreographed routine or spontaneously through an interpersonal interaction) has important interpersonal implications for the synchronized individuals, and in the case of spontaneous versus intentional synchrony, is almost certainly driven by separate neural mechanisms. Thus, researchers measuring synchrony should absolutely contextualize their results in consideration of the process by which they believe synchrony was achieved (i.e., Was it spontaneous? Was it instructed by an experimenter? Was there an external stimulus that may have facilitated synchrony between individuals?). In line with this recommendation, the present dissertation focuses on nonverbal behavioral synchrony achieved through the spontaneous alignment of individuals' movements and behaviors to one another.

Understanding *how* behavioral synchrony occurs among interacting individuals begs the question of *why* people do this and what purpose does it serve? For nonhuman biological systems, researchers have been able to precisely determine the evolutionary function of some synchronized behaviors. Male *Photinus carolinus* fireflies in Southeast Asia have been

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much each interacting individual adapts to the other (e.g., Bernieri & Rosenthal, 1991; Cappella, 1996), which can be accomplished through time series analysis (Lakens et al., 2016).

documented flashing their lights in synchronized union, creating a beautiful lightshow of coordinated light and dark patterns (Moiseff & Copeland, 2010; see https://ncase.me/fireflies/ for an interactive simulation of firefly synchrony by Nicky Case). More familiar to some may be the extraordinary, coordinated displays of behavior by flocks of birds moving throughout the sky (Okubo, 1986) or schools of fish moving through water (Parrish et al., 2002). For fireflies, it has been posited that synchronized light flashing by males helps female *Photinus carolinus* to integrate visual information more easily in order to recognize and isolate a single mate - a feat which would prove difficult under the visually cluttered conditions of asynchronized light flashing (Moiseff & Copeland, 2010). For birds and schools of fish, their unified movement is often attributed to antipredatory functions (Colorado Zuluaga, 2013; Zoratto et al., 2009). Specifically, for many groups of fish whose scales are thin and silvery, synchronous movement can render them almost invisible to predators attempting to select a single prey (Pitcher & Parrish, 1993). When it comes to synchronized behavior among humans, the exact function may be less precise.

In a special issue on interpersonal synchrony, Hoehl and colleagues (2021) discussed several possible evolutionary accounts regarding the advantages that synchronized behavior affords people including its *effective interaction* benefits, its *communication* benefits, and its *affiliation* benefits, which are briefly summarized. In terms of effectiveness, navigating complex and dynamic environments can serve as a challenge, especially for large groups of individuals. By coordinating and synchronizing behaviors together, humans may be able to navigate their environments more effectively (e.g., walking across a crowded intersection without bumping into others) and accomplish tasks more efficiently (e.g., moving a large couch down a spiral staircase). Research has also supported the notion that synchrony may provide a useful framework for communicative exchanges. For instance, rhythmic mouth, head, and hand movements during speech production may help listeners more easily process a speaker's vocalizations, which could help facilitate language learning among infant-parent dyads (Harrist & Waugh, 2002), or effective turn-taking between adult interaction partners (Campbell & Scherer, 2010). Finally, it is argued that behavioral synchrony may have been evolutionarily selected for as an indicator of individuals who would make favorable social partners (Hove & Risen, 2009; Tunçgenç et al., 2015). Indeed, infants as young as 12 months select synchronous compared to asynchronous social partners (Tunçgenç et al., 2015), showing how behavioral alignment may be related to individual's actual or perceived affiliation with others. Thus, humans' ability to synchronize to the rhythmic and periodic movements of others appears to be an incredibly important biological process that, across all these evolutionary accounts, seems to convey that two or more people are "with" each other or are "one" (Kendon, 1970).

Measuring Molecular Synchrony. Unlike internal psychological characteristics such as happiness, which may be assessed by asking a person how happy they are, behavioral synchrony is *not* describing an internal psychological characteristic of a person or group. Instead, this phenomenon is an attribute or characteristic of behavioral motion with respect to the temporal aspects emanating from the external environment. Thus, one job of synchrony researchers is to determine the best way to measure this behavioral phenomenon.

When deciding the best approach for measuring certain behaviors, researchers are often first confronted with selecting a unit of measurement. Burgoon and Baesler (1991) delineate two common approaches: molecular measurement and global measurement. Molecular measurement, also labeled micro measurement, refers to "descriptions of single behaviors or attributes that are concrete and discrete, usually measured as frequency counts, durations, or judgments within brief time intervals, via physical apparatus or highly consensual coder observations" (Burgoon & Baesler, 1991, p. 58). Conversely, global measurement, also labeled macro, molar, or gestalt measurement, often refers to subjective judgments or impressions of global attributes and behaviors that are often measured using a rating scale.

Some of the first psychologists to study behavioral synchrony selected the molecular measurement approach to maximize precision and accuracy in quantifying synchrony. One of these approaches, influenced by DST, operationalized synchrony as the extent to which the *cycles* of two or more people conformed to one another across time. Indeed, according to biochronometry, the human body has several physiological oscillators whose cycle times can range from approximately four weeks (the menstrual cycle) to 24 hours (the sleep-wake cycle) to 0.8 second (the cardiac cycle). To capture whether the cycles of two or more people conform to one another, third-party observers have been trained to code certain behaviors that have rhythmic properties associated with them (e.g., talking and listening patterns, periods of engagement and disengagement) separately for two interacting individuals, which are subsequently compared by a researcher for congruence (Berghout-Austin & Perry, 1983; Hayes & Cobb, 1982; Tronick et al., 1977, 2005). Researchers Hayes and Cobb (1982), for instance, isolated a couple in a laboratory apartment for 30 days and recorded their periodic patterns of conversation. By removing the couple's access to clocks and other time cues (e.g., light coming from window), as well as from external contact with others, the researchers were able to approximate the degree to which the couple's conversation periods synchronized to one another. Within the first 12 days of confinement, the researchers found that the conversational activity of the couple was not randomly distributed throughout the day but began to emerge cyclically every 94 minutes or so.

This finding was interpreted as the couple's conversational rhythms acting as oscillators that entrain and adapt to one another.

Another approach to coding synchrony has been to consider it in terms of the interactants' *simultaneous movements.* Rather than focusing on cycles of in-phase entrainment, some researchers have focused on the extent to which the muscle movements, postures, gestures, or vocalizations of a person occur simultaneously with the muscle movements, postures, gestures, or vocalizations of another. Condon and Ogston (1966) first attempted to capture this operationalization of synchrony by asking coders to analyze frame-by-frame movements of interactants to later determine whether the body movements of a listener were co-occurring with the speech articulations of a speaker (see also Kato et al., 1983). Some early work inspired by this approach also examined the head nods of listeners when a speaker was talking and found that approximately one-fourth of listeners' head nods occurred in precise synchrony with the speakers' vocal utterances (Hadar et al., 1985) leading researchers to speculate that this delineation of synchrony may be the behavioral foundation behind human communication and speech (Wylie, 1985).

One strength of these two molecular coding approaches is that the researcher is able to obtain a direct, objective estimate of how much synchrony occurred within a given interaction (e.g., a frequency count of simultaneous movement events). However, these molecular approaches require hours of labor-intensive coding to estimate how synchronous the movements of a single dyad are, millisecond to millisecond. Given this laboriousness, researchers must often pick and choose which behaviors to code for (e.g., coding for synchrony of head movements, Hadar et al., 1985; speech vocalizations, Bowling et al., 2013; facial expressions, Altmann et al., 2021). Intrinsic to the definition of synchrony, however, is that individuals as a system become rhythmically coordinated. This could mean that one person's head movements are coordinated with another person's gesturing – something that would not be empirically captured by researchers only focusing on certain discrete behaviors. In other words, by focusing on the specific "parts," this coding approach ignores the complexity of the "whole."

Measuring Global Synchrony. To overcome this limitation, Bernieri argued that third-party observers can do more than just code the independent behaviors and movements of individuals to later compare for synchrony, but instead can directly observe and rate synchrony themselves (Bernieri & Rosenthal, 1991). In other words, if synchrony is a real stimulus property of the environment, then it should be observable to the human eye on a more global level, where the movements and configurations of a group or dyad can be perceived as a whole rather than being broken down into their individual components (e.g., Bernieri et al., 1988; Bernieri et al., 1994).

Bernieri and Rosenthal (1991) outlined three components of synchrony that they believed could be validly assessed on the global level: *tempo similarity*, *simultaneous movement*, and *coordination and smoothness.* The first two components (tempo similarity and simultaneous movement) were derived from the molecular coding approach developed by Condon and Ogston (1966) described above. Specifically, tempo similarity can be understood as the extent to which the speed that two or more individuals are moving matches one another across an interaction (e.g., they are both moving slowly at the same time and quickly at other times, similar to cyclical patterns of engagement/disengagement). Simultaneous movement is conceptualized as the extent to which the movements of two individuals are occurring at the same time, regardless of whether the behaviors themselves are the exact same (e.g., does one person swing their arm at the same time the other shifts their posture?).

The final theorized component of behavioral synchrony, coordination and smoothness, first described by Bernieri and Rosenthal (1991), can be understood as the extent to which individuals appear as if they are components of the same single unit, or become a "superorganism," in the way their movements and behaviors intertwine and mesh together. In this way, beyond understanding whether interactants' behaviors adapt the same rhythmic properties and occur at the same time, Bernieri argued that whether interactants' behaviors also smoothly fit together is a core component of behavioral synchrony and provides a framework for understanding evolutionary fitness for group-living. For instance, goals like hunting an animal, fighting a predator, or even creating a piece of music results from the coordination of group behaviors into one unified organism that would be much more difficult (and sometimes impossible) to achieve individually. Given that this final component of synchrony is described as a gestalt perception of the "togetherness" of a dyad or group that relies on humans' ability to organize and interpret chaotic individual elements as an ordered whole (Vezzani et al., 2012), it cannot easily, if at all, be assessed through molecular coding approaches.

Bernieri and Rosenthal (1991) developed a system where trained human coders rated, on a scale[2], the extent to which interacting participants' movement speeds were matched (tempo similarity), that their movements occurred at the same time (simultaneous movement), and that they generally appeared as if they were a single unit (coordination and smoothness). Impression ratings of synchrony from this coding system have been shown to distinguish true interactions from pseudo interactions (i.e., interactions that were video edited to include two individuals who

[2] Unlike molecular ratings which allows for the objective quantification of the nature of synchrony, this approach quantifies synchrony in relative terms in a way that is directly related to the way in which a group of coders are using a rating scale. In this way, while the synchrony of groups *within* any particular study can be statistically compared to one another, comparing the synchrony of groups *between* different studies is not intrinsically informational as differences in synchrony averages across studies could be due to mere differences in the rating tendencies of human coders (i.e., one study employed a sample of human coders that utilized higher ends of the rating scale than the sample of coders from the other study).

never actually interacted; Bernieri et al., 1988), correlate significantly with molecular measurement methods of synchrony (Cappella, 1997), and can be done in ways that are not subject to rating artifacts (e.g., biased by participants' emotional expressions, physical attractiveness; Bernieri et al., 1994). Thus, these studies seem to suggest that, with training, humans can reliably and validly perceive the extent to which individuals are moving in synchrony on a global level.

Behavioral Mimicry: How, Why, and When. Thus far, I have outlined the defining characteristics of behavioral synchrony, a physical temporal phenomenon that describes the relationship between the movements of two or more individuals as *cyclical, simultaneous*, and *coordinated* such that two or more individuals appears as if they are one. Additionally, following DST, I have described how spontaneous synchrony is considered a dyad/group phenomenon opposed to an individual-level characteristic that has theorized benefits of creating effective interactions, facilitating communication, and indicating favorable social partners. I will now describe the defining characteristics of behavioral mimicry (sometimes called behavior matching) and compare these defining characteristics with those of behavioral synchrony (see Table 1 for a summary of differences between the two constructs).

Given that behavioral synchrony and mimicry are both sibling constructs under the parent construct of interpersonal coordination (Lawson & Robins, 2021), they share some features in common. For instance, both behavioral mimicry and synchrony organize two or more individuals in an interaction such that their behaviors become more patterned and predictable, opposed to chaotic and unpredictable. Additionally, both constructs generally imply some sort of *adaptation* of behavior, either by one or both individuals in an interaction. Finally, like synchrony, mimicry does *not* describe an internal psychological characteristic of a person or group (e.g., happiness). Instead, this phenomenon is an external, movement-based phenomenon.

Apart from these similarities, there are defining characteristics that separate synchrony from mimicry. The first of these is the theorized process regarding *how* each phenomenon occurs. While DST (Vallacher & Nowak, 1997) describes one process by which spontaneous synchronization of human behavior occurs, mimicry researchers theorize that a "perception-action link" describes the process that enables mimicry to occur among humans (Chartrand & Dalton, 2009). The perception-action link was initially derived from the notion of "ideomotor action" proposed by Carpenter (1874) and James (1890), which suggests that simply thinking about an action increases the likelihood that an individual will engage in that action, as the regions of the brain that are responsible for executing certain behaviors also become active when a person is just thinking about that behavior. Extending this to interpersonal interactions, researchers argue that individuals are more likely to engage in a behavior when they see another person engaging in that same behavior themselves (Chartrand & Dalton, 2009). In other words, mimicry, unlike synchrony, incorporates a leader-follower dynamic such that one person is always perceiving and responding to the behavior of another, for any one instance of discrete behavior.[3]

Evidence supporting this perception-action link for mimicry behaviors can be found in neuropsychology, where researchers have discovered "mirror neurons" (Iacoboni et al., 1999; Koski et al., 2003; Rizzolatti et al., 1996) which activate both to the perception of another's behavior, as well as the execution of one's own behavior. These neurons have been located

[3] Although mimicry always has this leader-follower dynamic for any *one* instance of a discrete behavior, the naturalistic expression of mimicry may sometimes be more realistically characterized by two individuals mimicking each other throughout a conversation or interaction, generally trading off as the leader and follower.

within individuals' premotor cortex (Kilner & Lemon, 2013; Rizzolatti et al., 1996) and primary motor cortex (Dushanova & Donoghue, 2010; Tkach et al., 2007; Vigneswaran et al., 2013), areas responsible for the selection of motor movements and the execution of these movements, respectively. On the other hand, neurological evidence supporting humans' ability to synchronize indicates that the cerebellum is strongly involved in this process due to its role in representing the temporal relationship between successive events that allow for temporal predictions (Chauvigné et al., 2014; Ivry & Spencer, 2004; Ivry et al., 2002; Kasdan et al., 2022). In other words, the cerebellum acts as a timing and rhythm mechanism that allows individuals to compare and update expected temporal signals in relation to an outcome in order to establish a "groove."

In addition to the mechanisms driving the phenomenon, mimicry also differs from synchrony in its *timing*. Whereas synchrony describes the extent to which the movements and behaviors of two or more individuals occur *at the same time*, mimicry describes the extent to which the behaviors of one individual are occurring in response to the behaviors of another such that there is a leader-follower (or stimulus-response) dynamic. In other words, definitions of mimicry must incorporate a *temporal delay* between the movements and behaviors of two individuals. It is difficult to determine the maximum length of a delay between two similar behaviors to be considered mimicry opposed to a person simply acting on their own accord. Indeed, if mimicry involves a perceptual-motor schema, then mimicry could theoretically occur any time that the schema is used (see Footnote 4 for an example of this). As a criterion for empirically measuring the phenomenon, however, some researchers have selected a maximum of a 10-second interval such that if a person displays the same behavior as their interaction partner up to 10 seconds after the initial behavior, then it is considered mimicry (e.g., Kurzius &

Borkenau, 2015; Kuszynski, 2015; Stel & Vonk, 2010). Maximum windows of time closer to three to five seconds may be more conservative in capturing mimicry (Chartrand & Lakin, 2013).

In addition to the differences in timing between synchrony and mimicry, these two constructs also differ in the extent that they must take place between the same discrete behaviors. Given that mimicry relies on the perception-action link, for a behavior to be considered an instance of mimicry, the behavior must be the same behavior as the person who initiated it (e.g., a person scratching their cheek followed by their partner scratching their cheek). Synchrony, on the other hand, does not have to occur between the same two discrete behaviors. For instance, one person tapping their foot at the same time another person shifted their posture would be considered synchrony. That is not to say that synchrony *cannot* take place between the same two discrete behaviors (e.g., two people tapping their feet at the same rhythmic rate), but unlike mimicry which must take place between the same two discrete behaviors, synchrony does not have to in order to meet its definitional criteria.

Another difference between the two phenomena is that behavioral mimicry, unlike synchrony, relies on *visual perception*, at least when mimicry and synchrony are considered nonvocal behaviors.[4] For the perception-action link to be enabled and mimicry to occur, there must be a visual input of an interaction partner's behavior that triggers the imitation of that behavior. Therefore, if a behavior is being visually blocked by some external input (e.g., a person tapping their foot is likely not visually available to an interaction partner over Zoom as cameras often only capture users from the shoulder to the head), then that behavior, by definition, cannot

[4] It is entirely possible for mimicry to occur through vocal behaviors. For instance, humans may spontaneously mimic the prosodic and phonological characteristics of languages (Hilton, 2005; Matarazzo et al., 1964; Skoyles, 1998). A fellow native English-speaking graduate student at the University of Maine whose partner's native language is French often spontaneously and effortlessly adopted the French prosodic melody and stress patterns when recalling activities they had engaged in together or times they had spent in France (i.e., when a "French" schema had been activated). In such a case, mimicry relies on *auditory* cues, opposed to visual cues.

be mimicked by an interaction partner. On the other hand, the external cues and zeitgebers that facilitate synchrony do not have to be visual cues. In fact, it is often theorized that *auditory* cues help facilitate synchrony more than visual or tactile cues (Condon, 1979; Dittmann & Llewellyn, 1969; Fujiwara et al., 2023; Kendon, 1970; Repp & Su, 2013; Van Puyvelde et al., 2013) perhaps due to our natural environments entailing more auditory rhythms than visual ones, leading to more practice adapting to these kinds of cues (Varlet et al. 2012) – although having multiple aligned cues generally facilitates synchrony more than any one sensory cue on their own (Armstrong & Issartel, 2014). Thus, this differentiation implies that behavioral synchrony could take place between two people on a phone call, whereas nonvocal behavioral mimicry could not.

Finally, synchrony and mimicry are theorized to serve different evolutionary processes. Specifically, while synchrony may serve to help organize and create effective interactions and communications, as well as identify favorable social partners, mimicry may initially serve to help learning through modeling and imitation. Piaget, for instance, argued that the developmental foundation of language learning is individuals' ability to mimic and imitate others (see also Meltzoff & Gopnik, 1989). In addition to serving language acquisition learning, mimicking the facial expressions of others may serve to facilitate learning of emotion recognition and identification (Krumhuber et al., 2014; Neal & Chartrand, 2011; Stel & Knippenberg, 2008). Following, the better individuals are at mimicking other's verbal and nonverbal behaviors, the more comprehensively and quicker they learn. In adulthood then, while synchrony between two interacting individuals may convey that one individual is "with" another (as described by Kendon, 1970), mimicry may communicate that one person "understands" or is "similar" to another (as described by Scheflen, 1964).

Table 1

Contrasting Characteristics of Behavioral Synchrony and Mimicry

Characteristics	Behavioral Synchrony	Behavioral Mimicry
Theorized process	Dynamic Systems Theory	Perception-action link
Location of neural activity	Cerebellum	Motor cortex
Timing	Requires temporal simultaneity	Requires a temporal delay
Behavior	Can be the same or different	Must be the same
Visual input	Not necessary	Necessary
Unit of analysis	Dyad/Group	Person; Only one mimicker/follower for every behavioral event

Measuring Molecular Mimicry. Unlike behavioral synchrony, researchers investigating mimicry have overwhelmingly limited their investigations to measuring a participant's behavioral response to the posed (or fixed) behavior of a faux participant. These experimental paradigms have included exposing participants to a faux participant's videotaped behaviors (e.g., Lanzetta & Englis, 1989) or a faux participant's trained behavior in-vivo (e.g., face touching, van Baaren et al., 2003). Then, researchers generally employ a molecular coding approach to capture the frequency of a participant's various behaviors during an interaction (e.g., Lakin & Chartrand, 2003) or the proportion of time spent engaging in a specific behavior (e.g., Dickens & DeSteno, 2014) to determine whether, for instance, a participant's face touching increased when interacting with a face touching faux participant compared to when interacting with a non-face touching faux participant, implying the automatic activation of a perceptual-action schema. Although this operationalization of mimicry certainly yields valuable insights into interpersonal behavioral coordination, it ignores the concept of timing, even though researchers utilizing this approach do suggest the presence of temporal delays as a feature of mimicry in their definitions (e.g., Chartrand & Bargh, 1999; Lakin & Chartrand, 2003). Ignoring timing in operationalizations of mimicry makes it difficult to determine whether the behaviors occurring were truly mimicry, synchrony, or something else entirely. Additionally, this approach to measuring mimicry only works in controlled interactions where the behavior of one person is fixed (e.g., as pictures, videos, or in-vivo faux participants), and cannot be utilized to explore mimicry as it naturally unfolds in real, dynamic interpersonal interactions.

A few studies have attempted to measure mimicry as it unfolds naturally between two real interactants. Some of these studies delineate mimicry as the matching of certain discrete behaviors/muscle movements. Hess and Bourgeois (2010), for instance, placed two participants together and had one recount an emotional narrative while the other listened. To assess mimicry, the researchers computed correlations between speakers' and listeners' facial muscle activations, where high correlations signaled the presence of simultaneous activation and deactivation of specific muscles for speakers and listeners. However, by capturing the *simultaneous* activation of facial muscles, this approach appears to capture the *synchrony* of muscle activation in the face, opposed to mimicry. Kurzius and Borkenau (2015) implemented a similar procedure where they coded whether 18 different behaviors were present or absent during each 10-second interval of an interaction between two unacquainted participants. However, these researchers also seem to be capturing some components of synchrony in their mimicry calculations by computing the correlation between participants' behaviors across these 10-second intervals, controlling for the participant's behavior 10 seconds prior.

Other approaches to coding mimicry, which developed from some of the earliest attempts to capture interpersonal coordination behaviors, have defined mimicry not necessarily as the imitation of another's discrete gestures/behaviors, but instead as matching another's postural configuration (McDougall, 1926; Scheflen, 1964)[5] – sometimes referred to as posture similarity, posture mirroring, or postural congruence. For instance, LaFrance and Ickes (1981) videotaped male-female dyads in a "waiting room," and subsequently coded the extent to which their postures matched one another. To do so, still photographs of both participants were taken every 20 seconds from the 5-minute interaction video, and coders were tasked with categorizing the arm and leg positions of each participant from 12 possible positions for the arm and 6 possible positions for the leg. To the extent that both members of the dyad's postural positions matched at each observation point, the dyad was considered to have higher postural similarity. This measurement approach, however, cannot discriminate synchrony from mimicry, as simply examining still photographs of an interaction does not allow a coder to determine whether one person shifted their posture in response to another, or whether both interactants matched their postures simultaneously.

A more recent and technologically forward approach to measuring postural mimicry was employed by Fujiwara and Daibo (2022) who used OpenPose, an automatic coding software, to capture 14 different points on the bodies of two interacting participants. The average correlation between each body point was then calculated across time. However, these researchers also comment that "the obtained coefficient excludes time lags" (p. 77) and therefore faces similar issues of ignoring timing like the approaches described above. Thus, while it appears as though

[5] The earliest descriptions of posture mirroring derived from McDougall (1926) who observed that spectators of athletic or dance events sometimes took on the postural configurations of those who they were watching. Although McDougall articulated this concept as a kind of behavioral synchrony, assuming the posture of another seems more aligned with behavioral mimicry, as it allows for a leader-follower process that is likely tied to the perception-action link. Indeed, Bernieri and collegues (1994) and Willis (1989) later showed how ratings of posture similarity correlated less strongly with ratings of behavioral synchrony, and described posture similarity as a related, but unique construct from behavioral synchrony. However, some researchers still refer to posture similarity as "static synchrony" and behavioral mimicry as "movement mimicry" (e.g., Ramseyer & Tschacher, 2008).

some studies have attempted to use molecular coding of mimicry in naturalistic interactions for either discrete gestural events (e.g., Hess & Bourgeois, 2010; Kurzius & Borkenau, 2015) or shared posture displays (e.g., Fujiwara & Daibo, 2022; LaFrance & Ickes, 1981), there is not yet a widely validated method for capturing mimicry in naturalistic interactions that is not confounded by synchrony.

Measuring Global Mimicry. Only three studies, that I am aware of, have attempted to assess mimicry using a global impression rating approach. Specifically, Bernieri (1988), Bernieri et al. (1994), and Willis (1989) measured participants' mimicry for posture with a rating scale where coders watched clips of interactants and rated the degree to which participants' postures were the same. For instance, trained raters in Willis (1989) were given the following definition for postural similarity: "Counselor and client share similar or identical positions of their upper and lower bodies… The positions may be mirrored (i.e., right leg of one mirrors the left leg of the other), or with the same side of the body (right leg of one is in the position of the right leg of the other). The focus is on the basic body positions, not the gestures coming out of those positions" (p. 49). While these researchers showed how global postural mimicry displayed discriminant validity with global synchrony in their studies, there has yet to be an attempt to assess the convergent validity of these global ratings of postural mimicry with other forms of mimicry (i.e., molecular measurement approaches).

Interpersonal States that May Facilitate Synchrony and Mimicry

Although some research has uncovered *how* synchrony and mimicry occur and have postulated *why* it may occur, little work has investigated *when* this coordination occurs among interactants. Behavioral coordination is not a pervasive phenomenon that is equally likely to emerge across all interpersonal interactions. As expressed by Bernieri (1988), "We can 'hit it off' immediately with some people and never ‘get it together’ with others” (p. 137). So, what predicts synchrony and mimicry? The literature addressing the antecedents of *behavioral synchrony* is surprisingly sparse (see Lakens et al., 2016 for a summary). Some researchers have shown that certain stable individual differences within people can predict how much synchrony is likely to be experienced by a dyad/group members in any given conversation. For instance, individuals who are more open to experience, lower in narcissistic interpersonal styles (Tschacher et al., 2018), higher in extraversion (Fujiwara & Yokomitsu, 2021), have a prosocial value orientation (Lumsden et al., 2012), and are female (Fujiwara et al., 2019) are more likely to synchronize during social interactions. On the level of the dyad, those who belong to the same subculture (Condon, 1982) as well as those who are from the same age and racial group (Stosic et al., in prep) also tend to synchronize their behaviors more. Finally, it appears as though context can influence synchrony during interpersonal interactions, such that unacquainted dyads who engaged in conversations regarding shared interests display greater synchrony than dyads debating highly polarizing topics (Paxton & Dale, 2013).

Significantly more work has examined antecedents to behavioral mimicry (see Chartrand & Lakin, 2013 and Kurzius & Borkenau, 2015 for summaries). There appear to be certain individual differences that have been associated with greater tendencies to engage in behavioral mimicry such as being higher in perspective taking (Chartrand & Bargh, 1999), higher in openness (Kurzius, 2015), having an interdependent self-construal (van Baaren et al., 2003), and being higher in self-monitoring (Cheng & Chartrand, 2003). One’s mood or emotional state can predict how much they mimic others, where those in a happy mood are more likely to engage in greater mimicry (Likowski et al., 2011; van Baaren et al., 2006) as well as those feeling more guilt (Martin et al., 2010). Finally, partner effects, such as interacting with someone likable (Stel et al., 2010), attractive (Karreman & Verwijmeren, 2008), or part of one's ingroup (Bourgeois & Hess, 2008; Yabar et al., 2006) appear to increase behavioral mimicry. These findings, however, are not yet tied together by a theoretical model that helps researchers understand when synchrony and mimicry are likely to occur.

One early theory that seems to warrant further investigation was offered by Tickle-Degnen and Rosenthal (1987). In their theory relating coordinated behaviors and rapport, these researchers stated that "Coordinated behavior in the early stage of a relationship may be an *attempt* to establish rapport, whereas at a later stage it may be an indication of *achieved* rapport" (Tickle-Degnen & Rosenthal, 1987, p. 127). Adapting this theory, I argue that, regardless of relationship stage, *behavioral mimicry* may reflect an attempt to establish rapport (or interpersonal closeness) while *behavioral synchrony* may be an indication of achieved rapport (or interpersonal closeness). Importantly, in this context, I use the terms rapport and closeness to describe interpersonal states that are temporally locked within any given moment, opposed to descriptive of the average relationship between two people (e.g., two friends who have known each other for years may describe their relationship as "close," but may feel more or less closeness during various moments in an interaction or across different interaction contexts. If one friend is conservative and one friend is liberal, for instance, they may feel close when talking about their shared love of folk music but may feel less close when talking about politics.). In other words, how close two individuals feel in a given moment might impact how much they synchronize, whereas how much closeness an individual desires to have with another person in a given moment may impact how much they mimic that person. However, little research has explicitly explored this possible theoretical dichotomy of these two predictors by examining behavioral synchrony and mimicry together in the same study. Below, I detail the existing empirical evidence regarding the relationship between closeness, rapport, and behavioral mimicry and synchrony and discuss how they provide preliminary support for this theoretical distinction.

Closeness, Rapport, and Behavioral Synchrony. Over the past few decades, researchers have begun to explore the important psychological phenomenon that behavioral synchrony may be associated with. While a variety of constructs have been found to be antecedents and consequences of behavioral synchrony, the most robust finding may be that synchronous behaviors in an interaction are related to the synchronized individuals' subjective feelings of *interpersonal closeness and rapport.* In fact, in Tickle-Degnen and Rosenthal's (1987, 1990) theory of rapport, they describe behavioral synchrony (named *coordination* in their original paper) as a key component of interactants' experience of rapport.

Bernieri (1988) was one of the first to empirically observe this phenomenon within the context of teacher-student interactions. Bernieri (1988) grouped individuals together into dyads, assigned one to roleplay as a teacher and one as a student, and measured the spontaneous synchrony that occurred between the two during their subsequent interaction. Dyads who were rated as more synchronous by outside observers self-reported experiencing more rapport with their interaction partner (i.e., feeling close and harmonious) than dyads who appeared less synchronous. Similarly, Sharon-David and colleagues (2019) observed that dyads who displayed greater behavioral synchrony (using Bernieri and Rosenthal's [1991] coding system) while discussing positive or neutral events reported feeling closer to their interaction partner. This phenomenon even extends to groups of three, where Fultz (2023) showed how greater synchrony observed among strangers planning a trip together was related to group members' ratings of rapport with one another. A meta-analysis of the intra and interpersonal outcomes of interpersonal coordination estimated a mean effect size of $r = .35$ between behavioral synchrony and feelings of closeness and rapport (Vicaria & Dickens, 2016).

These correlational studies beg the question of whether greater closeness and rapport predict greater behavioral synchrony, or whether having behavioral synchrony facilitates feelings of closeness and rapport among two or more people, or whether this relationship is bidirectional. A few experimental studies manipulating behavioral synchrony by asking participants to intentionally synchronize their behaviors have explored the latter pathway. For instance, Tarr and colleagues (2016) taught participants a series of dance moves to perform during a "silent disco." Those who performed the same dance moves at the same time subsequently reported feeling more connected to those who they danced with, liked them more, and felt as though their personalities were more similar than those who performed different dance moves. Wiltermuth and Heath (2009), in a creative approach to this same question, led groups of participants around campus on a walk. Those who were instructed to walk together in unison self-reported feeling more connected to their counterparts and acted more cooperatively with these same group members in a later task than groups who did not have instructions to walk synchronously. Finally, Tarr and colleagues (2018) utilized immersive virtual reality to manipulate the timing of a virtual human's movements to achieve more synchrony or less synchrony with the participant. Participants who interacted with a more synchronous virtual human reported significantly greater interpersonal closeness to them compared to those who had interacted with the less synchronous virtual human. However, given that each of these studies instructed synchrony to occur among participants and sometimes only examined synchrony among certain discrete behaviors (e.g., footsteps), these studies may not generalize to *spontaneous* and *naturalistic* behavioral synchrony.

Only two studies, that I am aware of, have explored the opposing pathway of more closeness or rapport predicting greater behavioral synchrony. Vacharkulkemsuk & Fredrickson (2012) instructed participants to either engage in Aron et al.'s (1997) closeness-inducing paradigm where participants took turns asking and answering intimate questions, or to read a scientific article together. Those assigned to engage in the closeness-inducing paradigm were rated as significantly more synchronous than those instructed to take turns reading a scientific article. However, because this experiment measured synchrony *during* the closeness-inducing (and scientific article reading) task, it could be that greater levels of synchrony observed for those in the closeness task was simply a by-product of the task itself, and not necessarily a reflection of the interpersonal closeness that the dyad achieved. For instance, because the closeness-inducing paradigm allowed participants to make eye contact, while the scientific article paradigm required participants to look down to read, it could be that eye contact facilitated greater synchrony between by providing participants more multisensory cues to entrain to. To avoid any experimental task potentially confounding observed synchrony, researchers should consider inducing an experimental manipulation, and then measuring its effect on synchrony in a later task that is the same across all experimental groups.

Asher and colleagues (2020) similarly instructed dyads to either engage in Aron et al.'s (1997) closeness-inducing task, where participants asked and answered intimate questions, or small-talk task, where participants asked and answered less-intimate questions. While these researchers did find that synchrony measured during dyads' interactions was higher for groups assigned to the closeness-inducing task compared to the small-talk task, these researchers did not investigate any mediating mechanisms, making it difficult to conclude what exactly it was about the closeness-inducing task that facilitated greater behavioral synchrony compared to the small-talk task. Additionally, these researchers quantified synchrony from time series data generated from an automated motion energy capture software (i.e., Motion Energy Analysis; Ramseyer & Tschacher, 2011) where synchrony was computed from "cross-correlations for positive and negative time lags up to 5 s" (p. 284-285). Since these researchers included time lags in their computations of synchrony, it becomes unclear whether the greater coordination observed in the closeness-inducing task was indeed greater synchrony or instead behavioral mimicry.

Thus, the current evidence regarding whether closeness and rapport facilitate behavioral synchrony or whether behavioral synchrony facilitates feelings of closeness and rapport appears inconclusive. Indeed, researchers may never be able to truly test which of these varying causal pathways is stronger as determining whether behavioral synchrony causes closeness and rapport would require the manipulation of behavioral synchrony – a process which may undermine the true nature of behavioral synchrony if researchers are interested in synchrony as a spontaneous, unconscious behavior. However, it may be possible to manipulate the degree of closeness two or more individuals feel in order to explore whether closeness predicts individual's behavioral synchrony. This is the approach taken in the current dissertation to better understand whether, as influenced by Tickle-Degnen and Rosenthal's (1987) theorizing, synchronized behavior is an indication of *achieved* rapport and closeness.

Closeness, Rapport and Behavioral Mimicry. Like behavioral synchrony, investigations of behavioral mimicry have generally linked this behavioral phenomenon with constructs such as interpersonal closeness and rapport. However, some empirical evidence has suggested that mimicry may not be a relational phenomenon indicative of feelings of closeness (i.e., akin to synchrony), but instead a motivational phenomenon associated with the *desire to achieve* greater affiliation and closeness.

The first researchers to pose this motivational account were LaFrance and Ickes (1981) who found that mimicry among unacquainted individuals unobtrusively observed in a waiting room was associated with these individuals feeling *less* rapport. In addition, these researchers reported a positive association between mimicry and participants' self-consciousness. LaFrances and Ickes interpreted this finding as mimicry reflecting the *motivation* to achieve rapport before true rapport had been achieved.

Since then, additional correlational research has provided preliminary evidence regarding the relationship between mimicry and the desire to have closeness with another, removed from actually feeling close. For instance, in the study describe above where participants were assigned to roleplay as a teacher-student dyad, Bernieri (1988) also measured global impressions of participants' mimicry (labeled behavior matching in Bernieri, 1988). Similar to LaFrance and Ickes, Bernieri (1988) observed that global ratings of mimicry displayed a slightly negative, yet nonsignificant, relationship with rapport. Additionally, global mimicry was positively related to participants' reported *anxiety* during their interaction. These findings may demonstrate that the social interaction performance pressures faced by participants, such as wanting their partner to like them and/or wanting to feel closer to their partner removed from actually feeling close, may be reflected in mimicking their interaction partner.

Lakin and Chartrand (2003) compared participants primed with a non-conscious goal to affiliate using affiliation-related words such as *affiliate, friend*, *partner,* and *together* to participants in a no-goal condition (i.e., primed with words such as *neutral*, *background*) by measuring participants' subsequent face-touching behaviors when matched with a face touching faux participant. Consistent with predictions, individuals who were primed with affiliation words displayed greater face-touching when matched with a face-touching faux participant than those in the no-goal condition, which the researchers describe as evidence for greater mimicry. Leighton and colleagues (2010) similarly showed how participants primed with prosocial words mimicked the open or closed hand positioning of pictures later presented to them more than participants primed with antisocial words. Finally, Karreman and Verwikmeren (2008) found that single participants mimicked an attractive faux participant to a greater degree than participants already in a romantic relationship. Together, these studies imply that one's desire to affiliate and get close to others may unconsciously motivate them to mimic those who they wish to get close to – perhaps to behaviorally communicate "I am similar to you" or "I understand you."

While most of these studies are correlational (e.g., Bernieri, 1988; LaFrance & Ickes, 1981) or did not directly manipulate participants' motivation to achieve closeness with their interaction partner, there are a few studies that more directly tested the impact of motivation on mimicry. For example, in addition to priming participants with affiliation words, Lakin and Chartrand (2003) also gave another group of participants the explicit goal to affiliate with their interaction partner and observed that this group of participants unconsciously mimicked a faux participant more than those who had received no explicit motivational goal. Researchers have also created unconscious affiliation-related motivational goals for participants by exposing them to ostracism or social exclusion and then measured their mimicry behaviors (Lakin, 2003; Lakin & Chartrand, 2005; Sommer & Bernieri, 2015). Lakin (2003) found that individuals who reported feeling a greater threat to their belonging after being excluded from a group, and thus felt motivated to re-affiliate with new people, mimicked a faux participant in a subsequent interaction more than those who did not feel a threat to their belonging or were not excluded. Similarly, Sommer & Bernieri (2015) found that participants who were randomly assigned to a social rejection manipulation mimicked the linguistic style of their new conversation partner more than participants who were randomly assigned to a social acceptance manipulation.

Together, it appears as though behavioral synchrony and mimicry are both different manifestations of interpersonal coordination and may be associated with different interpersonal phenomena (i.e., synchrony reflecting interpersonal closeness and mimicry reflecting the desire for interpersonal closeness, removed from actually feeling closeness). However, no study to date has tested this idea directly by exploring behavioral synchrony and mimicry together in the same study to ensure that measures of synchrony are unconfounded by mimicry, and vice versa. The current dissertation therefore explored various experimental manipulations intended to manipulate how much closeness two or more individuals are feeling, or desire to have, to better understand whether synchronized behavior is an indication of *achieved* rapport/closeness and mimicry behaviors are an indication of the *desire* to have rapport/closeness.

Interpersonal Closeness

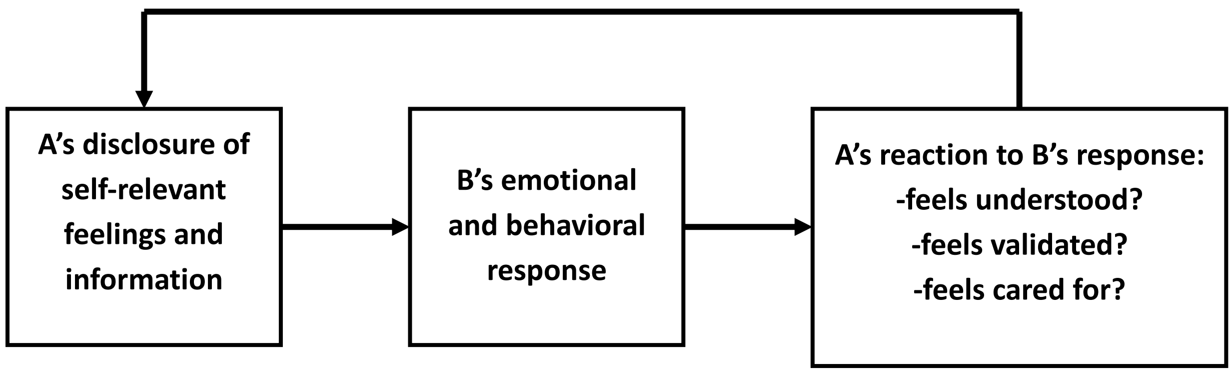
Self-Disclosure and Responsivity

Given that interpersonal coordination can be thought of as *behaving in a close and connected way* with another, it is not surprising that the most robust psychological phenomena it has been associated with is *feeling close and connected* to another. Aron and colleagues (1997) defined interpersonal closeness as the "interconnectedness of self and other" (p. 364), which shares definitional similarities to what some researchers call *intimacy* (McAdams, 1989). One theoretical model of intimacy, developed by Reis and Shaver (1988), describes the development of this psychological phenomenon as a dynamic and transactional interpersonal process where the key components are self-disclosure and responsivity (see Figure 2). Specifically, interpersonal closeness results from "one person (the speaker) communicating personally relevant and revealing information to another person (the listener)… As the [interpersonal closeness] process continues, the listener must *respond* to the speaker by disclosing personally relevant information, expressing emotion, and emitting various behaviors." (Laurenceau et al., 1998, p. 1239). Importantly, responsiveness spans beyond the verbal content that one says to someone else, and includes the *nonverbal* behavior that individuals use to communicate that they are listening, understand, and care for what someone else is saying (e.g., eye contact, forward leaning posture, head nodding, back-channel responses; Berg, 1987; Miller & Berg, 1984).

Researchers have demonstrated the importance of responsivity in the process of developing interpersonal closeness, with some researchers describing it as the most critical component (Rogers, 1961). Empirically, some researchers have shown how individuals generally do not feel interpersonal closeness with someone else if that person does not directly respond to them (Davis & Perkowitz, 1979; an exception to this is the existence of parasocial relationships, which describe the nonreciprocal socio-emotional connections that individuals form with media figures such as celebrities; Hoffner & Bond, 2022; Perse & Rubin, 1989). However, to the extent that two individuals engage in an interaction and disclose their personal thoughts and feelings to their partner and are responsive to these self-disclosures in ways that are accepting and/or validating, interpersonal closeness should develop.

Figure 2

The Interpersonal Process Model of Intimacy



Note. Adapted from Reis, H. T., & Shaver, P. (1988) *Intimacy as an Interpersonal Process*. In S. Duck (Eds.), *Handbook of personal relationships*, p. 375. Wiley.

Interpersonal Questions Tasks

Aron and colleagues (1997) developed an intensive experimental paradigm, named the "fast friends" paradigm that validly and reliably generates interpersonal closeness between unacquainted individuals in the laboratory to test various experimental questions regarding outcomes associated with interpersonal closeness. This task was originally designed as a question-response procedure between two unacquainted individuals that was intended to span 45 minutes. Within this 45-minute-long period, dyads would take turns asking each other questions from three sets of pre-written questions, working through the sets in sequential order. Each set contained questions that increased in their level of intimacy (e.g., Set I "When did you last sing to yourself" vs. Set III "Tell your partner what you like about them; be very honest this time saying things that you might not say to someone you've just met"). Experimenters would time each set and indicate to participants when to move on to the next set of questions in order to stay in the 45-minute time frame. During this task, participants generally *self-disclose* personal and emotionally laden information to one another and are largely *responsive* to each other in a way that allows dyads, on average, to achieve subjective feelings of interpersonal closeness.

As a comparison condition to the closeness-inducing task, Aron and colleagues (1997) developed the "small-talk" task. The small-talk task is the same structure as the closeness-inducing task, such that dyads are presented with three sets of questions and asked to take turns asking each other questions from these sets in sequential order over a 45-minute period. However, the questions for this task were designed to be less personal to the speaker (e.g., "Describe your mother's best friend") and do not increase in intimacy over the course of the three sets. In this way, the small-talk task was explicitly designed to *limit opportunities for self-disclosure* between two unacquainted individuals. Thus, although individuals could still communicate genuine responsiveness to their partner (e.g., back-channel responses, head nodding), the resulting state between the two interacting individuals from this task should be less achieved interpersonal closeness, as meaningful levels of self-disclosure of feelings and personal information between participants should not have taken place.

To empirically test whether dyads assigned who complete the closeness-inducing task reported greater interpersonal closeness than dyads assigned to complete the small-talk task, Aron and colleagues (1997) asked participants to complete the Inclusion of Other in the Self Scale (Aron et al., 1992). This scale is a single-item, pictorial measure of interpersonal closeness where individuals are asked to choose from a series of Venn diagrams, increasing in the degree to which they overlap, the picture that best describes how close they feel with their interaction partner. The researchers found that dyads randomly assigned to complete the closeness-inducing task reported significantly greater interpersonal closeness than those randomly assigned to the small-talk task (Aron et al., 1997). Additional research has shown that dyads who completed the closeness-inducing task reported more closeness than those who simply engaged in an unstructured conversation, and those who completed the small-talk task reported less closeness than those who engaged in an unstructured conversation (Sprecher, 2021). In this way, Aron's closeness-inducing task seems to promote interpersonal closeness by allowing for greater self-disclosure, while Aron's small-talk task seems to hinder closeness by specifically limiting opportunities for self-disclosure.

Communication Modality

While Aron and colleagues (1997) closeness-inducing and small-talk tasks were originally designed to take place face-to-face (FtF), researchers have since adapted the procedures to explore the validity of these tasks across various computer-mediated communication modes. Computer-mediated communication (CMC) can be defined as any communication that occurs between individuals on two or more computer-mediated formats (Brandon, 2016). Within CMC, researchers have further discriminated between platforms that allow for visual and vocal nonverbal cues such as videoconferencing platforms (i.e., visual CMC), versus platforms that limit these nonverbal cues such as email or text messaging (i.e., text-only CMC). Given the extreme shift of interpersonal interactions to various CMC platforms, especially during the COVID-19 pandemic, researchers have been able to begin exploring how interpersonal interaction localized to these different platforms may impact various relational outcomes.

Reis and Shaver's (1988) Model of Intimacy over CMC Platforms

In terms of self-disclosure, evidence across multiple studies seems to suggest that individuals self-report that their disclosure is relatively the same when completing Aron and colleagues (1997) closeness-inducing paradigm FtF, over a visual CMC platform, or over a text-only CMC platform. For example, Mallen and colleagues (2003) compared participants' self-reports of their own, and their perceptions of their partner's, self-disclosure during the closeness-inducing paradigm. Those randomly assigned to complete this paradigm FtF reported a similar degree of disclosure as those randomly assigned to complete this paradigm in a chat room (i.e., text-only CMC). A systematic review comparing visual communication modes and text-only CMC platforms likewise found that, even outside of Aron and colleagues (1997) "fast friends" paradigm, individuals tend to self-report disclosing the same amount during interpersonal interactions on platforms that allow visual and vocal nonverbal cues versus text-only CMC platforms (Nguyen et al., 2012). However, a few studies from this systematic review measuring participants' actual (i.e., not self-reported) disclosure found some evidence that participants actually disclosed more over text-only CMC platforms compared to FtF (see also Tidwell & Walther, 2002). So, even though text-only communication platforms remove individuals' access to various nonverbal cues (e.g., visual cues and vocal cues) in comparison to FtF and visual CMC contexts, this does not appear to impact the amount and relative intimacy of information individuals disclose to one another, and perhaps may even enhance it.

While participants report self-disclosing to one another to about the same degree over FtF, visual CMC, and text-only CMC platforms, the nature of text-only CMC platforms limits the emotional and behavioral *responses* individuals can provide one another. Consider the text-only CMC platform of email. A person cannot respond to the self-disclosures of another using eye contact, forward leaning posture, head nodding, or back-channel responses as these platforms do not allow for visual or verbal nonverbal cues to be encoded or decoded. Additionally, because email conversations may not always take place in "real time" (e.g., a person can send a message that another can respond to later), a person may not be verbally responsive to the self-disclosures of another as they are happening in the moment. According to Reis and Shaver's (1988) interpersonal process model of intimacy, this lack of responsivity should hinder feelings of interpersonal closeness.

Indeed, participants *do not* seem to feel the same degree of interpersonal closeness with people whom they interact with across text-only CMC platforms. Mallen and colleagues (2003) found that levels of subjective interpersonal closeness significantly differed depending on whether dyads completed Aron's closeness-inducing paradigm FtF versus over text-only CMC, such that those in the text-CMC condition reported feeling significantly *less* interpersonal closeness than those interacting FtF. Similarly, Brandon (2016) and Okdie and colleagues (2011) randomly assigned individuals to have an unstructured conversation either FtF or through text-only CMC. In both studies, those in the text-only CMC self-reported feeling significantly less close than those who interacted FtF. Thus, it could be that individuals did not feel close to their interaction partner when interacting over text-only CMC in part because of the lack of the nonverbal cues associated with *responsivity* in text-only CMC (e.g., mimical or no back-channel responses, eye contact, or nods) compared to either FtF or visual CMC interactions.

Desire for Greater Interpersonal Closeness

Reis and Shaver's (1988) interpersonal process model of intimacy would predict that individuals who engage in Aron's closeness-inducing task over a visual CMC platform (e.g., Zoom) would likely feel closeness to their partner as the nature of the closeness-inducing task enhances self-disclosure, and the nature of visual CMC allows for responsivity (see Figure 3: Condition 1). But what happens when individuals begin the process of forming interpersonal closeness with another, but do not get the opportunity to achieve it in full? More specifically, if individuals self-disclose their personal thoughts and feelings to another through Aron's closeness-inducing task, but the person they are interacting with is not able to respond behaviorally because the conversation is taking place over text-only CMC, is the discloser left with an unfulfilled need to achieve interpersonal closeness (see Figure 3: Condition 3)?

Baumeister and Leary (1995) argue that the need to belong, by forming and maintaining close interpersonal relationships, is a fundamental human desire. Additionally, they argue that once people begin the process of forming attachments and social bonds with others, individuals are reluctant to break those bonds and thus may be motivated to maintain or further develop them. So, it may be that individuals who undertake the process of interpersonal closeness by disclosing personal and emotional information about themselves to another person over a text-only CMC platform, but do not receive the responsivity from their partner necessary to fully feel close to them, may then experience a *desire for interpersonal closeness*, which is theorized to drive the behavioral response of mimicry.

This motivation to achieve interpersonal closeness should occur as long as the discloser does not interpret the lack of responsivity as a negative attribute of their partner. Empirically, it *does not* appear as though liking for one's interaction partner is impacted by the lack of responsivity that is inherent within text-only CMC platforms. For instance, the amount of liking for one's partner after a 20-min interaction did not differ between those randomly assigned to interact via a chat room (i.e., text-only CMC) and those randomly assigned to interact FtF (McKenna et al., 2002). Additionally, while Brandon (2016) observed a significant difference in interpersonal closeness between participants who communicated FtF versus on text-only CMC, they *did not* observe a significant difference in self-reported liking for one's partner. Okdie and colleagues (2011) did observe a significant difference in liking, where FtF interactants reported liking each other more than text-only CMC interactants, yet this effect was quite small (η_p^2 =

.03). In sum, it appears as though communication modalities that do not allow for visual and verbal cues to be expressed and perceived by interaction partners (i.e., text-only CMC) likely *decreases* the amount of responsivity partners can express to one another, which subsequently *decreases* feelings of interpersonal closeness. However, this same process may trigger individuals' need to belong and thus create a *desire* for greater interpersonal closeness.

Figure 3

Theorized Presence or Absence of Interpersonal Components of Self-Disclosure and Responsivity Based on Aron and colleagues (1997) Closeness-inducing or Small-talk Task over Visual or Text-Only CMC

		Interpersonal Closeness Component	
		Self-Disclosure	Responsivity
Experimental Conditions	**Condition 1:** Closeness-inducing over visual CMC	✓	✓
	Condition 2: Small-talk over visual CMC	✗	✓
	Condition 3: Closeness-inducing over text-only CMC	✓	✗
	Condition 4: Small-talk over text-only CMC	✗	✗

Present Study

The present dissertation examined the impact of interpersonal closeness and the desire to have interpersonal closeness on behavioral synchrony and behavioral mimicry among unacquainted dyads. Participants were randomly assigned to undergo a closeness-inducing task, or a comparison small-talk task designed to limit participants' self-disclosure. Additionally, participants were randomly assigned to complete these tasks either in real time over a videoconferencing platform (visual CMC), or over a text-only platform where participants were not able to respond directly to the self-disclosures of their partner. I expected that participants who completed the closeness-inducing task over visual CMC would feel the greatest interpersonal closeness, as they would have greater opportunities for self-disclosure and for responsivity. However, I expected that participants who completed the closeness-inducing task over text-only CMC would experience a greater desire for interpersonal closeness, as they would be provided the opportunity to self-disclose relevant feelings and information but would not receive a response from their partner due to the nature of the task—creating a need for closeness left unmet.

While these various tasks were designed to increase the chance that dyads would experience interpersonal closeness, or would experience a desire for interpersonal closeness, I was most interested in the impact that these interpersonal states have on behavioral synchrony and mimicry directly, as this would most precisely test the theoretical differentiations between these two constructs. Therefore, I expected that dyads who reported feeling greater interpersonal closeness after their first interaction, regardless of experimental condition, would display greater behavioral synchrony in a subsequent task. Additionally, I expected that dyads who desired to have interpersonal closeness with their partner after their first interaction, regardless of experimental condition, would display greater mimicry in a subsequent task. The results of this dissertation thus begin to address whether behavioral synchrony and mimicry can be driven by separate interpersonal states.

Hypotheses

The Effect of Experimental Condition on Interpersonal Closeness

H1: I expected that participants who completed the closeness-inducing task over visual CMC would self-report the greatest achieved interpersonal closeness in comparison to participants in any other condition.

H2: I expected that participants who completed the closeness-inducing task over text-only CMC would not feel close but would instead self-report the greatest desire for interpersonal closeness in comparison to participants in any other condition.

The Effect of Experimental Condition on Spontaneous Behavioral Coordination

H3: I expected that participants who completed the closeness-inducing task over visual CMC would display more behavioral synchrony in a subsequent interaction in comparison to participants in any other condition, as it was expected that these participants would feel the most interpersonal closeness with each other.

H4: I expected that participants who completed the closeness-inducing task over text-only CMC would display more behavioral mimicry in a subsequent interaction in comparison to participants in any other condition, as it was expected that these participants would feel the most desire for interpersonal closeness.

The Effect of Interpersonal Closeness on Spontaneous Behavioral Coordination

H5: I expected that individuals who reported feeling greater interpersonal closeness with their partner after an interpersonal interaction, collapsing across all experimental conditions, would display greater levels of behavioral synchrony with their partner in a subsequent interaction.

H6: I expected that individuals who reported a greater desire for interpersonal closeness with their partner after an interpersonal interaction, collapsing across all experimental conditions, would display greater levels of behavioral mimicry with their partner in a subsequent interaction.

Mediation Models

H7: I expected that the relationship between experimental condition and behavioral synchrony would be mediated by feelings of interpersonal closeness.

H8: I expected that the relationship between experimental condition and behavioral mimicry would be mediated by desire for interpersonal closeness.

CHAPTER 2

METHOD

Participants

Participants were recruited in groups of two to form 117 dyads (*N* = 234 participants) composed of university students who identified as women and were 18 years of age or older to participate in a study examining interpersonal interactions over Zoom. Students were encouraged (via recruitment materials, see Appendix B) to sign up with a person whom they did not know, to help ensure dyads were composed of strangers. While the current theory being tested extends to dyads composed of mixed genders and to pairs who are acquainted with one another, unacquainted women were selected as the first sample to test this theory in to reduce extraneous variance.

Recruitment took place across various universities including the University of Maine, the University of Rhode Island, the University of Lynchburg, and Northeastern University, such that dyads could be, but were not always, composed of students from different universities. Participants who completed the study were allowed to select their preferred compensation from 2 SONA credits, a $20 Amazon gift card, or extra credit for select courses at the University of Rhode Island and the University of Lynchburg.

Of those who completed the study, 16 dyads were excluded for having one or both participants in the dyad complete the study on their phone or for having poor video quality, 2 dyads were excluded for containing participants who identified as men, and 8 dyads were excluded for participants indicating they were “well acquainted with their partner” prior to the study, leaving a final sample of 91 dyads (*N* = 182 participants). Dyads were randomly assigned to one of four different experimental conditions: *N* = 24 dyads to closeness-inducing over visual

CMC condition, *N* = 23 dyads to the small-talk over visual CMC condition, *N* = 24 dyads to closeness-inducing over text-only CMC condition, and *N* = 20 dyads to small-talk over text-only CMC condition.

Participant ages ranged from 18 to 40 (*M* = 19.91, *SD* = 2.61). A total of 132 participants (72.5%) identified as White, 7 (3.8%) as Black or African American, 1 (0.5%) as American Indian or Alaska Native, 21 (11.5%) as Asian, 4 (2.2%) as "Other," and 17 (9.3%) selected multiple race categories. Additionally, 21 participants (11.5%) identified as Hispanic or Latinx. While all participants identified their gender as female, 2 participants retained in analyses also selected the category "Genderqueer or gender nonconforming, neither exclusively male nor female" and one participant also selected the category "Other". This study was reviewed and approved by the University of Maine IRB and participants provided their written informed consent to participate in this study. Methods and statistical analyses were preregistered and are available at the following link: https://osf.io/s6pxz/.

Power Analyses

Hypotheses 1-2 and 5-6 incorporate a hierarchical model where participants are nested within dyads for analyses. To account for nesting within the data, an a priori N was calculated using the following formula: $N_{non\text{-}nested} = N_{nested}/([1+(m-1)ICC])$ where m is the how many people are nested within units (i.e., 2 people per dyad; Diggle et al., 1994). $N_{non\text{-}nested}$ is the a-priori sample size determined from G*Power (Faul et al., 2007) for a non-nested sample. To estimate this, a fixed-effect Analysis of Variance (ANOVA) *F*-test with the following input parameters was utilized: α (two-sided) = .05, power = .80, number of groups = 4, effect size *f* = 0.31. The effect size estimate was taken from Sharon-David and colleagues (2019) Study 3, which examined the effect of synchrony on participants' perceptions of interpersonal closeness. The results suggested 120 independent participants would be needed to provide the power to detect medium effects (f = 0.31) for the study's hypotheses. The intraclass correlation (ICC) of .27 for rapport from Stosic (2021) was taken as the closest approximated ICC estimate for interpersonal closeness. Thus, a nested sample of 152 participants (i.e., 76 dyads) would be needed to achieve full power, suggesting that the current sample of 182 participants was sufficiently powered.

Hypotheses 3-4 are tested at the dyad level, and therefore do not need to account for nesting. A sensitivity power analysis was conducted in G*Power (Faul et al., 2007) for a repeated-measures Analysis of Variance (ANOVA) F-test, testing within-between interactions with the following input parameters: "as in SPSS" option, total sample size = 91, α (two-sided) = .05, power = .80, number of groups = 4, number of measurements = 2 (largest numerator df + 1), non-sphericity correction = 1. This analysis suggested that the sample was sufficiently powered to detect medium effects (f = .28) similar to the effect size f = .31 reported by Sharon-David and colleagues (2019) regarding the relationship between spontaneous behavioral synchrony and participants' perceptions of interpersonal closeness.

Procedure

Pre-Interaction Set Up

The following study took place entirely over Zoom – a videoconferencing platform (see Figure 6 for a visual of the proposed interaction flow across time). Participants signed up for one slot in a two-person slot posted on SONA, or via a Google Calendar appointment slot depending on recruitment method, for an online research study examining social interactions over videoconferencing platforms. Twenty-four hours before their allotted time slot, participants were sent an email reminding them of their sign-up time, along with the meeting link, and a brief description of what to expect (Appendix C). Participants were also informed they would need to sign onto the Zoom link on a computer with a working camera and be in a quiet and well-lit space. On the day of the study, participants used the link provided to them to log into a secure, password protected Zoom meeting room. Once both participants logged into the meeting room, the experimenter greeted the participants and sent an informed consent Qualtrics link to both participants over chat – informing participants they must complete it to participate in the study (Appendix D). After reading and signing the informed consent, participants were asked to follow a series of video set up instructions including ensuring their face, torso, and laps were visible, that their self-view in Zoom was turned off, and that full screen mode had been entered. Dyads were then randomly assigned to one of four experimental conditions (see Figure 4).

Figure 4

Diagram of Fully Crossed Factorial ANOVA Design

		Interpersonal Questions Task	
		Closeness-inducing	Small-talk
Communication Condition	Visual CMC	Condition 1 (*N* = 24 dyads)	Condition 2 (*N* = 23 dyads)
	Text-only CMC	Condition 3 (*N* = 24 dyads)	Condition 4 (*N* = 20 dyads)

Interaction One

Visual CMC: Closeness-inducing versus Small-talk Task. Forty-seven dyads were randomly assigned to the visual CMC condition where they completed either the closeness-inducing task or the small-talk task in real time (i.e., over Zoom). Of these, 24 dyads were randomly assigned to the closeness-inducing task where they completed a shortened version of Aron's "fast friends" paradigm (Aron et al., 1997). For this paradigm, participants were provided a set of 20 questions by the experimenter using the chat function on Zoom that were pulled from Aron's full set of 34 questions (see Appendix F). Aron's questions are grouped into three sets that increase in their intimacy (e.g., Set 1: "Given the choice of anyone in the world, whom would you want as a dinner guest?" vs. Set 3: "If you were to die this evening with no opportunity to communicate with anyone, what would you most regret not having told someone? Why haven't you told them yet?"). To mirror this structure, participants were provided 3 questions from Set 1, 5 questions from Set 2, and then 8 questions from Set 3.[6] Participants were instructed to take turns asking and answering these questions in the order the experimenter provided them and to ensure that both partners got a chance to answer every question.

Although this paradigm was originally intended to span across the length of 45-minutes, additional research has adapted the paradigm to be around 15-20 minutes and has achieved similar results in terms of self-reported interpersonal closeness (e.g., Mallen et al., 2003; Sprecher, 2021). Thus, for time purposes, participants were given 15 minutes to complete the shortened version of Aron et al.'s "fast friends" paradigm. During that time, dyads completed an average of 13 questions together (M = 12.63, SD = 3.94, Range = 5 to 20).

The other group of participants interacting over visual CMC were randomly assigned to complete the "small-talk" task, which is a similar procedure developed by Aron and colleagues (1997) to be a comparison task to the closeness-inducing task (see Appendix G). The small-talk task also includes three-sets of questions for participants to take turns asking one another, however these questions only involve minimal self-disclosure and the topics do not increase in intimacy over the sets (e.g., Set 1: "When was the last time you walked for more than an hour? Describe where you went and what you saw" vs. Set 3: "What are the advantages and

[6] The remaining 4 questions were selected from Sets 1 and 2, as it was expected that participants would not complete all 20 questions and we wanted to ensure they would reach Set 3 before time terminated.

disadvantages of artificial Christmas trees?”). Thus, participants are provided less of an opportunity to disclose self-relevant feelings and information.

As with the closeness-inducing task, participants were given 15 minutes to complete the shortened version of Aron’s “small-talk” task. During that time, dyads completed an average of 11 questions together (M = 10.96, SD = 3.94, Range = 7 to 16).

Text-only CMC: Closeness-inducing versus Small-talk Task. An additional two groups of participants (i.e., 44 dyads in total) were assigned to complete either the closeness-inducing task or the small-talk task through text-only CMC. For those assigned to this text-only CMC condition, the experimenter explained that participants would be writing responses to a list of questions about themselves and would subsequently read their interaction partner’s responses to these same questions. The participants were each provided a link to a separate google document containing either the same questions as the closeness-inducing task (N = 24 dyads), or the small-talk task (N = 20 dyads), in order to write their own answers to each question (they did not have access to their partner’s answers at this point). For the first 10 minutes of the task, both participants independently wrote their responses to questions from the closeness-inducing or small-talk task (depending on random assignment). After these first 10 minutes, the experimenter sent the link of each participant’s google document to their partner (e.g., participant A received the link to participant B’s google doc, and vice versa). They were then told to read the responses of their partner for the remaining 5 minutes of the interaction.

The text-only CMC condition differs from the visual CMC condition in two ways. First, those assigned to the text-only CMC condition were not exposed to nonverbal behavior cues of their partner during the interpersonal questions task. Specifically, they did not see their partner during the task, or hear their voice. In fact, unless a participant had a question before the task started, participants did not share *any* verbal communication prior to or during this first interaction task. Consequently, whereas those in the visual CMC task were able to respond directly to the self-disclosures of their partner, those in the text-only CMC conditions were not able to do so as their interaction did not take place in real time. Therefore, since participant A (or B) was not allowed to respond directly to participant B (or A), participants should theoretically not have felt much interpersonal closeness (see Figure 2). However, by self-disclosing one's feelings and information, and learning about their partner's feelings and personal information through reading their self-disclosures, participants should feel a *desire for interpersonal closeness* with their partner.

Post-Interaction One

Once the 15-minute interaction period was complete, the experimenter turned their camera back on and indicated to the participants that their time for the first interaction was up. The experimenter then sent a link to a Qualtrics survey in the chat window and informed the participants that they had approximately 5 minutes to complete the various survey questions (see Appendix H). These questionnaires included participants' perceived degree of self-disclosure, participants' perceived degree of responsivity, their self-reported interpersonal closeness and desire for interpersonal closeness with their partner, their liking for and rapport with their partner, the Ten-Item Personality Inventory (Gosling et al., 2003), the Positive and Negative Affect Schedule (Watson et al., 1988), and the Need to Belong Scale (Leary, 2013).

Interaction Two

Once both participants completed their post-interaction one questionnaires, they were given information about the second interaction. All dyads, regardless of prior communication channel random assignment, completed this second task in visual CMC (i.e., face-to-face over

Zoom). The experimenter explained that the two participants would be interacting for a period of 5 minutes and that during this time they would be asked to work collaboratively to brainstorm solutions to a novel problem. The problem-solving task that was selected is a true human-factors issue faced by the Walt Disney Company in their theme parks, where park attendees tend to travel clockwise around the park when choosing which theme park rides to board, causing different crowding issues for the various theme park rides depending on the time of the day (see Appendix I for full instructions for the "Traveling Around Disney's EPCOT Clockwise" problem-solving task). While participants were encouraged to brainstorm together many solutions to this problem, they were told that by the end of the 5-minute period they would be given 30 seconds to agree upon which solution they wanted to propose and would both be asked to write down the agreed upon solution in a questionnaire provided by the experimenter (Figure 5).

Figure 5

Example of Participants Solving the "Traveling Around Disney's EPCOT Clockwise" Problem

Note. Both participants gave permission to have their videotape used for educational purposes and for scientific meetings outside of the university including conferences or for publications.

While this specific problem-solving task was developed for the purposes of this project, it was selected for a variety of reasons. First, it is very similar in structure to other interaction tasks that have been used to study behavioral synchrony such as giving participants a map and fake money and asking them to plan a trip around the world together (e.g., Bernieri et al., 1996; Viccaria, 2017). Thus, it was believed that this task would be engaging and collaborative and would allow for behavioral synchrony and mimicry to unfold naturally. In addition, this specific task did not require any actual materials, making it a suitable problem-solving task that participants could complete together over a visual CMC platform. It also allowed participants to maintain visual focus on one another, opposed to focusing on task materials, to avoid confounding synchrony with task performance. Finally, this task was chosen because there is not one specific solution to the problem. Therefore, participants' final solutions could be evaluated for a variety of performance components such as creativity, cost effectiveness, complexity, and likelihood of enhancing park visitors' experience.

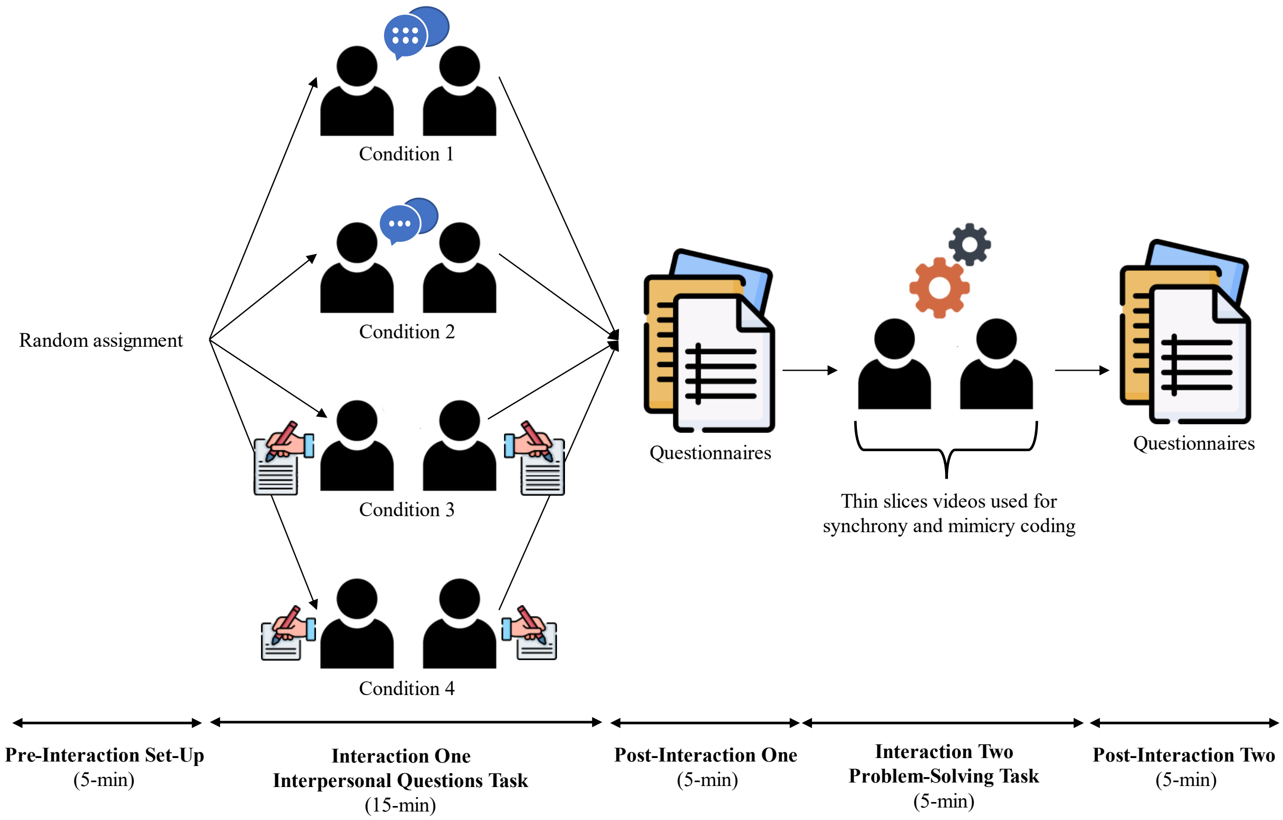
Post-Interaction Two

Once the 5-minute interaction period was complete, the experimenter turned their camera back on and indicated to the participants that their time for the second interaction was up. The experimenter then sent a link to a Qualtrics survey in the chat window and informed the participants that they would have approximately 5 minutes to complete the various survey questions. The first question on this survey was an open-ended question that asked participants to type out what they and their partner agreed upon as a final solution to the "Traveling Around Disney's EPCOT Clockwise" problem. Participants then moved on to answer a series of questionnaires (see Appendix H). These included perceptions of leadership, an adapted subjective state of deindividuation measure (Prentice-Dunn & Rogers, 1980), a flow state measure (Yoshida et al., 2013), participants' perceived similarity with their partner, participants' desire for interacting in the future with their partner, and a short demographic questionnaire.

Once participants completed their last set of questionnaires, they notified the experimenter that they were done. The experimenter would then send a final debriefing form to participants over the chat (see Appendix E) and participants would be thanked for their time.

Figure 6

Procedural Flow of Proposed Experimental Paradigm Across Time



Note. Condition 1 = Closeness-inducing task via visual CMC platform. Condition 2 = Small-talk task via visual CMC platform. Condition 3 = Closeness-inducing task via text-only CMC platform. Condition 4 = Small-talk task via text-only CMC platform.

Measures

Post-Interaction One Measures – Manipulation Checks

Perceived Degree of Disclosure. To measure perceptions of their own self-disclosure, as well as their perception of their partner's self-disclosure, participants were asked the following four questions: (1) “How much did your partner (you) tell you about themselves (yourself)?”, (2) “How much personal or intimate information did your partner (you) share with you (your partner)?”, (3) “How honest and open do you think your partner (you) was in their (your) responses?”, and (4) “How much knowledge do you think you (your partner) gained about your partner (you)?” (adapted from Sprecher, 2021). These questions were rated on a scale from 1 = not at all to 7 = a great deal and were averaged to form two composites (perceived degree of self-disclosure: α = .85, perceived degree of partner-disclosure: α = .85).

Perceived Degree of Responsivity. To measure perceptions of their own responsivity, as well as their perceptions of their partner’s responsivity, participants were asked the following three questions: (1) “My partner (I) really listened to me (my partner),” (2) “My partner (I) seemed interested in what I (my partner) was thinking and feeling,” (3) “My partner (I) was responsive to my (my partner’s) questions/answers” (adapted from Reis et al.’s Responsiveness Scale, 2017). These questions were rated on a scale from 1 = not at all to 7 = a great deal and were averaged to form two composites (perceived degree of self-responsivity: α = .94, perceived degree of partner-responsivity: α = .96).

Post-Interaction One Measures – Hypothesis Related

Achieved Interpersonal Closeness and Desire for Interpersonal Closeness. Interpersonal closeness and the desire for interpersonal closeness were assessed using Aron and colleagues Inclusion of Other in the Self (IOS; Aron et al., 1992). Participants were presented with various Venn diagrams that varied in the degree to which their circles overlapped. One circle was labelled “self” and the other was labelled “partner.” Participants were first asked “Please choose which pair of circles best reflects how close you feel with your partner” and then were asked “Please choose which pair of circles best reflects how close you would like to feel with your partner after your next conversation." To create a more robust measure of closeness and desire for closeness, participants were also asked "Please rate the level of rapport (i.e., how much you clicked, felt like you had chemistry) with your partner" and "Please rate the level of rapport you would like to feel with your partner after your next conversation." The IOS item and single item rapport question were highly correlated regarding participants' feelings of interpersonal closeness ($r = .63$, $p < .001$) and were therefore combined to form an *Achieved Interpersonal Closeness* composite ($\alpha = .77$). The IOS item and single item rapport question were highly correlated regarding participants' desire for closeness ($r = .61$, $p < .001$) and were therefore combined to form a *Desired Interpersonal Closeness* composite ($\alpha = .76$).

Post-Interaction One Measures – Exploratory

Liking, Intimacy, and Trust and Desire for Liking, Intimacy, and Trust. Participants were also asked two questions about each of the various interpersonal outcomes: *liking, intimacy, and trust*. First, participants were asked "Please rate the level of _____ you felt between you and your partner" on scale from 1 = not at all to 7 = a great deal. Participants were then asked "Please rate the level of _____ you would like to feel after your next conversation with your partner" on a scale of 1 = not at all to 7 = a great deal.

Perceived Similarity. Participants were asked two questions about their perceived similarity between themselves and their partner (i.e., "How much do you and your partner have in common with one another?" and "How similar are you and your partner?") on a scale from 1 = not at all to 7 = very much. Items were averaged together to form a *Perceived Similarity* composite ($\alpha = .93$).

Desire for Future Interaction. Participants were asked two questions about their desire to interact with their partner again in the future (i.e., "How much would you like to spend time with your partner again in the future?" and "If there were opportunities to interact again with your partner, how likely is it that the two of you could become friends?") on a scale from 1 = not at all to 7 = very much (adapted from Sprecher, 2021). Items were averaged together to form a *Desire for Future Interactions* composite (α = .88).

Ten-Item Personality Inventory. Participants completed the Ten-Item Personality Inventory which is a self-report inventory designed to measure the Big Five dimensions of personality (TIPI; Gosling et al., 2003). It is brief (10 items total) and consists of short phrases rated on a scale of 1 = disagree strongly to 7 = agree strongly. Two items were combined to form an *Extraversion* composite (α = .72), two to form an *Agreeableness* composite (α = .31), two to form a *Conscientiousness* composite (α = .48), two to form a *Neuroticism* composite (α = .59), and two to form an *Openness* composite (α = .40).

Positive and Negative Affect Schedule. Participants completed the Positive and Negative Affect Schedule which is a self-report questionnaire that consists of two 10-item scales that measure both positive and negative affect (PANAS; Watson et al., 1988). Items designed to measure positive affect were combined to form a *Positive Affect* composite (α = .88). Items designed to measure negative affect were combined to form a *Negative Affect* composite (α = .76).

Need to Belong Scale. Participants completed the Need to Belong Scale which is a self-report questionnaire that is designed to measure individuals' desire for acceptance and belonging (NTBS; Leary, 2013). It consists of 10 questions rated on a scale from 1 = not at all to 5 = extremely. Items from this scale were averaged to form a total *Need to Belong* score (α = .80).

Post-Interaction Two Measures – Exploratory

Final Solution Question. Participants responded to a one-item open ended question stating, “Please describe in a few sentences the final solution to the ‘Traveling Around Disney’s EPCOT Clockwise’ problem that you and your partner came up with.”

Interpersonal Closeness and Desire for Interpersonal Closeness. Interpersonal closeness and desire for interpersonal closeness were assessed using the same IOS scale as after interaction one (Aron et al., 1992). Participants were first asked “Please choose which pair of circles best reflects how close you feel with your partner” and then were asked “Please choose which pair of circles best reflects how close you would like to feel with your partner if you were to interact with them in the future.” As was done after the first interaction, participants were asked “Please rate the level of rapport (i.e., how much you clicked, felt like you had chemistry) with your partner” and “Please rate the level of rapport you would like to you would like to feel if you were to interact with your partner in the future.” For interpersonal closeness, the IOS item and single item rapport question were highly correlated ($r = .62$, $p < .001$) and were therefore combined to form an *Achieved Interpersonal Closeness* composite ($\alpha = .76$). For desired interpersonal closeness, the IOS item and single item rapport question were highly correlated ($r = .67$, $p < .001$) and were therefore combined to form a *Desired Interpersonal Closeness* composite ($\alpha = .80$).

Liking, Intimacy, and Trust and Desire for Liking, Intimacy, and Trust. Participants were asked two questions about each of the various interpersonal outcomes: *liking, intimacy, trust*. First, participants were asked “Please rate the level of _____ you felt between you and your partner” on scale from 1 = not at all to 7 = a great deal. Participants were then asked “Please rate the level of _____ you would like to feel if you were to interact with your partner in the future" on a scale of 1 = not at all to 7 = a great deal.

Perceived Similarity. Participants were asked two questions about their perceived similarity between themselves and their partner (i.e., "How much do you and your partner have in common with one another?" and "How similar are you and your partner?") on a scale from 1 = not at all to 7 = very much. Items were averaged together to form a *Perceived Similarity* composite ($\alpha = .95$).

Desire for Future Interaction. Participants were asked two questions about their desire to interact with their partner again in the future (i.e., "How much would you like to spend time with your partner again in the future?" and "If there were opportunities to interact again with your partner, how likely is it that the two of you could become friends?") on a scale from 1 = not at all to 7 = very much (adapted from Sprecher, 2021). Items were averaged together to form a *Desire for Future Interaction* composite ($\alpha = .93$).

Leadership. Participants were asked to identify who was more of a leader, themselves or their partner, using the following one-item slider question, "Between you and your partner, who was more of the leader during the prior problem-solving interaction?" where left side of sider = My partner was, middle of slider = Equal, and right side of slider = I was.

Subjective State of Deindividuation Measure. Participants were asked a variety of questions on a scale from 1 = not at all to 7 = very much regarding the extent to which they felt like they became immersed in the interaction such that they lost their sense of identity and self-awareness (adapted from Prentice-Dunn & Rogers, 1980; $\alpha = .60$).

The Flow State Scale for Occupational Tasks. Participants were asked about their degree of absorption in the problem-solving task on a scale from 1 = not at all to 7 = very much (adapted from Yoshida et al., 2013; α = .91).

Group Cohesion. Participants' group cohesion was measured with the following four items on a scale from 1 = not at all to 7 = very much: (1) "My partner and I did *not* work together as a team," (2) "We were cooperative with each other," (3) "We knew that we could rely on one another," and (4) "We were *not* supportive of one another" (adapted from and Gordon et al., 2020 and Podsakoff & MacKenzie, 1994). These items were reverse scored as necessary and then averaged together to form a composite of *Group Cohesion* (α = .80).

Demographics. Participants also completed a variety of demographic questions including their age, gender, sex assigned at birth, race, and ethnicity.

Behavioral and Task Impression Coding

Interaction One

Stimulus Clips. Thin slice methodology refers to observing a small section of an entire interaction in order to draw conclusions about the interacting individuals. Thin slices of participants' behavior have been shown to be sufficient for capturing estimates of nonverbal behavior to a similar degree as observing behavior from an entire interaction (Murphy et al., 2015; Rule & Ambady, 2008) and have been shown to have strong predictive validity by correlating with outcomes of interest after a given interaction (Ambady & Rosenthal, 1992; Murphy et al., 2019). Thus, three "thin slices" were taken from dyads' first 15-minute interaction to capture participants' behavior during Aron's "closeness-inducing" or "small-talk" task. For each slice, one question from each of the three "sets" of Aron's questions was randomly selected for each dyad, allowing for the comparison of participants' behavior at three different time points within their interaction (i.e., beginning, middle, and end). For those randomly assigned to complete the closeness-inducing task, these three time points should have reflected increasingly intimate points of the interaction as each set of questions increased in their intimacy. For those randomly assigned to complete the small-talk task, the three time points should not reflect increasingly intimate points of the interaction as the questions did not increase in their intimacy – although the three time points could still reflect increasing comfort between participants in these dyads.

For dyads assigned to complete their task over visual CMC (i.e., Zoom), slices of participants' *videos* were taken for each of the randomly selected questions they completed with each other. Each slice contained one participant reading the randomly selected question, the responses of both the partners to the question, and any follow-up or additional conversation regarding the specific question. The clip terminated as soon as either participant began to ask the next question or started talking about an irrelevant subject. Thus, the length of the thin slice clips varied depending on how long participants discussed each randomly selected question. As expected, the average time participants spent discussing each question increased as the set that the question was drawn from also increased [Set 1: M_{duration} = 29 seconds, Set 2: M_{duration} = 40 seconds, Set 3: M_{duration} = 47 seconds; $F_{(2, 399)} = 16.11$, $p < .001$, $\eta^2_p = .08$, where each set differed in length by p's < .041]. However, the average length of clips for participants in the closeness-inducing condition (M_{duration} = 40 seconds) were not any different in duration from those in the small-talk condition [M_{duration} = 38 seconds; $t_{(400)} = 0.55$, $p = .580$, Cohen's $d = .06$].

For dyads assigned to complete their first task over text-only CMC, thin slices of participants' *text responses* were taken for each of the randomly selected questions they were asked to complete. Each slice contained a randomly selected written question, and the

participant's written response to that same question. The average word count of participants' responses was approximately equivalent across each set that the questions were drawn from [Set 1: M_{wc} = 29.88, Set 2: M_{wc} = 28.72, Set 3: M_{wc} = 27.31; $F_{(2, 297)} = 0.40$, $p = .67$, $\eta^2_p = .00$].
However, responses from participants in the closeness-inducing task (M_{wc} =24.98) were shorter in length than were responses from participants in the small-talk task [M_{wc} = 33.30; $t_{(298)} = 3.61$, $p < .001$, Cohen's $d = .42$].

Disclosure. Two groups of research assistants[7] were trained to make ratings of the participants' degree of disclosure during this first interaction. One group composed of three research assistants were assigned to listen (i.e., not watch) to each of the thin slice clips for the visual CMC group described above in a randomized order to prevent order effects. Research assistants then rated four items regarding each participants' disclosure on an 8-point rating scale. These items were disclosure, elaboration, vulnerability, and subjective versus objective (for a full description of each code see Appendix J). On average, the research assistants had acceptable inter-rater reliability for each of the four items (*Mdn* α = .72; see Table 2 for full list of Cronbach's alphas for the inter-rater reliability of each of the four codes). Additionally, each of these four items (disclosure, elaboration, vulnerability, subjective vs. objective) displayed acceptable inter-item reliability and were therefore averaged to form a *Verbal Disclosure* composite at each of the three time periods (time 1 α = .78, time 2 α = .66, time 3 α = .71; see Table 3 for correlations between items by time). Finally, given the medium correlations between each of these verbal disclosure composites at each of the three time periods, these three

[7] Research assistants did not overlap in their coding responsibilities of interaction one stimulus clips. In other words, each group only coded these stimulus clips for one behavior (i.e., verbal disclosure, text disclosure, verbal responsivity, or nonverbal responsivity).

composites were also averaged to form a total *Verbal Disclosure* composite that reflected participant's average verbal disclosure across time (α = .50; see Table 4).

The other group composed of four research assistants[2] were assigned to read each of the thin slices taken from the text-only CMC group described above in a randomized order. After reading each participants' thin slice text responses, research assistants rated them on the same four disclosure related items described above on an 8-point rating scale. On average, the research assistants had acceptable inter-rater reliability for each of the four items across the three time periods (*Mdn* α = .79; see Table 2). Additionally, each of the four items (disclosure, elaboration, vulnerability, subjective vs. objective) displayed strong inter-item reliability and were thus averaged to form a *Text Disclosure* composite for relevant participants at each of the three time periods (time 1 α = .91, time 2 α = .89, time 3 α = .87; see Table 3). Finally, given the medium correlations between each of these text disclosure composites at each of the three time periods, these three composites were also averaged to form a total *Text Disclosure* composite reflecting each participant's average text disclosure across time (α = .55; see Table 4).

Responsivity. Two other groups of research assistants[2] were trained to make ratings of participants' degree of responsivity to their partner during their first interaction. Given that there was no real time interaction between participants in the text-only CMC conditions, research assistants only rated the responsivity of participants in the visual CMC conditions. One group of three research assistants were assigned to listen (i.e., not watch) to each of the thin slice clips for the visual CMC group described above in a randomized order. Research assistants then rated five items regarding participants' responsivity to their partner on an 8-point rating scale. These items were responsive, engaged/involved, indifferent (reverse coded), interactive, and warm (for a full description of each code see Appendix K). On average, the research assistants had excellent inter-rater reliability for each of these five items across the three time periods (*Mdn* $\alpha = .90$; see Table 2). Additionally, each of these five items (responsive, engaged, indifferent, interactive, warm) displayed strong inter-item reliability and were therefore averaged to form a *Verbal Responsivity* composite at each of the three time periods (time 1 $\alpha = .98$, time 2 $\alpha = .90$, time 3 $\alpha = .87$; see Table 3 for correlations between items by time). Finally, given the medium correlations between each of these verbal responsivity composites at each of the three time periods, these three composites were also averaged to form a total *Verbal Responsivity* composite reflecting each participant's average verbal responsivity across time ($\alpha = .49$; see Table 4).

The other group, composed of four research assistants,[2] was assigned to watch each of the thin slice clips for the visual CMC group in a randomized order *without sound* to only assess participants' responsive nonverbal behavior. Unlike the other groups of research assistants described, these research assistants were blind to whether participants were completing the closeness-inducing task or the small-talk task, as they did not know the question that had been asked. These research assistants rated four items regarding participants' responsivity to their partner on an 8-point Likert scale. These items were responsive, engaged/involved, indifferent (reverse coded), and warm.[8] On average, the research assistants had acceptable interrater reliability for each of these four items across the three time periods (*Mdn* $\alpha = .77$; see Table 2). Additionally, each of the four items (responsive, engaged, indifferent, warm) displayed strong inter-item reliability and were thus averaged to form a *Nonverbal Responsivity* composite at each of the three time periods (time 1 $\alpha = .95$, time 2 $\alpha = .91$, time 3 $\alpha = .91$; see Table 3). Finally, given the medium to large correlations between each of these nonverbal responsivity composites

[8] I removed the code for "interactivity" for those rating nonverbal responsivity as this code only applies to a participants' verbal behavior.

at each of the three time periods, these three composites were also averaged to form a total *Nonverbal Responsivity* composite reflecting each participant's average nonverbal responsivity across time (α = .70; see Table 4).

Table 2

Inter-Rater Reliability for Research Assistant Coded Variables from Interactions One and Two

	Cronbach's α	# of coders
Interaction One		
Verbal Disclosure[a]		
Time 1		
Disclosure	.73	3
Elaboration	.91	3
Vulnerability	.77	3
Subjective	.50	3
Time 2		
Disclosure	.66	3
Elaboration	.87	3
Vulnerability	.71	3
Subjective	.65	3
Time 3		
Disclosure	.71	3
Elaboration	.86	3
Vulnerability	.73	3
Subjective	.46	3
Text Disclosure[b]		
Time 1		
Disclosure	.79	4
Elaboration	.86	4
Vulnerability	.75	4
Subjective	.72	4
Time 2		
Disclosure	.69	4
Elaboration	.81	4
Vulnerability	.80	4
Subjective	.78	4
Time 3		
Disclosure	.72	4
Elaboration	.83	4

Table 2 Continued

	Cronbach's α	# of coders
Vulnerability	.83	4
Subjective	.78	4
Verbal Responsivity[a]		
Time 1		
Responsive	.90	3
Engaged/Involved	.92	3
Indifferent	.85	3
Interactive	.90	3
Warm	.86	3
Time 2		
Responsive	.92	
Engaged/Involved	.91	3
Indifferent	.87	3
Interactive	.92	3
Warm	.88	3
Time 3		3
Responsive	.87	3
Engaged/Involved	.91	3
Indifferent	.79	3
Interactive	.91	3
Warm	.85	3
Nonverbal Responsivity[a]		
Time 1		
Responsive	.79	4
Engaged/Involved	.73	4
Indifferent	.69	4
Warm	.82	4
Time 2		
Responsive	.74	4
Engaged/Involved	.67	4
Indifferent	.79	4
Warm	.80	4
Time 3		

Table 2 Continued

	Cronbach's α	# of coders
Responsive	.76	4
Engaged/Involved	.76	4
Indifferent	.77	4
Warm	.78	4
Interaction Two		
Global Behavioral Synchrony[c]		
Time 1		
Simultaneous Movement	.83	8
Tempo Similarity	.77	8
Coordination	.79	8
Time 2		
Simultaneous Movement	.79	8
Tempo Similarity	.73	8
Coordination	.79	8
Time 3		
Simultaneous Movement	.85	8
Tempo Similarity	.78	8
Coordination	.83	8
Global Behavioral Mimicry[c]		
Time 1		
Gestural Mimicry	.78	8
Postural Mimicry	.79	8
Time 2		
Gestural Mimicry	.76	8
Postural Mimicry	.75	8
Time 3		
Gestural Mimicry	.77	8
Postural Mimicry	.75	8
Global Impression Ratings		
Time 1		
Expressivity[d]	.77	2
Attractiveness[d]	.66	2
Perceived Rapport[c]	.64	2

Table 2 Continued

	Cronbach's α	# of coders
Time 2		
Expressivity[d]	.74	2
Attractiveness[d]	.72	2
Perceived Rapport[c]	.49	2
Time 3		
Expressivity[d]	.73	2
Attractiveness[d]	.70	2
Perceived Rapport[c]	.67	2
Problem Solution Ratings[c]		
Creativity	.81	3
Cost	.77	3
Complexity	.73	3
Enhance Visitor Experience	.69	3

Note. [a]N = 94 participants, [b]N = 88 participants, [c]N = 91 dyads, [d]N = 182 participants.

Table 3

Inter-Item Reliability and Inter-Item Correlations for Research Assistant Coded Variables Used to Form Composites from Interactions One and Two

Time 1	Cronbach's α	2.	3.	4.	5.
Interaction One					
Verbal Disclosure[a]	(.78)				
1. Disclosure		.84***	.83***	.24*	
2. Elaboration			.72***	.23*	
3. Vulnerability				.20†	
4. Subjective					
Text Disclosure[b]	(.91)				
1. Disclosure		.92***	.74***	.68***	
2. Elaboration			.63***	.66***	
3. Vulnerability				.81***	
4. Subjective					
Verbal Responsivity[a]	(.98)				
1. Responsive		.97***	.86***	.98***	.88***
2. Engaged/Involved			.91***	.98***	.93***
3. Indifferent (reversed)				.86***	.93***
4. Interactive					.88***
5. Warm					
Nonverbal Responsivity[a]	(.95)				
1. Responsive		.84***	.85***	.92***	
2. Engaged/Involved			.74***	.80***	
3. Indifferent (reversed)				.87***	
4. Warm					
Interaction Two					
Global Behavioral Synchrony[c]	(.91)				
1. Simultaneous Movement		.68***	.78***		
2. Tempo Similarity			.91***		
3. Coordination					
Global Behavioral Mimicry[c]	(.56)				
1. Gestural Mimicry		.39***			
2. Postural mimicry					

Table 3 Continued

	Cronbach's α	2.	3.	4.	5.
Molecular Behavioral Mimicry[c]	(-.17)				
1. Gestural Mimicry		.08	-.21*		
2. Postural Mimicry			-.03		
3. Nod Mimicry					
Time 2	Cronbach's α	2.	3.	4.	5.
Interaction One					
Verbal Disclosure[a]	(.66)				
1. Disclosure		.72***	.64***	.14	
2. Elaboration			.39***	.02	
3. Vulnerability				.34***	
4. Subjective					
Text Disclosure[b]	(.89)				
1. Disclosure		.81***	.73***	.68***	
2. Elaboration			.51***	.67***	
3. Vulnerability				.74***	
4. Subjective					
Verbal Responsivity[a]	(.90)				
1. Responsive		.98***	.85***	.98***	.90***
2. Engaged/Involved			.85***	.98***	.89***
3. Indifferent (reversed)				.82***	.94***
4. Interactive					.86***
5. Warm					
Nonverbal Responsivity[a]	(.91)				
1. Responsive		.69***	.80***	.87***	
2. Engaged/Involved			.63***	.61***	
3. Indifferent (reversed)				.75***	
4. Warm					
Interaction Two					
Global Behavioral Synchrony[c]	(.87)				
1. Simultaneous Movement		.57***	.63***		
2. Tempo Similarity			.90***		
3. Coordination					

Table 3 Continued

	Cronbach's α	2.	3.	4.	5.
Global Behavioral Mimicry[c]	(.66)				
1. Gestural Mimicry		.50***			
2. Postural mimicry					
Molecular Behavioral Mimicry[c]	(.14)				
1. Gestural Mimicry		.15	.11		
2. Postural Mimicry			-.05		
3. Nod Mimicry					
Time 3	Cronbach's α	2.	3.	4.	5.
Interaction One					
Verbal Disclosure[a]	(.71)				
1. Disclosure		.69***	.57***	.16	
2. Elaboration			.46***	.11	
3. Vulnerability				.36***	
4. Subjective					
Text Disclosure[b]	(.87)				
1. Disclosure		.74***	.67***	.63***	
2. Elaboration			.47***	.59***	
3. Vulnerability				.73***	
4. Subjective					
Verbal Responsivity[a]	(.87)				
1. Responsive		.97***	.90***	.96***	.88***
2. Engaged/Involved			.91***	.98***	.91***
3. Indifferent (reversed)				.88***	.93***
4. Interactive					.88***
5. Warm					
Nonverbal Responsivity[a]	(.91)				
1. Responsive		.78***	.78***	.77***	
2. Engaged/Involved			.66***	.64***	
3. Indifferent (reversed)				.70***	
4. Warm					
Interaction Two					
Global Behavioral Synchrony[c]	(.92)				

Table 3 Continued

	Cronbach's α	2.	3.	4.	5.
1. Simultaneous Movement		$.73^{***}$	$.77^{***}$		
2. Tempo Similarity			$.89^{***}$		
3. Coordination					
Global Behavioral Mimicry[c]	(.67)				
1. Gestural Mimicry		$.51^{***}$			
2. Postural Mimicry					
Molecular Behavioral Mimicry[c]	(.28)				
1. Gestural Mimicry		.12	$.21^{\dagger}$		
2. Postural Mimicry			.07		
3. Nod Mimicry					

Note. [a]N = 94 participants, [b]N = 88 participants, [c]N = 91 dyads.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 4

Research Assistant Coded Variables' Cronbach's Alphas for Composites Across Time and Composite Correlations Across Time from Interactions One and Two

	Cronbach's α	T2	T3
Interaction One			
Verbal Disclosure[a]	(.50)		
T1		.18†	.33**
T2			.26*
Text Disclosure[b]	(.55)		
T1		.31**	.18†
T2			.39***
Verbal Responsivity[a]	(.49)		
T1		.25*	.09
T2			.39***
Nonverbal Responsivity[a]	(.70)		
T1		.48***	.37***
T2			.50***
Interaction Two			
Total Global Synchrony[c]	(.78)		
T1		.52***	.51***
T2			.61***
Total Global Mimicry[c]	(.79)		
T1		.50***	.51***
T2			.63***
Gestural Mimicry[c]	(.65)		
T1		.32***	.33***
T2			.51***
Postural Mimciry[c]	(.86)		
T1		.72***	.63***
T2			.70***

Table 4 Continued

	Cronbach's α	T2	T3
Total Molecular Mimicry[c]	(.41)		
T1		.14	.01
T2			.43***
Gestural Mimicry[c]	(.47)		
T1		.14	.23*
T2			.32**
Postural Mimicry[c]	(.50)		
T1		.31**	.14
T2			.33**
Nod Mimicry[c]	(.45)		
T1		.09	-.01
T2			.46***
Expressivity[d]	(.76)		
T1		.44***	.43***
T2			.69***
Attractiveness[d]	(.94)		
T1		.80***	.82***
T2			.87***
Perceived Rapport[c]	(.80)		
T1		.54***	.46***
T2			.68***
Positive Affect[d]	(.90)		
T1		.74***	.67***
T2			.80***

Note. [a]N = 94 participants, [b]N = 88 participants, [c]N = 91 dyads, [d]N = 182 participants.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Interaction Two

Stimulus Clips. Another series of thin slices were prepared from videos taken from interaction two where dyads completed the problem-solving task. Thin slices of one-minute segments were taken from the first minute, third minute, and fifth minute of the interaction.

Trained and reliable research assistants completed the following ratings on each stimulus clip in a randomized order.

Global Behavioral Synchrony and Mimicry. One group of nine research assistants were assigned to make global ratings of synchrony and mimicry for each of the stimulus clips on an 8-point rating scale. These ratings were made via the following codes derived from Bernieri and Rosenthal's (1991) interpersonal coordination rating system: tempo similarity, simultaneous movement, coordination and smoothness, and postural mimicry (initially called posture similarity; see Appendix L for global rating descriptions). Tempo similarity refers to the rate of speed at which two individuals' behaviors occur such that both individuals seem to be "marching to the beat of the same drum." Simultaneous movement refers to the extent to which movement from one partner generally occurs at the same moment as movement from the other partner (e.g., one person kicks their foot at the precise instant another swings their arm). Coordination and smoothness refers to the degree of behavioral unity or "smoothness" achieved by the interactants (e.g., are there any false starts or hesitations? Do their behaviors mesh or combine evenly or smoothly?). Postural mimicry refers to the degree to which the posture of both interactants matched one another throughout the clip (e.g., are they both sitting upright?). I also included a fifth global impression code, named gestural mimicry, to capture researcher's differing conceptualizations of mimicry (i.e., mimicry for postural displays or mimicry for discrete behaviors and gestures). Gestural mimicry referred to the degree to which the participants performed the *exact same gestures* as the person they were interacting with in the clip.

Conceptually, tempo similarity, simultaneous movement and coordination and smoothness reflect the construct of behavioral synchrony whereas gestural mimicry and postural mimicry reflect the construct of behavioral mimicry (Bernieri et al., 1994). Regarding synchrony, these three global impression ratings, on average, had acceptable inter-rater reliability across the three time periods (*Mdn* α = .79; see Table 2). Additionally, each of these three items (tempo similarity, simultaneous movement, coordination and smoothness) displayed strong inter-item reliability and were therefore averaged to form a *Global Behavioral Synchrony* composite at each of the three time periods (time 1 α = .91, time 2 α = .87, time 3 α = .92; see Table 3 for correlations between items by time). Finally, given the large correlations between each of these global behavioral synchrony composites at each of the three time periods, these three composites were also averaged to form a total *Global Behavioral Synchrony* composite reflecting each dyad's average global behavioral synchrony across time (α = .78; see Table 4).

The two global impression ratings used to assess mimicry also displayed acceptable inter-rater reliability across the three time periods (*Mdn* α = .77; see Table 2). While these two items had satisfactory but not strong inter-item reliability across time (time 1 α = .56, time 2 α = .66, time 3 α = .67; see Table 3), they were averaged to form a *Global Mimicry* composite for each of the three time periods nonetheless, as these two items both conceptually assess displays of behavioral mimicry. However, given that these two items did not display a strong empirical overlap, I also kept them separate for each mimicry analysis to explore whether certain hypothesized relationships were more strongly expressed through postural mimicry or gestural mimicry. Finally, given the large correlations between each of these global mimicry composites at each of the three time periods, these three composites were also averaged to form a total *Global Mimicry* composite reflecting each dyad's average global behavioral mimicry across time (α = .79; see Table 4).

Molecular Mimicry. To avoid conflating the synchrony and mimicry constructs as much as possible due to method variance, and to allow for a mimicry coding approach that directly incorporates a set time lag, mimicry was also coded on the molecular level. Similar to the mimicry coding methodologies outlined by Kurzuis and Borkenau (2015), another group of research assistants was trained to look for the following behaviors separately: hand movements (i.e., gestures), posture shifts, and nodding.[9] Nodding, which may in some ways may be considered a gesture, was retained as its own code in order to explore differing relationships for gestural mimicry in hand movements versus gestural mimicry in head movements. Two research assistants were assigned to each mimicry behavior group and watched the same one-minute segment stimuli clips taken from the first minute, third minute, and fifth minute of interaction as those who coded for global synchrony and mimicry behaviors. There was no overlap between research assistants coding for mimicry such that each research assistant only coded each video for mimicry of one kind of behavior (i.e., gestures, posture, or nods).

Any time participant A or B displayed one of the behaviors noted above in a stimuli clip (e.g., shifted their posture), the research assistant would take note of the time the behavioral event occurred and indicated who initiated it (i.e., participant A or B). Then, the research assistant would watch to see whether this exact behavior was mimicked by the other participant from any time after the behavior was initiated up to five seconds after the behavior had ceased. Although past research has sometimes utilized timeframes with upper limits as high as 10 seconds for a subsequent behavior to be considered mimicry (Kurzius & Borkenau, 2015; Kuszynski, 2015; Stel & Vonk, 2010), the present research selected an upper bound of five seconds as a more conservative approach (as suggested by Chartrand & Lakin, 2013). Research

[9] This coding method was piloted by a group of research assistants in Fall 2022. In addition to coding mimicry in gestures, posture shifts, and nodding, research assistants also coded for mimicry in smiling. However, negligible levels of inter-rater reliability were achieved. Due to these coding difficulties, and the conflation of mimicry for smiling with related constructs such as emotion contagion and empathy, research assistants did not code for mimicry in smiling for this dissertation.

assistants then indicated the number of times the exact behavior was mimicked by the other participant during this 5-second time frame, if applicable. If a research assistant could not precisely determine who initiated the behavior when examining the clips frame by frame, they were instructed that this was "synchrony" and to not code this. Weighted Cohen's Kappa's (Cohen, 1968) presented in Table 5 reflect the degree of agreement between coders for each behavior within each time period. Whereas non-weighted Cohen's kappas calculate the disagreement between two raters, weighted Cohen's kappas takes into consideration the degree of disagreement such that the further apart judgments are, the higher the weights that are assigned (e.g., one coder indicating 3 instances of nod mimics and the other indicating 1 for the same behavioral event are weighted more than one coder indicating 2 instances of nod mimics and another indicating 1 for the same behavioral event). Fleiss et al. (2013) states that, for most purposes, values between 0.40 and 0.75 reflect fair to good agreement beyond chance. With the exception of mimicry for nods (*Mdn* κ = .35)[10], there was generally a moderate strength of agreement between research assistants for gestural mimicry (*Mdn* κ = .61) and postural mimicry (*Mdn* κ = .47).

[10] While reliability for mimicry in nodding was low, this variable was retained for analyses for two reasons. First, the low reliability in this code was often not due to coders disagreeing on when a nod happened and if it was mimicked, but disagreement on how many times a nod was mimicked within a time period (e.g., was a string of nods one mimic or more) or whether back-to-back nods were two separate behavioral events or the same event. Additionally, I served as the expert coder to solve discrepancies between research assistants.

Table 5

Weighted Cohen's Kappa Reliability for Molecular Mimicry Variables from Interaction Two

	Weighted Cohen's Kappa
Gestural Mimicry	
T1	.56
T2	.62
T3	.61
Postural Mimicry	
T1	.43
T2	.47
T3	.56
Nod Mimicry	
T1	.41
T2	.29
T3	.35

Note. N = 91 dyads.

Given that there was some degree of disagreement between coders, I served as an expert coder to resolve any discrepancies between coders. For a behavioral event to be considered an agreement between research assistants, the two had to agree on the start and stop time of the behavioral event +/- 2 seconds. Additionally, coders had to agree on who initiated the behavior, and agree on the frequency of times it was mimicked within the appropriate time period. Anytime there was disagreement between research assistants for any of those reasons, I watched the stimuli clip and determined a final code. The final result for each dyad[11] was a frequency count for the number of times mimicry occurred for gestures, posture, and nods for each of the three sampled time periods during participants second problem-solving interaction.

[11] While it is possible to derive a mimicry variable for each participant individually opposed to averaging across participants to form a dyadic variable, a dyadic mimicry variable was chosen for the present investigation to directly compare synchrony and mimicry as dyadic behavioral variables.

Similar to the global mimicry components, each of these three mimicry variables displayed weak inter-item reliability across each of the sampled time periods (time 1 α = -.17, time 2 α = .14, time 3 α = .28; see Table 3 for correlations between items by time). Nonetheless, they were still summed to form a *Molecular Behavioral Mimicry* composite at each of the three time periods, as these codes conceptually all measure mimicry behaviors. However, similar to global mimicry, each of the molecular mimicry variables were also retained independently for analyses in order to examine whether different kinds of mimicry (e.g., gestural mimicry vs. postural mimicry) share differing relationships with each variable of interest.

Table 4 presents the correlations between each of these mimicry variables across the three sampled time periods. For molecular gestural mimicry, there were small to medium correlations between variables across the three time periods (*Mdn* r = .23) which were thus summed to form a total *Molecular Gestural Mimicry* composite (α = .47). For postural mimicry, there were also small to medium correlations across the three time periods (*Mdn* r = .31) which were summed to form a total *Molecular Postural Mimicry* composite (α = .50). While nod mimicry captured during T2 correlated with nod mimicry captured during T3 at r = .46, mimicry for nodding captured during T1 did not strongly correlate with mimicry for nodding at T2 (r = .09) nor T3 (r = -.01). Nonetheless, these three nod mimicry variables were summed to form a total *Nod Mimicry* composite on conceptual grounds (α = .45). Finally, for each molecular mimicry composite, there were small to medium correlations across the three time periods (*Mdn* r = .14) which were summed to form a total *Molecular Behavioral Mimicry* composite reflecting each dyad's average molecular mimicry across time (α = .41).

General Impression Ratings of Participants. I also recruited a group of three research assistants to code for various impression ratings of participants during their second interaction.

These ratings were 1) *attractiveness*, 2) *expressivity*, and 3) *perceived rapport* (see Appendix M for a full description of ratings). Research assistants watched the same stimuli clips from interaction two described above in a random order and rated their impressions on a 7-point scale. Ratings for attractiveness and expressivity were made on a participant level, while ratings for perceived rapport were made on the dyad level. Thus, research assistants were trained to watch each stimuli clip three times: once watching the participant on the left, once watching the participant on the right, and once watching the dyad as a whole. Due to not following directions, one research assistant was removed from the final impression rating estimates.

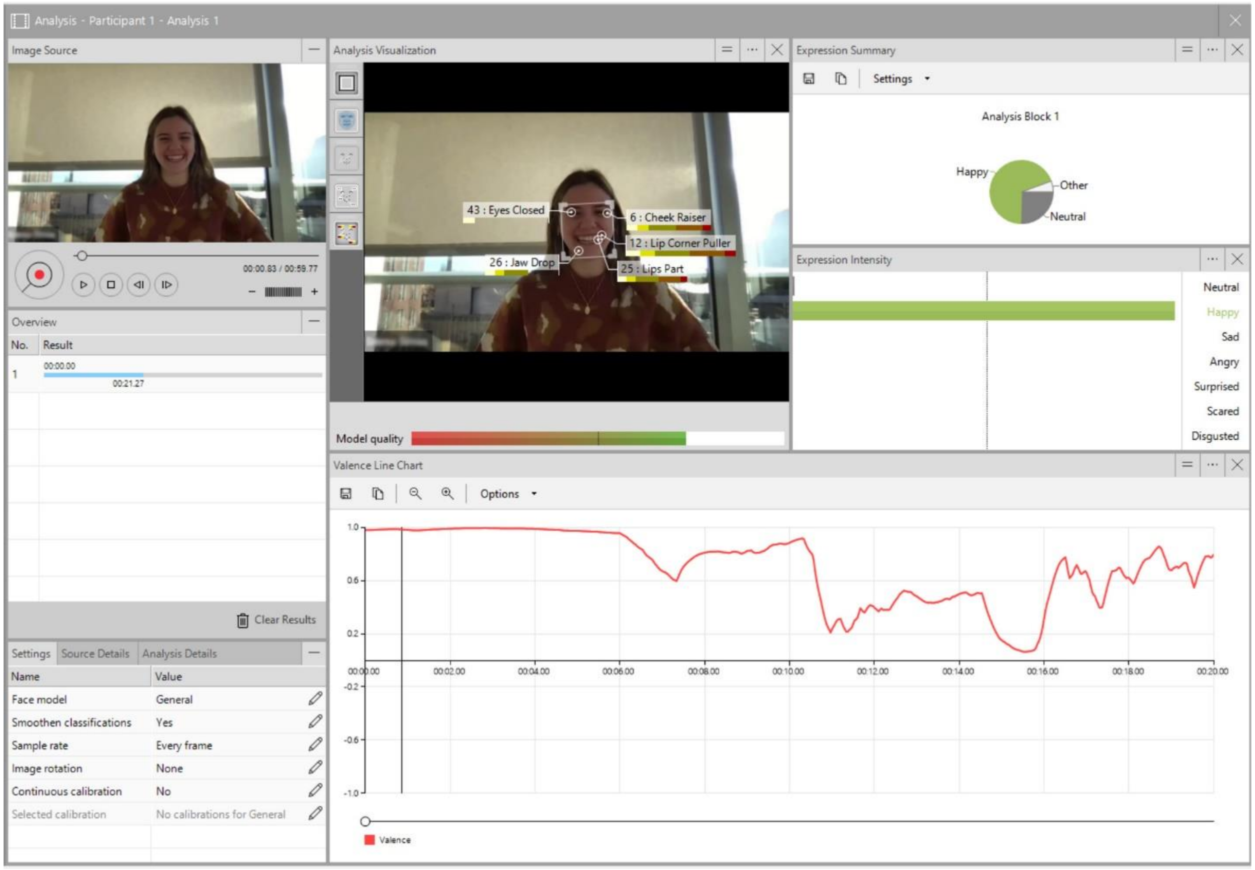
Ratings of expressivity (*Mdn* α = .74) and attractiveness (*Mdn* α = .70) had acceptable inter-rater reliability across the three time periods (see Table 2). There was slightly lower inter-rater reliability for judgments of perceived rapport across the three time periods (*Mdn* α = .64). Correlations between ratings for these three impressions variables across the three time periods, as well as Cronbach's alpha for composites averaged across time, are presented in Table 4.

Positive Affect. Participants' positive affect was also measured using the automated facial recognition and coding software FaceReader (Noldus; 2014). FaceReader has been validated alongside human coders and shown to be a reliable and valid indicator of basic human emotions (Lewinski et al., 2014). FaceReader can recognize several properties in faces within images or videos including discrete emotional expressions (e.g., happy, sad, angry, fear, disgust, and surprise). To classify discrete emotional expressions "FaceReader uses a facial modeling technique based on deep neural networks [Bulat & Tzimiropoulos, 2017]. It synthesizes an artificial face model, which describes the location of 468 key points in the face. It uses a single pass quick method to directly estimate the full collection of landmarks in the face. After the initial estimation, the key points are compressed using Principal Component Analysis. This leads to a highly compressed vector representation describing the state of the face. Then, classification of the facial expressions takes place by a trained deep artificial neural network to recognize patterns in the face [Gudi et al., 2015]. FaceReader directly classifies the facial expressions from image pixels" (Loijens & Krips, 2013, p. 4).

To utilize this software, each video clip of dyads completing their problem-solving task which were used to code for behavioral synchrony and mimicry were cropped so that only one participant was visible at a time. A research assistant then ran each video through the FaceReader software (see Figure 7) and extracted its full analyses of discrete emotional expressions for each participant at the three time points described above. Each emotion output is expressed as a value between 0 and 1 for every .5 seconds in the video, indicating the intensity of the emotion, where "0" indicated that the emotion is not visible on the face and "1" indicates that the emotion is fully present on the face. Mean estimates were taken across each of the .5 second intervals of FaceReader's output to express the average intensity of each emotion for participants in each video clip. For the present dissertation, only FaceReader's estimates of participants' average discrete "happy" emotion are used, which is referred to as positive affect hereafter. Participants' scores for their average positive affect were highly correlated across the three time points and were thus averaged to form a *Positive Affect* composite reflecting each participants' average positive affect across time (α = .90; see Table 4).

Figure 7

Screenshot of FaceReader (Noldus) Analysis of a Single Participant



Note. Participant gave permission to have their videotape used for educational purposes and for scientific meetings outside of the university including conferences or for publications.

Impression Ratings of Problem-Solving Task Outcome

Three research assistants were recruited to read the responses of both dyad members to the question “Please describe in a few sentences the final solution to the ‘Traveling Around Disney’s EPCOT Clockwise’ problem that you and you partner came up with.” Although participants’ responses differed slightly between each member of the dyad, they should have reflected the same solution since dyad members verbally decided on their solution together at the end of their problem-solving task. Research assistants were therefore instructed to take into consideration all of the information and descriptions provided by both members of the dyad when making their impression ratings. After reading solutions provided by both members of the dyad, research assistants rated the solution on a scale from 1 = not at all to 7 = very much on the following codes: (1) creativity, (2) cost to implement, (3) complexity, (4) likelihood of enhancing the visitor experience (see Appendix N for a full description of each rating). There was acceptable inter-rater reliability for each of the four problem-solving impression ratings (*Mdn* α = .75; see Table 2).

CHAPTER 3

RESULTS

The results are divided into three sections. In section one, I outline the descriptive statistics of the self-report variables and behavioral variables from participants' interpersonal questions interaction (i.e., interaction one) as well as their problem-solving task (i.e., interaction two) that are relevant to my primary and secondary hypotheses. Here, I also describe these variables' intraclass correlations, detail any variable transformations that were made due to skewed data, and present the correlations between these variables.

For section two, I examine the relationships between global behavioral synchrony and various global and molecular measures of behavioral mimicry. In section three, I begin to address my primary hypotheses by first examining a series of manipulation checks that test whether participants in my four experimental conditions behaved in a way consistent with my own hypotheses, and Aron and colleagues (1997) previous work developing the closeness-inducing and small-talk tasks. Specifically, I examine whether participants self-disclosed more about themselves in the closeness-inducing task than the small-talk task and whether participants perceived their partner to be more responsive to them in the visual CMC conditions than in the text-only CMC conditions.

Continuing in section three, I then test my main hypotheses regarding whether the experimental conditions impacted participants' achieved and desired interpersonal closeness in the expected directions (i.e., H1and H2), whether the experimental conditions impacted participants' behavioral synchrony and mimicry in the expected directions (i.e., H3 and H4), whether achieved and desired interpersonal closeness impacted participants' behavioral synchrony and mimicry in the expected directions (i.e., H5 and H6), and whether there was a mediating relationship between the experimental conditions, achieved and desired interpersonal closeness, and behavioral synchrony and mimicry (i.e., H7 and H8).

Section One: Descriptive Statistics

Descriptive statistics are only reported for hypothesis-related variables. Specifically, participants' self-reported variables related to their self-disclosure, responsivity, interpersonal closeness, and desire for interpersonal closeness appear in Table 6 split by experimental condition, as well as across all conditions. Additionally, intraclass correlations (ICCs) are presented for each self-report item that reflect the ratio of the between-dyad variance to the total variance of each item. ICCs can also be interpreted as the average correlation between participants' scores within the same dyad and thus assess, to some degree, how "dependent" each participants' score was on their partner's score within an average dyad.

Descriptive statistics for participants' behavioral variables, as rated by research assistants (e.g., disclosure and responsivity from interaction one and behavioral synchrony and mimicry from interaction two), appear in Table 8 split by experimental condition, as well as across all conditions. Additionally, ICCs are presented for each participant-level variable. To see the descriptive statistics for these variables split by time in the interaction (time 1, time 2, and time 3), refer to Appendix A, Table 1.

Self-Report Variables

Skewness. The skewness of each self-report variable was examined to determine whether each variable was normally distributed. Most variables had skewness values below +/- 1, indicating that there was not any heavy skewness. However, participants' self-reported responsivity was heavily skewed to the right for participants in the closeness-inducing over visual CMC condition (Skewness = -1.65) and small-talk over visual CMC condition (Skewness

= -1.21), indicating that most participants in these two conditions rated themselves as highly responsive to their partner. To correct for this, self-reported responsivity was reflected and a logarithmic transformation was applied to the variable. The variable was then re-reflected for greater interpretability. This transformation appropriately corrected for the heavy skewness across the various experimental conditions (-.83 < Skewness < .95). These log-transformed variables are used for all subsequent analyses.

ICCs. To examine the average correlation between participants' scores within the same dyad and thus determine whether there was a measurable degree of dependence between participants' score on various self-report measures, I examined the ICCs for participants' self-reported variables. First, I present the ICCs for participants' self-reported variables following their first, interpersonal closeness interaction. Regarding disclosure, it did not appear as though participants' self-reported disclosure was strongly related to their partners' self-reported disclosure across all experimental conditions (ICC = .12, p = .246). When examining ICCs for disclosure split by experimental condition, participants in the closeness-inducing over visual CMC condition had greater dependence within the dyad (ICC = .28, p = .220), suggesting that when the dyad was face-to-face and discussing intimate topics, participants tended to self-disclose slightly more about themselves when their partner also disclosed more about themselves. However, this average correlation was not significant at the $p < .05$ level, likely due to the smaller sample size (N = 48) that resulted from examining each experimental condition individually. Self-disclosure from participants in all other experimental conditions was negligibly related to their partner's self-disclosure (ICCs < .03, p's > .901). This might be expected, especially from participants in the text-only CMC conditions, as these participants were not aware of what their partners had self-disclosed over text until after they had already written their responses to the Aron's closeness-inducing or small-talk questions.

Participants' perception of their partner's responsivity was strongly correlated within each dyad across all experimental conditions (ICCs = .60, $p < .001$), suggesting that participants who rated their partner as more responsive to them were likely to be rated by their partner as more responsive as well. These ICCs were much weaker when split by experimental condition (ICCS < .17, *p*'s > .293).

Participants moderately agreed with one another regarding the amount of interpersonal closeness they felt with their partner after their first interaction across all experimental conditions (ICC = .27, $p = .012$). This relationship was strongest for participants in the closeness-inducing over visual CMC condition (ICC = .20, $p = .104$). Participants in the remaining three experimental conditions had little to no agreement with one another regarding the interpersonal closeness they felt with their partner (ICCs < .16, *p*'s > .421).

This pattern replicated for desired interpersonal closeness, where participants moderately agreed with one another regarding how much interpersonal closeness they desired to have in the future (ICC = .27, $p = .013$). Again, this relationship was strongest for participants in the closeness-inducing over visual CMC condition (ICC = .29, $p = .099$). There were small to medium relationships between participants desired interpersonal closeness within dyads across the remaining three experimental conditions (ICCs < .25, *p*'s > .358).

Table 6

Descriptive Statistics and ICCs for Self-Report Variables of Interest for Interactions One and Two

	M (SD)	Min-Max	Skewness	ICCs
Interaction One				
Closeness over Visual CMC[a]				
Self-Disclosure	4.99 (1.15)	3.00-6.75	-0.12	.28
Perception of Partner's Disclosure	4.78 (0.99)	2.25-6.50	-0.31	.03
Perception of Partner's Responsivity	6.06 (0.88)	3.67-7.00	-0.78	.00
Achieved Interpersonal Closeness	3.82 (0.90)	2.00-5.50	-0.24	.20
Desired Interpersonal Closeness	4.82 (0.99)	3.00-6.50	-0.20	.29[†]
Small-talk over Visual CMC[b]				
Self-Disclosure	5.27 (1.06)	3.25-7.00	-0.27	.00
Perception of Partner's Disclosure	5.11 (1.18)	2.25-7.00	-0.45	.19
Perception of Partner's Responsivity	6.20 (0.99)	4.00-7.00	-0.91	.00
Achieved Interpersonal Closeness	4.10 (0.92)	2.00-6.50	-0.26	.00
Desired Interpersonal Closeness	5.05 (0.93)	2.50-7.00	-0.14	.00
Closeness over Text Only CMC[a]				
Self-Disclosure	4.51 (1.07)	2.50-7.00	-0.11	.02
Perception of Partner's Disclosure	4.28 (1.08)	2.00-6.50	-0.02	.00
Perception of Partner's Responsivity	3.44 (1.28)	1.00-6.00	-0.41	.00
Achieved Interpersonal Closeness	2.83 (1.15)	1.00-5.00	0.15	.00
Desired Interpersonal Closeness	4.14 (1.12)	1.50-6.00	-0.28	.17
Small-talk over Text Only CMC[c]				
Self-Disclosure	4.60 (1.03)	2.50-7.00	0.22	.00
Perception of Partner's Disclosure	4.36 (1.00)	2.50-7.00	0.55	.12
Perception of Partner's Responsivity	3.28 (1.49)	1.00-6.33	-0.23	.17
Achieved Interpersonal Closeness	2.46 (1.12)	1.00-5.00	0.77	.16
Desired Interpersonal Closeness	4.28 (1.22)	1.00-7.00	-0.23	.25

Table 6 Continued

	M (SD)	Min-Max	Skewness	ICCs
Across All Conditions[d]				
Self-Disclosure	4.85 (1.12)	2.50-7.00	-0.05	.12
Perception of Partner's Disclosure	4.64 (1.11)	2.00-7.00	-0.03	.14
Perception of Partner's Responsivity	4.80 (1.80)	1.00-7.00	-0.52	.60***
Achieved Interpersonal Closeness	3.33 (1.22)	1.00-6.50	-0.15	.27*
Desired Interpersonal Closeness	4.58 (1.12)	1.00-7.00	-0.35	.27*

Note. All variables have possible ranges of 1 "not at all" to 7 "very much". Brackets reflect skewness values for variables after being transformed. ICCs for skewed variables were performed on the transformed variable. ICC values can range between 0 and 1.

[a]$N = 48$, [b]$N = 46$, [c]$N = 40$, [d] $N = 182$.

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Correlations. Correlations between participants' self-reported variables appear in Table 7 to allow for a preliminary exploration of relationships between them. Most variables across interaction one and interaction two were highly correlated. As might be expected from Reis and Shaver's (1988) model of intimacy, participants' ratings of their own disclosure ($r = .45$, $p < .001$) were strongly related to how much interpersonal closeness they reported feeling with their partner. Participants' perceptions of how responsive their partner was to them were also strongly related to how much interpersonal closeness they reported feeling with their partner ($r = .66$, $p < .001$).

Table 7

Correlation Between Self-Report Variables from Interaction One Across All Conditions

	1.	2.	3.	4.
Interaction One				
1. Self-Disclosure				
2. Perception of Partner's Disclosure	.62***			
3. Perception of Partner's Responsivity	.42***	.45***		
4. Achieved Interpersonal Closeness	.45***	.65***	.66***	
5. Desired Interpersonal Closeness	.42***	.39***	.42***	.70***

Note. †p < .10, *p < .05, **p < .01, ***p <.001.

Behavioral Variables

Skewness. The skewness of each behavioral variable was examined to determine whether each variable was normally distributed. Most variables had skewness values below +/- 1, indicating that there was not any heavy skewness. However, participants' mimicry for posture (Skewness = 1.68) and for nods (Skewness = 1.40) captured during participants' interaction two was heavily skewed to the left, indicating that most participants had low frequencies of mimicry for posture shifts and nods. Additionally, participants' positive affect captured during participants' interaction two was heavily skewed to the left (Skewness = 1.20) indicating that most participants displayed low average intensities of positive affect during their problem-solving task. To correct for this, logarithmic transformations were applied to all three variables. This transformation appropriately corrected for the heavy skewness for postural mimicry (Skewness = .14), nod mimicry (Skewness = -.38), and positive affect (Skewness = 0.86). These log-transformed variables were used for all subsequent analyses.

ICCs. Once again, it was important to examine the average correlation between participants' behavior within the same dyad to determine whether there was a measurable degree of dependence between participants' behaviors. Therefore, ICCs for participants' behaviors, as rated by outside research assistants, were examined across all conditions and split by experimental condition. I start by presenting the ICCs for participants' behavioral variables coded from their first, interpersonal questions interaction.

For research assistant rated verbal disclosure, the average correlation between participants' scores within the same dyad was moderate across all experimental conditions (ICC = .34, p = .030), suggesting that participants were rated as verbally disclosing more to the extent that their partner verbally disclosed more as well. When examining these ICCs split by experimental condition, replicating participants' self-report data, ICCs were the highest for participants in the closeness-inducing over visual CMC condition (ICC = .62, p = .041). However, there was a negligible average correlation between participants' verbal disclosure scores within the same dyad for participants in the small-talk over visual CMC condition (ICC = .02, p = .861). The average correlation between participants' verbal disclosure score for participants assigned to the text-only conditions was moderate in size (closeness-inducing over text-only CMC condition ICC = .43, p = .103; small-talk over text-only CMC condition ICC = .33, p = .056), an unexpected result given that participants in these conditions were not aware of what their partners had self-disclosed over text until after they had already written their responses to Aron's questions. However, this is likely due to the fact that research assistants coded the same randomly selected three questions from Aron's tasks within each dyad for text disclosure. Each randomly selected question for dyads likely naturally generated more or less disclosure (e.g., from Aron's small-talk questions: "Where did you go to high school? What was your high school like?" may generate more disclosure than "Tell the names and ages of your family members, include grandparents, aunts, uncles, and where they were born (to the extent you know this information"). Thus, given that participants were rated on their responses to the same questions within a dyad, but questions differed between dyads, one might expect participants' average self-disclosure to be somewhat correlated within the same dyad.

Participants' verbal and nonverbal responsivity was rated by research assistants only for participants within the visual CMC conditions, as participants in the text-only CMC conditions were never given the chance to respond to one another. For research assistant rated *verbal* responsivity, there was a small average correlation between participants' score within the same dyad (ICC across all visual CMC conditions = .15, p = .321; closeness-inducing over visual CMC condition ICC = .02, p = .922; small-talk over visual CMC condition ICC = .30, p = .137). For research assistant rated *nonverbal* responsivity, there was a similarly small average correlation between dyad members (ICC across all visual CMC conditions = .17, p = .255). When split by experimental condition, there was a moderate correlation between research assistant rated nonverbal responsivity for those in the closeness-inducing over visual CMC condition (ICC = .47, p = .082), suggesting that the more nonverbally responsive one dyad member was when responding to intimate questions with their partner, the more likely their partner was to be responsive as well. However, there was a negligible average correlation between dyad members for those in the small-talk over visual CMC condition (ICC = .00, p = .999).

For participants' second interaction where they were asked to solve a problem together, an ICC for behavioral synchrony or mimicry cannot be estimated as these are already dyadic variables (i.e., there can be no degree of within-dyad variance). However, ICCs were estimated for research assistant rated expressivity and FaceReader coded positive affect from participants' problem-solving interaction as these variables were measured on the level of the participant. Regarding expressivity, there was a small to moderate average correlation between participants within the same dyad (ICC = .25, $p = .022$), suggesting that a participant was slightly more likely to be expressive to the extent that their partner was expressive. For positive affect, there was a large average correlation between participants within the same dyad (ICC = .55, $p < .001$), suggesting that participants were more likely to express positive affect to the extent that their partner expressed positive affect during their problem-solving task.

Table 8

Descriptive Statistics and ICCs for Behavioral Variables for Interactions One and Two

	M (SD)	Min-Max	Skewness	ICCs
Interaction One				
Closeness over Visual CMC[a]				
Verbal Disclosure	3.81 (0.82)	2.00-5.53	-0.02	.62*
Verbal Responsivity	4.22 (1.47)	1.13-7.49	0.20	.02
Nonverbal Responsivity	5.16 (0.79)	3.08-6.85	-0.63	.47†
Small-talk over Visual CMC[b]				
Verbal Disclosure	3.58 (0.58)	1.94-5.17	-0.27	.02
Verbal Responsivity	4.32 (1.32)	1.42-6.64	-0.26	.30
Nonverbal Responsivity	5.20 (0.65)	3.56-6.40	-0.52	.00
Closeness over Text Only CMC[a]				
Text Disclosure	2.88 (0.91)	1.25-5.26	0.29	.43
Small-talk over Text Only CMC[c]				
Text Disclosure	2.47 (0.68)	1.44-3.96	0.55	.33*
Across all Conditions				
Verbal Disclosure[d]	3.70 (0.72)	1.94-5.53	0.07	.34*

Table 8 Continued

	M (SD)	Min-Max	Skewness	ICCs
Text Disclosure[e]	2.69 (0.84)	1.25-5.26	0.52	.43*
Verbal Responsivity[d]	4.27 (1.39)	1.13-7.49	-0.01	.15
Nonverbal Responsivity[d]	5.18 (0.72)	3.08-6.85	-0.61	.17
Interaction Two				
Total Global Synchrony[f]	4.43 (0.74)	2.46-6.58	0.32	-
Total Global Mimicry[f]	4.17 (0.68)	2.85-5.94	0.45	-
Gestural Mimicry[f]	3.40 (0.73)	1.88-5.50	0.67	-
Postural Mimicry[f]	4.94 (0.83)	2.76-6.63	-0.13	-
Total Molecular Mimicry[f]	8.91 (4.59)	0.00-24.00	0.86	-
Gestural Mimicry[f]	3.02 (2.17)	0.00-10.00	0.72	-
Postural Mimicry[f]	2.13 (2.32)	0.00-12.00	1.68 [0.14]	-
Nod Mimicry[f]	3.76 (3.15)	0.00-16.00	1.40 [-0.38]	-
Expressivity[g]	4.62 (1.01)	2.00-7.00	-0.01	.25*
Positive Affect[g]	0.21 (0.17)	0.00-0.89	1.20 [0.86]	.55***

Note. Possible values for Verbal Disclosure, Verbal Responsivity, Nonverbal Responsivity, Text Disclosure, Expressivity, and Attractiveness range from 1 = not at all to 7 = very much. Possible values for Global Behavioral Synchrony, Gestural Mimicry, Postural Mimicry, and Global Behavioral Mimicry Composite range from 1 = not at all to 8 = very much. Possible values for Positive Affect range from 0 = indicating that the emotion is not visible in the face to 1= indicating that the emotion is fully present in the face. Gestural Mimicry, Postural Mimicry, Nod Mimicry, and Molecular Mimicry Composite are all presented as frequency counts. Brackets reflect skewness values for variables after being transformed. ICCs for skewed variables were performed on the transformed variable. ICC values can range between 0 and 1.

[a]N = 48 participants, [b]N = 46 participants, [c]N = 40 participants, [d]N = 94 participants, [e]N = 88 participants, [f]N = 91 dyads, [g]N = 182 participants.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Correlations. For the current dissertation, it was important to measure participants' self-reports of their disclosure and their perceptions of their partner's responsivity during Aron's closeness-inducing or small-talk tasks (i.e., interaction one), as well as to obtain behavioral ratings of these constructs by research assistants as self-reports can often be subject to various rating biases (e.g., social desirability). The correlations between participants' self-reported variables and research assistant rated behaviors appear in Table 9 to examine the extent to which participants' self-reports of their disclosure and their perceptions of their partners' responsivity were related to research assistants' ratings of these constructs. It is important to remind the reader, however, that the questions participants' responded to in their own ratings of their disclosure and responsivity differed slightly from the behavioral variables research assistants used to rate these participants (see Methods). Therefore, one might not expect these variables to have a perfect overlap.

These variables are presented by condition, as well as by time in the interaction, as Aron's closeness-inducing task is designed to increase in intimacy across time whereas Aron's small-talk task is not. Therefore, one might expect participants' perceptions of how much they disclosed to their partners to be biased by how much they disclosed during the most intimate points of the interaction (i.e., time 3 in closeness-inducing conditions). If this were the case, then participants' ratings of their own self-disclosure should be most strongly correlated with research assistants' ratings of participants' disclosure at time 3 for participants in the closeness-inducing conditions, but there should be no difference in correlation strength across time for participants in the small-talk conditions.

This pattern is precisely what was observed. The relationship between participants' perception of their self-disclosure and behavioral ratings of their disclosure during their first interaction were much stronger at time 3 (visual CMC: $r = .54$, $p < .001$; text-only CMC: $r = .28$, $p = .055$) compared to time 1 (visual CMC: $r = .12$, $p = .431$; text-only CMC: $r = -.29$, $p = .043$) or time 2 (visual CMC: $r = .34$ $p = .017$; text-only CMC: $r = .16$, $p = .281$), for participants in the closeness-inducing conditions. However, the relationship between participants' perception of their self-disclosure and behavioral ratings of their disclosure for participants in the small-talk conditions did not meaningfully differ from time 1 ($r = -.04$, $p = .790$) to time 2 ($r = .09$, $p = .566$) to time 3 ($r = -.07$, $p = .655$; p-values comparing the difference between these correlations were > .457) for those in the visual CMC condition, nor from time 1 ($r = -.21$, $p = .203$) to time 2 ($r = .13$, $p = .413$) to time 3 ($r = .03$, $p = .865$; p-values comparing the difference between these correlations were > .139) for those in the text-only CMC condition.

Across all conditions, and all time points, participants' ratings of their own responsivity to their partner did not generally correlate strongly with research assistants' rating of participants responsivity. Further, the correlation between a participants' rating of their partners' responsivity and research assistants' behavioral ratings of that partners' responsivity also did not strongly correlate. In other words, participants in the dyadic interactions rated the responsivity of their partner in a manner generally unrelated to ratings made by third-party research assistants.

Table 9

Correlation Between Self-Report Variables and Behavior Coded Variables from Interaction One Split by Time

	Self-Rating	Rating of Partner
	Disclosure	Responsivity
Closeness over Visual CMC		
Verbal Disclosure		
T1	.12	-.15
T2	.34*	-.11
T3	.54***	.15
Verbal Responsivity		
T1	.24	-.02
T2	.30*	.01
T3	.19	.13
Nonverbal Responsivity		
T1	.22	.11
T2	.14	.13
T3	.35*	.09
Small-talk over Visual CMC		
Verbal Disclosure		
T1	-.04	-.03
T2	.09	.04
T3	-.07	.10
Verbal Responsivity		
T1	.13	.05
T2	.19	.07
T3	-.06	.03
Nonverbal Responsivity		
T1	-.06	-.03
T2	.09	.05
T3	.08	-.05
Across all Visual CMC		
Verbal Disclosure		
T1	.06	-.01
T2	.20†	-.01

Table 9 Continued

	Self-Rating	Rating of Partner
	Disclosure	Responsivity
T3	.26*	.03
Verbal Responsivity		
T1	.19†	.09
T2	.26*	-.01
T3	.05	.10
Nonverbal Responsivity		
T1	.10	.01
T2	.13	.08
T3	.20†	.05
Closeness over Text-only CMC		
Text Disclosure		
T1	-.29*	-.04
T2	.16	.11
T3	.28†	-.12
Small-talk over Text-only CMC		
Text Disclosure		
T1	-.21	-.13
T2	.13	.18
T3	.03	.03
Across all Text-only CMC		
Text Disclosure		
T1	-.26*	-.07
T2	.13	.14
T3	.16	-.06

Note. Self-rating correlations reflect the correlation between a participant's self-rating and research assistants' behavioral ratings of that participant. Rating of partner correlations reflect the correlation between a participant's rating of their partner and research assistants' behavioral ratings of that partner.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Section Two: The Relationship Between Behavioral Synchrony and Mimicry

The main goal of the present dissertation was to help differentiate the constructs of behavioral synchrony and mimicry from one another. To do so, I examined how these two variables were related to, and different from, one another in order to estimate their convergent validity.

However, before examining the relationship between synchrony and mimicry, researchers must consider the degree to which both constructs are related to, and possibly confounded by, other human rating biases. Two such biases that may be particularly important to investigate are the behavioral constructs of expressivity and positive affect. Both constructs reflect the degree to which a person appears lively, energetic, and charismatic when interacting with their partner. Although research assistants are trained to not pay attention to a dyad's expressivity or positive affect when making global ratings of synchrony or mimicry, it is still possible that these qualities of the dyad may influence research assistants' ratings of synchrony or mimicry. Specifically, Cappella (1990) states that "Judgments of coordination, whether by participants or observers, could be confounded with judgments of positivity if judges' implicit theories of social interactions are that positive interactions are ones in which the people are in sync" (p. 303). It is true that dyads must have *some* expressive movement in order to synchronize or mimic one another (i.e., a dyad who sits still should not have much synchrony or mimicry). Additionally, one might expect both synchrony and mimicry to be naturally correlated with constructs such as positive affect, as synchronous interactions are theorized to indicate a positive quality of an interaction (Reis et al., 2022; Tickle-Degnen & Rosenthal, 1990). However, the constructs of mimicry and synchrony themselves do not theoretically contain components of expressivity or positive affect.

These "rating biases" should theoretically only be an issue for ratings made on the global level, in which an impression judgment is being made. For participants making molecular ratings of mimicry, their own implicit theories of the social interaction should not have a bearing on whether or not they code discrete acts as occurring or not occurring, and whether those discrete acts were mimicked. While past research has shown that ratings of synchrony and mimicry on a global level *can* be done without human raters being subject to these kinds of external stimuli that drive perception (e.g., Bernieri et al., 1994; Cappella, 1990), this does not necessarily mean that ratings are always free from these biases. Thus, when examining the relationships between synchrony and mimicry, I examined these relationships with and without controlling for positive affect and expressivity.

I first examined the extent to which research assistants' ratings of global and molecular behavioral synchrony and mimicry were related to research assistants' ratings of expressivity and FaceReader coded positive affect. Although both expressivity and positive affect were coded on the level of the participant, I averaged them within each dyad to create an estimate of the dyad's average expressivity and positive affect. The relationships between synchrony, mimicry, and dyads' expressivity and positive affect are presented in Table 10. To see these relationships split by time in the interaction, see Appendix A, Table 2.

Dyads' average expressivity was strongly correlated with their positive affect ($r = .49$, $p < .001$). Additionally, these two variables displayed small to medium relationships with behavioral synchrony and mimicry. Global behavioral synchrony was strongly related to both dyadic expressivity ($r = .58$, $p < .001$) and dyadic positive affect ($r = .52$, $p < .001$). Global behavioral mimicry was related to dyadic expressivity ($r = .53$, $p < .001$) and dyadic positive affect ($r = .46$, $p < .001$) to a similar magnitude. Molecular ratings of mimicry were related to dyadic expressivity (molecular mimicry composite $r = .49$, $p < .001$) and dyadic positive affect (molecular mimicry composite $r = .32$, $p = .003$), to a slightly lesser, but still moderately strong degree.

It is difficult to determine whether these medium to large correlations were driven by the fact that research assistants were biased in their synchrony and mimicry coding by dyads' expressivity and positive affect, or whether ratings of synchrony and mimicry were free from these rating biases, and these relationships instead reflect the natural variance shared by synchrony, mimicry, and dyads' expressivity and positive affect. Of note is the finding that the molecular mimicry composite, which should theoretically be the freest from rating biases such as expressivity and positive affect, correlated to a similar degree with these constructs as did the global mimicry composite. This finding may thus suggest that expressivity and positive affect, as measured in the present study, may be serving as an antecedent or consequence of behavioral synchrony or mimicry, opposed to serving as rating biases that confounded the measurement of these behavioral constructs.

Table 10

The Relationship Between Synchrony, Mimicry, and Dyadic Expressivity and Positive Affect

	Dyadic Expressivity	Dyadic Positive Affect
Global Rating Method		
Total Global Synchrony	$.58^{***}$	$.52^{***}$
Total Global Mimicry	$.53^{***}$	$.46^{***}$
Gestural Mimicry	$.67^{***}$	$.50^{***}$
Postural Mimicry	$.28^{**}$	$.31^{**}$
Molecular Coding Method		
Total Molecular Mimicry	$.49^{***}$	$.32^{**}$
Gestural Mimicry	$.46^{***}$	.15
Postural Mimicry	$.22^{*}$	$.28^{**}$
Nod Mimicry	$.23^{*}$	.17
Dyadic Positive Affect	$.49^{***}$	-

Note. $N = 91$.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Next, given that mimicry was assessed using two kinds of methods (i.e., global impression ratings and molecular coding), I examined the convergent relationships between these various mimicry variables to determine whether the two kinds of mimicry rating methods were assessing the same behavioral construct. Table 11 presents these relationships a) without any control variables and b) controlling for dyadic expressivity and positive affect. See Appendix A, Table 3 for these relationships split by time in the interaction.

As expected, the global mimicry composite was correlated strongly with the molecular mimicry composite. While this relationship was large at zero-order ($r = .57$, $p < .001$), the relationship between these two composites remained quite large even after controlling for dyads' expressivity and positive affect ($r = .41$, $p < .001$). In other words, ratings from research assistants who watched videos of dyads frame-by-frame to determine when participants mimicked each other's gestures, posture shifts, and nods, were strongly related to ratings from research assistants who watched videos of dyads at full speed and made impression judgments regarding how much gestural mimicry and postural mimicry they observed. Additionally, this relationship did not appear to be driven by a dyads' expressivity or positive affect, providing further evidence that positive affect and expressivity may not be serving as rating biases in the present study.

These relationships somewhat remained even when mimicry was broken down into its constituent parts. Specifically, gestural mimicry rated at the molecular level was significantly related to global impressions of gestural mimicry (Zero-order $r = .61$, $p < .001$; First-order partial $r = .51$, $p < .001$). Unlike molecular gestural mimicry and global gestural mimicry, molecular postural mimicry and global postural mimicry, while both assessing mimicry in postural displays, had slightly different operationalization and therefore should be correlated but likely to a lesser degree. Specifically, whereas scoring higher on mimicry for molecular postural mimicry required that participants engaged in multiple posture shifts that were mimicked, global posture mimicry only required that participants' posture matched one another throughout the entire interaction. In other words, a dyad whose posture was the exact same, but whose posture did not change throughout the course of an interaction might score 0 for molecular postural mimicry, and 7 for global postural mimicry. Indeed, postural mimicry rated at the molecular level was significantly, albeit less strongly, related to global impressions of postural mimicry at zero-order ($r = .27$, $p = .011$). This relationship became marginally significant after controlling for expressivity and positive affect ($r = .19$, $p = .085$).

Table 11

The Relationships Between Global and Molecular Mimicry Variables

	Global Rating Method			Molecular Coding Method		
	Total Global Mimicry	Gestural Mimicry	Postural Mimicry	Total Molecular Mimicry	Gestural Mimicry	Postural Mimicry
			Zero-Order			
Global Rating Method						
Total Global Mimicry						
Gestural Mimicry	.85***					
Postural Mimicry	.88***	.50***				
Molecular Coding Method						
Total Molecular Mimicry	.57***	.71***	.30**			
Gestural Mimicry	.36***	.61***	.04	.56***		
Postural Mimicry	.38***	.39***	.27*	.51***	.12	
Nod Mimicry	.30***	.31***	.21*	.60***	-.03	-.02
			First-Order Partial[a]			
Global Rating Method						
Total Global Mimicry						
Gestural Mimicry	.76***					
Postural Mimicry	.90***	.40***				
Molecular Coding Method						
Total Molecular Mimicry	.41***	.59***	.18†			
Gestural Mimicry	.18†	.51***	-.09	.45***		
Postural Mimicry	.27**	.30**	.19†	.46***	.04	
Nod Mimicry	.21†	.21*	.15	.57***	-.15	-.09

Note. $N = 91$. Correlations from similar behavioral constructs appear in boxes.

[a]Partialing dyadic expressivity and dyadic positive affect.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Finally, I examined the relationships between global behavioral synchrony, global behavioral mimicry, and molecular behavioral mimicry. Conceptually, behavioral synchrony and behavioral mimicry should display some empirical overlap with one another as they both are part of the superordinate construct of interpersonal coordination. Both constructs organize the behaviors of interacting individuals in a patterned and predictable way which this is achieved through individuals adapting their behaviors to one another. However, these two constructs also have important definitional differences (see Figure 1) and as such should be expected to display some degree of discriminant validity with one another. Table 12 presents these relationships (see Appendix A, Table 4 for these relationships split by time in the interaction).

Global behavioral synchrony and global behavioral mimicry were highly correlated (Zero-order $r = .84$, $p < .001$; First-order partial $r = .74$, $p < .001$). These relationships remained relatively strong even when mimicry was broken down into its constituent parts. Specifically, global gestural mimicry and global postural mimicry correlated with global synchrony at magnitudes above $r = .50$ (p's $< .001$). This might be expected, as these two constructs were measured using the same global impression rating approach by the same research assistants who coded these two constructs at the same time.

When comparing the relationship between global synchrony with molecular mimicry which should be free from common-method variance there was still a medium to large overlap between the two composite measures (Zero-order $r = .62$, $p < .001$; First-order partial $r = .47$, $p < .001$). When mimicry was broken down into its various components, global synchrony correlated with molecular gestural mimicry and molecular postural mimicry at approximately the same magnitude ($.32 < r's < .46$, p's $< .002$). While molecular nod mimicry was related to global behavioral synchrony at zero-order ($r = .23$, $p = .028$), this relationship was not significant when dyads' expressivity and positive affect were controlled for ($r = .11$, $p = .318$).

In summary, section two compared the relationships between behavioral synchrony and behavioral mimicry. While positive affect and expressivity were explored as possible rating biases that may have confounded global ratings of synchrony and mimicry, these potential rating biases were associated with ratings of global mimicry to about the same degree as ratings of molecular mimicry, which is not impacted by these rating biases. Additionally, the relationships among synchrony and mimicry with and without controlling for these possible confounds did not differ meaningfully, which all together suggests that positive affect and expressivity were likely not substantial biases in the current study. Further, measures of molecular mimicry correlated strongly with measures of global mimicry, suggesting that these two rating methods are tapping into a similar construct. Finally, as expected, behavioral synchrony and mimicry displayed some empirical overlap which was approximately the same in strength for gestural and postural mimicry. The strength of these relationships demonstrates the relatedness but uniqueness of behavioral synchrony and mimicry.

Table 12

The Relationships Between Synchrony and Mimicry

	Global Behavioral Synchrony	
	Zero-order	First-order partial[a]
Global Rating Method		
Total Global Mimicry	.84***	.74***
Gestural Mimicry	.89***	.81***
Postural Mimicry	.58***	.50***
Molecular Rating Method		
Total Molecular Mimicry	.62***	.47***
Gestural Mimicry	.46***	.32*
Postural Mimicry	.46***	.38***
Nod Mimicry	.23*	.11

Note. $N = 91$.

[a]Partialing dyadic expressivity and dyadic positive affect.

$^{*}p < .05$, $^{***}p < .001$.

Section Three: Hypothesis Testing

Manipulation Checks

Before addressing my main hypotheses regarding the differing impacts of closeness and desire for closeness on synchrony and mimicry, a series of manipulation checks were tested to confirm whether the four experimental conditions impacted participants' self-disclosure and their perceptions of their partner's responsivity in the expected directions. Specifically, I examined whether participants self-disclosed more about themselves in the closeness-inducing task than the small-talk task and whether participants perceived their partner to be more responsive to them in the visual CMC conditions than in the text-only CMC conditions.

While both self-disclosure and responsivity were measured at the participant level after dyads' interactions, these variables were collapsed to create a dyadic variable to enhance the interpretability of these effects.[12] Thus, a series of 2 (task type: closeness-inducing vs. small-talk) x 2 (communication platform: visual CMC vs. text-only CMC) Analyses of Variance (ANOVAs) were conducted to examine these manipulation checks.

Self-Disclosure. First, I examined the impact of experimental condition on dyads average self-reported disclosure. Contrary to what was expected, there was not a significant effect of task type ($F_{(1, 87)} = 1.25$, $p = .266$, $\eta^2_p = .01$) suggesting that participants randomly assigned to the closeness-inducing task ($M = 4.75$, $SD = 0.79$) did not report self-disclosing more about themselves than participants in the small-talk task ($M = 4.94$, $SD = 0.79$; see Figure 8). However, there was an effect of communication platform ($F_{(1, 87)} = 11.99$, $p < .001$, $\eta^2_p = .12$) where participants who completed their task over visual CMC ($M = 5.13$, $SD = 0.79$) reported self-disclosing more to their partner than did those who completed their task over text-only CMC ($M = 4.55$, $SD = 0.80$). There was no significant interaction between task type and communication platform ($F_{(1, 87)} = 0.34$, $p = .564$, $\eta^2_p = .00$).

While it is informative to understand how participants perceived their own self-disclosure in these various conditions, it is also important to examine disclosure as rated by a participant's own partner, as self-reports of one's own behavior may be subject to various self-rating biases (e.g., social desirability). Thus, I ran the same 2x2 ANOVA model where the dependent variable was disclosure as rated by participants' partners (see Figure 8). As before, and contrary to what was expected, there was no significant effect of task type ($F_{(1, 87)} = 1.55$, $p = .216$, $\eta^2_p = .02$),

[12] Manipulation checks were also tested using MLM models with dummy coded variables to represent experimental conditions on participants-level self-disclosure and responsivity. Results did not meaningfully differ from using a dyadic approach. Thus, a dyadic level approach was chosen for greater interpretability.

such that participants in the closeness-inducing task (M = 4.53, SD = 0.78) were not rated as significantly higher in disclosure by their partners than participants in the small-talk task (M = 4.73, SD = 0.78). However, there was again a main effect of communication platform ($F_{(1, 87)}$ = 14.76, $p < .001$, η^2_p = .15), where participants who completed their interactions over visual CMC (M = 4.95, SD = 0.78) were rated by their partners as disclosing more than participants who completed their interaction over text-only CMC (M = 4.32, SD = 0.75). There was no significant interaction observed between task type and communication platform ($F_{(1, 87)}$ = 0.57, p = .452, η^2_p = .01).

I also examined whether this pattern replicated when examining disclosure rated by research assistants. For participants in the visual CMC conditions, research participants listened (i.e., did not watch) to thin slices of participant's first interaction with their partner at three time points that corresponded with Aron's three sets of questions and rated various components of disclosure (see Methods). Given that Aron's closeness-inducing task was designed to increase in intimacy over time, one might expect to observe more disclosure by participants as time increased. However, given that Aron's small-talk task does not increase in intimacy over time, one would not expect to observe more disclosure over time. In other words, there might not be a difference in disclosure for dyads in the closeness-inducing vs. small-talk conditions at time 1, but dyads in the closeness-inducing condition should disclose more than dyads in the small-talk condition at time 2 and time 3.

For participants in the visual CMC conditions only, I ran a 2 (task type: closeness-inducing vs. small-talk) x 3 (time: time 1, time 2, time 3) mixed measures ANOVA on research assistant rated (i.e., behavioral) disclosure (Figure 8). As before, there was no significant effect of task type ($F_{(1, 45)}$ = 1.79, p = .188, η^2_p = .04). However, there was a significant effect of time on disclosure ($F_{(2, 90)} = 10.06$, $p < .001$, $\eta^2_p = .18$) where dyads' disclosure significantly increased over each set of Aron's questions (p's < .039, Cohen's *d's* > .33). As expected, these effects were qualified by a significant interaction between task type and time ($F_{(2, 90)} = 4.06$, $p = .021$, $\eta^2_p = .08$). A series of pairwise comparisons[13] revealed the expected pattern. Specifically, at time 1, there was no significant difference in disclosure between dyads in the closeness-inducing condition ($M = 3.24$, $SD = 0.90$) and dyads in the small-talk condition ($M = 3.48$, $SD = 0.90$; $p = .361$, Cohen's $d = .27$). However, at time 2, dyads in the closeness-inducing condition ($M = 3.90$, $SD = 0.75$) were rated as disclosing marginally more than dyads in the small-talk condition ($M = 3.52$, $SD = 0.75$; $p = .087$, Cohen's $d = .51$). Finally, at time 3, dyads in the closeness-inducing condition ($M = 4.28$, $SD = 0.79$) were rated as disclosing significantly more than dyads in the small-talk condition ($M = 3.74$, $SD = 0.80$; $p = .025$, Cohen's $d = .68$).

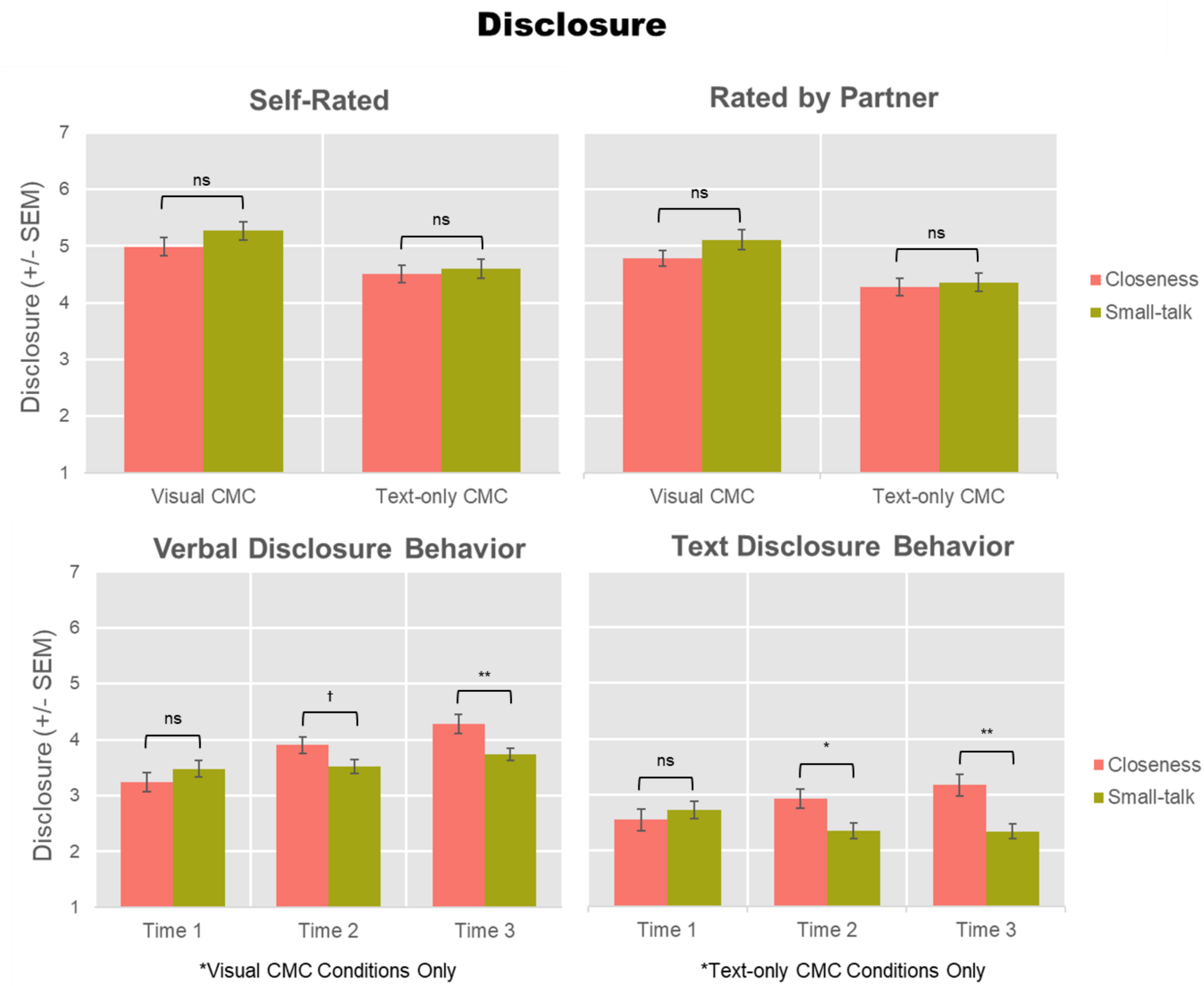
Another group of research assistants were assigned to read thin slices of written responses from participants in the text-only CMC conditions and rate disclosure at three different time points (see Methods). Therefore, similar to participants in the visual CMC conditions presented above, I ran another 2 (task type: closeness-inducing vs. small-talk) x 3 (time: time 1, time 2, time 3) mixed measures ANOVA on participants' research assistant rated disclosure over text (Figure 8). Unlike those in the visual CMC conditions, there was a marginal main effect of task type on ratings of disclosure ($F_{(1, 42)} = 3.90$, $p = .055$, $\eta^2_p = .09$), where dyads in the closeness-inducing condition ($M = 2.88$, $SD = 0.69$) were rated as disclosing more than dyads in the small-talk condition ($M = 2.47$, $SD = 0.68$). While there was no significant effect of time on disclosure ($F_{(2, 84)} = 0.39$, $p = .676$, $\eta^2_p = .01$), there was a significant interaction between task

[13] Least Significant Difference (LSD) corrections for multiple comparisons are employed for all pairwise comparisons in the present dissertation.

type and time on research assistant rated disclosure ($F_{(2, 84)} = 5.87$, $p = .004$, $\eta^2_p = .12$). This interaction replicated the same pattern as those in the visual CMC conditions. Specifically, at time 1, there was no significant difference in disclosure between dyads in the closeness-inducing condition (*M* = 2.55, *SD* = 0.90) and dyads in the small-talk condition (*M* = 2.72, *SD* = 0.89; *p* = .519, Cohen's *d* = .19). However, at time 2, dyads in the closeness-inducing condition (*M* = 2.93, *SD* = 0.79) were rated as disclosing significantly more than dyads in the small-talk condition (*M* = 2.35, *SD* = 0.79; *p* = .021, Cohen's *d* = .73). This difference was largest at time 3, where dyads in the closeness-inducing condition (*M* = 3.17, *SD* = 1.00) were rated as disclosing significantly more than dyads in the small-talk condition (*M* = 2.34, *SD* = 1.01; *p* = .009, Cohen's *d* = .83).

Figure 8

Participants' Differences in Self-Rated, Partner-Rated, and Research Assistant Coded Disclosure by Experimental Condition



Note. ns = not significant.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Responsivity. The other component of Aron's various question tasks that served as a manipulation check was participants' perception of their partner's responsivity. Specifically, I expected that participants in the visual CMC conditions would rate their partners as more responsive to them than participants in the text-only CMC conditions. It is important to reiterate that participants in the text-only CMC conditions did not interact with their partner at all in real time during their first interaction. Instead, they spent the first half of their interaction writing responses to one of Aron's sets of interpersonal questions, and the second half of their interaction reading their partners' responses to those same questions. Participants did not verbally talk to each other at all during this process. Thus, participants should not have perceived their partners to be responsive to them.

To test this, I first ran a 2 (task type: closeness-inducing vs. small-talk) x 2 (communication platform: visual CMC vs. text-only CMC) ANOVA where participants' perceptions of their partner's responsivity served as the dependent variable. As with disclosure, participants' perceptions of their partner's responsivity were averaged within each dyad to create a dyadic variable, allowing me to use conventional parametric methods to test this manipulation check.[7] As expected, there was a significant and large main effect of communication platform ($F_{(1, 87)}$ = 245.18, p <.001, η^2_p = .74) where participants who completed their task over visual CMC (M = 6.13, SD = 0.84) rated their partner as much more responsive to them than participants who completed their task over text-only CMC (M = 3.36, SD = 0.83; see Figure 9). It is interesting, however, that participants in the text-only CMC platform rated their partners as responsive *at all* (with responsivity averaged from the questions "My partner really listened to me," "My partner seemed interested in what I was thinking and feeling," and "My partner was responsive to my questions/answers"), given that participants never actually interacted with each other in real time. This mean of 3.36 (on a scale from 1-7) may instead reflect participants being confused by the question (i.e., not understanding how they could rate how responsive a partner was to them who they had not yet interacted with), a demand characteristic where participants were motivated to respond in a way consistent with what they thought the research was about, or perhaps participants wanting to appear overly nice and amicable regarding their ratings of their partner.

Although not necessarily serving as a manipulation check, since participants in the text-only conditions were not included here as a comparison group, research assistants also coded the *behavioral* responsivity of participants from various thin slices across three time points in the visual CMC group. I did not have any a priori expectations regarding the effect of closeness-inducing vs. small-talk on behavioral responsivity. However, to the extent that a person is self-disclosing more personal and intimate information about themselves, the more a listener might be expected to display more responsive (e.g., interactive, engaged, warm; see Appendix K for full list of behavioral codes). Thus, one might expect a similar interaction between task type and time as was observed for research assistant rated disclosure for research assistant rated responsivity, where responsivity would increase over time only for dyads in the closeness-inducing condition.

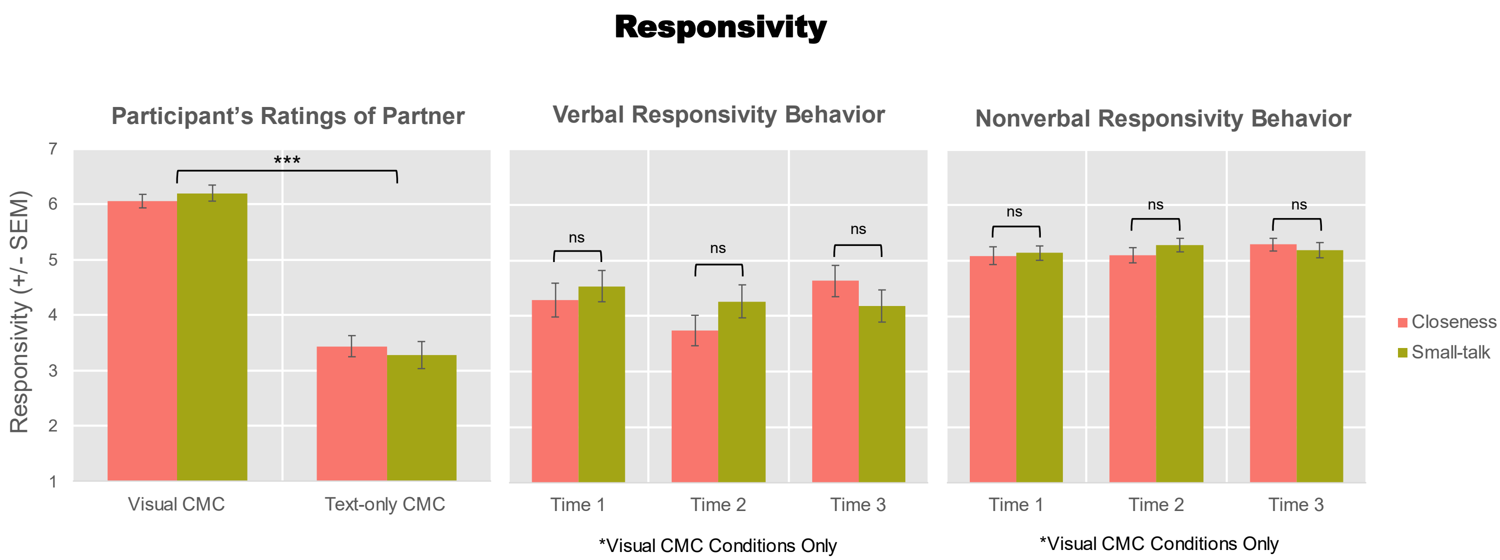
To explore whether the responsivity of participants in the closeness-inducing over visual CMC condition differed from participants in the small-talk over visual CMC condition, I tested two additional repeated measures ANOVA models. I first ran a 2 (task type: closeness-inducing vs. small-talk) x 3 (time: time 1, time 2, time 3) mixed measures ANOVA on dyads' *verbal* responsivity rated by research assistants who listened (i.e., did not watch) to thin slice clips of participants' interactions over Zoom. There were no main effects of task type ($F_{(1, 45)}$ = 0.11, p = .739, η^2_p = .00) on ratings of dyads' average verbal responsivity, suggesting that participants in the closeness-inducing condition (M = 4.22, SD = 1.06) were rated as similar in their verbal responsivity as those in the small-talk condition (M = 4.32, SD = 1.06 ; see Figure 9). There was also no effect of time on participants verbal responsivity ($F_{(2, 90)} = 1.65$, $p = .199$, $\eta^2_p = .04$) nor an interaction between task type and time ($F_{(2, 90)} = 1.85$, $p = .163$, $\eta^2_p = .04$).

Next, I ran a 2 (task type: closeness-inducing vs. small-talk) x 3 (time: time 1, time 2, time 3) mixed measures ANOVA on dyads' *nonverbal* responsivity rated by a separate group of research assistants who watched, but did not listen to, thin slice clips of participants' interactions over Zoom. Consistent with ratings of verbal responsivity, there was no significant effect of task type ($F_{(1, 45)} = 0.06$, $p = .802$, $\eta^2_p = .00$) on ratings of nonverbal responsivity. Additionally, there was no effect of time ($F_{(2, 90)} = 0.64$, $p = .532$, $\eta^2_p = .01$), nor any interactions between task type and time ($F_{(2, 90)} = 0.80$, $p = .430$, $\eta^2_p = .02$), on ratings of dyads' nonverbal responsivity; see Figure 9. Thus, it did not appear as though the degree to which participants were responsive to their partner depended on the task they were completing, or the level of intimacy of the questions they were discussing.

In summary, the first part of section 3 tested a series of manipulation checks regarding whether participants in the closeness-inducing conditions self-disclosed more intimate and personal information about themselves compared to the small-talk conditions, and whether participants who met with their partner face-to-face over Zoom to complete Aron's question tasks (i.e., visual CMC conditions) felt that their partner was more responsive to them than participants who completed Aron's question tasks independently on a Google doc (i.e., text-only CMC conditions). Contrary to what was expected, participants in the small-talk task appeared to disclose as much as participants in the closeness-inducing task, according to participants self-reports and their partner's reports of participants' disclosure. There was some evidence that participants in the closeness-inducing task disclosed more than participants in the small-talk task at later timepoints in their interaction, according to research assistant ratings of participants' verbal and text disclosure. In terms of responsivity, participants did indeed perceive their partner to be more responsive to them when their interactions were taking place face-to-face over Zoom compared to independently over a Google document. When examining the verbal and nonverbal responsivity for participants who interacted over Zoom, there did not appear to be any differences between participants who completed Aron's closeness-inducing task and Aron's small-talk task, according to research assistants' ratings of participants' behavior.

Figure 9

Participants' Differences in Ratings of Partner's Responsivity, and Research Assistant Coded Verbal and Nonverbal Responsivity by Experimental Condition



Note. ns = not significant.

$^{***}p < .001$.

Hypotheses 1 & 2: The Effect of Experimental Condition on Interpersonal Closeness

H1. My first main hypothesis tested the effect of experimental condition on participants' self-reported interpersonal closeness. Specifically, for H1, I expected that participants who completed the closeness-inducing task over visual CMC would self-report the greatest interpersonal closeness in comparison to participants in any other condition as this experimental condition was the only condition meant to generate both high levels of self-disclosure and responsivity from one's partner compared to the other experimental conditions.

Interpersonal closeness was measured at the participant level after dyads' interactions, and as such, the assumption that observations between subjects are independent is violated, rendering conventional parametric methods unsuitable. Thus, a series of multilevel models (MLM's) were conducted to examine my first hypothesis. All models reported are random-intercept models which allowed for intercepts for each participant to vary (Hox, 2002). Additionally, because MLM does not provide standardized regression coefficients, all continuous variables were standardized at the grand mean of the sample ($M = 0$, $SD = 1$) to enhance the interpretability of the regression coefficients, referred to as Standardized Parameter Estimates (SPEs). SPE coefficients can be interpreted in a similar manner to a standardized regression coefficient such that every standard deviation increase in the predictor variable leads to an increase in the dependent variable equivalent to the SPE. As with non-MLM standardized regression coefficients, however, interpreting changes in standard deviations can be non-intuitive. Thus, the value of SPEs is in their ability to be compared to one another in terms of their magnitude to get a sense of the importance of each variable in the MLM.

To address H1, I examined the impact of experimental condition on participants' reports of the interpersonal closeness they achieved with their partner using the 2-item composite of Aron's IOS (Aron et al., 1992) and an item assessing achieved rapport (see Methods). Since experimental condition was categorial predictor variable, various dummy codes were created to model the various experimental conditions. Unlike my hypotheses pertaining to my manipulation checks, I did not have specific hypotheses about the main effects of task type (closeness-inducing vs. small-talk) or communication platform (visual CMC vs. text-only CMC) on interpersonal closeness. Instead, I expected that participants randomly assigned to the closeness-inducing condition over visual CMC would report feeling the most closeness with their partner compared to any of the other three experimental conditions. Therefore, to test my hypothesis more closely, I created three dummy codes, d_{1ij}, d_{2ij}, and d_{3ij}. The first dummy code, d_{1ij}, was coded 1 for participants in the small-talk over visual CMC condition and 0 for participants in all other conditions. The second dummy code, d_{2ij}, was coded 1 for participants in the closeness-inducing over text-only CMC condition and 0 for participants in all other conditions. The third dummy code, d_{3ij}, was coded 1 for participants in the small-talk over text-only CMC condition and 0 for participants in all other conditions. Thus, participants in the closeness-inducing over visual CMC condition served as the reference category against the other three conditions (see Table 13).

Table 13

Coding Schemes Use for MLM Categorical Predictor Variables

	Dummy Coding		
	d_{1ij}	d_{2ij}	d_{3ij}
Achieved Interpersonal Closeness			
Closeness over Visual CMC	0	0	0
Small-talk over Visual CMC	1	0	0
Closeness over Text-only CMC	0	1	0
Small-talk over Text-only CMC	0	0	1
Desired Interpersonal Closeness			
Closeness over Visual CMC	1	0	0
Small-talk over Visual CMC	0	1	0
Closeness over Text-only CMC	0	0	0
Small-talk over Text-only CMC	0	0	1

I entered the three dummy coded predictor variables, d_{1ij}, d_{2ij}, and d_{3ij} into an MLM model with participants' self-reported interpersonal closeness serving as the dependent variable (see Figure 10). Contrary to what was hypothesized, there were no significant differences in interpersonal closeness for participants who had completed the closeness-inducing task over visual CMC (M = 3.82, SD = 0.90) compared to participants who had completed the small-talk over visual CMC (M = 4.10, SD = 0.92; SPE = .23, p = .195). However, as expected, participants who had completed the closeness-inducing task over visual CMC (M = 3.82, SD = 0.90) did report feeling closer to their partner than participants who had completed either the closeness-inducing task over text-only CMC (M = 2.83, SD = 1.15; SPE = -.81, p < .001) or those who had completed the small-talk over text-only CMC (M = 2.46, SD = 1.12; SPE = 1.12, p < .001).

H2. My next main hypothesis tested the effect of experimental condition on participants' self-reported desire for interpersonal closeness with their partner. Specifically, for H2, I expected that participants who completed the closeness-inducing task over text-only CMC would self-report a greater desire for interpersonal closeness with their partner in comparison to participants in any other condition as this experimental condition was meant to generate high levels of self-disclosure but not provide participants the opportunity to respond to one another. By not giving participants the opportunity to respond to one another after self-disclosing personal and intimate information, I theorized that participants would be left with a residual need and desire to seek closeness with their partner since they were not given the opportunity to do so.

To test this hypothesis, I created a new set of dummy coded variables, d_{1ij}, d_{2ij}, and d_{3ij}. The first dummy code, d_{1ij}, was coded 1 for participants in the closeness-inducing over visual CMC condition and 0 for participants in all other conditions. The second dummy code, d_{2ij}, was coded 1 for participants in the small-talk over visual CMC condition and 0 for participants in all other conditions. The third dummy code, d_{3ij}, was coded 1 for participants in the small-talk over text-only CMC condition and 0 for participants in all other conditions. Thus, participants in the closeness-inducing over text-only CMC condition served as the reference category against the other three conditions (see Table 13).

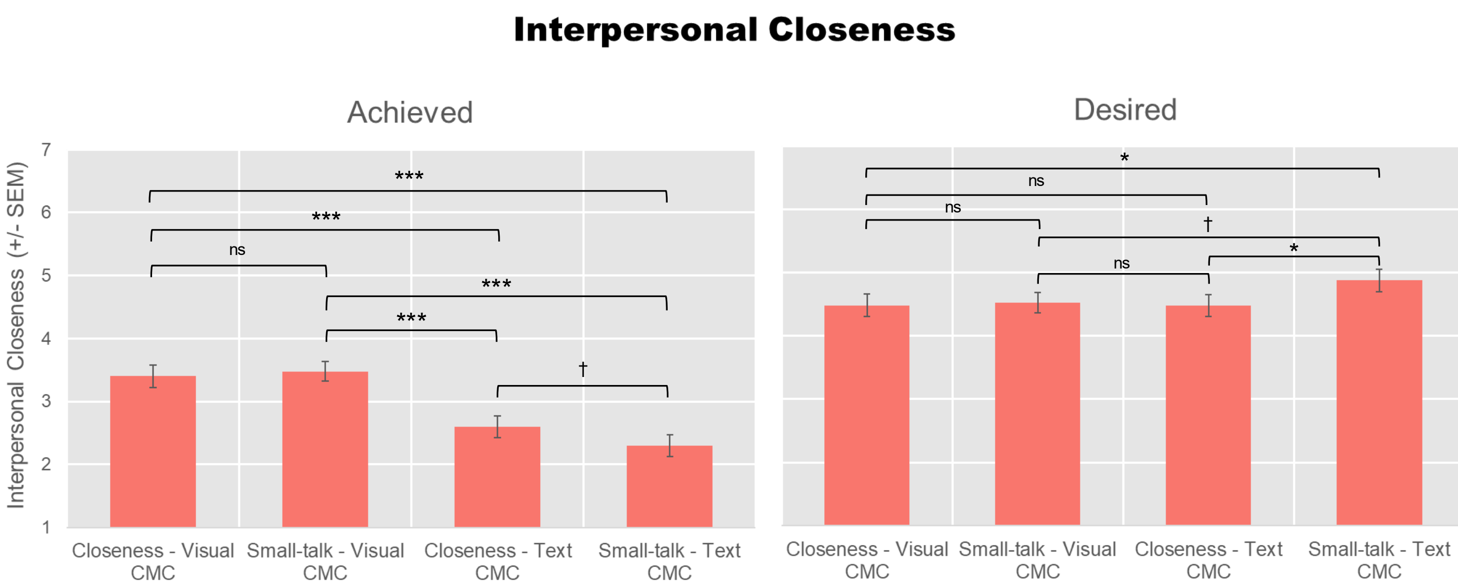
I entered the three dummy coded predictor variables, d_{1ij}, d_{2ij}, and d_{3ij} into a MLM model with desired interpersonal closeness serving as the dependent variable and achieved interpersonal closeness as a covariate (see Figure 10). It is important to control for achieved interpersonal closeness in all analyses involving the desire for interpersonal closeness, as the amount of interpersonal closeness a person desires with their partner may be influenced by the amount of interpersonal closeness they feel they already have with their partner (these variables are correlated across all participants at $r = .70$, $p < .001$). For instance, a person who says they desire to be a “5” in closeness with their partner and reported achieving a “5” in closeness with their partner may not be experiencing the same absolute desire to be close with their partner as a person who says they desire to be a "5" in closeness with their partner yet reported achieving a "2" in closeness with their partner.

Contrary to what was hypothesized, the results of this MLM did not suggest that participants in the closeness-inducing over text-only CMC condition (M = 4.48, SD = 0.82) reported feeling a significantly greater desire to be close to their partner than participants in the closeness-inducing over visual CMC condition (M = 4.48, SD = 0.82; SPE = .00, p = .991) or participants in the small-talk over visual CMC condition (M = 4.52, SD = 0.85; SPE = .04, p = .812). There was a significant difference in reported desire for interpersonal closeness between participants in the closeness-inducing over text-only CMC condition (M = 4.48, SD = 0.82) and the small-talk over text-only CMC condition (M = 4.88, SD = 0.86; SPE = .35; p = .022), although this effect was in the opposite direction than expected. Specifically, participants in the small-talk over text-only CMC condition reported a greater desire for interpersonal closeness with their partner than participants in the closeness-inducing over text-only CMC condition. In fact, a series of additional MLM models exploring all possible pairwise comparisons beyond those hypothesized revealed that participants who had been randomly assigned to complete Aron's small-talk task over text-only CMC reported feeling the desire for closeness with their partner significantly more than participants in any other condition (p's < .074; see Figure 10).

In summary, there was some, although inconsistent evidence in support of H1 and H2. Specifically, it was not necessarily participants assigned to Aron's closeness-inducing task over visual CMC that reported feeling closest with their partner, but participants who had simply completed their task together over visual CMC (i.e., Zoom), regardless of what the task was. This finding is consistent with insights derived from the manipulation checks revealing that participants who had completed the closeness-inducing and small-talk tasks over Zoom disclosed similar degrees of open and intimate information to their partner. Regarding H2, it appeared that it was not necessarily participants who had completed the closeness-inducing task over text-only CMC that felt the greatest desire for closeness with their partner, but those who had completed the small-talk task over text-only CMC, which may also be due to participants in the text-only conditions behaving differently than expected in terms of their completion of Aron's tasks (i.e., participants who completed the small-talk task disclosing similar to greater amounts than participants who completed the closeness-inducing task).

Figure 10

Participants' Achieved and Desired Interpersonal Closeness by Experimental Condition



Note. All hypothesized and non-hypothesized pairwise comparisons are presented. ns = not significant.

$^{\dagger}p < .10$, $^{*}p < .05$ $^{***}p < .001$.

Hypotheses 3 & 4: The Effect of Experimental Condition on Spontaneous Behavioral Coordination

H3. Next, I tested a series of hypotheses regarding the effect of experimental condition on dyads' interpersonal coordination (i.e., behavioral synchrony and mimicry). Specifically, for H3, I expected the same pattern of results as H1, where dyads who completed the closeness-inducing task over visual CMC for their first interaction would display the most behavioral synchrony in a subsequent problem-solving interaction in comparison to participants in any other condition. Given that experimental condition and behavioral synchrony were both dyadic variables, I tested this hypothesis at the level of the dyad (N = 91) using conventional parametric statistics.

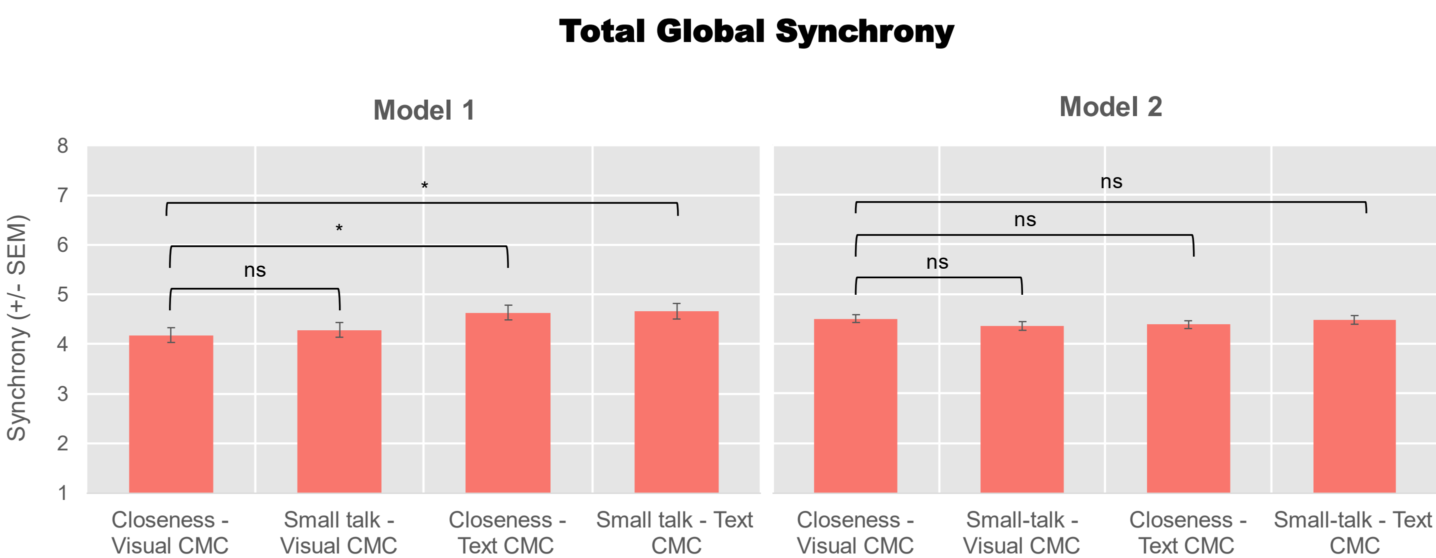
Two separate models were utilized to test this hypothesis. Model 1 employed a one-way ANOVA where experimental condition served as the predictor variable and behavioral synchrony displayed by a dyad during their problem-solving interaction served as the dependent variable. There were no covariates entered into this model. Model 2 included dyads' global mimicry and molecular mimicry as covariates, to determine the effect of experimental condition on synchrony unconfounded by a dyads' behavioral mimicry. For both models, results did not meaningfully differ across the various time points that synchrony was measured in the problem-solving interaction (i.e., time 1, time 2, and time 3). Thus, dyads' average synchrony and mimicry across time were examined. Results presented by time in the interaction appear in Appendix A, Table 5.

For Model 1, there was a marginally significant main effect of experimental condition on behavioral synchrony ($F_{(3, 87)} = 2.65$, $p = .054$, $\eta^2_p = .08$; see Figure 11). The size of this effect was medium in size (Cohen, 1969). A series of pairwise comparisons, however, did not reveal the expected pattern. Specifically, participants who had previously been in the closeness-inducing over visual CMC condition (*M* = 4.18, *SD* = 0.72) did not synchronize their behavior with their partner any more than participants who had previously been in the small-talk over visual CMC condition (*M* = 4.28, *SD* = 0.72; *p* = .631, Cohen's *d* = .14). However, participants who had previously been in the closeness-inducing over visual CMC condition (*M* = 4.18, *SD* = 0.72) synchronized their behavior significantly *less* during the problem-solving interaction than participants who had been in the closeness-inducing over text-only CMC condition (*M* = 4.63, *SD* = 0.72; *p* = .030, Cohen's *d* = .63) and participants who had been in the small-talk over text-only CMC (*M* = 4.66, *SD* = 0.72; *p* = .029, Cohen's *d* = .67).

When global mimicry and molecular mimicry were entered as covariates (Model 2), these differences between experimental conditions disappeared ($F_{(3, 85)} = 0.74$, $p = .531$, $\eta^2_p = .03$; see Figure 11). While, as hypothesized, participants who had previously been randomly assigned to participate in the closeness-inducing over visual CMC condition (*M* = 4.50, *SD* = 0.41) were rated as higher in synchrony during their second interaction than those in any other experimental condition, none of these comparisons were significantly different (*p*'s > .201, Cohen's *d*'s < .36).

Figure 11

Participants' Total Global Synchrony in Interaction Two by Interaction One Experimental Condition



Note. Model 1 includes experimental condition as the predictor variable and global behavioral synchrony as the dependent variable. Model 2 includes experimental condition as the predictor variable and global behavioral mimicry as the dependent variable, with the global mimicry composite and molecular mimicry composite as a covariates. Only hypothesized pairwise comparisons are presented. ns = not significant.

$^{\dagger}p < .10$, $^{*}p < .05$.

H4. Next, I tested whether participants who completed the closeness-inducing task over text-only CMC displayed greater mimicry with their partner in comparison to participants in any other condition. As before, given that experimental condition and behavioral mimicry are both dyadic variables, I tested this hypothesis at the level of the dyad (N = 91) using conventional parametric statistics. A series of one-way ANOVAs were employed where experimental condition always served as the predictor variable and the various mimicry variables served as the dependent variables. Result presented by time in the interaction appear in Appendix A, Table 6.

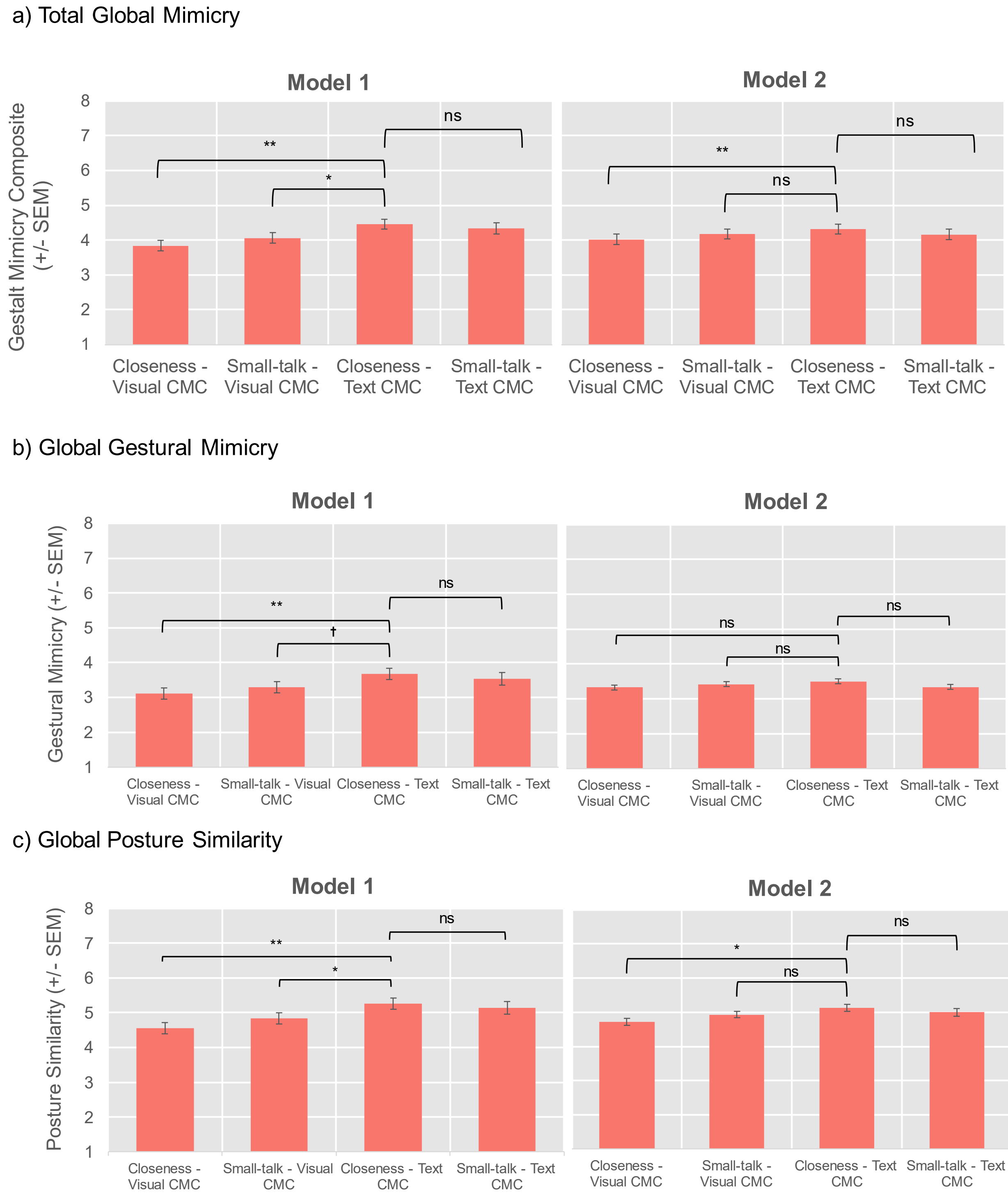
Global Mimicry. First, I examined my hypothesized effect using the global mimicry composite as the dependent variable (see Figure 12). There was a significant and large effect of experimental condition (Model 1: $F_{(3, 87)} = 4.47$, $p = .006$, $\eta^2_p = .13$). A series of pairwise comparisons revealed that, as hypothesized, dyads who had been in the closeness-inducing over text-only CMC condition ($M = 4.46$, $SD = 0.64$) were rated as displaying greater global mimicry during their subsequent problem-solving interaction than dyads who had been in either the closeness-inducing over visual CMC condition ($M = 3.84$, $SD = 0.64$; $p = .001$, Cohen's $d = .97$) or the small-talk over visual CMC condition ($M = 4.06$, $SD = 0.64$; $p = .036$, Cohen's $d = .63$). While the mean global mimicry of those who had been in the closeness-inducing over text-only CMC condition ($M = 4.46$, $SD = 0.64$) was also greater than those who had been in the small-talk over text-only CMC condition ($M = 4.33$, $SD = 0.64$), this difference was not statistically significant ($p = .510$, Cohen's $d = .20$). These relationships were slightly weakened with the inclusion of behavioral synchrony as a covariate, but the pattern remained the same (Model 2; see Figure 12).

Given that the two components of global mimicry, gestural mimicry and postural mimicry, were related but unique constructs (see Table 3 for inter-item reliability), I also ran the same one-way ANOVA with these two measures as dependent variables in order to determine whether one of these mimicry variables was driving the pattern observed for the global mimicry composite. I first entered global gestural mimicry as the dependent variable, where a significant main effect of experimental condition was observed (Model 1: $F_{(3, 87)} = 2.95$, $p = .037$, $\eta^2_p = .09$). A series of pairwise comparisons revealed the same pattern as above, where participants who had been in the closeness-inducing over text-only CMC condition (*M* = 3.68, *SD* = 0.71) displayed significantly greater gestural mimicry in their subsequent interaction compared to those who had been in the closeness-inducing over visual CMC condition (*M* = 3.11, *SD* = 0.71; $p = .007$, Cohen's $d = .80$), marginally greater than those who had been in the small-talk over visual CMC condition (*M* = 3.29, *SD* = 0.71; $p = .066$, Cohen's $d = .55$), and were not significantly different from those who had been in the small-talk over text-only CMC condition (*M* = 3.54, *SD* = 0.71; $p = .523$, Cohen's $d = .20$).

I next entered global postural mimicry as the dependent variable, where a slightly larger significant main effect of experimental condition was observed (Model 1: $F_{(3, 87)} = 3.50$, $p = .019$, $\eta^2_p = .11$). Once again, the same pattern of means was observed, where participants who had been in the closeness-inducing over text-only CMC condition (*M* = 5.26, *SD* = 0.80) displayed significantly greater postural mimicry in their subsequent interaction compared to those who had been in the closeness-inducing over visual CMC condition (*M* = 4.56, *SD* = 0.80; $p = .004$, Cohen's $d = .88$) and those who had been in the small-talk over visual CMC condition (*M* = 4.84, *SD* = 0.80; $p = .020$, Cohen's $d = .53$), but were not significantly different from those in the small-talk over text-only CMC condition (*M* = 5.14, *SD* = 0.80; $p = .630$, Cohen's $d = .15$). As with the global mimicry composites, these relationships for both global postural mimicry and global gestural mimicry were slightly weakened when behavioral synchrony was added as a covariate, but none of the patterns changed (Model 2; see Figure 12).

Figure 12

Participants' Total Global Mimicry in Interaction Two by Interaction One Condition



Note. Model 1 includes experimental condition as the predictor variable and a) global mimicry composite, b) gestural mimicry, or c) postural mimicry as the dependent variable. Model 2 includes experimental condition as the predictor variable and a) global mimicry composite, b) gestural mimicry, or c) postural mimicry as the dependent variable, with global behavioral synchrony as a covariate. Only hypothesized pairwise comparisons are presented. ns = not significant.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Molecular Mimicry. Next, I examined my hypothesized effects with mimicry measured at the molecular level as the dependent variables (see Figure 13). As before, I ran a series of one-way ANOVA models without any covariates (Model 1) and including behavioral synchrony as a covariate (Model 2).

When the molecular mimicry composite was entered as the dependent variable, there was a marginally significant effect of experimental condition (Model 1: $F_{(3, 87)} = 2.23$ $p = .090$, $\eta^2_p = .07$). The size of this effect was medium (Cohen, 1969). A series of pairwise comparisons revealed that dyads who had been in the closeness-inducing over text-only CMC condition ($M = 9.29$, $SD = 4.59$) displayed marginally greater mimicry in their subsequent interaction than dyads who had been assigned to the closeness-inducing over visual CMC condition ($M = 7.03$, $SD = 4.59$; $p = .087$, Cohen's $d = .49$). Although marginal, this effect was large in size. However, dyads who had been in the closeness-inducing over text-only CMC condition ($M = 9.29$, $SD = 4.59$) did not significantly differ in their molecular mimicry during their subsequent interaction from dyads who had been in the small-talk over visual CMC condition ($M = 9.13$, $SD = 4.59$; $p = .903$, Cohen's $d = .03$) or the small-talk over text-only CMC condition ($M = 10.45$, $SD = 4.59$; $p = .398$, Cohen's $d = .25$). There were no significant effects observed when behavioral synchrony was entered as a control variable (Model 2; see Figure 13).

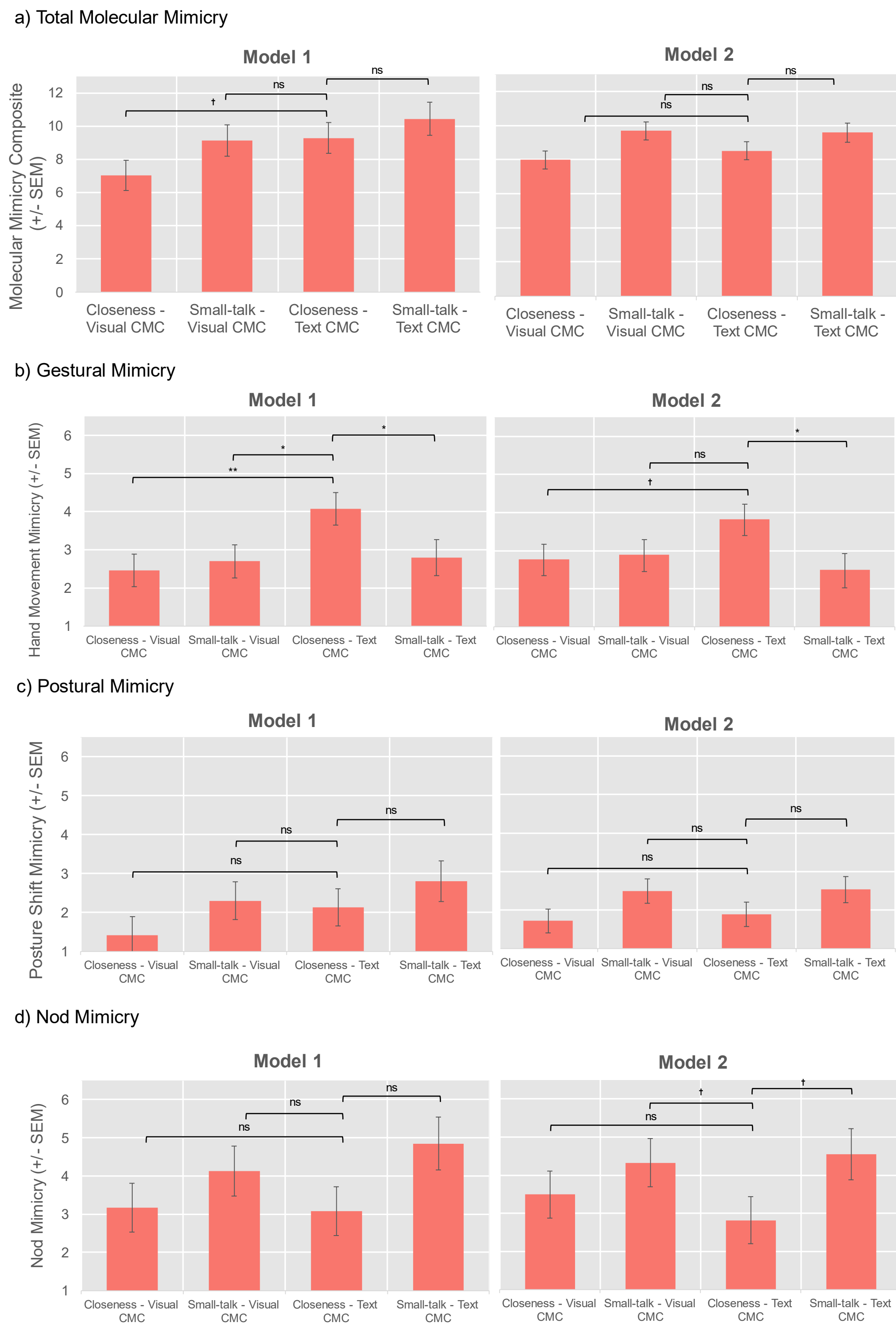
As before, I also examined whether this pattern replicated with each of the molecular mimicry variables. First, I entered molecular gestural mimicry as the dependent variable, where a slightly larger significant main effect of experimental condition emerged (Model 1: $F_{(3, 87)} = 2.88$, $p = .041$, $\eta^2_p = .09$). Pairwise comparisons supported the hypothesized pattern. Specifically, participants who had been in the closeness-inducing over text-only CMC condition (*M* = 4.08, *SD* = 2.10) displayed significantly greater gestural mimicry in their subsequent interaction compared to those who had been in the closeness-inducing over visual CMC condition (*M* = 2.46, *SD* = 2.10; *p* = .009, Cohen's *d* = .77), those in the small-talk over visual CMC condition (*M* = 2.70, *SD* = 2.10; *p* = .026, Cohen's *d* = .66), and those in the small-talk over text-only CMC condition (*M* = 2.80, *SD* = 2.10; *p* = .047, Cohen's *d* = .61). The inclusion of synchrony as a control variable slightly reduced the size of this main effect (Model 2: $F_{(3, 86)} = 2.05$, $p = .112$, $\eta^2_p = .07$), yet dyads who had been in the closeness-inducing over text-only CMC condition (*M* = 3.82, *SD* = 1.92) still displayed the most gestural mimicry in their subsequent interaction compared to those who had been in the other three conditions (closeness-inducing over visual CMC *M* = 2.78, *SD* = 1.93, small-talk over visual CMC *M* = 2.89, *SD* = 1.91, small-talk over text-only CMC *M* = 2.51, *SD* = 1.92: *p*'s < .101, Cohen's *d*'s > .49).

Across both Models 1 and 2, there were no significant effects of experimental condition on either postural mimicry (Model 1: $F_{(3, 86)} = 1.57$, $p = .204$, $\eta^2_p = .05$; Model 2: $F_{(3, 86)} = 1.08$, $p = .362$, $\eta^2_p = .04$) or nod mimicry (Model 1: $F_{(3, 87)} = 1.58$, $p = .200$, $\eta^2_p = .05$; Model 2: $F_{(3, 86)} = 1.44$, $p = .236$, $\eta^2_p = .05$).

In summary, H3 and H4 explored the impact of participants' experimental condition assignment for their first interaction on the dyads' behavioral synchrony and mimicry displayed during their second interaction together. There was no support for H3 when experimental condition was entered as the independent variable predicting behavioral synchrony without any control variables. When behavioral mimicry was controlled for in a second model, the expected pattern emerged where dyads who had previously been in the closeness-inducing condition over visual CMC, who were thus theorized to feel the closest with their partner, displayed more synchrony in their subsequent interaction that participants who had previously been in any of the other experimental conditions. However, none of these comparisons were significant at $p < .05$. There was some more support for H4 depending on the measurement unit (global vs. molecular) and mimicry behavior (gestural vs. postural). For global mimicry, participants who had previously been in the closeness-inducing over text-only condition did display more mimicry in their subsequent task than those who had previously been in either of the visual CMC conditions but did not significantly differ from those who had been in the small-talk over text-only CMC condition. For molecular mimicry, there were no significant differences in total mimicry during participants' problem-solving task depending on what experimental condition participants had been previously assigned to complete. However, the exact hypothesized patten was observed when molecular mimicry was observed specifically for gestures such that participants who had previously been assigned to the closeness-inducing task over text-only CMC, and thus those theorized to have the most desire to get close with their partner, mimicked their partners' hand gestures significantly more than participants who had been in any other experimental condition.

Figure 13

Participants' Total Molecular Mimicry in Interaction Two by Interaction One Experimental Condition



Note. Model 1 includes experimental condition as the predictor variable and a) molecular mimicry composite, b) gestural mimicry, c) postural mimicry, or d) nod mimicry as the dependent variable. Model 2 includes experimental condition as the predictor variable and a) molecular mimicry composite, b) gestural mimicry, c) postural mimicry, or d) nod mimicry as the dependent variable, with total global synchrony as a covariate. Only hypothesized pairwise comparisons are presented. ns = not significant.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$.

Hypotheses 5 & 6: The Effect of Interpersonal Closeness on Spontaneous Behavioral Coordination

The final test of whether different interpersonal mechanisms drive the behavioral manifestations of synchrony and mimicry is represented in hypotheses 5 and 6. For H5, I expected that individuals who reported feeling greater interpersonal closeness with their partner after their first interaction, collapsing across experimental condition, would display greater levels of behavioral synchrony with their partner in a subsequent problem-solving interaction. For H6, I expected that the more participants reported *desiring* interpersonal closeness with their partner after their first interaction, the more they would display behavioral mimicry with their partner in a subsequent problem-solving interaction. In this way, while this final hypothesis test is nonexperimental, it most directly answers the question of whether different interpersonal states have differential impacts on synchrony and mimicry.

Achieved and desired interpersonal closeness were measured at the participant level after dyads' first interpersonal closeness interaction, and as such, the assumption that observations between participants are independent is violated, rendering conventional parametric methods unsuitable. Thus, a series of MLMs were conducted to examine these two hypotheses.

Participants' synchrony or mimicry averaged across time were entered as the dependent variables with self-reported achieved interpersonal closeness and their desire for interpersonal closeness simultaneously entered as predictor variables (Table 14). Entering these two predictor variables simultaneously allows for the most direct test of H5 and H6 by clarifying the unique effect of achieved (or desired) interpersonal closeness on interpersonal coordination behaviors, controlling for the effect of the other associated variable. While achieved and desired closeness were correlated at $r = .70$ after participants' first interaction, this correlation was not strong enough to induce multicollinearity as the largest variance inflation factor (VIF) was 1.96. Generally, values greater than 5 are considered problematic (Daoud, 2017).

Two different models were explored to examine the effects of achieved and desired interpersonal closeness on dyads' synchrony and mimicry behaviors. Model 1 did not utilize any covariates. Model 2 explored a more direct test of the differences between synchrony and mimicry by partialing synchrony from mimicry estimates and partialing mimicry from synchrony estimates. In other words, when examining behavioral synchrony as the dependent variable, the global mimicry composite and molecular mimicry composite were entered as covariates. When examining behavioral mimicry as the dependent variable, the global synchrony composite was entered as a covariate. As before, all models reported are random-intercept models with all continuous variables were standardized at the grand mean of the sample ($M = 0$, $SD = 1$) to enhance the interpretability of the regression coefficients, referred to as Standardized Parameter Estimates (SPE's). For results separated by each time point in interaction two, see Appendix A, Table 7.

H5. First, participants' achieved and desired interpersonal closeness with their partner after their first interaction were simultaneously entered as independent variables predicting global behavioral synchrony, without controlling for behavioral mimicry (Model 1). Participants' achieved interpersonal closeness after their first interaction was not related to their average behavioral synchrony during their second interaction where they were asked to solve a problem together (*SPE* = -.14, *p* = .186). However, when participants' behavioral mimicry was controlled for, allowing for a more direct test of the effect of achieved interpersonal closeness on behavioral synchrony, a significant relationship was observed in the hypothesized direction (*SPE* = .13, *p* = .019). Specifically, the more participants reported feeling as though they achieved a sense of closeness with their partner after their first interaction, the more likely they were to be rated as higher in behavioral synchrony during their second interaction, when behavioral mimicry was controlled for.

Using similar MLM models, I also examined the impact of *desired* interpersonal closeness on dyad's behavioral synchrony. Although not explicitly hypothesized, I might have expected that desiring to have closeness with one's partner, removed from achieving closeness, might disrupt the manifestation of synchrony in a subsequent interaction. Specifically, if a participant is anxious regarding their partner's perception of them and is actively trying to get their partner to like them, this may result in greater self-consciousness and less natural rapport and synchrony. While there was not a significant effect of participants' desire for interpersonal closeness on the amount of synchrony in Model 1 (*SPE* = .09, *p* = .380), there was a significant effect of participants' desire for interpersonal closeness on dyads' synchrony in a subsequent interaction in Model 2, where behavioral mimicry was controlled for (*SPE* = -.11, *p* = .047). This effect was in the negative direction, suggesting that the more desire participants felt to get close with their interaction partner in the future, the less likely the dyad was to experience synchrony during their second interaction.

H6. A new series of MLMs were utilized to capture the effect of achieved and desired interpersonal closeness on behavioral mimicry. I first tested Model 1, where I entered participants achieved and desired interpersonal closeness predicting global behavioral mimicry, without any additional covariates. In line with hypotheses, there was a significant effect of participants' self-reported desire for closeness with their partner after their first interaction on global impression ratings of dyads' mimicry during their second interaction (*SPE* = .23, *p* = .025). This effect seemed to be driven by dyads' postural mimicry (*SPE* = .25, *p* = .016), which was more strongly related to participants' desire for interpersonal closeness than was their gestural mimicry (*SPE* = .15, *p* = .161).

These effects remained relatively consistent, even when global behavioral synchrony was entered as a covariate (Model 2). Specifically, I observed a significant effect of participants' desire for interpersonal closeness with their partner after their first interaction on the degree to which they mimicked their partner during their second interaction (global mimicry composite *SPE* = .16, *p* = .006). As before, this effect was stronger when mimicry was conceptualized as global impressions of postural mimicry (*SPE* = .20, *p* = .020) compared to global impressions of gestural mimicry (*SPE* = .06, *p* = .175).

This pattern of effects somewhat remained when mimicry was considered on the molecular level. Regarding Model 1, participants' desire for interpersonal closeness with their partner after their first interaction was more strongly related to their molecular postural mimicry during their second interaction (*SPE* = .17, *p* = .099) than their gestural mimicry (*SPE* = -.01, *p* = .959) or their mimicry for nods (*SPE* = .11, *p* = .287). However, participants desire for interpersonal closeness with their partner was not significantly related to the molecular mimicry composite (*SPE* = .15, *p* = .158). Additionally, the effect of desired interpersonal closeness on molecular mimicry did not remain significant after global behavioral synchrony was entered as a covariate (Model 2; *SPE*'s < .13, *p*'s > .174).

Again, these MLM models also allowed me to examine the impact achieved interpersonal closeness on dyads' behavioral mimicry, although these effects were not explicitly hypothesized. However, if behavioral mimicry reflects the *desire* for interpersonal closeness, but not the achieved state of interpersonal closeness, then achieved interpersonal closeness might be expected to be negatively related to behavioral mimicry (similar to results reported in LaFrance & Ickes, 1981). There was consistent evidence of this pattern. Specifically, within Model 1, participants' feelings of closeness with their partner after their first interaction was significantly *negatively* related to global ratings of mimicry for gestures (*SPE* = -.20, *p* = .054), postural mimicry (*SPE* = -.31, *p* = .003), and the composite of these two ratings during their second interaction (*SPE* = -.30, *p* = .004), suggesting that the more closeness participants reported feeling after their first interaction, the less mimicry they displayed with their partner during their second interaction. When global behavioral synchrony was controlled for (i.e., Model 2), the effect of achieved interpersonal closeness remained for postural mimicry (*SPE* = -.23, *p* = .007), and the global mimicry composite (*SPE* = -.18, *p* = .001), but became nonsignificant for gestural mimicry (*SPE* = -.08, *p* = .102).

This pattern replicated for mimicry rated on the molecular level for Model 1 (molecular mimicry composite: *SPE* = -.24, *p* = .023), where feeling more closeness with one's partner after their first interaction was related to less molecular mimicry during their second interaction. This relationship appeared strongest when examining molecular mimicry for nods (*SPE* = -.20, *p* = .055), compared to gestural mimicry (*SPE* = -.11, *p* = .275) or postural mimicry (*SPE* = -.13, *p* =

.212). This pattern of effects remained consistent, even when controlling for global behavioral synchrony (Model 2: see Table 14).

In summary, hypotheses 5 and 6 directly tested whether participant who reported feeling close with their partner after their first interaction displayed greater synchrony with their partner during their second interaction and whether participants who reported wanting to feel closer to their partner (i.e., a desire for closeness) after their first interaction displayed greater mimicry of their partner during their second interaction. There was initially no support for H5 when examining the direct effect of closeness from interaction one predicting synchrony during interaction two. However, when estimates of behavioral mimicry were partialed out of the synchrony variable, the hypothesized pattern emerged where participants who reported feeling closer to their partner after their first interaction displayed more behavioral synchrony with one another during a subsequent interaction. There was some support for H6, where participants who reported feeling a greater desire to be close with their partner after their first interaction were more likely to mimic their partner during a subsequent interaction. This effect was stronger when mimicry was observed on a global level opposed to on a molecular level. Additionally, although not hypothesized, the strongest predictor of whether dyads mimicked each other during their second interaction appeared to be how close they felt with one another – such that the *less* closeness participants reported feeling with one another after their first interaction, the *more* mimicry they displayed with their partner during a subsequent interaction.

Table 14

Desired Interpersonal Closeness During Interaction One Predicting and Behavioral Synchrony and Mimicry from Interaction Two

	Model 1		Model 2	
	SPE	SE	*SPE*	SE
Global Rating Method				
Total Global Synchrony				
β_1 Achieved Interpersonal Closeness	-.14	.10	.13*	.06
β_2 Desired Interpersonal Closeness	.09	.10	-.11*	.05
Total Global Mimicry				
β_1 Achieved Interpersonal Closeness	-.30**	.10	-.18**	.06
β_2 Desired Interpersonal Closeness	.23*	.10	.16**	.06
Gestural Mimicry				
β_1 Achieved Interpersonal Closeness	-.20†	.10	-.08	.05
β_2 Desired Interpersonal Closeness	.15	.10	.06	.05
Postural Mimicry				
β_1 Achieved Interpersonal Closeness	-.31**	.10	-.23**	.08
β_2 Desired Interpersonal Closeness	.25*	.10	.20*	.08
Molecular Rating Method				
Total Molecular Mimicry				
β_1 Achieved Interpersonal Closeness	-.24*	.10	-.15†	.08
β_2 Desired Interpersonal Closeness	.15	.10	.09	.08
Gestural Mimicry				
β_1 Achieved Interpersonal Closeness	-.11	.10	-.05	.09
β_2 Desired Interpersonal Closeness	-.01	.10	-.05	.09
Postural Mimicry				
β_1 Achieved Interpersonal Closeness	-.13	.10	-.07	.09
β_2 Desired Interpersonal Closeness	.17†	.10	.13	.09
Nod Mimicry				

Table 14 Continued

	Model 1		Model 2	
	SPE	SE	*SPE*	SE
β_1 Achieved Interpersonal Closeness	-.20†	.10	-.17†	.10
β_2 Desired Interpersonal Closeness	.11	.10	.09	.10

Note. Model 1 does not have any covariates. Model 2 includes global behavioral mimicry and molecular behavioral mimicry as covariates when the dependent variable is global behavioral synchrony and includes global behavioral synchrony as a covariate when the dependent variable is any behavioral mimicry variable.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Hypotheses 7 & 8: Mediation Models

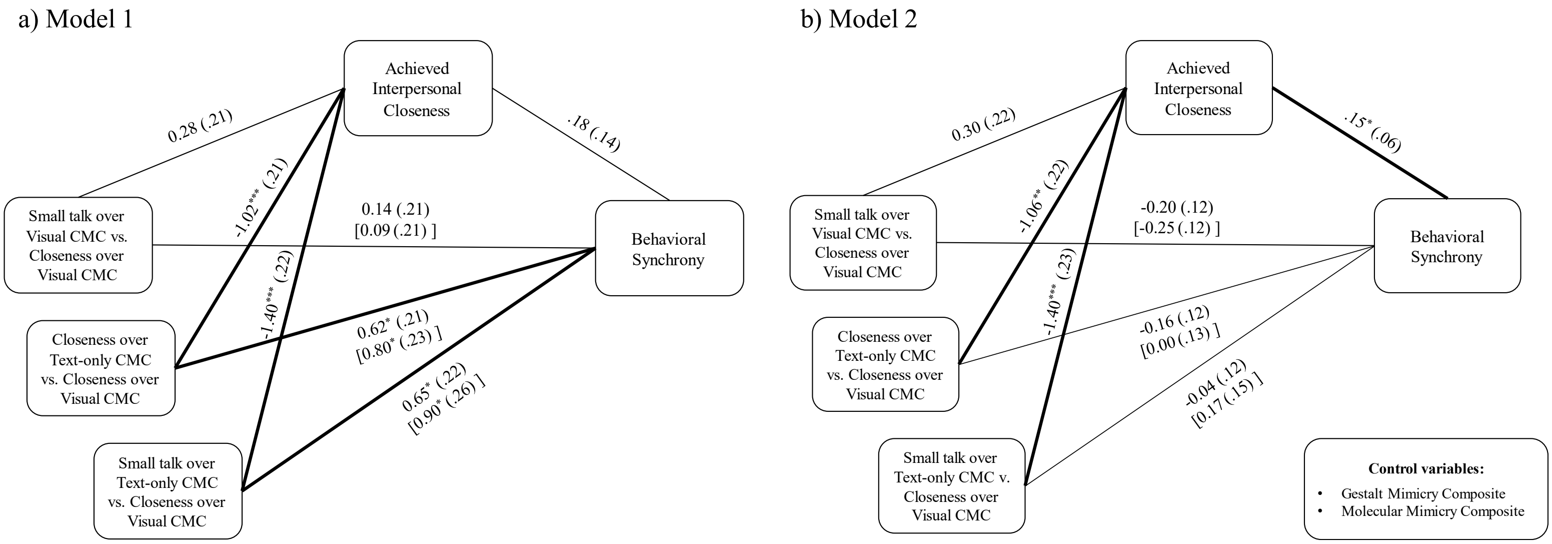
H7. My final set of hypotheses considered the effect of experimental condition, interpersonal closeness, and behavioral coordination together in one model. For H7, I expected that the relationship between experimental condition and behavioral synchrony would be mediated by achieved interpersonal closeness, such that participants who had been in the closeness-inducing over visual CMC condition would report feeling the most closeness with their partner which would, in turn, predict greater levels of behavioral synchrony. While achieved interpersonal closeness was measured at the participant level after dyads' first interaction, this variable was collapsed to create a dyadic variable in order to run a mediation analysis. Both experimental condition and behavioral synchrony remained dyadic level variables (N = 91). Additionally, as with all hypotheses involving behavioral coordination, I presented two models: one exploring the effect of experimental condition on synchrony mediated through achieved interpersonal closeness not controlling for behavioral mimicry (Model 1) and one controlling for behavioral mimicry (Model 2).

These various models were tested using Hayes PROCESS macro in SPSS (Hayes, 2012) where experimental condition was entered as a categorical predictor variable, dyads' achieved interpersonal closeness as the mediator variable, behavioral synchrony as the dependent variable for Model 1 and dyads' global mimicry composite and molecular mimicry composite entered as covariates for Model 2. Since experimental condition served as a categorical predictor variable, the "Indicator" option in PROCESS was selected which treats the categorical predictor as a series of dummy coded variables (Hayes & Preacher, 2014). In a similar manner to H1, the closeness-inducing over visual CMC condition served as the reference category against the other three conditions (see Table 13).

Regarding Model 1, as might be expected from the previous hypothesis tests, there was no indication of a mediating relationship between these variable as evidenced by the following indirect effects: closeness-inducing over visual CMC vs. small-talk over visual CMC: $B = .05$, $SE = .06$, 95% CI [-.03, .22], closeness-inducing over visual CMC vs. closeness-inducing over text-only CMC: $B = -.18$, $SE = .14$, 95% CI [-.46, .09], closeness-inducing over visual CMC vs. small-talk over text-only CMC: $B = -.25$, $SE = .18$, 95% CI [-.61, .13]; see Figure 14. However, when dyads' behavioral mimicry was controlled for, there was some evidence of a mediating relationship. Specifically, there was a significant indirect effect mediated through the closeness-inducing over visual CMC vs. closeness-inducing over text-only CMC condition comparison (indirect effect $B = -.16$, $SE = .08$, 95% CI [-.34, .00]). Additionally, there was a significant indirect effect mediated through the closeness-inducing over visual CMC vs. small-talk over text-only CMC condition comparison (indirect effect $B = -.22$, $SE = .11$, 95% CI [-.43, .00]), suggesting that achieved interpersonal closeness is one process by which the closeness-inducing over visual CMC condition increased participants' behavioral synchrony, when compared to either the closeness-inducing over text-only CMC condition or the small-talk over text-only CMC condition. There was no significant indirect effect mediated through the closeness-inducing over visual CMC vs. small-talk over visual CMC condition comparison (B = .05, SE = .05, 95% CI [-.01, .17].

Figure 14

Mediation Models of the Relationship Between Experimental Condition, Achieved Interpersonal Closeness, and Behavioral Synchrony



Note. Standardized coefficients are presented with standard errors in parentheses. Direct effects are reported in brackets. Model 1 does not contain any covariates. Model 2 contains dyads' global behavioral mimicry and molecular behavioral mimicry as a covariates.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

H8. For H8, I expected that the relationship between experimental condition and behavioral mimicry would be mediated by desired interpersonal closeness, such that participants who had been randomly assigned to the closeness over text-only CMC condition would report the most desired interpersonal closeness with their partner which would, in turn, predict greater levels of behavioral mimicry during a subsequent interaction. While desired interpersonal closeness was measured at the participant level after dyads' first interaction, this variable was collapsed to create a dyadic variable to run the various mediation models. Both experimental condition and behavioral synchrony remained dyadic level variables (*N* = 91).

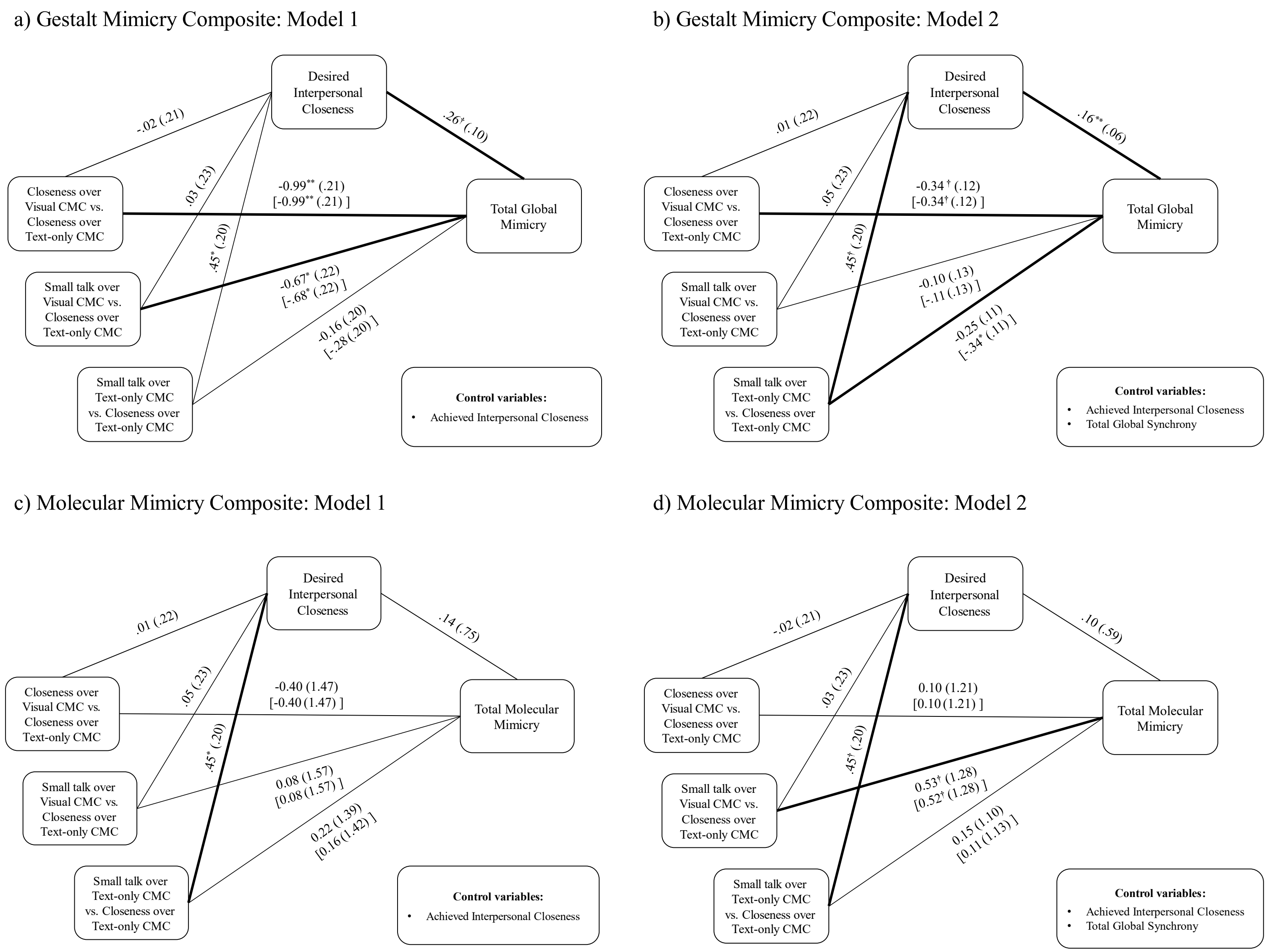
This hypothesis was tested using Hayes PROCESS macro in SPSS (Hayes, 2012) where experimental condition was entered as a categorical predictor variable, dyads' desired interpersonal closeness as the mediator variable, behavioral mimicry as the dependent variable. Dyads' achieved interpersonal closeness was entered as a covariate for Model 1, and dyads' achieved interpersonal closeness *and* their global synchrony composite were entered as covariates for Model 2. As before, since experimental condition served as a categorical predictor variable, the "Indicator" option in PROCESS was selected which treats the categorical predictor as a series of dummy coded variables (Hayes & Preacher, 2014). In a similar manner to H2, the closeness-inducing over text-only CMC condition served as the reference category against the other three conditions (see Table 13).

The first mimicry variable I tested as the outcome variable was the global mimicry composite. For Model 1, there was no indication of a mediating relationship between these variables as evidenced by the following indirect effects: closeness-inducing over text-only CMC vs. closeness-inducing over visual CMC: *B* = .00, *SE* = .07, 95% CI [-.15, .13], closeness-inducing over text-only CMC vs. small-talk over visual CMC: *B* = .01, *SE* = .07, 95% CI [-.13, .15], closeness-inducing over text-only CMC vs. small-talk over text-only CMC: *B* = .12, *SE* = .08, 95% CI [-.03, .30]. For Model 2, there was also no indication of a mediating relationship as evidenced by the following indirect effects: closeness-inducing over text-only CMC closeness-inducing over visual CMC: *B* = .00, *SE* = .05, 95% CI [-.10, .11], closeness-inducing over text-only CMC vs. small-talk over visual CMC: *B* = .01, *SE* = .05, 95% CI [-.09, .12], closeness-inducing over text-only CMC vs. small-talk over text-only CMC: *B* = .09, *SE* = .06, 95% CI [-.01, .23]; see Figure 15.

There was also no indication of a mediating relationship in Model 1 when the molecular mimicry composite was entered as the dependent variable as evidenced by the following indirect effects: closeness-inducing over text-only CMC vs. closeness-inducing over visual CMC: *B* = .00, *SE* = .04, 95% CI [-.11, .09], closeness-inducing over text-only CMC vs. small-talk over visual CMC: *B* = .00, *SE* = .05, 95% CI [-.09, .11], closeness-inducing over text-only CMC vs. small-talk over text-only CMC: *B* = .06, *SE* = .08, 95% CI [-.08, .23]. Similarly, there was no evidence of any mediating relationships in Model 2: closeness-inducing over text-only CMC vs. closeness-inducing over visual CMC: *B* = .00, *SE* = ,03, 95% CI [-.08, .07], closeness-inducing over text-only CMC vs. small-talk over visual CMC: *B* = .01, *SE* = .04, 95% CI [-.07, .09], closeness-inducing over text-only CMC vs. small-talk over text-only CMC: *B* = .04, *SE* = .06, 95% CI [-.07, .19]; see Figure 15. There was also no evidence of a significant mediating relationship for Model 1 or Model 2 among the remining variables used to form the above composites (i.e., global gestural mimicry, global postural mimicry, molecular gestural mimicry, molecular postural mimicry, or molecular nod mimicry). See Table 15 for these coefficients.

Figure 15

Mediation Models of the Relationship Between Experimental Condition, Desired Interpersonal Closeness, and Behavioral Mimicry



Note. a) Relationship between experimental condition and global behavioral mimicry as mediated by desired interpersonal closeness. b) Relationship between experimental condition and molecular behavioral mimicry as mediated by desired interpersonal closeness. Standardized coefficients are presented with standard errors in parentheses. Direct effects are reported in brackets. Path significant at $p < .10$ are bolded. Models 1 presented with dyads' achieved interpersonal closeness as a covariate. Models 2 presented with dyads' achieved interpersonal closeness and global behavioral synchrony as a covariate.

$^{\dagger}p < .10$ $^{*}p < .05$, $^{**}p < .01$.

Table 15

Mediation Models of the Hypothesized Relationship Between Experimental Condition, Achieved Interpersonal Closeness, and Behavioral Mimicry Variables

	B	*SE*	95% CI
Model 1			
Global Rating Method			
Gestural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	-.02	.21	-0.44, 0.41
Small-talk over visual CMC v. closeness over text-only CMC	.03	.23	-0.43, 0.47
Small-talk over text-only CMC v. closeness over text-only CMC	.45*	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.16	.12	-0.10, 0.37
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.86**	.23	-1.09, -0.17
Small-talk over visual CMC v. closeness over text-only CMC	-.65†	.25	-0.97, 0.02
Small-talk over text-only CMC v. closeness over text-only CMC	-.15	.22	-0.55, 0.32
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.86**	.23	-1.09, -0.17
Small-talk over visual CMC v. closeness over text-only CMC	-.65†	.25	-0.97, 0.01
Small-talk over text-only CMC v. closeness over text-only CMC	-.23	.22	-0.61, 0.28
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.05	-0.12, 0.09
Small-talk over visual CMC v. closeness over text-only CMC	.00	.05	-0.11, 0.10
Small-talk over text-only CMC v. closeness over text-only CMC	.07	.08	-0.06, 0.24
Postural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	-.01	.21	-0.44, 0.41
Small-talk over visual CMC v. closeness over text-only CMC	.03	.23	-0.43, 0.47

Table 15 Continued

	B	*SE*	95% CI
Small-talk over text-only CMC v. closeness over text-only CMC	.45*	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.29*	.13	.01, .53
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.86**	.26	-1.24, -0.19
Small-talk over visual CMC v. closeness over text-only CMC	-.53	.28	-1.00, 0.12
Small-talk over text-only CMC v. closeness over text-only CMC	-.13	.25	-0.60, 0.39
Path c'			
Closeness over visual CMC v. closeness over text-only CMC	-.85**	.26	-1.22, -0.20
Small-talk over visual CMC v. closeness over text-only CMC	-.54	.28	-1.00, 0.10
Small-talk over text-only CMC v. closeness over text-only CMC	-.26	.25	-0.71, 0.28
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.07	-0.16, 0.15
Small-talk over visual CMC v. closeness over text-only CMC	.01	.07	-0.13, 0.16
Small-talk over text-only CMC v. closeness over text-only CMC	.13	.09	-0.03, 0.33
Molecular Coding Method			
Gestural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	-.02	.21	-0.44, 0.41
Small-talk over visual CMC v. closeness over text-only CMC	.03	.23	-0.43, 0.47
Small-talk over text-only CMC v. closeness over text-only CMC	.45*	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.03	.35	-0.62, 0.77
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.68*	.69	-2.84, -0.11
Small-talk over visual CMC v. closeness over text-only CMC	-.55	.74	-2.67, 0.27
Small-talk over text-only CMC v. closeness over text-only CMC	-.63*	.67	-2.70, -0.04

Table 15 Continued

	B	*SE*	95% CI
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.68*	.69	-2.84, -0.11
Small-talk over visual CMC v. closeness over text-only CMC	-.55	.74	-2.67, 0.27
Small-talk over text-only CMC v. closeness over text-only CMC	-.63*	.67	-2.70, -0.04
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.03	-0.07, 0.07
Small-talk over visual CMC v. closeness over text-only CMC	.00	.03	-0.07, 0.08
Small-talk over text-only CMC v. closeness over text-only CMC	.01	.07	-0.14, 0.17
Postural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	-.02	.21	-0.44, 0.41
Small-talk over visual CMC v. closeness over text-only CMC	.03	.23	-0.43, 0.47
Small-talk over text-only CMC v. closeness over text-only CMC	.45*	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.15	.05	-0.05, 0.15
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.42	.10	-0.32, 0.07
Small-talk over visual CMC v. closeness over text-only CMC	-.05	.11	-0.23, 0.19
Small-talk over text-only CMC v. closeness over text-only CMC	.40	.09	-0.06, 0.31
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.41	.10	-0.32, 0.07
Small-talk over visual CMC v. closeness over text-only CMC	-.06	.11	-0.23, 0.19
Small-talk over text-only CMC v. closeness over text-only CMC	.33	.10	-0.09, 0.29
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.04	-0.10, 0.10
Small-talk over visual CMC v. closeness over text-only CMC	.00	.05	-0.09, 0.12
Small-talk over text-only CMC v. closeness over text-only CMC	.07	.08	-0.07, 0.27

Table 15 Continued

	B	*SE*	95% CI
Nod Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	-.02	.21	-0.44, 0.41
Small-talk over visual CMC v. closeness over text-only CMC	.03	.23	-0.43, 0.47
Small-talk over text-only CMC v. closeness over text-only CMC	.45*	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.08	.05	-0.07, 0.13
Path c			
Closeness over visual CMC v. closeness over text-only CMC	.23	.10	-0.12, 0.26
Small-talk over visual CMC v. closeness over text-only CMC	.49	.10	-0.06, 0.36
Small-talk over text-only CMC v. closeness over text-only CMC	.52†	.09	-0.03, 0.34
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	.23	.10	-0.13, 0.27
Small-talk over visual CMC v. closeness over text-only CMC	.49	.11	-0.06, 0.36
Small-talk over text-only CMC v. closeness over text-only CMC	.48	.10	-0.04, 0.34
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.04	-0.09, 0.06
Small-talk over visual CMC v. closeness over text-only CMC	.00	.04	-0.08, 0.07
Small-talk over text-only CMC v. closeness over text-only CMC	.04	.07	-0.10, 0.19
Model 2			
Global Rating Method			
Gestural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	.01	.22	-0.43, 0.45
Small-talk over visual CMC v. closeness over text-only CMC	.05	.23	-0.42, 0.51
Small-talk over text-only CMC v. closeness over text-only CMC	.45†	.20	0.00, 0.80
Path b			

Table 15 Continued

	B	*SE*	95% CI
Desired Interpersonal Closeness	.10	.06	-0.02, 0.19
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.15	.11	-0.34, 0.11
Small-talk over visual CMC v. closeness over text-only CMC	-.01	.12	-0.25, 0.23
Small-talk over text-only CMC v. closeness over text-only CMC	-.24†	.10	-0.38, 0.03
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.15	.11	-0.34, 0.11
Small-talk over visual CMC v. closeness over text-only CMC	-.02	.12	-0.25, 0.22
Small-talk over text-only CMC v. closeness over text-only CMC	-.29*	.10	-0.42, 0.00
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.03	-0.06, 0.06
Small-talk over visual CMC v. closeness over text-only CMC	.01	.03	-0.05, 0.07
Small-talk over text-only CMC v. closeness over text-only CMC	.05	.04	-0.01, 0.16
Postural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	.01	.22	-0.43, 0.45
Small-talk over visual CMC v. closeness over text-only CMC	.05	.23	-0.42, 0.51
Small-talk over text-only CMC v. closeness over text-only CMC	.45†	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.25*	.11	0.01, 0.45
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.42	.23	-0.81, 0.10
Small-talk over visual CMC v. closeness over text-only CMC	-.15	.24	-0.60, 0.37
Small-talk over text-only CMC v. closeness over text-only CMC	-.19	.21	-0.57, 0.26
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.43	.23	-0.80, 0.09
Small-talk over visual CMC v. closeness over text-only CMC	-.15	.24	-0.60, 0.35

Table 15 Continued

	B	*SE*	95% CI
Small-talk over text-only CMC v. closeness over text-only CMC	-.30	.21	-0.68, 0.17
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.06	-0.13, 0.13
Small-talk over visual CMC v. closeness over text-only CMC	.01	.06	-0.11, 0.15
Small-talk over text-only CMC v. closeness over text-only CMC	.11	.08	-0.02, 0.30
Molecular Coding Method			
Gestural Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	.01	.22	-0.43, 0.45
Small-talk over visual CMC v. closeness over text-only CMC	.05	.23	-0.42, 0.51
Small-talk over text-only CMC v. closeness over text-only CMC	.45†	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.01	.31	-0.62, 0.63
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.32	.64	-1.96, 0.58
Small-talk over visual CMC v. closeness over text-only CMC	-.23	.68	-1.84, 0.85
Small-talk over text-only CMC v. closeness over text-only CMC	-.66*	.58	-2.60, -0.28
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.32	.64	-1.97, 0.58
Small-talk over visual CMC v. closeness over text-only CMC	-.23	.68	-1.85, 0.86
Small-talk over text-only CMC v. closeness over text-only CMC	-.67*	.60	-2.63, -0.25
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.03	-0.05, 0.07
Small-talk over visual CMC v. closeness over text-only CMC	.00	.03	-0.05, 0.07
Small-talk over text-only CMC v. closeness over text-only CMC	.00	.07	-0.13, 0.15
Postural Mimicry			
Path a			

Table 15 Continued

	B	*SE*	95% CI
Closeness over visual CMC v. closeness over text-only CMC	.01	.22	-0.43, 0.45
Small-talk over visual CMC v. closeness over text-only CMC	.05	.23	-0.42, 0.51
Small-talk over text-only CMC v. closeness over text-only CMC	.45[†]	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.12	.05	-0.05, 0.13
Path c			
Closeness over visual CMC v. closeness over text-only CMC	-.06	.09	-0.20, 0.17
Small-talk over visual CMC v. closeness over text-only CMC	.27	.10	-0.11, 0.28
Small-talk over text-only CMC v. closeness over text-only CMC	.35	.08	-0.06, 0.28
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	-.06	.09	-0.20, 0.17
Small-talk over visual CMC v. closeness over text-only CMC	.26	.10	-0.11, 0.27
Small-talk over text-only CMC v. closeness over text-only CMC	.30	.09	-0.08, 0.26
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.04	-0.08, 0.10
Small-talk over visual CMC v. closeness over text-only CMC	.01	.04	-0.08, 0.11
Small-talk over text-only CMC v. closeness over text-only CMC	.05	.08	-0.08, 0.25
Nod Mimicry			
Path a			
Closeness over visual CMC v. closeness over text-only CMC	.01	.22	-0.43, 0.45
Small-talk over visual CMC v. closeness over text-only CMC	.05	.23	-0.42, 0.51
Small-talk over text-only CMC v. closeness over text-only CMC	.45[†]	.20	0.00, 0.80
Path b			
Desired Interpersonal Closeness	.07	.05	-0.07, 0.12
Path c			
Closeness over visual CMC v. closeness over text-only CMC	.43	.10	-0.07, 0.33
Small-talk over visual CMC v. closeness over text-only CMC	.67[†]	.10	0.00, 0.41

Table 15 Continued

	B	*SE*	95% CI
Small-talk over text-only CMC v. closeness over text-only CMC	.50†	.09	-0.03, 0.33
Path c’			
Closeness over visual CMC v. closeness over text-only CMC	.43	.10	-0.07, 0.33
Small-talk over visual CMC v. closeness over text-only CMC	.67†	.10	-0.01, 0.41
Small-talk over text-only CMC v. closeness over text-only CMC	.47	.09	-0.04, 0.33
Indirect Effects			
Closeness over visual CMC v. closeness over text-only CMC	.00	.03	-0.08, 0.06
Small-talk over visual CMC v. closeness over text-only CMC	.00	.03	-0.07, 0.07
Small-talk over text-only CMC v. closeness over text-only CMC	.03	.06	-0.09, 0.18

Note. Path a reflects the effect of experimental condition on dyads’ desired interpersonal closeness. Path b reflects the effect of dyads’ desired interpersonal closeness on behavioral mimicry. Path c reflects the total effect of experimental condition on dyads’ behavioral mimicry. Path c’ reflects the direct effect of experimental condition on dyads behavioral mimicry. Model 1 presented with dyads’ achieved interpersonal closeness as a covariate. Model 2 presented with dyads’ achieved interpersonal closeness and global behavioral synchrony as a covariate. *B* = Standardized beta coefficient. *SE* = Standard Error. 95% CI = 95% Confidence Interval.

$^{\dagger}p < .10$ $^{*}p < .05$, $^{**}p < .01$.

CHAPTER 4

DISCUSSION

The current dissertation sought to provide a comprehensive assessment of the behavioral constructs of synchrony and mimicry in naturalistic dyadic interactions. Results were presented across 91 dyads who were randomly assigned to one of four experimental manipulations intended to generate varying levels of interpersonal closeness or the desire for interpersonal closeness among participants. Then, all dyads engaged in the same problem-solving interaction where their synchrony and mimicry behaviors were measured. For the first time, these two interpersonal coordination behaviors were examined using multiple methodologies, some established and some novel, and across multiple theoretical conceptualizations. Specifically, behavioral mimicry was measured using global impression ratings as well as a molecular coding approach. Additionally, behavioral mimicry was captured across two theoretical conceptualizations - mimicry in participants' posture (as described by Scheflen, 1964) and in their discrete gestures and behaviors (as described by Chartrand & Bargh, 1999). For exploratory purposes, participants' mimicry for nodding behaviors was also measured using molecular coding. Behavioral synchrony was measured using Bernieri & Rosenthal's (1991) global impression rating system where synchrony was defined in terms of its components of tempo similarity, simultaneous movement, and coordination/smoothness. These various assessment approaches were used to investigate the relationships between synchrony and mimicry and determine whether synchrony and mimicry were related to different interpersonal states.

My first set of hypotheses (H1 and H2) concerned the impact of the various experimental conditions on participants' self-reports of interpersonal closeness with their partner. Specifically, for H1, I expected that participants who completed the closeness-inducing task over visual CMC would self-report feeling the most interpersonal closeness, as these participants would have the opportunity to disclose self-relevant feelings and information about themselves as well as receive emotional and behavioral responses from their partner (see Figure 2 for the Reis and Shaver's 1988 Interpersonal Process Model of Intimacy). Alternatively, for H2, I expected that participants who completed the closeness-inducing task over text-only CMC would self-report the most desire for interpersonal closeness with their partner as these participants would have the opportunity to disclose self-relevant feelings and information about themselves but would not be given the chance to receive any emotional or behavioral responses from their partner.

Results revealed some support for these hypotheses. For instance, participants who were randomly assigned to the closeness-inducing over visual CMC condition did report feeling closer to their partner than participants in either of the text-only CMC conditions but did not report feeling closer to their partner in comparison to participants who had been randomly assigned to the small-talk over visual CMC condition. See the *Achieving Interpersonal Closeness* section below for a detailed discussion of these findings. Regarding H2, participants who had been randomly assigned to the closeness-inducing over text-only CMC condition did not report feeling a greater desire for closeness with their partner compared to participants who had been randomly assigned to any of the other three conditions. Instead, participants who had been randomly assigned to the small-talk over text-only CMC condition reported feeling significantly more desire for closeness with their partner compared to participants who had been randomly assigned to any of the other conditions. A discussion about how this finding still provides some support for H2 is provided below in the *Creating a Desire for Interpersonal Closeness* section.

My second set of hypotheses (H3 and H4) concerned the impact of experimental condition on participants' spontaneous behavioral coordination. For H3, I hypothesized that participants who completed the closeness-inducing task over visual CMC would display the most synchrony with their partner during a subsequent interaction as this experimental condition was intended to generate the most interpersonal closeness among participants. However, results did not provide support for this hypothesis as dyads who had been randomly assigned to the closeness-inducing over visual CMC condition synchronized their behavior to a similar extent as dyads who had been randomly assigned to the other three conditions. For H4, I hypothesized that participants who completed the closeness-inducing task over text-only CMC would display the most mimicry with their partner in a subsequent interaction as this experimental condition was intended to generate the greatest desire for interpersonal closeness among participants. There was some support for this hypothesis, as dyads who had been randomly assigned to the closeness-inducing task over text-only CMC condition displayed the most behavioral mimicry with their partner compared to dyads who had been randomly assigned to any other experimental condition. This effect was the strongest for gestural mimicry compared to postural mimicry.

The hypotheses that most directly test the theory related question of whether closeness and desire for closeness were differentially related to synchrony and mimicry behaviors among dyads were H5 and H6. Specifically, for H5, it was hypothesized that participants' self-reported feelings of closeness with their partner would predict their synchrony in a subsequent task with their partner. For H6, it was hypothesized that participants' self-reported desire for closeness with their partner would predict their mimicry in a subsequent task with their partner. When collapsing across the four experimental conditions to examine participants' reported feelings of achieved and desired interpersonal closeness directly, results generally suggested that those who felt more *achieved* interpersonal closeness were significantly more likely to synchronize with their partner during a subsequent problem-solving task whereas those who felt more *desired* interpersonal closeness were significantly more likely to display mimicry with their partner in a subsequent problem-solving interaction. This evidence provides initial support for the theorizing adapted from LaFrance and Ickes (1981) and Tickle-Degnen and Rosenthal (1987) who suggested that certain coordination behaviors may be a reflection of the interpersonal closeness two or more individuals feel, while other coordination behaviors may be a reflection of the interpersonal closeness that two or more individuals are motivated, or desired to achieve. A discussion of these findings and their implications for the measurement of spontaneous synchrony and mimicry appears below in the *Behavioral Synchrony and Mimicry* section.

Aron's and Colleagues (1997) Interpersonal Questions Tasks

Achieving Interpersonal Closeness

An unexpected finding in the present dissertation was that Aron's closeness-inducing task and Aron's small-talk task did not necessarily have the effects expected from past literature on participants' disclosure or their self-reports of interpersonal closeness. In terms of disclosure, participants who were randomly assigned to the small-talk task self-reported disclosing approximately the same amount of open, honest, and vulnerable information as did participants who had been randomly assigned to complete the closeness-inducing task. Similarly, partners of participants who had completed the small-talk task rated their partners as disclosing to the same degree as partners of participants who had completed the closeness-inducing task.

Although *self-reports* of participants' own disclosure have largely been utilized to help validate Aron's interpersonal questions tasks (e.g., Aron et al., 1997; Slatcher, 2010; Sprecher, 2021), participants' reports of their own disclosure may not always reflect their true disclosure behavior due to several rating biases. Specifically, some participants may have underestimated or overestimated how much they disclosed to their partner depending upon the average amount of disclosure participants are used to engaging in during social interactions. Participants may have also been too engrossed in the interaction to accurately remember how much they disclosed to their partner or may have experienced demand characteristics. In other words, participants' self-reports may not be the most valid way to measure participants' objective degree of open and vulnerable disclosure.

To overcome these limitations, the present investigation expanded upon participants' self-report ratings of their own disclosure by also asking research assistants to assess participants' disclosure. Unlike participants' self-reports of their disclosure, participants' disclosure rated by third-party research assistants *did* significantly differ depending on the interpersonal questions task participants were assigned to complete (for similar results see Baccon et al., 2019). Specifically, for participants assigned to complete their questions task over visual CMC, as well as for participants assigned to complete their questions task over text-only CMC, there was an interaction between time in the interaction (i.e., time 1, time 2, and time 3) and task (i.e., closeness-inducing task vs. small-talk task). This effect was driven by participants who had completed the closeness-inducing task being rated as disclosing the same amount as those who had completed the small-talk task at time 1, but participants who had completed the closeness-inducing task being rated as disclosing more than those who had completed the small-talk task at times 2 and 3.

This significant effect showing that participants who had completed the closeness-inducing condition were rated as disclosing more than participants who had completed the small-talk condition during times in the interaction where participants were discussing more intimate questions is encouraging and provides some further validity to Aron's interpersonal questions tasks. It is important to note, however, that research assistants who rated participants' disclosure from thin slices of their responses to various questions from Aron's paradigm knew the questions that the participants were responding to. Instead of blinding research assistants to the question that a participant was responding to, an unblinded approach was chosen as participants' disclosure can sometimes be tied to the questions they are responding to. For example, a participant whose response was "Yesterday actually, with my roommate. I normally don't do that, but I was really glad she was there with me" should score higher on disclosure if the question they were responding to was "When was the last time you cried in front of another person" opposed to "When was the last time you walked for more than an hour." While knowing the question that participants were responding to helped research assistants assess how vulnerable participants were being, it is quite possible that research assistants were naturally biased in their rating of disclosure because they knew some questions were more intimate than others.

The central aim of Aron's interpersonal closeness paradigms, however, is to generate varying levels of *interpersonal closeness* through manipulating participants' disclosure. Regardless of how much participants actually disclosed (assessed via third-party observer ratings), it is likely that how much participants believed they disclosed (assessed via self-ratings) is more strongly tied to how close they felt with their partner. Given that participants' self-reported disclosure did not differ depending upon whether they completed Aron's closeness-inducing or small-talk task, it is not surprising that participants did not report feeling any differences in closeness with their partner depending upon which of these two tasks they were randomly assigned to complete. These results diverge from several validation studies showing how Aron's closeness-inducing task generates more closeness between strangers in comparison to Aron's small-talk task (e.g., Aron et al., 1997; Kashdan & Wenzel, 2005; Sprecher, 2021). Two possible explanations for these differences are discussed below.

One possibility regarding why participants did not report feeling closer to their partner after discussing more intimate questions, compared to discussing less intimate questions, may be due to these results being collected post-COVID where participants may feel more apprehensive to be open and vulnerable with strangers. The COVID-19 pandemic certainly created challenges and caused disruption to people's normal face-to-face interactions that may have changed participants' traditional responses to Aron's interpersonal questions tasks. Especially for college-aged students, such as the population sampled in the current study, social distancing, mask-wearing policies, and transitions to online learning have functionally limited individuals' opportunities to interact with one another across the past few years. These lifestyle changes have measurably impacted the way people interact with one another and may have created greater anxiety and discomfort with discussing intimate and deep topics with strangers. For instance, a 2022 study found that participants who were shown some questions from Aron's closeness-inducing task and small-talk task expected that engaging in Aron's closeness-inducing task with a stranger would be significantly more awkward than engaging in Aron's small-talk task (Kardas et al., 2022). Capitalizing on these likely increases in discomfort in intimate interactions, Kashdan and colleagues (2014) showed how participants high in experiential avoidance (i.e., the tendency to control or avoid unpleasant internal events, such as distressing emotions, negative thoughts and unwanted physical sensations; Hayes et al., 1996) experienced greater social anxiety in Aron's closeness-inducing task, compared to Aron's small-talk task. Following, a series of studies by Kashdan and colleagues showed that participants' social anxiety and avoidance can interfere with the generation of closeness during Aron's closeness-inducing task

(Kashdan & Roberts, 2006, 2007; Kashda & Wenzel, 2005). Given that researchers have documented social anxiety heightening in the general population due to the pandemic (Kindred & Bates, 2023), it is plausible that participants in the current study did not necessarily experience more closeness with their partner after asking and answering intimate questions with one another, compared to discussing surface level topics, as this task may have felt more unnatural, anxiety inducing, and overly personal for participants who have had less experience engaging in these kinds of interactions across the past few years compared to pre-COVID participants. While social anxiety was not assessed in the current study, it may thus be important to control for this in future research utilizing Aron's interpersonal questions paradigms.

However, it is equally plausible that the COVID-19 pandemic may have had the *opposite* effect on participants' engagement in these tasks, as the limited opportunities for interpersonal interactions across the past three year have been linked to higher reported loneliness (Ernst et al., 2022) and lower belongingness (Gopalan et al., 2022; Mooney & Becker, 2021), especially among college-aged students. Thus, the current set of participants may have actually had a greater need and desire for closeness and intimacy at baseline than participants who engaged in Aron's interpersonal questions tasks in the past. If so, then participants in the small-talk task may have naturally disclosed more open and intimate information about themselves in an attempt to feel belonging with their interaction partner, leading to similar levels of closeness between Aron's closeness-inducing and small-talk task.

To better understand whether there were no observed differences in self-reported closeness between Aron's two interpersonal questions tasks in the current study because participants in the closeness-inducing task were being *less* vulnerable and open than usual, or because participants in the small-talk task being *more* vulnerable and open than usual, mean levels of closeness from a brief literature review of studies utilizing Aron's closeness-inducing and small-talk task were examined. Table 16 shows that individuals' self-reported closeness scores after Aron's closeness-inducing task were approximately one-third of a scale point lower in the current study than the average reported closeness after this task, although still within the previously observed range. Additionally, self-reported closeness scores after Aron's small-talk task were approximately one-fourth of a scale point higher in the current study than the average reported closeness after this task, although also still within the previously reported range. Thus, there may be preliminary support for both theorized pathways. Only one study (Samdi, 2022) was found that appeared to have been collected post-COVID, although the data collection date was not specified in this study, making pre-COVID and post-COVID comparisons beyond the current study difficult. Future research should continue to explore whether post-COVID participants may experience Aron's interpersonal questions tasks in new ways compared to pre-COVID participants, utilizing both Aron's full 45-minute task, as well as shorted versions of the task like those employed in the present study.

Table 16

Mean Closeness Values from Zero-Acquaintance Studies Comparing Aron's Closeness-inducing and Small-talk Tasks

Study	Closeness-inducing task *M (SD)*	Small-talk task *M (SD)*
Current study	**Study 1: 3.82**	**Study 1: 4.10**
Aron et al. (1997)	Study 1: 4.06 Study 2: 4.02 Study 3: 3.76	Study 1: 3.25
Kashdan et al. (2011)	Study 2: ≈ 3.86 Study 3: ≈ 5.20	Study 2: ≈ 3.45 Study 3: ≈ 5.50
Kashdan & Wenzel (2005)	Study 1: ≈ 4.62[a]	Study 1: ≈ 4.18[a]
Smadi (2022)	Study 1: 4.38	Study 1: 3.24
Sprecher (2021)	Study 1: 4.30	Study 1: 3.42
Vacharkulksemsuk & Fredrickson (2012)	Study 1: 3.26	N/A
Total[b]	*M* = 4.16 Range = 3.26 – 5.20	*M* = 3.84 Range = 3.25 – 5.50

Note. Means were obtained through a brief literature review. A database search of Google Scholar was conducted with the following terms: (Aron* AND *Small-talk AND *Closeness-inducing) where the first 20 pages were examined. For a study to be included it had to (1) utilize Aron's closeness-inducing or small-talk task (2), be conducted among unacquainted individuals, and (3) employ a self-report measure of closeness. Possible means range from 1 to 7. Means with ≈ indicate values that were estimated from figures but were not reported explicitly in text. Means from the current study are bolded.

[a]Adjusted from previous 0 to 12 range to equal 1 to 7 range. [b]Excluding means from the current study.

Creating a Desire for Interpersonal Closeness

One exploratory aim of this work was to test whether the *desire* for interpersonal closeness could be experimentally induced by restricting Aron's closeness-inducing task to a text-only CMC platform. Specifically, it was hypothesized that participants who began the process of generating interpersonal closeness with their partner by self-disclosing personal and intimate information about themselves (i.e., via Aron's closeness-inducing task), but were not given the opportunity to hear or see their partner's responses to these disclosures by restricting participants' interaction to a text-only CMC platform, would decrease participants' feelings of interpersonal closeness but increase participants' *desire* for interpersonal closeness.

While there was not support for this hypothesis, as participants randomly assigned to the small-talk task over text-only CMC condition reported a significantly greater desire for interpersonal closeness compared to participants in any other experimental condition opposed to participants randomly assigned to the closeness-inducing task over text-only CMC condition, there was still some support for the theorizing behind this hypothesis. Specifically, participants who completed the closeness-inducing task did not necessarily disclose more personal and intimate information about themselves to their partner than participants who completed the small-talk task (see above). Interestingly, although not significant at the $p < .05$ level, participants in the small-talk over text-only CMC condition actually self-reported being higher in their disclosure than participants in closeness-inducing over text-only CMC condition. This effect was similar for partners of participants reporting how much they believed their partner had disclosed. Further, responses from participants in the small-talk task over text-only CMC condition were significantly longer in length than responses from participants in the small-talk task over text-only CMC condition. Thus, it appears as though participants who had completed the small-talk task over text-only CMC disclosed a comparatively sizable amount of open and personal information, while being experimentally restricted from having their interaction partner respond to them. In other words, the two ingredients theorized to create a desire for interpersonal closeness (i.e., increased self-disclosure and restricted partner responsivity) seemed to be the most strongly present for participants in the small-talk over text-only CMC condition, who subsequently reported the greatest desire for closeness with their interaction partner.

This effect shows some promise for future experimental manipulations for inducing a state of desired closeness with another, while simultaneously limiting participants' ability to achieve closeness. Future research, however, might consider giving participants more time to complete the questions they are given from Aron's interpersonal questions tasks to ensure participants are able to fully respond to the questions in an elaborative, vulnerable, and personal manner. Additionally, future research could explore instructional manipulations in the closeness-inducing task that may encourage more disclosure such as describing the benefits of being open and vulnerable with strangers.

Behavioral Synchrony and Mimicry

Evidence from the current dissertation supported that behavioral synchrony and mimicry are predicted by different interpersonal states among unacquainted individuals. Specifically, when controlling for behavioral mimicry, participants' self-reported closeness after a getting-acquainted interaction positively predicted their behavioral synchrony during a subsequent interaction. Additionally, participants' desire for closeness after their first interaction together negatively predicted their behavioral synchrony during their second interaction.

These results do not suggest that individuals' closeness *caused* individuals to be more synchronous during their second interaction, as these effects were nonexperimental. It is quite possible, for example, that the reverse causal pathway could still be operating in these effects, to some extent. Specifically, it may have been that participants who reported feeling close to their partner after their first interaction did so because their behaviors and movements during their first interaction were synchronized. Then, the greater levels of synchrony observed during individuals' second interaction might have, in some ways, reflected the continuation of a close and harmonious relationship from interaction one to interaction two. In other words, while the current study showed how closeness measured at time one predicted synchrony at time two, it is still possible that synchrony at time one (not measured in the current study) preceded feelings of closeness at time one – which would support the opposing causal pathway that the one currently offered.[14] It is also possible that there was some third variable driving both feelings of closeness at time one and synchrony at time two. While the current results are unable to completely untangle these causal pathways, these results do at least indicate that the more closeness and rapport individuals felt with one another during an initial interaction, the more likely they were to display behavioral synchrony with one another in a subsequent interaction, an extension of a plethora of literature linking these two constructs (e.g., Bernieri et al., 1994, 1996; Fujiwara et al., 2021; Fultz, 2023; Ramseyer & Tschacher, 2011, 2014; Stosic, 2021).

On the other hand, when controlling for behavioral synchrony, participants' self-reported closeness after their first interaction together generally *negatively* predicted their behavioral mimicry during a subsequent interaction. However, participants' desire for closeness after their

[14] To help empirically rule out the causal pathway that synchrony at time one predicted closeness at time one, a MLM utilizing Model 2 from Section 3 of the results was run *only* for dyads assigned to the complete their first interaction over text-only CMC. A significant effect of feelings of closeness on behavioral synchrony ($SPE = .17$, $p = .029$) was still observed for dyads who completed their first interaction over text-only CMC, and thus, by definition, did not have any synchrony with their partner during this time. This preliminary result suggests that synchrony at time one was *not* an artifact that was driving the relationship between closeness observed at time one and synchrony observed at time two.

first interaction together positively predicted their behavioral mimicry during their second interaction. This effect was only significant for postural mimicry, and not for gestural mimicry.

Again, these results cannot be used to assume a causal relationship between the desire for closeness and behavioral mimicry. However, unlike behavioral synchrony, there is less theoretical reasoning behind the reverse causal pathway that, for instance, participants who reported feeling the desire to be close with their partner, removed from actually feeling close, after their first interaction did so in part because there was greater mimicry during participants' first interaction.[15] Additionally, past experimental work does support a causal pathway whereby greater desire for affiliation or closeness predicts greater behavioral mimicry (Lakin, 2003; Lakin & Chartrand, 2005; Leighton et al., 2010). However, as before, there could also be a third variable responsible driving the relationship between desired closeness at time one and mimicry at time two in the present study. Nonetheless, the current results do at least indicate that the more strangers desired to become close to one another after their first interaction, the more likely they were to display behavioral mimicry with one another in a subsequent interaction.

The current dissertation is one of the only empirical investigations that has explored expressions of behavioral synchrony and mimicry together in one study (see also Bernieri, 1988, Fujiwara & Daibo, 2022, and Kuszynski, 2015). Additionally, to my knowledge, it is the only investigation which has entered synchrony and mimicry together in the same model, allowing for the effects of synchrony to be unconfounded by mimicry and the effects of mimicry to be

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[15] To help empirically rule out the causal pathway that mimicry at time one predicted desired closeness at time one, a MLM utilizing Model 2 from Section 3 of the results was run only for dyads assigned to the complete their first interaction over text-only CMC. A significant effect of desired closeness on the global mimicry composite (SPE = .13, p = .050) was still observed for dyads who completed their first interaction over text-only CMC, and thus, by definition, did not have any behavioral mimicry with their partner during this time. This preliminary result suggests that mimicry at time one was *not* an artifact that was driving the relationship between desired closeness observed at time one and mimicry observed at time two.

unconfounded by synchrony. The present work shows just how important empirically disentangling these two constructs can be, as the positive association between participants' self-reported closeness and their behavioral synchrony was not present when mimicry was not controlled for. In other words, because mimicry was *negatively* associated with closeness, yet *positively* associated with synchrony, its presence affected the true relationship between synchrony and closeness in the present study in a way which could have led to incorrect conclusions about the relationship between the two constructs. However, by entering synchrony and mimicry together in the same model, the current study was able to provide support for the current theorizing adapted from LaFrance and Ickes (1981) and Tickle-Degnen and Rosenthal (1987) that behavioral synchrony may be a reflection of the interpersonal closeness two or more individuals feel, while behavioral mimicry may be a reflection of the interpersonal closeness that two or more individuals are motivated, or desire to achieve. These results begin to address the central question of *when* certain coordination behaviors are likely to occur among people.

Gestural Mimicry versus Postural Mimicry

The present dissertation is also, to my knowledge, the first study to explicitly differentiate mimicry operationalized by Chartrand and Bargh (1999) as the imitation of the discrete gestures or behaviors and by Scheflen (1964) as the imitation of others' postural configurations. While these two operationalizations of mimicry may differ from one another, a theoretical distinction between the two suggesting that one may reflect a different state than the other has yet to be offered. As such, it may be prudent, for the moment, to treat the two operationalizations of mimicry as behavioral manifestations of the same construct.

The present study did, however, find that participants' desire for closeness with one another was reflected more strongly through postural mimicry than it was through gestural mimicry. While this finding could suggest that gestural mimicry and postural mimicry are separate constructs that predict separate outcomes, this finding may more realistically reflect the constraints in the measurement of these two constructs within the current study. Specifically, given that the current study took place over a videoconferencing platform, opposed to face-to-face, it may have been that participants were more likely to mimic their partner's posture than they were to mimic their partner's gestures, especially given that participants' hands were often out of the frame (see *Interaction Medium* section below for a further discussion of potential differences in interpersonal coordination depending on communication modality). Indeed, global ratings of participants' postural mimicry ($M = 4.94$, $SD = 0.84$) were significantly greater than participants gestural mimicry ($M = 3.40$, $SD = 0.73$; $t_{(91)} = 18.61$, $p < .001$, Cohen's $d = 1.95$). Thus, it is possible that the desire for closeness may have impacted both participants' gestural mimicry and their postural mimicry if this study were to have taken place face-to-face, where participants' entire bodies were visible to one another and mimicry for gestures would have been more likely to occur.

In addition to the measuring mimicry in participants' posture and gestures, the current study also separately measured participants' mimicry for head nods on the molecular level.[16] It may be that mimicry for head nods is simply another behavioral manifestation of mimicry, akin to assuming similar functions between gestural mimicry and postural mimicry. However, unlike some kinds of gestural mimicry and postural mimicry, head nodding has been found to hold the specific functions of signaling acceptance and agreement (Fusaro et al., 2012; Helweg-Larsen et al., 2004; Poggi et al., 2010). Thus, it could be that mimicry for head nodding may not always be a process that took place in the motor cortex via the perception-action link but instead may be a

[16] Mimicry for head nods on the global level was captured within research assistants' ratings of gestural mimicry.

process occurring within areas of the brain linked to communication functions as copying someone's head nod may be indicating to that person that they are agreeing and accepting what they are saying. While little research has directly compared head nod mimicry with mimicry occurring in other parts of the body, a study by Kuszynaski (2015) did find that dyads composed of intergenerational participants mimicked each other's head nods more than intragenerational dyads – yet this differentiation was not found for mimicry in participants' arm, hand, or foot movements. Future research should thus exercise caution in assuming all kinds of mimicry are created equal and may wish to further explore whether mimicry for certain noncommunicative behaviors (e.g., brushing hair away from one's face) functions in the same way as mimicry for communicative behaviors (e.g., nodding).

Boundary Conditions

Degree of Acquaintanceship. Although the current results revealed that mimicry and synchrony may reflect different interpersonal states, these relationships were observed within pairs of unacquainted individuals. It is quite possible that the current set of results does not describe the function of synchrony and mimicry in well-acquainted individuals. For instance, in the present dissertation mimicry was *negatively* related to participants' self-reported closeness, and instead was positively related to participants desire to have closeness with their partner. However, research investigating mimicry between interactants who were relatively familiar with one another (e.g., between therapists and patients, teachers and students, or pairs of friends) has shown that greater mimicry between dyads was *positively* related to self-reported closeness and rapport (Charney, 1966; LaFrance, 1979; LaFrance & Broadbent, 1976; McIntosh, 2006). Bernieri and Rosenthal (1991) attempted to explain these discrepancies by stating "If [mimicry] is more reflective of attempts at reaching rapport than it is of the rapport itself, it could mean that the positive relationship between rapport and [mimicry] in ongoing interactions is better interpreted as reflecting an attempt at sustaining rapport" (p. 408). In other words, it may be that mimicry observed early in a relationship occurs between individuals who do *not* feel closeness to one another but have the desire/motivation to, whereas mimicry observed in an established relationship may be a social glue mechanism that helps maintain rapport between two individuals who wish to preserve it.

Similarly, the relationship between synchrony and feelings of closeness may depend somewhat on how established the actual relationship between two individuals is. For instance, the current theory tested suggests that how much closeness individuals are feeling moment-to-moment may predict their subsequent synchrony. However, it is possible that the actual closeness or robustness of a dyad's relationship may interact with state (i.e., momentary) feelings of closeness to predict synchrony such that state feelings of closeness may be more strongly related to synchrony if the dyad is also in an established relationship (also described in Lin et al., 2023). There is reason to believe, for instance, that individuals who are more used to one another's behaviors, movements, and rhythms may synchronize with one another more easily than individuals who are unacquainted with one another and are still building these internal models of their partners' natural movements, behaviors, and rhythmic cycles. Indeed, true mother-infant pairs show more synchrony than unacquainted mother-infant pairs (Bernieri et al., 1988) and friends display more synchrony than stranger pairs (Fujiwara et al., 2020; Latif et al., 2014). Thus, among dyads who already have an established relationship, synchrony might come quicker/easier when the two are feeling momentary closeness which might lead to a stronger or more stable relationship between the two variables. However, even in established relationships, it should still be the current state of closeness that more strongly predicts synchrony, opposed to the closeness of the relationship between two people (e.g., one might not expect much synchrony among a married couple who is currently bickering about whose turn it is to clean the dishes). Comparing the manifestation of synchrony in established relationships to unestablished relationships seems opportune for future research as little work has directly examined differences in behavioral synchrony across differing kinds of relationships thus far.

Interaction Medium. It is also important to contextualize the present synchrony and mimicry results within the communication medium these interactions took place over. Specifically, although the majority of studies investigating naturalistic synchrony and mimicry have investigated these processes as they occur face-to-face, the present dissertation investigated these processes as they took place over a visual CMC platform (i.e., Zoom).

Interactions between individuals over visual CMC platforms have become increasingly common since the onset of the COVID-19 pandemic in March 2020, especially for the millions of students who, for some period within the past three years, have experienced remote learning. Understanding how processes that traditionally take place over face-to-face may or may not translate to computer mediated platforms is therefore an important avenue for researchers to explore. Only two studies, that I am aware of, have documented behavioral synchrony over a visual CMC platform (Fujiwara et al., 2022; Stosic, 2021). Whereas some mimicry studies have investigated participants' mimicry of a videotaped person (e.g., Lanzetta & Englis, 1989), I am not aware of any studies investigating behavioral mimicry between two real interactants over a videoconferencing platform. In Fujiawara et al., researchers performed a secondary analysis on talk show interviews that occurred through a videoconferencing platform and analyzed the synchrony of the interviewer and interviewee using an automated coding software. Stosic asked groups of two strangers to log onto a videoconferencing platform and complete a semi-structured "getting-to-know-you" task where synchrony estimates were then derived from Bernieri and Rosenthal's (1991) global rating system.

These two studies did *not* compare synchrony over a videoconferencing platform to synchrony in a face-to-face interaction and were thus not able to examine within- or between-subjects differences in face-to-face synchrony versus computer-mediated synchrony. Therefore, these studies do not answer questions such as whether synchrony is hindered by visual CMC platforms or whether this behavioral phenomenon is robust enough to occur through videoconferencing platforms. However, synchrony measured in both studies did display predictive validity patterns consistent with those observed in face-to-face interactions, such as dyads containing women displaying higher degree of synchrony than dyads without women (Fujiwara et al., 2022; Stosic, 2021) and synchrony being related to self-reports of individuals' rapport (Stosic, 2021). Given that synchrony observed over videoconferencing platforms displays some of the same relationships as synchrony observed face-to-face, this suggests that synchrony over visual CMC platforms likely occurs at greater than chance levels and may share similar properties to face-to-face synchrony. However, in order to truly test whether synchrony occurs at above chance levels on videoconferencing platforms, researchers should compare synchrony observed from real videoconferencing interactions to synchrony in pseudo interactions (i.e., interactions that were video edited to include two individuals who never actually interacted; see Bernieri et al., 1988).

Nonetheless, given the lack of direct comparisons between synchrony within face-to-face interactions compared to computer mediated interactions, and functionally no research examining mimicry in computer mediated interactions between two real interactants, it is important to consider the ways in which the present results may have been impacted by the videoconferencing interaction platform. In the present dissertation, participants could only see each other from approximately the torso to the top of the head. Considering that mimicry is theorized to be tied to the perception-action link (Chartrand & Dalton, 2009), and thus relies on visual perception, it is likely that constraining interactions to videoconferencing platforms limited the amount of behavioral mimicry that participants were able to engage in. For instance, because participants were not able to see the leg shaking or foot tapping of their partner, neither of these behaviors could have been mimicked. In this way, if the present dissertation were to have been conducted face-to-face, there may have been stronger relationships between the desire for closeness and behavioral mimicry, as participants may have had more opportunities to mimic one another.

Unlike mimicry, synchrony is not theorized to directly rely on visual perception. In fact, some researchers suggest that synchrony may be more strongly driven by auditory cues (Condon, 1979; Dittmann & Llewellyn, 1969; Fujiwara et al., 2023; Kendon, 1970; Repp & Su, 2013; Van Puyvelde et al., 2013). In this way, constraining participants' interactions to videoconferencing platforms may not have limited participants' behavioral synchrony in as direct a manner as behavioral mimicry. However, it is very possible that other factors beyond the limitation of visual cues may have impacted participants' experience of behavioral synchrony such as distracting roommates or external noises that impacted participants' attention. Additionally, while dyads whose videoclips contained noticeable video lags or poor video/audio quality were excluded from the present study based on researcher judgment, it is likely that videos with some degree of video lags or poor video/audio quality may have been retained in the study. To the degree that videos contained these unwanted elements, participants' synchrony may have been negatively impacted. Future research should continue to explore the manifestation of synchrony and mimicry in computer-mediated platforms and compare these behaviors to those in face-to-face interactions in order to determine whether and to what degree interpersonal coordination occurs in these mediated interactions.

Improving the Measurement of Spontaneous Synchrony and Mimicry Behaviors

One of the goals of the present dissertation was to help differentiate the constructs of behavioral synchrony and mimicry by assessing these constructs using multiple coding methods across multiple theoretical conceptualizations. To assist future researchers in determining the best measurement approaches for assessing spontaneously occurring synchrony and mimicry, recommendations for assessment considerations and best practices drawn from insights derived from the hundreds of effects presented in the current investigation are discussed.

Synchrony. Although psychologists have been measuring spontaneous synchrony and mimicry for many years, little research has explicitly discussed the strengths and weaknesses of global versus molecular coding approaches for assessing these constructs to ensure that researchers are engaging in the best measurement practices for capturing their conceptualizations of interest. Burgoon and Baesler (1991) discuss the merits of global impression ratings and molecular coding approaches broadly in nonverbal behavior measurement, which translate well to understanding the advantages and disadvantages of these coding approaches for measuring synchrony. Specifically, they detail certain criteria that are relevant to choosing the most effective measurement strategy such as the isomorphism between the level of measurement and the nonverbal phenomenon of conceptual interest and the concurrent validity between the two approaches.[17]

[17] Two additional criteria delineated by Burgoon and Baesler (1991) are (1) the relative reliability of measuring the behaviors at global versus molecular approaches and (2) the relative predictive validity of each.

Isomorphism. The first criterion of isomorphism refers to the extent to which there is a one-to-one correspondence between the definition of synchrony and its measurement approach. While synchrony can be defined as the rhythmic coordination of behaviors and movements between two or more individuals, this definition intrinsically considers rhythmic coordination as systemic, opposed to localized to a particular behavior. Given the cost of employing molecular coding in terms of physical equipment, technical expertise, extensive training, and lengthy coding time, researchers utilizing this approach generally focus on only one or two behaviors within interacting participants. Following, molecular coding of synchrony often limits the behavioral degrees of freedom that can be used to calculate individuals' synchrony, functionally ignoring the nature of synchrony as the coordination of an entire system. Global ratings of behavioral synchrony, however, allow raters to make impression judgments regarding the amount of synchrony they observe in an entire system (i.e., a dyad or group) and is therefore more isomorphic with synchrony's definitional criteria.

Concurrent Validity. Another criteria of Burgoon and Baesler (1991) refers to the concurrent validity between the two measurement approaches, indicating the amount of convergence the two assessment approaches provide. A strength of molecular coding approaches is that this approach emphasizes precision and accuracy such that there is no ambiguity in knowing which behaviors are yielding coordination. Global impression judgment approaches, on the other hand, may suffer in accuracy because of the subjectivity involved in judgment tasks and ambiguity in the specific behaviors that contribute to an impression judgment. Additionally, global impression ratings may be subject to judges' rating biases that might confound impression judgments (e.g., a person's expressivity, positive affect). Thus, if the two methods do not display convergent validity with one another, then it might be appropriate to conclude that judges are not sensitive to behavioral synchrony on the global level.[18] However, if the two methods do display convergent validity with one another, it might be appropriate to conclude that judges are sensitive to behavioral synchrony, implying that global ratings are a valid assessment approach.

Previous research has explicitly made convergent validity comparisons between global impression ratings and molecular coding approaches for behavioral synchrony. Cappella and Palmer (1990) videotaped dyads engaging in a 30-minute unstructured conversation and subsequently coded each partner's face-directed gaze, vocalization, illustrator gestures, adaptor gestures, and smiles and laughter. Time series analyses were then employed to determine the extent to which these various behaviors were coordinated within partners across time. In a follow-up study, Cappella (1997) took thin slices of these videos and asked judges to make global impression ratings of dyads' synchrony using Bernieri and Rosenthal's (1991) coding scheme. Across three studies, Cappella found strong correlations between the molecular coding approach and global impression ratings. Additionally, both global impression and molecular coding approaches displayed predictive validity with participants' self-reported evaluations of one another and their evaluations of their satisfaction with the interaction altogether, leading Cappella to conclude that "the judgment method developed by Bernieri is a robust one" (Cappella, 1997, p. 128).

If a researchers' goal is to quantify synchrony precisely and accurately, or if they have a specific hypothesis regarding synchrony distilled down to a certain behavior (e.g., periods of engagement and disengagement between mother and infants), then investing the effort and

[18] If global judgments of synchrony do not correlate with molecular coding approaches, it could also be that global raters are able to assess some component of the construct that is not accessible via molecular coding. For instance, Bernieri and Rosenthal's (1991) synchrony component of coordination/smoothness is precisely a perceptual judgment based on how much two components appear as if they are one and is thus not assessable to coders on the molecular coding level.

resources needed to quantify synchrony on a molecular level may be warranted. However, unless a researcher has these specified goals, it appears as though global impression ratings are a much less effortful, and potentially more valid surrogate for measuring behavioral synchrony.

Mimicry. Unlike studies examining the relative validities and reliabilities of global impression ratings versus molecular coding approaches for synchrony, much less research has explored these comparisons in regards to behavioral mimicry. Thus, many of the findings in the current dissertation can serve future researchers in making these methodological decisions. Like synchrony, Burgoon and Besler's (1991) criteria for selecting the most effective level of measurement are used as a basis for discussing the strengths and weaknesses of global impression ratings of mimicry versus molecular coding approaches.

Isomorphism. Unlike behavioral synchrony, mimicry's definition does not imply a systemic process that is weakly captured when a behavior is distilled down into its constituent parts. Instead, behavioral mimicry takes place entirely in the isolated behaviors or body configurations of individuals. Thus, measuring mimicry through molecular coding approaches of specific body regions, gestures, or configurations is isomorphic with the definitional criteria of mimicry. Of course, molecular coding approaches for mimicry still limit the *amount* of behaviors that researchers can code for (e.g., mimicry in gestures, posture shifts, smiling, nodding, leg shaking, etc...) as the cost of employing this coding technique is quite high. Accordingly, global ratings of mimicry may be able to capture *more* mimicry behaviors than molecular coding approaches and may thus provide a researcher with more power in their analyses. However, if one were to measure all possible body movements and behaviors for mimicry using a molecular approach, this approach would be more isomorphic to the definition of mimicry.

Concurrent Validity. As far as I am aware, the present dissertation is the first to provide a concurrent validity estimate regarding the relationship between global impression ratings and molecular coding approaches for mimicry. The relationship between these two measurement approaches was strikingly large, as the composite for molecular mimicry correlated at $r = .57$ with the composite for global mimicry. This relationship remained quite strong ($r = .41$) even after controlling for potential artifacts in global impression judgments such as a dyads' overall expressivity and positive affect. When broken down into its constituent components, there was also relatively strong concurrent validity between molecular and global ratings of gestural mimicry, as well as postural mimicry. While a few limitations to the present study may have somewhat inflated these correlations (see below), these concurrent validity results seem to suggest that judges are sensitive to mimicry behaviors on the global level.

In addition to providing assessments of the concurrent validity of molecular and global impression judgements of mimicry, the current study also provided an assessment of these rating methods' predictive validity. Specifically, ratings of mimicry made on the global impression level displayed stronger relationships with individuals' desire for interpersonal closeness than did ratings of mimicry made on the molecular level. One explanation for these findings is that, as mentioned previously, global impression ratings of mimicry were able to capture more mimicry behaviors than the molecular coding approaches, providing a more powered estimate to test for differences in desired closeness. An unfortunate limitation of this, however, is that it is less clear from a global impression level *what* exactly the mimicry judgments were based on (e.g., Were only certain behaviors focused on? Were true mimicry criteria used such as appropriately considering the time lag between initiated and mimicked behaviors?).

In sum, if a researchers' goal is to quantify the exact amount of mimicry occurrences within a specific interaction, particularly within a certain behavior (e.g., leg shaking), then investing the effort and resources needed to quantify mimicry on a molecular level may be appropriate. However, there appears to be preliminary evidence that researchers without these specified goals may be able to forgo the effort and time needed to conduct molecular coding for a relatively similar, if not greater payoff using global impression ratings, assuming that global impression ratings are able to capture *more* mimicry behaviors than most molecular approaches. Still, researchers should continuously compare and contrast the relative reliability, and concurrent and predictive validities of molecular coding versus gestalt impressions given that developing technologies may be able to start surmounting previous concerns with molecular coding approaches not being able to capture the full aggregate of mimicry behaviors.

Additional Measurement Considerations. The present dissertation also revealed an additional consideration that behavioral synchrony and mimicry researchers should be thoughtful about in future investigations. Specifically, along with other global rating artifacts such as individuals' expressivity and positive affect that may confound judges' synchrony and mimicry ratings, the presence of synchrony and mimicry themselves may be confounders. Given that both synchrony and mimicry are interpersonal coordination behaviors, the presence of one within a given interaction may bias raters into believing there is high presence of the other as well. Additionally, if mimicry behaviors are occurring very close in time together (e.g., less than one second) judges rating mimicry on a global scale may visually see this as a synchronous event. Thus, researchers must take care to ensure their ratings of synchrony are not confounded by mimicry, or that their ratings of mimicry are not confounded by synchrony. Otherwise, researchers could more accurately refer to their variable as a general interpersonal coordination.

Approaches to consider in order to help remove synchrony from mimicry estimates (and vice versa) depending upon one's study design and the degree of concern regarding this confound may be (1) asking global rating judges to watch video clips at .5 speed in order to help disambiguate synchrony events from mimicry events (least effort, least correction for confounding), (2) measuring both synchrony and mimicry and presenting analyses controlling for the one another (moderate effort, moderate correction for confounding), (3) employing molecular coding approaches whose definitional criteria do not allow for synchrony or mimicry to be confounders (e.g., setting 0 second time lags when investigating synchrony, setting a time lag of at least more than 0 seconds[19] when investigating mimicry; most effort, most correction for confounding).

Automated Systems for Capturing Synchrony and Mimicry. Given recent technological advances in automated coding systems, new methods are now being developed that allow for the quantification of synchrony and mimicry *without* human coders. The current dissertation did not explore the use of these technologies and thus cannot empirically draw comparisons between the use of human coders and automated coding technologies (see Fujiwara et al., 2021 for an empirical comparison between some of these approaches). However, given the emergence of these coding approaches in contemporary synchrony research, a brief comment on these technologies framed in the current discussion of strengths and weaknesses in synchrony and mimicry coding is warranted.

[19] There is not yet a consensus in the literature regarding the lower and upper bounds for timeframes between an initial behavior and a subsequent behavior in order for the subsequent behavior to be operationalized as mimicry. However, for a behavior to be mimicked, the perception-action link implies that a person must first notice (i.e., perceive) a behavior in order to mimic it. To account for this, some researchers have suggested a timeframe from 2 to 10 seconds, to allow for this perception-action process to occur (Kuszynski, 2015; Stel et al., 2008; Stel & Vonk, 2010). The lower bound of this interval, however, may be a bit conservative while the upper bound is likely a bit liberal.

Automated methods for capturing synchrony and mimicry seem to carry much promise. Regarding synchrony, OpenPose (Cao et al., 2017) and Motion Energy Analysis (Ramseyer & Tschacher, 2011) generate time-series data that allow for researcher to conduct time-series analyses and spectrum analyses that deconstruct time-series data into estimates of simultaneous movement and tempo similarity, respectively, for the any identified region of interest on the body (Fujiwara & Daibo, 2016). In this way, these new technologies seem to overcome some of the previous isomorphism concerns that afflict molecular ratings of synchrony isolated to certain behaviors, as tempo similarity and simultaneous movement can be modeled across individuals' entire bodies. This allows for synchrony estimates to consider whether the movements of one person's hand are synchronized with the movement of another's head nod, for example. However, these technologies are unable to estimate global impressions of coordination/smoothness that capture whether a dyad or group appear as if they are one coordinated system. Given that it is possible for a dyad to be high in simultaneous movement and tempo similarity, but low in coordination/smoothness (e.g., consider two people who are dancing at the same tempo, but keep bumping into each other), these new automated technologies seemingly cannot capture *all* components of behavioral synchrony.

Although these automated coding techniques may not yet be able to capture all three theorized components of behavioral synchrony (i.e., tempo similarity, simultaneous movement, and coordination/smoothness; Bernieri & Rosenthal, 1991) one particular benefit to these systems is that they are able to reliably capture the *average movement* of dyads and groups across an interaction (e.g., Fujiwara et al., 2019, 2020; Schoenherr et al., 2019). The average movement between individuals in a dyad or group (similar to participants' expressivity) can absolutely be confounded with measurements of synchrony on the global and molecular level.

On the global level, the more individuals move the more likely they may be to be judged as moving in synchrony, even if this is not truly the case. On the molecular level, the more individuals move the more likely synchronous moments are to occur, simply by chance. Thus, a potential novel strength to these new automated coding systems is that they may provide a quick estimate of any dyads' average movement that can be controlled for in synchrony estimates – allowing for synchrony to be assessed unconfounded by how much members of a dyad/group were moving on average.

Utilizing systems such as OpenPose and Motion Energy Analysis to measure mimicry behaviors seems much less common, especially given that current technologies seem fit for testing changes in movements, but not for changes in discrete behaviors. In other words, these programs may not yet be fit for determining whether two people exhibited the "same" behavior or gesture, but may be able to assess mimicked changes in individuals' entire bodily postures (see Fujiwara & Daibo, 2022 for a study utilizing OpenPose to assess postural matching). Nonetheless, these systems similarly seem to carry promise, as they may allow for isomorphism with definitions of mimicry without the labor and cost of utilizing people as molecular coders. Interestingly, given that these automated software produce time-series data, researchers may be able to test their hypotheses regarding mimicry as an independent or dependent variable *exploring multiple operationalizations of mimicry embedded within varying timeframes.* That is, these technologies would allow researchers to compare mimicry quantified as an imitated behavior between 0.01-5 seconds after an initiated behavior and as an imitated behavior between 2-10 seconds after an initiated behavior. If certain timeframes allow for greater predictive validity (e.g., desired closeness predicts mimicry defined as imitated behaviors 0.01-5 seconds after initiated behaviors to a greater degree than mimicry defined as imitated behaviors 2-10 seconds after initiated behaviors), then this may provide researchers with an empirical roadmap for selecting mimicry timeframes in future research.

Limitations

While this work provided a comprehensive assessment of spontaneous synchrony and mimicry in naturalistic dyadic interactions, several limitations to the work must be mentioned. One limitation worth noting is that some of the research assistants who coded for behavioral synchrony also coded for behavioral mimicry. Specifically, all research assistants who coded videos for global synchrony also coded for global mimicry, as these two codes appeared simultaneously on the same rating sheet. As such, there is reason to believe that some of the variance in the strong relationship between global synchrony and global mimicry (r = .84) is due to research assistants failing to thoroughly differentiate between the two constructs when making their ratings, or applying a rating heuristic such as assuming a dyad must be high in synchrony if they are rated high in mimicry.

Similarly, 6 out of the original 9 research assistants who coded each dyad for global mimicry also coded for molecular mimicry. However, there is reason to believe that the relationships observed between global mimicry and molecular mimicry are less confounded by researchers' rating heuristics than is the relationship between global synchrony and global mimicry. For instance, there is less of a likelihood that research assistants remembered the molecular codes made for certain dyads when rating global impressions of these same dyads. Research assistants rated global mimicry approximately 5 weeks after their initial assessments of dyads' molecular mimicry and rated all videos from the three different time points in a randomized order. Therefore, it is less likely that a research assistant remembered a specific video of a dyad from their molecular coding and that memory influenced their global impression ratings – especially since all videos (approximately 351 video per rating method) were watched without sound. Nonetheless, to obtain the most precise estimate of the relationship between global synchrony and mimicry without artificial inflation due to shared raters, future research should seek to train independent groups of researchers to rate these various interpersonal coordination behaviors.

Another limitation of the present study was that global and molecular mimicry were measured on the level of the dyad opposed to as an individual-level variable. Unlike studies that utilize faux participants (e.g., Chartrand & Bargh, 1999; Dickens & DeSteno, 2014; Lakin & Chartrand, 2003), which allow for the clear differentiation between a leader and a follower, naturalistic studies provide the challenge of identifying who initiated a certain discrete behavior, and who mimicked the behavior. This can be particularly challenging for repetitive behaviors such as head nodding where both participants may display repetitive streams of the behavior across time, providing research assistants challenging decisions such as "Did participant A just mimic participant B twice, or did they only mimic participant B once and that second nod is the start of a new discrete behavior?" To overcome this challenge, the present dissertation prioritized quantifying the frequency (or global impression) of mimicry within a dyad, without differentiating between which participant was doing the mimicking for any one discrete behavior. Thus, although there was a significant relationship between the desire for closeness and greater dyadic mimicry in the present study, it may be that true strength of this relationship is even greater when this analysis is distilled down to the level of the participant.

Finally, an important limitation to consider in the present study regards *when* participants' feelings of closeness or their desire for closeness with their partner were measured in relation to *when* their synchrony and mimicry behaviors were measured. The current theory being tested speculated that how much closeness someone felt would predict their subsequent synchrony, and how much someone desired closeness would predict their subsequent mimicry. Importantly, closeness and desired closeness were considered states that could change moment-to-moment. For both achieved closeness and desired closeness, participants reported these states right after completing their first question answering task with one another. Participants then finished completing an additional set of questionnaires regarding various states and traits and then transitioned into their next task where they first completed a few camera set-up procedures and were then explained the instructions of their task by their experimenter. Therefore, on average, participants experienced an approximate delay of 10 minutes in between reporting how much closeness/desired closeness they felt with their partner and when their synchrony and mimicry was measured with their partner. It is possible that, in this time, participants' feelings of closeness and desired closeness changed. Further, it is possible that participants' feelings of closeness and desired closeness also changed throughout the course of their subsequent problem-solving interaction. To the extent that this occurred, the current set of results which presented synchrony and mimicry averaged across participants' five-minute-long interaction may not capture the true effect between closeness/desired closeness and synchrony/mimicry.[20] A better test of this theory would be to have participants report their closeness/desired closeness in time sampled intervals throughout the course of an interaction in order to determine whether changes in momentary feelings of closeness predicted changes in synchrony, for example. However, interrupting participants in an interpersonal interaction to ask them intermittent questions might also disturb their synchronous behavior. Future research employing these and other creative

[20] For instance, self-reported closeness was a significant predictor of synchrony observed in the first minute of participants' problem-solving interaction but was not a significant predictor for synchrony three or five minutes into the problem-solving interaction. This finding is consistent with the idea that synchrony may change as individual's feelings of closeness change and should be most strongly predicted by feelings of closeness that were adjacent in time to when synchrony was measured. See Appendix A, Table 7 for the results by time in the interaction.

techniques in tandem may be better able to estimate the true strength of the relationship between these distinct variables.

Conclusions

Although behavioral mimicry and synchrony both describe coordinated behavioral phenomena between individuals often involved in interpersonal interactions, the central contribution of the present dissertation was to help clarify these two constructs as disparate from one another. Notably, one mechanism that seems to drive behavioral mimicry is the motivation to get close to another person, whereas one mechanism that seems to drive behavioral synchrony is the achievement of a close and harmonious interaction between two people. Thus, when designing their empirical research questions, psychologists should consider whether they are interested in capturing coordinated behavior that is reflective of motivational state or a relational state. Importantly, researchers must also refine their measurement approach to ensure that they are explicitly capturing either synchrony or mimicry and may wish to consider the defining factors of these two behavioral phenomena when operationalizing their construct of interest so as to not unintentionally assess one construct when the focus is on the other (see Figure 1). If a researcher is not precise in their measurement approach and do not creatively explore ways of measuring mimicry that aren’t confounded by synchrony and vice versa, then it is likely that a researcher’s results may not validly assess the construct that they are interested in but rather a more general construct of behavioral coordination that is less precise and likely a mixture of both mimicry and synchrony. Only by making these continued efforts to empirically discriminate between behavioral synchrony and mimicry will psychologists be able to fully understand the nomological network of constructs associated with these interpersonal coordination phenomena, and more fully appreciate how these constructs may be "the key to understanding the social brain" (Schirmer et al., 2021, p. 1).

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APPENDIX A

Tables by Time

Table 1

Descriptive Statistics and ICCs for Behavioral Variables of Interest for Interactions One and Two by Time in Interaction

	M (SD)	Min-Max	Skewness	ICCs
Interaction 1				
Closeness over Visual CMC[a]				
Verbal Disclosure				
T1	3.24 (1.18)	1.38-5.50	0.44	.50†
T2	3.90 (0.98)	1.67-5.92	-0.12	.35
T3	4.28 (1.14)	1.63-6.75	-0.15	.64*
Verbal Responsivity				
T1	4.23 (2.12)	1.13-8.00	-0.03	.19
T2	3.74 (1.89)	1.07-7.73	0.46	.00
T3	4.63 (1.97)	1.20-7.80	0.12	.27
Nonverbal Responsivity				
T1	5.09 (1.08)	2.56-7.06	-0.35	.42
T2	5.10 (0.92)	1.81-6.44	-1.31	.48†
T3	5.29 (0.80)	3.63-7.25	0.22	.39*
Small-talk over Visual CMC[b]				
Verbal Disclosure				
T1	3.48 (1.00)	1.00-6.08	-0.19	.18
T2	3.52 (0.86)	1.00-5.08	-0.96	.29
T3	3.75 (0.74)	1.83-5.08	-0.52	.00
Verbal Responsivity				
T1	4.53 (1.92)	1.27-7.87	-0.17	.22
T2	4.26 (1.99)	1.13-7.73	0.15	.41†
T3	4.18 (1.98)	1.13-7.60	0.27	.00
Nonverbal Responsivity				
T1	5.14 (0.90)	2.63-6.31	-0.83	.23
T2	5.28 (0.81)	3.25-6.63	-0.63	.00
T3	5.19 (0.91)	2.75-6.88	-0.55	.00
Closeness over Text Only CMC[a]				
Text Disclosure				
T1	2.55 (1.34)	1.06-5.00	0.46	.00
T2	2.93 (1.18)	1.00-5.31	0.10	.01
T3	3.17 (1.30)	1.25-6.42	0.44	.89**
Small-talk over Text Only CMC[c]				
Text Disclosure				

Table 1 Continued

	M (SD)	Min-Max	Skewness	ICCs
T1	2.72 (0.99)	1.13-4.88	0.14	.31[†]
T2	2.35 (0.89)	1.06-4.25	0.44	.21
T3	2.34 (0.83)	1.13-4.19	0.55	.12
Across all Conditions				
Verbal Disclosure[d]				
T1	3.36 (1.10)	1.00-6.08	0.15	.34[*]
T2	3.72 (0.94)	1.00-5.92	-0.35	.35[*]
T3	4.02 (1.00)	1.63-6.75	0.10	.38[*]
Text Disclosure[e]				
T1	2.63 (1.19)	1.06-5.00	0.31	.11
T2	2.67 (1.09)	1.00-5.31	0.37	.16
T3	2.79 (1.19)	1.13-6.42	0.78	.65
Verbal Responsivity[d]				
T1	4.40 (2.02)	1.13-8.00	-0.10	.19
T2	3.99 (1.95)	1.07-7.73	0.31	.08
T3	4.41 (1.98)	1.13-7.80	0.19	.07
Nonverbal Responsivity[d]				
T1	5.12 (0.99)	2.56-7.06	-0.53	.32[*]
T2	5.19 (0.88)	1.81-6.63	-1.05	.20
T3	5.24 (0.86)	2.75-7.25	-0.25	.05
Interaction 2				
Global Behavioral Synchrony[f]				
T1	4.56 (0.93)	2.25-6.92	-0.09	-
T2	4.29 (0.77)	2.58-6.46	0.26	-
T3	4.44 (0.94)	2.33-7.33	0.21	-
Global Behavioral Mimicry[f]				
T1	4.23 (0.83)	2.56-6.38	0.06	-
T2	4.07 (0.76)	2.56-6.06	0.34	-
T3	4.22 (0.83)	2.38-7.00	0.41	-
Gestural Mimicry[f]				
T1	3.53 (0.99)	1.50-6.13	0.22	-
T2	3.21 (0.89)	1.50-5.75	0.43	-
T3	3.46 (0.99)	1.38-6.50	0.70	-
Postural mimicry[f]				
T1	4.93 (0.99)	2.63-6.88	-0.11	-
T2	4.94 (0.87)	3.00-6.75	0.10	-
T3	4.98 (0.94)	2.29-7.50	-0.28	-
Molecular Mimicry Composite[f]				
T1	2.73 (1.76)	0.00-8.00	0.82	-
T2	2.80 (2.01)	0.00-8.00	0.55	-
T3	3.42 (2.87)	0.00-14.00	1.38 [-0.37]	-
Gestural Mimicry[f]				
T1	1.12 (1.09)	0.00-4.00	0.80	-
T2	0.95 (0.94)	0.00-4.00	0.78	-

Table 1 Continued

	M (SD)	Min-Max	Skewness	ICCs
T3	0.97 (1.07)	0.00-4.00	1.17 [0.33]	-
Postural Mimicry[f]				
T1	0.86 (1.10)	0.00-6.00	1.82 [0.57]	-
T2	0.56 (0.88)	0.00-4.00	1.68 [1.02]	-
T3	0.72 (1.26)	0.00-7.00	2.42 [1.23]	-
Nod Mimicry[f]				
T1	0.75 (1.03)	0.00-4.00	1.47 [0.73]	-
T2	1.30 (1.42)	0.00-5.00	1.06 [0.28]	-
T3	1.73 (1.98)	0.00-10.00	1.44 [0.26]	-
Expressivity[g]				
T1	4.71 (1.30)	1.50-7.00	-0.23	.00
T2	4.57 (1.24)	2.00-7.00	-0.06	.23*
T3	4.57 (1.14)	1.50-7.00	0.05	.34**
Attractiveness[g]				
T1	5.24 (1.20)	2.00-8.00	-0.41	.00
T2	5.16 (1.21)	2.50-8.00	-0.21	.00
T3	5.01 (1.08)	2.50-7.50	-0.05	.00
Perceived Rapport[f]				
T1	4.53 (1.04)	2.00-7.00	0.22	-
T2	4.51 (1.10)	1.50-7.00	-0.25	-
T3	4.56 (1.17)	1.50-700	0.07	-
Positive Affect[g]				
T1	0.21 (0.19)	0.00-0.91	1.15	.45***
T2	0.19 (0.19)	0.00-0.94	1.43	.56***
T3	0.22 (0.20)	0.00-0.86	1.00	.61***

Note. Possible values for Verbal Disclosure, Verbal Responsivity, Nonverbal Responsivity, Text Disclosure, Expressivity, and Attractiveness range from 1 = not at all to 7 = very much. Possible values for Global Behavioral Synchrony, Gestural Mimicry, Postural Mimicry, and Global Behavioral Mimicry Composite range from 1 = not at all to 8 very much. Possible values for Positive Affect range from 0 = indicating that the emotion is not visible in the face to 1 = indicating that the emotion is fully present in the face. Gestural Mimicry, Postural Mimicry, Nod Mimicry, and Molecular Mimicry Composite are all presented as frequency counts. Brackets reflect skewness values for variables after being transformed. ICCs for skewed variables were performed on the transformed variable. ICC values can range between 0 and 1.

[a]*N* = 48 participants, [b]*N* = 46 participants, [c]*N* = 40 participants, [d]*N* = 94 participants, [e]*N* = 88 participants, [f]*N* = 91 dyads, [g]*N* = 182 participants.

[†]$p < .10$, [*]$p < .05$, [**]$p < .01$, [***]$p < .001$.

Table 2

The Relationship Between Synchrony, Mimicry, and Dyadic Expressivity and Positive Affect by Tine in Interaction Two

	Dyadic Expressivity			Dyadic Positive Affect		
	T1	T2	T1	T2	T1	T2
Global Rating Method						
Global Behavioral Synchrony						
T1	.50***	.36***	.21†	.37***	.30**	.25*
T2	.39***	.60***	.44***	.32**	.47***	.40***
T3	.32**	.49***	.48***	.32**	.48***	.60***
Global Mimicry Composite						
T1	.40***	.33**	.21*	.33**	.34**	.20†
T2	.37***	.56***	.43***	.32**	.43***	.36***
T3	.24***	.43***	.47***	.26*	.42***	.44***
Gestural Mimicry						
T1	.45***	.36***	.20†	.34**	.30**	.20†
T2	.38***	.63***	.45***	.29**	.42***	.36***
T3	.32***	.55***	.58***	.28**	.45***	.46***
Postural mimicry						
T1	.22*	.19†	.15	.23*	.33**	.26*
T2	.26*	.34*	.29**	.27*	.33**	.26*
T3	.10	.19†	.22*	.16	.27*	.30**
Molecular Coding Method						
Molecular Mimicry Composite						
T1	.18†	.23*	.10	.01	.10	.03
T2	.23*	.37***	.36***	.23*	.39***	.28**
T3	.32**	.31**	.31**	.13	.26*	.26*
Gestural Mimicry						
T1	.32**	.27**	.14	.15	.11	.08
T2	.12	.37***	.35***	-.01	.11	.06
T3	.18†	.33**	.32**	.00	.10	.10
Postural Mimicry						
T1	.06	.10	.10	-.09	.05	.01
T2	.15	.10	.04	.28**	.34***	.25*

Table 2 Continued

	Dyadic Expressivity			Dyadic Positive Affect		
	T1	T2	T3	T1	T2	T3
T3	.22*	.15	.15	.21*	.26*	.32**
Nod Mimicry						
T1	-.13	-.01	-.09	-.03	.05	.01
T2	.16	.20†	.25*	.17	.28**	.20†
T3	.27*	.22*	.24*	.07	.15	.12
Dyadic Positive Affect						
T1	.41***	.36***	.24*			
T2	.31**	.54***	.38***			
T3	.27*	.45***	.40***			

Notes. $N = 91$ dyads.

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3

The Relationships Between Global and Molecular Mimicry by Time in Interaction Two

	Global Mimicry Composite	Gestural Mimicry	Postural mimicry	Molecular Mimicry Composite	Gestural Mimicry	Postural Mimicry
Time 1						
	Global Rating Method			Molecular Coding Method		
Zero-Order						
Global Rating Method						
Global Mimicry Composite						
Gestural Mimicry	.83***					
Postural mimicry	.84***	.39***				
Molecular Coding Method						
Molecular Mimicry Composite	.37***	.54***	.08			
Gestural Mimicry	.40***	.59***	.07	.55***		
Postural Mimicry	.19†	.24*	.08	.61***	.07	
Nod Mimicry	.08	.11	.02	.42***	-.21*	-.05
First-Order Partial[a]						
Global Rating Method						
Global Mimicry Composite						
Gestural Mimicry	.79***					
Postural mimicry	.83***	.32**				
Molecular Coding Method						
Molecular Mimicry Composite	.35***	.55***	.05			
Gestural Mimicry	.31**	.53***	-.01	.53***		
Postural Mimicry	.22*	.27*	.09	.61***	.05	
Nod Mimicry	.14	.19 †	.05	.46***	-.18†	-.04
Time 2						
	Global Rating Method			Molecular Coding Method		
	Global Mimicry Composite	Gestural Mimicry	Postural mimicry	Molecular Mimicry Composite	Gestural Mimicry	Postural Mimicry
Zero-Order						
Global Rating Method						

Table 3 Continued

	Global Rating Method			Molecular Coding Method		
	Global Mimicry Composite	Gestural Mimicry	Postural mimicry	Molecular Mimicry Composite	Gestural Mimicry	Postural Mimicry
Global Mimicry Composite						
Gestural Mimicry	$.87^{***}$					
Postural mimicry	$.86^{***}$	$.50^{***}$				
Molecular Coding Method						
Molecular Mimicry Composite	$.50^{***}$	$.59^{***}$	$.27^{*}$			
Gestural Mimicry	$.35^{***}$	$.54^{***}$	.06	$.60^{***}$		
Postural Mimicry	$.32^{**}$	$.31^{**}$	$.24^{*}$	$.48^{***}$	.16	
Nod Mimicry	$.27^{**}$	$.30^{**}$	.17	$.75^{***}$	.14	.02
First-Order Partial ^{b}						
Global Rating Method						
Global Mimicry Composite						
Gestural Mimicry	$.80^{***}$					
Postural mimicry	$.86^{***}$	$.37^{***}$				
Molecular Coding Method						
Molecular Mimicry Composite	$.35^{***}$	$.49^{***}$	.12			
Gestural Mimicry	$.20^{\dagger}$	$.44^{***}$	-.06	$.59^{***}$		
Postural Mimicry	$.28^{**}$	$.30^{**}$	.17	$.43^{***}$	$.19^{\dagger}$	
Nod Mimicry	.17	$.21^{8}$	.08	$.73^{***}$	.10	-.08

Time 3

	Global Rating Method			Molecular Coding Method		
	Global Mimicry Composite	Gestural Mimicry	Postural mimicry	Molecular Mimicry Composite	Gestural Mimicry	Postural Mimicry
Zero-Order						
Global Rating Method						
Global Mimicry Composite						
Gestural Mimicry	$.88^{***}$					
Postural mimicry	$.86^{***}$	$.51^{***}$				
Molecular Coding Method						
Molecular Mimicry Composite	$.48^{***}$	$.54^{***}$	$.28^{**}$			

Table 3 Continued

	Global Rating Method			Molecular Coding Method		
	Global Mimicry Composite	Gestural Mimicry	Postural mimicry	Molecular Mimicry Composite	Gestural Mimicry	Postural Mimicry
Gestural Mimicry	.39***	.57***	.10	.54***		
Postural Mimicry	.32**	.29**	.27*	.54***	.08	
Nod Mimicry	.27*	.29**	.17	.74***	.12	.13
First-Order Partial[c]						
Global Rating Method						
Global Mimicry Composite						
Gestural Mimicry	.82***					
Postural mimicry	.87***	.44***				
Molecular Coding Method						
Molecular Mimicry Composite	.37***	.45***	.20†			
Gestural Mimicry	.32**	.54***	.04	.50***		
Postural Mimicry	.22*	.18†	.19†	.51***	.04	
Nod Mimicry	.18†	.19†	.12	.73***	.04	.10

Note. $N = 91$. Correlations from similar behavioral constructs appear in boxes.

[a]Partialing dyadic expressivity and dyadic positive affect at time 1. [b]Partialing dyadic expressivity and dyadic positive affect at time 2. [c]Partialing dyadic expressivity and dyadic positive affect at time 3.

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4

The Relationships Between Synchrony and Mimicry by Time in Interaction Two

	Global Behavioral Synchrony					
	Zero-Order			First-Order Partial		
Global Rating Method	T1	T2	T3	T1[a]	T2[b]	T3[c]
Gestural Mimicry						
T1	.84***	.45***	.41**	.78***	.28**	.34**
T2	.38***	.83***	.49***	.22*	.72***	.27*
T3	.37***	.53***	.85***	.23*	.27*	.79***
Postural mimicry						
T1	.54***	.33***	.35***	.49***	.23*	.33**
T2	.39***	.61***	.40***	.28**	.52***	.27*
T3	.29**	.38***	.56***	.26*	.31**	.49***
Global Mimicry Composite						
T1	.45***	.83***	.51***	.78***	.32**	.41***
T2	.38***	.53***	.82***	.30**	.74***	.32**
T3	.66***	.72***	.72***	.28**	.34**	.74***
Molecular Rating Method						
Gestural						
T1	.53***	.16	.17	.45***	-.01	.12
T2	.03	.35***	.14	-.03	.20†	.02
T3	.14	.29**	.44***	.08	.15	.42***
Postural Mimicry						
T1	.28**	.17	.18†	.32**	.14	.19†
T2	.19†	.35***	.22*	.08	.32**	.12
T3	.22*	.30**	.36***	.11	.23*	.22*
Nod Mimicry						
T1	.03	.04	.01	.12	.04	.04
T2	.08	.22*	.19†	-.01	.11	.03
T3	.18†	.23*	.27*	.06	.11	.20†
Molecular Mimicry Composite						
T1	.49***	.19†	.18†	.49***	.07	.19†
T2	.16*	.48***	.33**	.03	.33***	.13

Table 4 Continued

	Zero-Order			First-Order Partial		
	T1	T2	T3	T1[a]	T2[b]	T3[c]
T3	.27*	.38***	.50***	.14	.24*	.41***

Note. N = 91. Correlations from the same stimuli clip (i.e., timeframe) appear in boxes.

[a]Partialing dyadic expressivity and dyadic positive affect at time 1. [b]Partialing dyadic expressivity and dyadic positive affect at time 2. [c]Partialing dyadic expressivity and dyadic positive affect at time 3.

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 5

The Relationship between Experimental Condition and Behavioral Synchrony by Time in Interaction Two

	F	p	η^2_p
Model 1			
T1	1.50	.219	.049
T2	2.87^{*}	.041	.090
Pairwise Comparisons	Mean Difference[a]	p	Cohen's d
Small-talk over Visual CMC	-.28	.192	.39
Closeness over Text-only CMC	$-.58^{**}$	.009	.77
Small-talk over Text-only CMC	$-.53^{*}$	.023	.70
T3	1.97	.125	.064
Model 2			
T1	0.88	.456	.03
T2	0.18	.912	.01
T3	1.64	.186	.06

Note. Pairwise comparisons are only presented for main effects significant at $p < .05$.

[a]Closeness-inducing over visual CMC condition serves as the reference category.

$^{*}p < .05$, $^{**}p < .01$.

Table 6

The Relationships between Experimental Condition and Behavioral Mimicry by Time in Interaction Two

	F	*p*	η^2_p
Model 1			
Global Mimicry Composite			
T1	3.38*	.022	0.10
Pairwise Comparisons	Mean Difference[a]	*p*	Cohen's *d*
Closeness over Visual CMC	0.23*	.010	0.76
Small-talk over Visual CMC	0.23**	.009	0.77
Small-talk over Text-only CMC	0.24	.349	0.29
T2	5.35**	.002	0.16
Pairwise Comparisons	Mean Difference[a]	*p*	Cohen's *d*
Closeness over Visual CMC	0.77***	<.001	1.07
Small-talk over Visual CMC	0.37†	.083	0.51
Small-talk over Text-only CMC	0.13	.561	0.18
T3	2.07	.110	0.07
Gestural Mimicry			
T1	2.39†	.074	0.08
T2	2.72*	.049	0.09
Pairwise Comparisons	Mean Difference[a]	*p*	Cohen's *d*
Closeness over Visual CMC	0.69**	.007	0.86
Small-talk over Visual CMC	0.29	.250	0.37
Small-talk over Text-only CMC	0.16	.542	0.20
T3	1.16	.331	0.04
Postural mimicry			
T1	2.39†	.074	.08
T2	5.31**	.002	0.16
Pairwise Comparisons	Mean Difference[a]	*p*	Cohen's *d*
Closeness over Visual CMC	0.86***	<.001	1.05
Small-talk over Visual CMC	0.44†	.071	0.53
Small-talk over Text-only CMC	0.09	.716	0.11
T3	2.66†	.053	0.09
Molecular Mimicry Composite			

Table 6 Continued

	F	p	η^2_p
T1	0.22	.880	0.01
T2	4.49^{**}	.006	0.13
Pairwise Comparisons	Mean Difference[a]	p	Cohen's d
Closeness over Visual CMC	$0.96^{\dagger}$	.085	0.50
Small-talk over Visual CMC	-0.03	.951	0.02
Small-talk over Text-only CMC	-1.16^{*}	.048	0.61
T3	1.99	.122	0.07
Gestural Mimicry			
T1	0.90	.443	0.03
T2	1.23	.304	0.04
T3	$2.41^{\dagger}$	.073	0.08
Postural Mimicry			
T1	0.50	.684	0.02
T2	1.31	.278	0.04
T3	$2.27^{\dagger}$	.086	0.07
Nod Mimicry			
T1	0.76	.522	0.03
T2	3.86^{*}	.012	0.12
Pairwise Comparisons	Mean Difference[a]	p	Cohen's d
Closeness over Visual CMC	0.00	.987	0.00
Small-talk over Visual CMC	-0.09	.191	0.39
Small-talk over Text-only CMC	-0.22^{**}	.004	0.92
T3	1.18	.321	0.04
Model 2			
Global Mimicry Composite			
T1	2.61	.057	.08
T2	2.40	.073	.08
T3	1.52	.215	.05
Gestural Mimicry			
T1	2.25	.088	.07
T2	0.44	.726	.02
T3			

Table 6 Continued

	F	p	η^2_p
Postural mimicry			
T1	1.13	.340	.04
T2	2.40	.073	.08
T3			
Molecular Mimicry Composite			
T1	0.22	.882	.01
T2	3.06	.033	.10
Pairwise Comparisons	Mean Difference[a]	p	Cohen's d
Closeness over Visual CMC	0.31	.547	.18
Small-talk over Visual CMC	-0.36	.482	.21
Small-talk over Text-only CMC	-1.21*	.022	.70
T3			
Gestural Mimicry			
T1	0.53	.666	.02
T2	0.42	.743	.01
T3			
Postural Mimicry			
T1	0.61	.609	.02
T2	0.49	.692	.02
T3			
Nod Mimicry			
T1	0.79	.502	.03
T2	3.56	.018	.11
Pairwise Comparisons	Mean Difference[a]	p	Cohen's d
Closeness over Visual CMC	-0.04	.582	.17
Small-talk over Visual CMC	-0.11	.113	.48
Small-talk over Text-only CMC	-0.22	.003	.93
T3			

Note. Pairwise comparisons are only presented for significant main effects.

[a]Closeness-inducing over text-only CMC condition serves as the reference category.

[†]$p < .10$, [*]$p < .05$, [**]$p < .01$, [***]$p < .001$.

Table 7

Achieved and Desired Interpersonal Closeness During Interaction One Predicting Behavioral Synchrony and Mimicry by Time in Interaction Two

	Time 1				Time 2				Time 3			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	SPE	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE
Global Rating Method												
Global Behavioral Synchrony												
β_1 Achieved Interpersonal Closeness	.02	.10	.16**	.05	.08	.10	.10	.06	.11	.10	.04	.06
β_2 Desired Interpersonal Closeness	-.04	.10	-.16**	.05	-.11	.10	-.05	.06	-.18†	.10	-.05	.06
Global Mimicry Composite												
β_1 Achieved Interpersonal Closeness	-.23*	.10	-.19***	.06	-.23*	.10	-.14*	.06	-.28**	.10	-.14*	.06
β_2 Desired Interpersonal Closeness	.19†	.10	.17**	.06	.15	.10	.09	.06	.21*	.10	.12†	.06
Gestural Mimicry												
β_1 Achieved Interpersonal Closeness	-.13	.10	-.09	.06	-.11	.10	-.03	.06	-.21*	.10	-.05	.05
β_2 Desired Interpersonal Closeness	.09	.10	.07	.06	.03	.10	-.04	.06	.20†	.11	.10†	.06
Postural mimicry												
β_1 Achieved Interpersonal Closeness	-.25*	.10	-.23*	.09	-.28**	.10	-.21	.08*	-.29**	.10	-.19*	.09
β_2 Desired Interpersonal Closeness	.22*	.10	.21*	.09	.24*	.10	.19*	.08	.17	.10	.11	.09
Molecular Rating Method												
Molecular Mimicry Composite												
β_1 Achieved Interpersonal Closeness	-.12	.10	-.10	.09	-.26*	.10	-.21*	.09	-.16	.10	-.07	.09

Table 7 Continued

	Time 1				Time 2				Time 3			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	SPE	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE
β_2 Desired Interpersonal Closeness	.14	.10	.13	.09	.08	.10	.04	.09	.06	.11	.00	.09
Gestural Mimicry												
β_1 Achieved Interpersonal Closeness	-.11	.10	-.09	.09	-.10	.10	-.07	.10	-.03	.11	.06	.09
β_2 Desired Interpersonal Closeness	.00	.10	.00	.09	-.06	.10	-.08	.10	.03	.11	-.02	.10
Postural Mimicry												
β_1 Achieved Interpersonal Closeness	-.08	.10	-.07	.10	-.09	.10	-.06	.10	-.14	.10	-.08	.10
β_2 Desired Interpersonal Closeness	.14	.10	.13	.10	.09	.10	.06	.10	.14	.11	.10	.10
Nod Mimicry												
β_1 Achieved Interpersonal Closeness	.06	.10	.07	.10	$-.23^{*}$	.10	$-.20^{*}$	.10	$-.18^{\dagger}$	.10	-.14	.10
β_2 Desired Interpersonal Closeness	.08	.10	.08	.10	.10	.10	.07	.10	.08	.11	.05	.10

Note. Model 1 does not have any covariates. Model 2 includes global behavioral mimicry and molecular behavioral mimicry as covariates when the dependent variable is global behavioral synchrony and includes global behavioral synchrony as a covariate when the dependent variable is any behavioral mimicry variable.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$.

APPENDIX B

Participant Recruitment for SONA Participants

SONA DESCRIPTION

Study Name: Communicating Over Zoom (chance to win $50)

Study Type: Zoom Study/Survey Study

Duration: 60 minutes

Credits: 2 credits

Description: We are attempting to understand how social interactions are impacted by videoconferencing platforms such as Zoom. You must be at least 18 years of age, use a laptop, desktop computer, or tablet, have a webcam and built-in or external microphone, and access to stable internet or data (i.e., via a hotspot) during your session. You will receive 2 credits and will be entered in a raffle to win one of five $50 Amazon gift cards for completing a video recorded Zoom session with another participant. Please sign up for a session time in which you will have stable internet or data, and can be in a quiet undisturbed location.

Participant Recruitment for non-SONA Participants

Subject Line: Earn $20 Amazon.com gift card for helping researchers at UMaine learn about interactions over Zoom!

Hello!

We are emailing you about an opportunity to participate in a study to help us learn about how social interactions are impacted by videoconferencing platforms. Participants will complete various (hopefully fun) tasks with another person over Zoom and answer a few survey questions regarding how their interactions went. The research is being conducted by Dr. Jordan LaBouff, an Associate Professor of Psychology, and his graduate student Morgan Stosic. This research has been approved by the University of Maine Institutional Review Board.

We are interested in recruiting adults **18 years or older** who **identify as women.**

You will earn a **$20 Amazon.com gift** for completing the study, which will take no more than one hour to complete.

If you are interested in participating, please click the link below to schedule a time that works with your schedule: XXX

Please sign up for a time in which you can use a laptop, desktop computer, or tablet that has a webcam and built-in or external microphone, and access to stable internet or data (i.e., via a hotspot) during your session. Additionally, since this is a two-person study, please try to sign up for a time slot that already has another person (who you do NOT know) signed up if possible!

If you have any questions, please contact our graduate research assistant, Morgan Stosic, morgan.stosic@maine.edu, or Dr. Jordan Labouff, Jordan.labouff@maine.edu

Kind Regards,

-EPIC Lab Research Team

APPENDIX C

Email script 24 hours before study for SONA participants

Subject: Reminder of SONA Study Session, University of Maine

Thank you again for your interest in participating in the study Communicating Over Zoom. We are examining how social interactions are impacted by videoconferencing platforms such as Zoom.

This email is a reminder of your appointment scheduled for tomorrow, [date] at [time]. The session will take place over Zoom. You will be asked to participate in two tasks with another participant over Zoom. One of these tasks will be a “getting-to-know-you” task, where you will take turns asking and answering questions with one another. The other task will be a problem-solving task, where you will be given a problem and asked to generate solutions with the other participant. This session will be video recorded. You will also be asked to complete several questionnaires about your traits and emotion states. The study session should take approximately 1 hour. You will receive 2 credits for participating in this study.

Before logging onto the zoom platform, please:

a) Only use a tablet, laptop, or computer; do not log into the Zoom session on your phone
b) Be in a quiet and comfortable space and make sure that your internet is working

Below is the invitation to join the Zoom meeting:

[[Insert Zoom meeting link]]

If you need to cancel or reschedule your study session, ***please notify us immediately*** by responding to this email.

We look forward to your study session tomorrow.

Participant Recruitment Email for non-SONA students

Subject Line: Earn $20 Amazon.com gift card for helping researchers at UMaine learn about interactions over Zoom!

Hello!

We are emailing you about an opportunity to participate in a study to help us learn about how social interactions are impacted by videoconferencing platforms. Participants will complete various (hopefully fun) tasks with another person over Zoom and answer a few survey questions regarding how their interactions went. The research is being conducted by Dr. Jordan LaBouff, an Associate Professor of Psychology, and his graduate student Morgan Stosic. This research has been approved by the University of Maine Institutional Review Board.

We are interested in recruiting adults **18 years or older** who **identify as women.**

You will earn a **$20 Amazon.com gift** for completing the study, which will take no more than one hour to complete.

If you are interested in participating, please click the link below to schedule a time that works with your schedule: XXX

Please sign up for a time in which you can use a laptop, desktop computer, or tablet that has a webcam and built-in or external microphone, and access to stable internet or data (i.e., via a hotspot) during your session. Additionally, since this is a two-person study, please try to sign up for a time slot that already has another person (who you do NOT know) signed up if possible!

If you have any questions, please contact our graduate research assistant, Morgan Stosic, morgan.stosic@maine.edu, or Dr. Jordan Labouff, Jordan.labouff@maine.edu

Kind Regards,

APPENDIX D

Informed Consent Form

You are invited to participate in a research project being conducted by principal investigator Morgan Stosic, a graduate student in the Department of Psychology at the University of Maine and faculty sponsor Jordan LaBouff, PhD, a faculty member in the Department of Psychology at the University of Maine. The purpose of the research is to study different aspects of social interactions over videoconferencing platforms. You must be at least 18 years of age to participate.

What Will You Be Asked to Do?

If you decide to participate:

- You will be asked to participate in two tasks with another participant over Zoom. One of these tasks will be a "getting-to-know-you" task, where you will take turns asking and answering questions with one another. The other task will be a problem-solving task, where you will be given a problem and asked to generate solutions with the other participant. This session will be video recorded.

- You will also be asked to participate in several questionnaires regarding some demographic information from you and information about your attitudes and personality.

- Some example questions include, how much you endorse the following statement: "In emergency situations, I feel apprehensive and ill-at-ease".

- You will also be asked to participate in several questionnaires regarding your attitudes towards you partner and willingness to work with them in the future.

- This study may take approximately 60 minutes to complete.

Risks

-It is possible that you may feel uncomfortable interacting with or answering questions about you or your partner. You may skip any questions that you prefer not to answer

Benefits

- While this study will have no direct benefit to you, this research may help us learn more about social interactions over technology mediated platforms.

Compensation:

- You will receive a $20 amazon.com gift card for participating in this study or 2 credits in eligible Psychology courses at UMaine. Participants will receive 2 SONA credits or their $20 amazon.com gift card (awarded over email) within 24 hours of the study completion. You may stop at any time and still receive the credits or monetary compensation. If you skip questions that you don't feel comfortable answering, you will still receive full compensation. Students who are receiving SONA credit will also automatically be entered into a raffle to win one of five $50 amazon gift cards. Names for winners of the raffle will be randomly drawn upon completion of data collection for the study (April 2023) and winners will be notified via email.

Confidentiality

- An identification number will be used to protect your identity. An electronic, password protected computer with additional security will have key linking your name to the data and will be kept separate from the data *on a password-protected computer.* This key will be destroyed by October 2024. All video data and questionnaire data will be kept on a password protected computer indefinitely. Only trained research assistants will have access to the data. Your name or other identifying information will not be reported in any publications.

Voluntary

Participation in this study is voluntary. If you choose to take part in this study, you may stop at any time and will still receive compensation. You may skip any questions you do not wish to answer without losing compensation.

Contact Information

If you have any questions about this study, please contact Jordan LaBouff (jordan.labouff@maine.edu; 207/581-2826) or Morgan Stosic (morgan.stosic@maine.edu; 775/232-7567). If you have any questions about your rights as a research participant, please contact the Office of Research Compliance, University of Maine, 207/581-2657 (or e-mail umric@maine.edu).

Your signature below indicates that you have read the above information and agree to participate. Please sign and return to the researcher. You will receive a copy of this form.

Participant Printed Name	**Participant Signature**	**Date**

APPENDIX E

Debriefing

The study is now complete. The purpose of this study was to examine whether the closeness you felt with your partner after your first conversation is related to the nonverbal behavior you displayed during the problem-solving interaction you completed your partner (i.e., how coordinated or *synchronous* your behaviors were with each other or how often you mimicked one another's gestures. Please do not tell others about the purpose of this study as to retain its integrity in future experimental sessions.

Thank you very much for your participation in our study today. Please let us know if you have any questions.

I agree to have my videotape used in the future phase of this study as described below. In future research, we plan on having new participants attempt to infer characteristics about you by only viewing videotapes **without sound**. If you do not wish to have your videotapes used in the future, please check the appropriate box below.

Agree ________ I do not agree __________

I agree to have my videotape used in all future research where new participants at the University of Maine or in psychology laboratories at other institutions may watch my video and infer things about me.

Agree ________ I do not agree __________

I agree to have my videotape used for educational purposes and for scientific meetings outside of the university including conferences or for publications.

Agree ________ I do not agree __________

Signature ________________________ Date _________________

Printed name ______________________

APPENDIX F

Closeness-Inducing Task Questions

Set I

1. Given the choice of anyone in the world, whom would you want as a dinner guest?
2. Would you like to be famous? In what way?
3. If you could wake up tomorrow having gained any one quality or ability, what would it be?

Set II

4. If a crystal ball could tell you the truth about yourself, your life, the future, or anything else, what would you want to know?
5. Is there something that you've dreamed of doing for a long time? Why haven't you done it?
6. What is the greatest accomplishment of your life?
7. How close and warm is your family? Do you feel your childhood was happier than most other people's ?
8. What is your most treasured memory?

Set III

9. If you were going to become a close friend with your partner, please share what would be important for him or her to know.
10. Share with your partner an embarrassing moment in your life.
11. When did you last cry in front of another person? By yourself?
12. What, if anything, is too serious to be joked about?
13. Is there anything you most regret not having told someone? Why haven't you told them yet?
14. Your house, containing everything you own, catches fire. After saving your loved ones and pets, you have time to safely make a final dash to save any one item. What would it be? Why?
15. Complete this sentence: "I wish I had someone with whom I could share…"
16. If you were to die this evening with no opportunity to communicate with anyone, what would you most regret not having told someone? Why haven't you told them yet?
17. What roles do love and affection play in your life?
18. How do you feel about your relationship with your mother?
19. What do you value most in a friendship?
20. Before making a telephone call, do you ever rehearse what you are going to say? Why?

APPENDIX G

Small-talk Task Questions

Set I

1. When was the last time you walked for more than an hour? Describe where you went and what you saw.
2. How did you celebrate last Halloween?
3. What is a good number of people to have in a student household and why?
4. If you could invent a new flavor of ice cream, what would it be?
5. What gifts did you receive on your last birthday?

Set II

6. Describe the last time you went to the zoo.
7. Tell the names and ages of your family members, include grandparents, aunts, uncles, and where they were born (to the extent you know this information)
8. Where are you from? Name all the places you've lived.
9. Who is your favorite actor of your own gender? Describe a favorite scene in which this person has acted.
10. What was your impression of your university the first time you ever saw it?

Set III

11. Where did you go to high school? What was your high school like?
12. Do you prefer digital watches and clock or the kind with hands? Why?
13. What are the advantages and disadvantages of artificial Christmas trees?
14. What foreign country would you most like to visit? What attracts you to this place?
15. How often do you get your hair cut? Where do you go? Have you ever had a really bad haircut experience?
16. Do you think left-handed people are more creative than right-handed people?
17. Were you ever in a school play? What was your role? What was the plot of the play? Did anything funny ever happen when you were on stage?
18. Describe your mother's best friend.
19. What did you do this summer?
20. What is your favorite holiday? Why?

APPENDIX H

Manipulation Checks

Perceived Degree of Partner-Disclosure

1. How much did your partner tell you about themselves?

0 1 2 3 4 5 6 7

Not at all A great deal

2. How much personal or intimate information did your partner share with you?

0 1 2 3 4 5 6 7

Not at all A great deal

3. How honest and open do you think your partner was in their responses?

0 1 2 3 4 5 6 7

Not at all A great deal

4. How much knowledge do you think you gained about your partner?

0 1 2 3 4 5 6 7

Not at all A great deal

Perceived Degree of Self-Disclosure

1. How much did you tell your partner about yourself?

0 1 2 3 4 5 6 7

Not at all A great deal

2. How much personal or intimate information did you share with your partner?

0 1 2 3 4 5 6 7

Not at all A great deal

3. How honest and open do you think you were in your responses?

0 1 2 3 4 5 6 7

Not at all A great deal

4. How much knowledge do you think your partner gained about you?

0 1 2 3 4 5 6 7

Not at all A great deal

Perceived Degree of Partner-Responsivity

1. My partner really listened to me

0 1 2 3 4 5 6 7

Not at all A great deal

2. My partner seemed interested in what I was thinking and feeling

0 1 2 3 4 5 6 7

Not at all A great deal

3. My partner was responsive to my questions/answers

0 1 2 3 4 5 6 7

Not at all A great deal

4. My partner made me feel understood

0 1 2 3 4 5 6 7

Not at all A great deal

5. My partner made me feel validated

0 1 2 3 4 5 6 7

Not at all A great deal

6. My partner made me feel cared for

0 1 2 3 4 5 6 7

Not at all A great deal

Perceived Degree of Self-Responsivity

1. I really listened to my partner

0 1 2 3 4 5 6 7

Not at all A great deal

2. I seemed interested in what my partner was thinking and feeling

0 1 2 3 4 5 6 7

Not at all A great deal

3. I was responsive to my partner's questions/answers

0 1 2 3 4 5 6 7

Not at all A great deal

4. I made my partner feel understood

0 1 2 3 4 5 6 7

Not at all A great deal

5. I made my partner feel validated

0 1 2 3 4 5 6 7

Not at all A great deal

6. I made my partner feel cared for

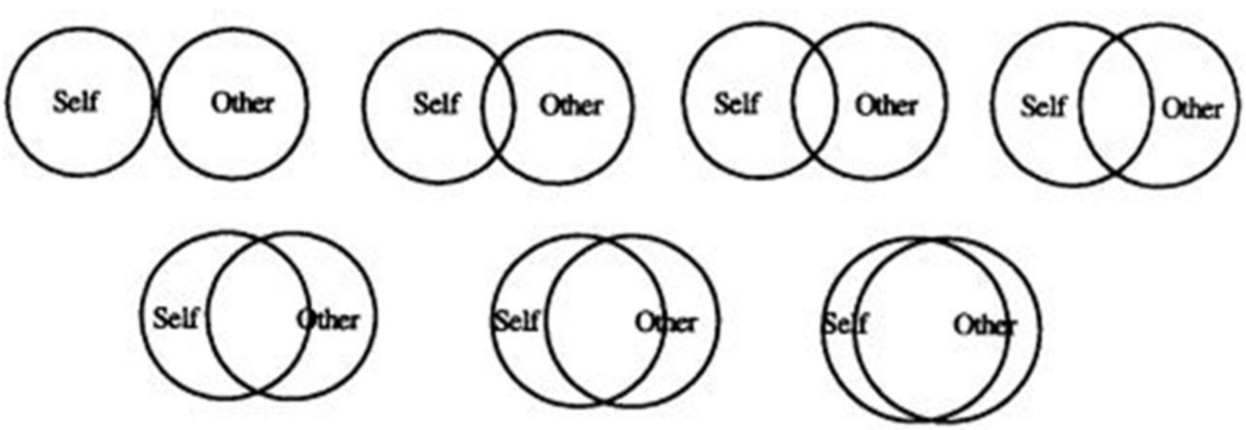
0 1 2 3 4 5 6 7

Not at all A great deal

Post-Interaction One Measures – Hypothesis Related

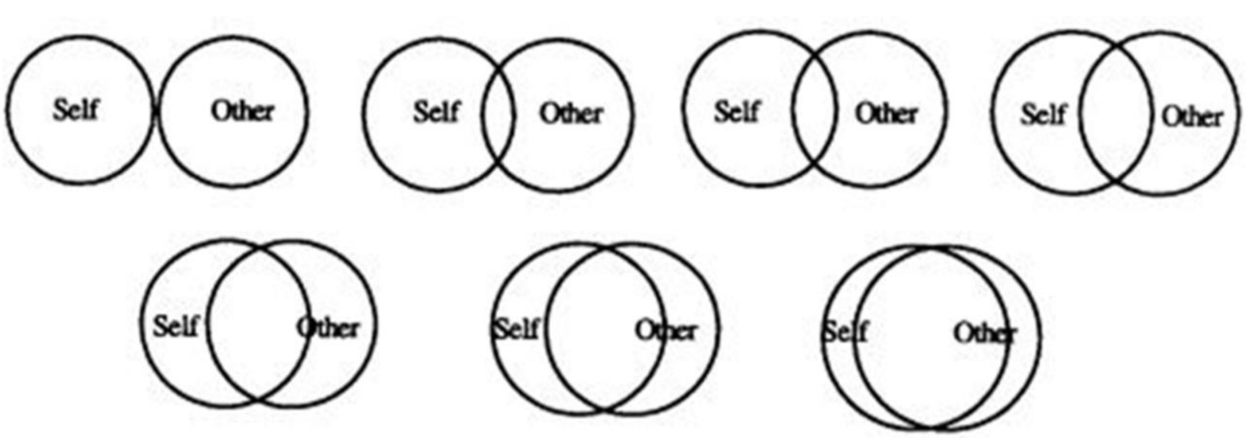
Self-Reported Achieved Interpersonal Closeness

Please choose which pair of circles best reflects **how close you feel** with your partner, where "self" indicates you and "other" indicates your partner.



Self-Reported Desire for More Interpersonal Closeness

Please choose which pair of circles best reflects **how close you would like to feel with your partner after your next conversation**, where "self" indicates you and "other" indicates your partner.



Post-Interaction One Measures - Exploratory

Achieved Interpersonal Outcomes and Desire for More Interpersonal Outcomes

1. Please rate the level of *rapport* (i.e., how much you clicked, felt like you had chemistry) you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

2. Please rate the level of *rapport* (i.e., how much you clicked, felt like you had chemistry) you **would like to feel** after your next conversation with your partner

0 1 2 3 4 5 6 7

Not at all A great deal

3. Please rate how much **you *liked*** your partner

0 1 2 3 4 5 6 7

Not at all A great deal

4. Please rate how much **you would like to *like*** your partner after your next conversation

0 1 2 3 4 5 6 7

Not at all A great deal

5. Please rate the level of *closeness* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

6. Please rate the level of *closeness* you **would like to feel** after your next conversation with your partner

0 1 2 3 4 5 6 7

Not at all A great deal

7. Please rate the level of *intimacy* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

8. Please rate the level of *intimacy* you **would like to feel** after your next conversation with your partner

0 1 2 3 4 5 6 7

Not at all A great deal

9. Please rate the level of *trust* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

10. Please rate the level of *trust* you **would like to feel** after your next conversation with your partner

0 1 2 3 4 5 6 7

Not at all A great deal

11. Please rate how much you got to know your partner

0 1 2 3 4 5 6 7

Not at all A great deal

12. Please rate how much **would you like** to get to know your partner during the next conversation

0 1 2 3 4 5 6 7

Not at all A great deal

Perceived Similarity

1. How much do you and your partner have in common with one another?

0 1 2 3 4 5 6 7

Not at all A great deal

2. How similar are you and your partner?

0 1 2 3 4 5 6 7

Not at all A great deal

Desire for Future Interaction

1. How much would you like to spend time with your partner again in the future?

0 1 2 3 4 5 6 7

Not at all Very Much

2. If there were opportunities to interact again with your partner, how likely is it that the two of you could become friends?

0 1 2 3 4 5 6 7

Not at all Very Much

Ten-Item Personality Inventory

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly
2 = Disagree moderately
3 = Disagree a little
4 = Neither agree nor disagree
5 = Agree a little
6 = Agree moderately
7 = Agree strongly

I see myself as:

1. _____ Extraverted, enthusiastic.

2. _____ Critical, quarrelsome.

3. _____ Dependable, self-disciplined.

4. _____ Anxious, easily upset.

5. _____ Open to new experiences, complex.

6. _____ Reserved, quiet.

7. _____ Sympathetic, warm.

8. _____ Disorganized, careless.

9. _____ Calm, emotionally stable.

10. _____ Conventional, uncreative.

Positive and Negative Affect Schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. **Indicate to what extent did you experience these emotions during the previous conversation with your partner.**

1	2	3	4	5
Very Slightly or Not at all	A Little	Moderately	Quite a bit	Extremely

__________ 1. Interested

__________ 2. Distressed

__________ 3. Excited

__________ 4. Upset

__________ 5. Strong

__________ 6. Guilty

__________ 7. Scared

__________ 8. Hostile

__________ 9. Enthusiastic

__________ 10. Proud

__________ 11. Irritable

__________ 12. Alert

__________ 13. Ashamed

__________ 14. Inspired

__________ 15. Nervous

__________ 16. Determined

__________ 17. Attentive

__________ 18. Jittery

__________ 19. Active

__________ 20. Afraid

Need to Belong Scale

Instructions: For each of the statements below, indicate the degree to which you agree or disagree with the statement by writing a number in the space beside the question using the scale below:

1 = Strongly disagree

2 = Moderately disagree

3 = Neither agree nor disagree

4 = Moderately agree

5 = Strongly agree

_____ 1. If other people don't seem to accept me, I don't let it bother me.

_____ 2. I try hard not to do things that will make other people avoid or reject me.

_____ 3. I seldom worry about whether other people care about me.

_____ 4. I need to feel that there are people I can turn to in times of need.

_____ 5. I want other people to accept me.

_____ 6. I do not like being alone.

_____ 7. Being apart from my friends for long periods of time does not bother me.

_____ 8. I have a strong need to belong.

_____ 9. It bothers me a great deal when I am not included in other people's plans.

____ 10. My feelings are easily hurt when I feel that others do not accept me.

Post-Interaction Two Measures - Exploratory

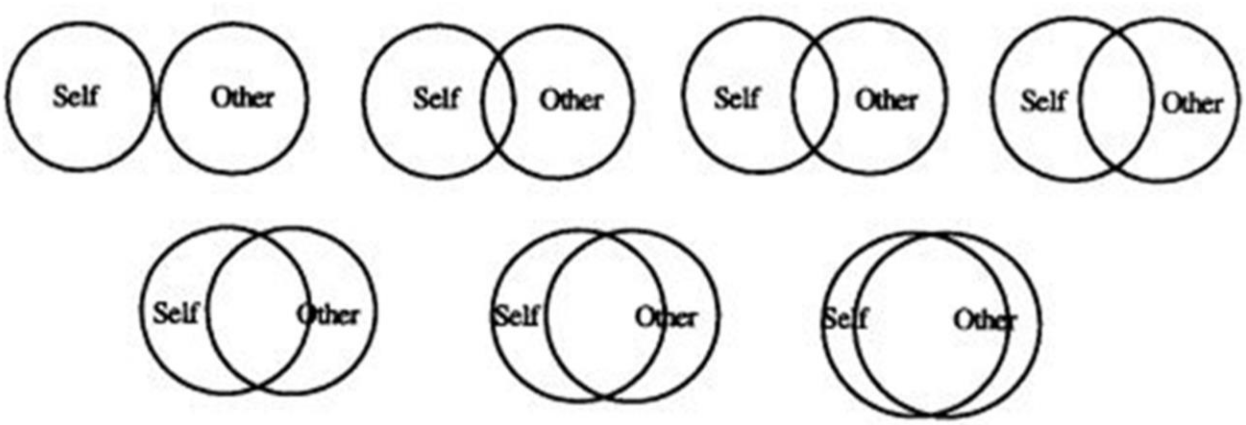
Final Solution Question

Please describe in a few sentences the final solution to the "Traveling Around Disney's EPCOT Clockwise" problem that you and your partner came up with

____

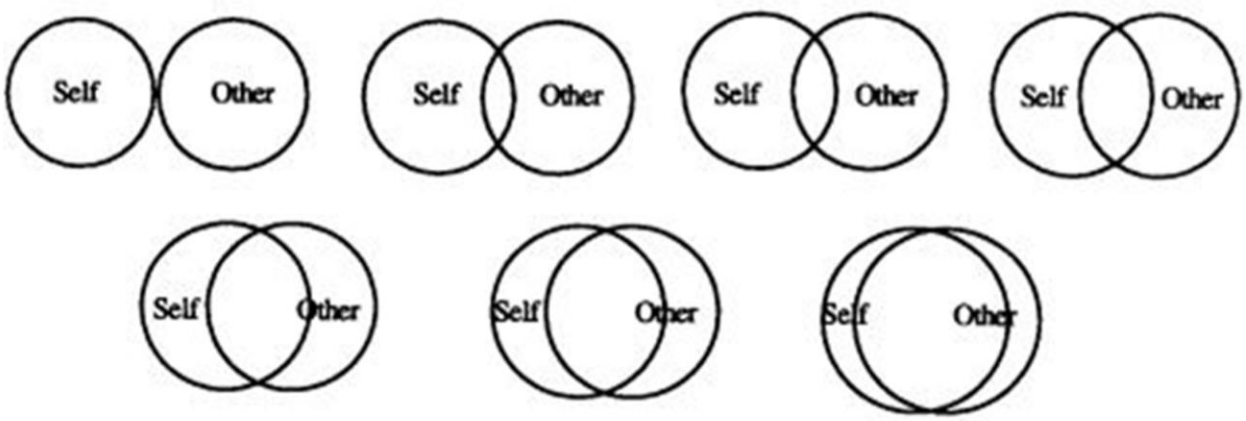
Self-Reported Achieved Interpersonal Closeness

Please choose which pair of circles best reflects **how close you feel** with your partner, where "self" indicates you and "other" indicates your partner.



Self-Reported Desire for More Interpersonal Closeness

Please choose which pair of circles best reflects **how close you would like to feel with your partner if you were to interact with them in the future**, where “self” indicates you and “other” indicates your partner.



Achieved Interpersonal Outcomes and Desire for More Interpersonal Outcomes

1. Please rate the level of *rapport* (i.e., how much you clicked, felt like you had chemistry) you **felt** between you and your partner

0	1	2	3	4	5	6	7
Not at all							A great deal

2. Please rate the level of *rapport* (i.e., how much you clicked, felt like you had chemistry) you **would like to feel** if you were to interact with your partner in the future

0	1	2	3	4	5	6	7
Not at all							A great deal

3. Please rate how much **you *liked*** your partner

0 1 2 3 4 5 6 7

Not at all A great deal

4. Please rate how much **you would like to *like*** your partner if you were to interact with them again in the future

0 1 2 3 4 5 6 7

Not at all A great deal

5. Please rate the level of *closeness* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

6. Please rate the level of *closeness* you **would like to feel** if you were to interact with your partner in the future

0 1 2 3 4 5 6 7

Not at all A great deal

7. Please rate the level of *intimacy* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

8. Please rate the level of *intimacy* you **would like to feel** if you were to interact with your partner in the future

0 1 2 3 4 5 6 7

Not at all A great deal

9. Please rate the level of *trust* you **felt** between you and your partner

0 1 2 3 4 5 6 7

Not at all A great deal

10. Please rate the level of *trust* you **would like to feel** if you were to interact with your partner in the future

0 1 2 3 4 5 6 7

Not at all A great deal

Perceived Similarity

1. How much do you and your partner have in common with one another?

0 1 2 3 4 5 6 7

Not at all A great deal

2. How similar are you and your partner?

0 1 2 3 4 5 6 7

Not at all A great deal

Desire for Future Interaction

1. How much would you like to spend time with your partner again in the future?

0 1 2 3 4 5 6 7

Not at all Very Much

2. If there were opportunities to interact again with your partner, how likely is it that the two of you could become friends?

0 1 2 3 4 5 6 7

Not at all Very Much

Leadership

1. Between you and your partner, who was more of the leader during the prior problem-solving interaction?

My partner was Equal I was

Subjective State of Deindividuation Measure - Adapted

Please indicate how you felt *during* the problem-solving task you just completed on a scale of 1 to 7 where 1 = not at all and 7 = very much.

1. Time seemed to pass quickly
2. I felt self-conscious
3. My emotions were affected
4. I was concerned with what my partner was thinking of me
5. I felt uninhibited in what I could/should say
6. When not speaking, I spent a large portion of time planning what I was going to say next
7. Much effort was required to keep the conversation going for the allotted time
8. My sense of individual identity (uniqueness) was heightened
9. I was very aware of the sounds outside my room and space (e.g., other people talking, doors closing, wind)
10. I found the problem-solving task to be invigorating
11. My thinking was somewhat altered while my partner and I were talking
12. I was primarily responsible for how things went and felt during the problem-solving task
13. My thoughts during the problem-solving task seemed concentrated and focused on the moment.
14. The problem-solving task was enjoyable
15. The responsibility for what transpired during the problem-solving task was shared equally within the group
16. I had a feeling of togetherness or connectedness with my partner
17. During the problem-solving task, I was noting various details in my partner’s appearance and dress and can provide a detailed description if necessary (e.g., what they were wearing, eye color, jewelry)

The Flow State Scale for Occupational Tasks - Adapted

Please indicate how you felt *during* the problem-solving task you just completed on a scale of 1 to 7 where 1 = not at all and 7 = very much.

1. I had a meaningful time

2. I knew clearly what I wanted to do or what I should do at every moment

3. I really enjoyed what I was doing

4. My abilities matched the challenge of what I was doing

5. I felt that I could deal with whatever might happen next

6. It felt like time passed quickly

7. It was easy to concentrate on what I was doing

8. I was aware of how well the task was going

9. The task was really boring

10. I had a sense of great control over everything I was doing

11. I lost track of time while doing the task

12. I lost myself in doing the task

13. I wanted to do the task again

14. I knew how well I was dealing with the task

Self-Reported Group Cohesion

1. My partner and I **did not** work together as a team

0 1 2 3 4 5 6 7

Not at all Very Much

2. We were cooperative with each other

0 1 2 3 4 5 6 7

Not at all Very Much

3. We knew that we could rely on one another

0 1 2 3 4 5 6 7

Not at all Very Much

4. We were **not** supportive of one another

0 1 2 3 4 5 6 7

Not at all Very Much

Demographics

What is your current gender identity? (Check all that apply)

Male

Female

Female-to-Male (FTM)/Transgender Male/Trans Man

Male-to-Female (MTF)/Transgender Female/Trans Woman

Genderqueer, neither exclusively male nor female

Additional Gender Category/(or Other), please specify ___________________

What sex were you assigned at birth (check one)?

Male

Female

What is your age in years? ________

I consider myself a member of the following racial group (check all that apply):

White

Black or African American

American Indian or Alaska Native

Asian

Native Hawaiian or Other Pacific Islander

Other

I consider myself a member of the following ethnic group:

Hispanic or Latino

Not Hispanic or Latino

APPENDIX I

Problem-Solving Task

Traveling Around Disney's EPCOT Clockwise

Experimenter script: Imagine the two of you have just been hired as a creative team at Walt Disney World. At a company meeting, you a briefed onto your first task together. Park managers at Disney's ECPOT park are concerned about a crowding issue that has been occurring in the park. For some reason, park attendees tend to travel clockwise around the park when choosing which rides to go on. Therefore, wait times for rides in Mexico, Norway, and China tend to skyrocket quickly, while wait times in the United Kingdom and Canada stay low in the morning. Then, by the time attendees have made their way around the park in the afternoon, this pattern reverses and rides in the United Kingdom and Canada become the most crowded.

Your task is to find a solution to this problem. We want you to spend the next five-minutes brainstorming ideas that will help disperse park attendees around the Disney's ECPOT more evenly. This can be technological innovations, engineering innovations, or whatever else your mind can come up with. For example, you hear that another creative team is putting together a pitch to build gates at the entrance to the right and left side of the park. When a group of park attendees scans their park ticket, either the gate to the right side or the left side of the park would open at random, in an attempt to equally disperse park attendees in clockwise and counterclockwise walking direction.

We encourage you to brainstorm many ideas, but will let you know when you have 30 seconds left so that you can agree as a team on which idea to present to the Disney board of directors. If you come up with one good solution right away, we encourage you to still take more time to generate additional solutions if you can.

While there is no correct answer to this problem, we want you to try your best to work together as a team to create the most effective, creative, and feasible solution. Please take a few moments to familiarize yourself with the map, and then we'll get started.

APPENDIX J

Disclosure Coding Sheet

Disclosure: Overall, how much does this person reveal about themselves?

1	2	3	4	5	6	7	8
Not at all							Very Much

Elaboration: How much information does this person provide in response to the question? That is, what is the breadth of the description they provide?

1	2	3	4	5	6	7	8
Not at all							Very Much

Vulnerability: How deep or revealing did this person get with their response to the question? Was the information they revealed private, embarrassing, or emotional?

1	2	3	4	5	6	7	8
Not at all							Very Much

Objective versus Subjective: Objective refers to the speaker providing facts about themselves or events, whereas subjective refers to the speaker providing their own internal thoughts, feelings, experiences. For example, objective may include statements like, “when i was younger X happened” while subjective may include statements like, “that happening made me feel mad”.

1	2	3	4	5	6	7	8
Not at all							Very Much

APPENDIX K

Responsivity Coding Sheet

Responsive: Overall, how much does this person appear to show interest in what the other person has to say?

1 2 3 4 5 6 7 8
Not at all Very Much

Engaged/Involved: How much is this person participating in the conversation opposed to letting the other person carry it?

1 2 3 4 5 6 7 8
Not at all Very Much

Indifferent: How much does this person appear bored or disinterested in what the other person has to say?

1 2 3 4 5 6 7 8
Not at all Very Much

Interactive (for verbal only)**:** Verbally acknowledges or reflects or expands on partner's responses, asks follow-up questions, or shares something similar that's related

1 2 3 4 5 6 7 8
Not at all Very Much

Warm: How friendly/kind does this person seem?

1 2 3 4 5 6 7 8
Not at all Very Much

APPENDIX L

Behavioral Synchrony Coding Sheet

Indicate to what extent you believe you the dyad you are viewing seemed to display these various behaviors.

Coordination that does NOT involve timing or rhythm

Gestural Mimicry. A gesture is any movement that has a clear beginning and end. A head nod (up and down) is a gesture. Pointing a finger is a gesture. Scratching one's knee is a gesture. Moving your hand and arm through space while you are saying something is a gesture. All because it is possible to identify precisely when the gesture began, and when it was completed. Breathing and speaking are not gestures. Changing the direction of one's gaze is not a gesture. A single instance of gestural mimicry occurs when a person performs the *exact same gesture* (copies the person they are with) at any point in the clip you are viewing. Give a rating of 1 only if you do not see any gestural mimicry at all.

In short… are they copying each other (e.g., hand movements?)

1 2 3 4 5 6 7 8
Not at all Extremely

Postural similarity/mirroring. Imagine you are rating a photograph rather than a video clip. This rating captures the extent to which the two people *look alike* (or mirror each other) in terms of their postures, head orientation, limb positions, and facial expressions. Body shape, hair, clothing, and all coloring are to be ignored. This rating is impacted by the *completeness* of the mirroring (e.g., They are both pointing at the same thing but nothing else in their bodies appeared mirrored versus, they are both looking intensely curious and both leaning forward in the same way with arms and legs in the exact same position) as well as the duration of the mirroring (e.g., two people might mirror for only 5 seconds of the clip whereas two others might mirror each other for the entire time).

In short… To what extent where their bodies matched throughout the entire video?

1 2 3 4 5 6 7 8
Not at all Extremely

The other aspect of coordination known as ***movement synchrony*****,** involves timing and rhythm. There are three manifestations of movement synchrony: (a) simultaneous movements, (b) tempo similarity, and (c) behavioral meshing .

To understand what these are, it is best to imagine the conditions under which there is, by definition, ***zero*** *movement synchrony.* Imagine two different individuals in separate rooms talking to themselves with no one else present. The postures, movements, and breathing of these two individuals would be completely independent. They would *each be moving to the beat of their own drum.*

Coordination that is *defined* by timing and rhythm

Tempo Similarity. Now imagine that both rooms had radios that were tuned to the same station that was playing an upbeat happy pop song. You might expect that the movements of these two people might be impacted by the music such that they both might start moving more energetically because they both would be driven by the music's downbeat. Although they would still be in different rooms, their movements would no longer be independent. *They literally would both be dancing to the beat of the same drum.* The key aspect of this rating is the speed of the beats, not their rhythm. Think of two fast-talking New Yorkers having a conversation versus two Cajun alligator trappers in the deep south. The tempo similarity within these two conversational pairs would be very high compared to what would occur when one of the New Yorkers attempts to talk with one of the alligator trappers.

In short, think… are these people listening to the same tempo of music?

1	2	3	4	5	6	7	8
Not at all							Extremely

Simultaneous Movement. Imagine further that one of these people is a head bopper, who doesn't move their body much but moves their head a lot in time with the music. Imagine that other person is a hip gyrator who doesn't beat so much as they fluidly sway and gyrate their hips. If both are dancing to the same music in their own ways AND if they are both keeping perfect time, then the downbeats of the head bopper's head should be perfectly in sync with the hip sways of the other. In this case, simultaneous movement would be very high. But suppose the head-bopper can't keep a beat well such that, although it is clear that they are moving to the same music, they do not hit the beats perfectly in sync. The head popper is always "off" slightly. A fraction early or a fraction late. If you were listening to a band or orchestra you might describe this as "tightness." A band that is tight hits the notes in perfect sync sounding as one. The sloppy or loose band players can't quite hit the note at the exact time. Simultaneous movement does not have to be driven by tempo or rhythm. Another manifestation of this might be if one person blinks at the exact instant another person sneezes. The two people are moving different body parts simultaneously but not because of any dancing rhythm but because they are both impacted by the same stimulus.

- Note: If two people aren't moving at all, this is low simultaneous movement, because they aren't moving! If one person is moving a bunch and the other person isn't moving at all, this is also low simultaneous movement.

In short, think…are the people moving their bodies at the same time?

1	2	3	4	5	6	7	8
Not at all							Extremely

Coordination and Smoothness (Behavioral Meshing). When two people are dancing they are not copying or mirroring each other's movements so much as **complementing** them. They movements *fit together* like two pieces of a puzzle. When they fit together well, the perception is that they are two components to the same single *thing* like a watch's second hand and underlying gears are different components that all perceived as *one* watch. This rating is similar to the gestalt notion of unity. Assume you are watching two people dancing rather than an interaction. How smoothly do the behaviors of the two people smoothly intertwine and mesh with each other in a way that makes them appear as a single unit, as opposed to two independent people?

In short, think…how connected do these people appear?

1	2	3	4	5	6	7	8
Not at all							Extremely

APPENDIX M

General Impression Rating Coding Sheet

Expressivity: The extent that one's nonverbal expressions, gestures, and body movements charismatically command the attention of others (Friedman et al., 1988; Riggio & Friedman, 1986). An individual's total behavior is active, animated, and exaggerated. People who are expressive show their emotions quite readily, whereas those who are not tend to have "poker faces" and gesticulate very little.

1 2 3 4 5 6 7
Not at all Extremely

Attractiveness (Natural Beauty): The extent to which one appears pleasant to look at, and might be considered conventionally attractive by society compared to other men or women their age.

1 2 3 4 5 6 7
Not at all Extremely

Rapport: Rapport is a term used to describe the combination of qualities that emerge from an interaction where two people seemed on the same wavelength. These interactions are characterized by such statements as "we really clicked" or "we experienced real chemistry."

1 2 3 4 5 6 7
Not at all Extremely

APPENDIX N

Problem-Solving Outcomes Coding Sheet

Creativity: This code captures how *original*, *innovative*, and *imaginative* the solution was.

For example, a response that involves building a bridge or adding multiple entrances to disperse the crowds might score lower on creativity than a response that suggests implementing a scavenger hunt or opening new breakfast shops on the right side of the park.

1	2	3	4	5	6	7
Not at all						Extremely

Cost: This code would reflect how *expensive* the solution is likely to be to implement.

<u>For example,</u> a response that involves having employees direct people where to go or limiting the park's capacity might score lower than a response that involves building new structures, such as bridges or new attractions.

<u>Note</u>: Consider only the cost to *implement* the solution. For instance, while limiting the number of people in the park might "cost" Disney, because they won't be making as much money, this solution would still be free to implement and would therefore be rated as low cost.

1	2	3	4	5	6	7
Not at all						Extremely

Complexity: This code would assess how *intricate* or *involved* the pair's solution was.

<u>For example</u>, a response that proposes having multiple park entrances might score lower on complexity than a response that suggests giving visitors wristbands of different colors that allow them access to different attractions at different times.

<u>Note</u>: Consider how many solutions were offered by the pair. Most will only offer one, but some offer multiple parts of their solution - incorporate this into your score such that *the more solutions that were offered, the higher they would score on complexity.*

1	2	3	4	5	6	7
Not at all						Extremely

Visitor Experience: This code would capture how much the proposed solution is likely to *enhance the overall visitor experience* - to make it better and more fun, or to *decrease the overall visitor experience* - to make it less enjoyable.

<u>For example,</u> a response that suggests adding more interactive play areas or events that would encourage visitors to go to different places might score higher on enhancing

visitor's experience whereas a response that forces visitors to go in a specific walking direction may decrease visitor's experience.

Note: Consider the impact on *potential visitors* here too. For instance, while limiting the number of people in the park may enhance the experience for those who get in, it would hurt the experience for those who were not able to get into the park. Therefore, this proposed solution might be near the lower end of the scale.

1	2	3	4	5	6	7
Not at all						Extremely

BIOGRAPHY OF THE AUTHOR

Morgan Stosic was born and raised in Reno, Nevada on June 13th, 1997. She attended Oregon State University where she graduated in 2019 with a Bachelor's degree in Psychology. She moved to Orono, Maine that same year to begin the Psychology graduate program at the University of Maine with a focus in Social Psychology. Morgan is now a candidate for the Doctor of Philosophy degree in Psychology from the University of Maine in August 2023. After receiving her degree, Morgan will be joining Collective Health, a third-party healthcare benefits administrator, to begin her career as a research scientist.