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LETTING ACCURACY 'SYNC' IN: THE ROLE OF SYNCHRONY IN PERCEPTIONS OF PERSONALITY TRAITS AND AFFECTIVE STATES

By

Morgan D. Stosic

B.S. Oregon State University, 2019

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A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Arts

(in Psychology)

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June 2021

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By Morgan D. Stosic

Thesis Advisor: Dr. Mollie A. Ruben

An Abstract of the Thesis Presented
in Partial Fulfillment of the Requirements for the
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The human propensity to synchronize their behaviors to one another seems to be an ever-present aspect of our social lives. While a breadth of approaches have been taken to explain this phenomenon, the benefit of individuals temporally aligning their behaviors to one another during an interaction remains to be precisely identified. Some have argued that by becoming synchronized to the movements and actions of another, one may become a better perceiver of that other's internal attributes (Hoehl et al., 2021). The purpose of the present thesis was to explore this potential benefit of synchrony by examining its relation to one's ability to accurately judge the personality traits and affective states of an interaction partner. A secondary purpose was to explore whether these two interpersonal processes central to face-to-face interactions, synchrony and interpersonal accuracy, would be hindered if they took place over a videoconferencing platform.

Groups of two strangers (N = 196 participants, N = 98 dyads) logged onto a videoconferencing platform (Zoom) with an experimenter and were asked to engage in a five-minute long recorded "getting-to-know-you" interaction. Subsequently, participants were asked to complete a variety of questionnaires including judgments of their partner's personality traits

and affective states from the prior interaction. Accuracy for judgments of personality traits and affective states was operationalized as the correlation between participant's judgments of their partners states and traits, and their partner's self-reported states and traits. The recordings derived from these interactions underwent rigorous coding by eight trained research assistants in order to determine the extent to which interactants' behaviors were synchronized with one another during the first 30-seconds, middle 30-seconds, and last 30-seconds of conversation.

Results supported that dyads whose movements were more synchronized with one another during their interaction were subsequently more accurate judges of their interaction partner's personality traits and affective states. However, this relationship was only significant when examined during the beginning of the interaction, indicating that becoming temporally aligned to an interaction partner within the first 30-seconds of conversation seems to be most important for facilitating accuracy for interpersonal judgments of that person. In addition, the predictive validity relationships observed between synchrony, interpersonal accuracy, and a collection of theoretically-related outcome variables suggested that individuals' tendency to synchronize with one another, as well as form accurate judgments of another's states and traits, was likely not substantially hindered by videoconferencing platforms. These findings not only help refine existing theoretical frameworks regarding synchrony and accuracy, but help to address core questions regarding the benefits of humans' innate tendency to synchronize their behaviors with one another.

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CHAPTER 1

INTRODUCTION

To a greater degree than some may realize, systems are programmed to synchronize to the external world around them, including to one another. Schools of fish coordinate their behavior to move through water in a seamless, synchronized fashion (Parrish et al., 2002), flocks of birds likewise display this pattern of unified movement throughout the sky (Okubo, 1986), and fireflies even flash their lights in unison (Moiseff & Copeland, 2010). If one were to even observe two lifeless metronomes next to each other that were started at different times, within a short period of time the arms of the metronomes would begin to swing together in-time (Pantaleone, 2002).

With respect to humans, synchrony can manifest as an intentional coordination between dyads or groups of individuals such as a dance team performing a choreographed routine, or a rock band playing their instruments together in rhythm. Yet, synchrony can also manifest completely outside of human awareness, such as two friends falling into identical step with one another while walking down the street (van Uelzen et al., 2008), or on a larger scale such as spontaneous rhythmic applause by a crowd in a concert hall (Neda et al., 2000). Given the seemingly ubiquitous presence of synchrony throughout a variety of physical and biological systems, it is not surprising that some have argued that this phenomenon may be one of the most pervasive drives throughout all of nature (Strogatz, 2012).

Although the benefits of synchronized behavior have already been posited for some biological systems (e.g., unified movement among birds serves to protect from predators, Fernández-Juricic et al., 2004; coordinated flashing of lights by fireflies serves to attract potential mates, Moiseff & Copeland, 2010), the benefit of humans synchronizing their behavior

to one another has yet to be precisely determined (Bernieri & Rosenthal, 1991; Hoehl, et al., 2021). The purpose of this thesis is to thoroughly explore one possible evolutionary benefit associated with synchronous behavior that may serve as a clue to why human beings "sync". Specifically, the present research will be the very first to examine whether synchrony may act as a mechanism that helps facilitates the accurate perception of others' internal attributes.

Interpersonal Synchrony

Interpersonal synchrony, and its associated construct of mimicry (aka mirroring or behavior matching), comprise the larger construct of interpersonal coordination (Bernieri & Rosenthal, 1991). Defined loosely, interpersonal coordination is the "degree to which individuals' behaviors during an interaction are nonrandom, patterned, or synchronized" (Bernieri & Rosenthal, 1991, p. 403). What differentiates synchrony from mimicry is the precise *timing* of behaviors (Chartrand & Lakin, 2013; Lakin et al., 2003). Specifically, mimicry incorporates a temporal delay in a sequential string of actions (e.g., one person itches their nose followed a few seconds later by their interaction partner imitating the same action; Vicaria & Dickens, 2016). Synchrony, on the other hand, is characterized by a precise *lack of temporal delay* in terms of behavioral coordination, which means that behaviors occur at exactly the same time. Although the terms synchrony and mimicry are sometimes used interchangeably, these two facets of interpersonal coordination are likely driven by separate neural mechanisms (e.g., mimicry by motor-mirror neurons, Gallese et al., 2004, Rizzolatti & Craighero, 2004; synchrony by the cerebrum and basal ganglia, Ivry & Spencer, 2004), and certainly engender different interpersonal outcomes. Therefore, for the purposes of the present thesis, I will limit the scope of interpersonal coordination to the measurement and analysis of synchrony.

Interpersonal synchrony can be defined and understood in terms of its three constituent components: *tempo similarity, simultaneous movement,* and *coordination and smoothness* (Bernieri & Rosenthal, 1991). To understand what each of these components of synchrony are, imagine two different individuals standing next to each other at a concert. You might expect that the movements of these two people become impacted by the music such that the individuals' movements would no longer be independent because they both would be driven by the music's downbeat. This aspect of synchrony is *tempo similarity,* and is defined by the match in the speed at which individuals are moving (e.g., are they both moving slowly to the sound of classical music, energetically to the sound of rock music, or are their speeds mismatched?). This interactional "rhythm" becomes the supporting structure of the interaction, much like how a rhythm is the supporting structure of a musical composition.

Imagine further that one of these individuals is swaying their hips to the beat of the music while the other is bobbing their head. If both individuals are keeping perfect timing to the rhythm and beats of the music, then the swaying of one's hip should occur at the precise moment that the other individual bobs their head. In this way, even though both individuals are dancing and moving in their own unique ways, their movements are occurring at the same exact time. This aspect of synchrony is called *simultaneous movement*.

Finally, assume both individuals turn to one another and agree to start dancing together. As one steps forward, the other steps back, and both begin to move in unity with one another. From the perception of an onlooker, it would appear as though the individuals are two components to the same single unit instead of two separate people. Their movements "fit" together, as two pieces of a puzzle, in the way that they smoothly intertwine and mesh together. This final characteristic of synchrony constitutes *coordination/smoothness.* Although the

manifestation of synchrony in the present illustrative example is dependent upon, and impacted by, an external stimulus (i.e., music at a concert), in an interpersonal interaction this external stimulus is the person or persons that one is interacting with.

Measuring Synchrony.

Various methods have been developed to capture the synchrony process. The oldest of these methodologies is microanalysis, where interactions are analyzed frame-by-frame by human coders who look for changes in the movements of interactants (e.g., Condon & Ogston, 1966). Although this process allows for synchrony to be easily broken down by the constituent body parts of the interacting individuals (e.g., synchrony in posture versus synchrony in facial expressions), it is incredibly laborious depending upon the length of any given interaction, as well as the number of units (i.e., body parts) on a given individual that are being coded for changes in movement. Coding a single minute of an interpersonal interaction frame-by-frame could take even the most experienced of coders hours to complete.

Automatized microanalysis tools have since been developed in order to aid the arduous efforts of human coders. One such computer-based tool developed by Nagaoka and Komori (2008) automatically detects whether an individual is moving at any given time during an interaction. This allows researchers to correlate the movements of one individual across time with that of their interaction partner in order to assess the degree to which the two were simultaneously moving during their interaction. A similar tool, Motion Energy Analysis (Ramseyer, 2020; Ramseyer & Tschacher, 2011), is a freely available software that monitors the amount of movement that occurs within a previously defined area of interest (e.g., the head versus the torso) and therefore allows for an even more fine-grained approach to automatic coding of synchrony than Nagaoka and Komori (2008). However, caution should be exercised

regarding these new technologies given that, in addition to requiring very good quality video to detect subtle changes in movement, the reliability and validity of these programs are less well established.

While these new technologies have certainly surmounted various difficulties inherent within human coded microanalysis, nonverbal behavior research has consistently found that gestalt (aka molar) impressions tend to yield more useful information about an attribute or criterion than do micro (aka molecular) impressions (Ambady & Rosenthal, 1993). Additionally, given that synchrony is an observable external characteristic of an interaction, it is likely that asking raters to simply perceive synchrony, as opposed to measuring it with mechanical or laborious microanalysis, may actually allow for an easier and more fruitful approach to capturing synchronous behavior. Following this line of thought, Bernieri & Rosenthal (1991) developed a rating scale where reliable human coders rate, on a Likert scale, the extent to which interacting participants' movement speeds are matched with one another (tempo similarity), that their movements occur at the same time (simultaneous movement), and that they generally appear as if they are a single unit (coordination/smoothness). This coding procedure also asks coders to rate two additional aspects of the interaction: the degree to which the posture of one interactant matches the other (posture similarity) and the degree to which the movements of one interactant are copied/matched by the other (gestural mimicry). Whereas the first three codes (tempo similarity, simultaneous movement, coordination/smoothness) capture *synchronous* behaviors, the two additional codes (posture similarity, gestural mimicry) reflect the *mimicry* domain of interpersonal coordination.

This rating procedure is often applied on short segments of an interaction (i.e., thin slices) as opposed to having coders rate an entire interaction, as ratings derived from shorter clips of

nonverbal behavior are generally just as representative of any given behavior as ratings derived from an entire interaction (Murphy et al., 2015, 2019). When applied to these short clips, this rating approach generally produces high reliability among raters (alphas between .75 to 85; Bernieri, 1988; Bernieri et al., 1988), and can validly discriminate between synchrony that occurs by chance and true synchronous behaviors (e.g., Bernieri & Rosenthal, 1991; Bernieri et al., 1988; Kimura & Daibo, 2006). Thus, it appears as though approaching the measurement of synchrony from a gestalt lens may be the least strenuous and most conducive avenue for assessing interpersonal synchrony.

The Benefit of Synchrony.

Although synchrony has been described as one of the most pervasive drives throughout all of nature, not much is known regarding the evolutionary benefit(s) of humans spontaneously synchronizing their behaviors. That is, *why* do we sync? In a recent special issue on interpersonal synchrony, Hoehl and colleagues (2021) discussed several possible evolutionary accounts regarding the advantages that synchrony affords. Specifically, they argue that synchrony might facilitate *affiliation* and *perception.*

Affiliation. Along with Hoehl and colleagues (2021), scholars have argued that interpersonal synchrony may have been evolutionarily selected for as a marker of individuals who would make favorable social partners (Freeman, 2000; McNeill, 1995). Evidence for this claim seems to be mounting, as the majority of synchrony research to date has examined synchrony's effect on perceived or actual affiliation. Within roleplaying teacher-student interactions, pairs who were rated as more synchronous by outside observers self-reported experiencing more rapport with their interaction partner (Bernieri, 1988). When examining synchrony between mothers and their infants at 3 and 9 months of age, dyads whose interactions

were more synchronous at 3 months had more secure attachment styles, relative to avoidant attachment styles at 9 months (Isabella & Belsky, 1991).

Although these studies were correlational in nature, experimental paradigms have also been used to examine the relationship between synchrony and affiliative outcomes. Tarr and collegues (2016) taught participants a series of dance moves to perform during a "silent disco", and found that those who were in the synchronous dance condition subsequently reported feeling more connected to those who they had danced with, liked them more, and felt as though their personalities were more similar. In another creative approach to manipulating synchrony, Wiltermuth and Heath (2009) had experimenters lead groups of participants on walks around campus where participants were required to walk in step with one another (synchrony condition), or walk normally (control condition). Groups who had walked in step with one another were objectively better at cooperating with their group members on a later, ostensibly separate experiment, and self-reported feeling more connected to their counterparts than groups who did not have instructions to walk synchronously. Thus, it seems as though synchrony is consistently related to a variety of affiliative outcomes such as increased feelings of *rapport, liking, perceived similarity*, and a greater *willingness to cooperate* with another.

A small wealth of literature has examined these affiliative benefits while taking into account the biological sex of interactants. Consistent with socially defined gender roles, females are generally taught and expected to be more cooperative and affiliative with others than are males (Broverman et al., 1972). Following, affiliative outcomes have been shown to be highest among two interacting females, in comparison to a female interacting with a male (Wilkinson et al., 2013; Van Vugt et al., 2007), with the least amount of affiliative behaviors observed between males interacting with other males. Seeing as how the need to achieve affiliative outcomes is

emphasized for females at a young age and reinforced through gender roles/societal norms, one might expect that synchronous behaviors would be the most prominent among females interacting with other females. Indeed, some research has shown that female-female dyads display more synchronous behaviors with one another when asked to engage in a naturalistic conversation compared to male-male dyads (Fujiwara et al., 2019; Thorson & West, 2018). In addition, Bernieri and colleagues (1994) found that the relationship between synchrony and affiliative outcomes was moderated by biological sex such that these relationships were strongest among females. In this way, an abundance of evidence suggests that synchrony may be an evolutionarily benefit by means of inducing social bonding and affiliation, and may be strongest among females.

Perception. While it seems clear that interpersonal synchrony engenders greater affiliation, some researchers have posited that "[b]eyond the broad relationship between behavioral coordination and positive social outcomes, the nature of the coordination itself [may have] significant bearing on core elements of social cognition" (Miles et al., 2010, p. 4). Hoehl and colleagues (2021) argue more specifically that synchrony may help optimize an organism's efficiency in interacting within a complex and dynamic environment by facilitating the *accurate perception* of other humans. Human brains are constantly working to process a large number of behavioral cues emanating from other humans which may be valid signals to an individual's interpersonal attributes (e.g., traits, states, motivations, thoughts, goals, etc.), or may simply be noise. Syncing up with another may act as a mechanism that helps to filter out non-relevant cues, consequently increasing one's ability to accurately assess the interpersonal features of those they are synced to. Research has shown that the simple observation of another moving in an identical way to one's self leads to a blurring of the self and the other on a neurocognitive level (Wheatley

et al., 2012) and increases one's attention towards that individual (Lang et al., 2017). Thus, by increasing attention towards the person one is interacting with, and by allowing one to neurologically experience the cognitive state of another, synchrony may facilitate the accurate perception of others' interpersonal attributes.

Some research in the area of social cognition has tested whether synchrony facilities accurate *memory* for the appearance of one's interaction partner (e.g., Macrae et al., 2008; Miles et al., 2010). Macrae and colleagues (2008) found that when participants were asked to wave their hand in sync, relative to out of sync, with an experimenter, they were more accurate in their later recollection of the experimenter's physical features. While this study certainly seems to support the theory that synchrony is evolutionarily beneficial for the perception of others, it does not address the core of Hoehl and colleagues (2021) position that this enhanced perception is for the *internal* characteristics, or behavioral intentions, of another that are not readily apparent to an outside observer. To date, no study to date has directly tested whether individuals who are more in sync with one another are subsequently more accurate judges of the interpersonal characteristics of the person whom they are synchronized with.

Interpersonal Accuracy

It is important for individuals to be able to accurately judge those whom they are interacting with – especially when meeting someone for the first time. Determining whether someone is mad (i.e., their affective state) might be useful information in deciding whether to approach or avoid that individual. Additionally, assessing someone's conscientiousness (i.e., their personality trait) might be useful information in deciding whether that person may be helpful on a task. In order to better understand whether and when people are accurate in their inferences of other's states, traits, attitudes, health, etc., the field of *interpersonal accuracy*

emerged (Davis & Kraus, 1997; Hall et al., 2016). Although the umbrella term "interpersonal accuracy" can be used to denote the process of accurately perceiving a wide variety of interpersonal features, the two most well-researched, and most essential to nearly all interpersonal interactions, are accurate perceptions of *personality* (e.g., Funder & Colvin, 1988), and *affect* (e.g., Ekman et al., 1987), which will be the two areas of focus for the present thesis.

Funder's (1995, 1999) Realistic Accuracy Model.

While neither personality nor affect are directly observable, these attributes can be validly revealed through a target's (i.e., the person being judged) verbal and nonverbal behavior. Funder's Realistic Accuracy Model (RAM; 1995, 1999) is one of the most comprehensive models for describing how these behavioral cues are utilized by a perceiver (i.e., the person doing the judging) in order to achieve accuracy. First, the target's attribute must produce a *relevant* behavioral cue. For example, if the attribute is a happy affective state, then the relevant behavioral cue may be the presence of a smile and crow's feet around the eyes (Gunnery & Ruben, 2016). Second, the behavioral cue must be *available* to the perceiver. If the behavioral cue is covered up (e.g., a smile covered by a face mask or the person being judged is out of the frame in a videoconferencing call), then the accuracy process may be hindered. Third, the relevant and available behavioral cues must be *detected* by the perceiver. Perceivers can miss behavioral cues if they are not paying attention or are not particularly motivated to detect behavioral cues that are especially difficult to perceive. Finally, a perceiver must correctly *utilize* the relevant and available behavioral cues in order to achieve accuracy. That is, they must use their prior knowledge regarding the relation of behavioral cues to attributes to realize, for example, that a smile and crow's feet around the eyes may be some of the behavioral cues diagnostic of a happy affective state opposed to a sad affective state.

Whereas the relevance and availability of behavioral cues are processes attributed to the target, the detection and utilization of behavioral cues are processes attributed to the perceiver. Unless certain interventions, trainings, or natural stereotype updating occurs that change a perceiver's beliefs about which behavioral cues are valid indicators of certain states and traits, a perceiver's ability to correctly *utilize* the collection of behavioral cues emanating from a target is generally stable. A perceiver's *detection* of behavioral cues, however, likely differs to a great extent from interaction to interaction as it is particularly influenced by attention and motivation, and may therefore be particularly susceptible to the influence of synchrony. Specifically, if syncing up with one another allows one to share in some of the neurological experiences of the target (Wheatley et al., 2012) and increases one's attention towards the target (Lang et al., 2017), then it could be that synchrony facilitates interpersonal accuracy by means of increasing a perceiver's *detection* of relevant and available behavioral cues. Figure 1.1 depicts the manner in which synchrony is theorized to relate to the accurate perception of personality traits and affective states.

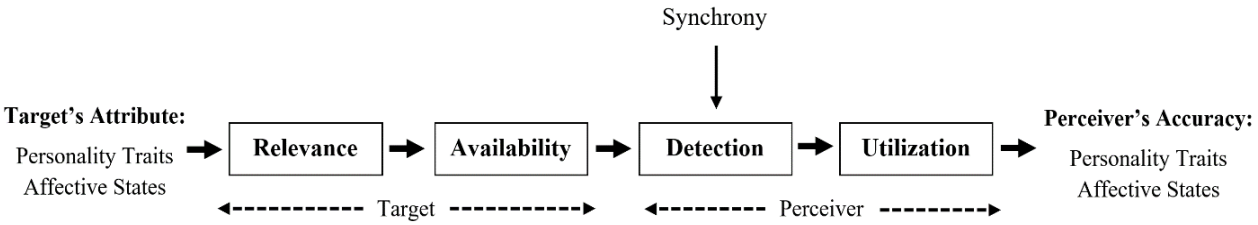


Figure 1.1 Adapted from Funder's (1995, 1999) Realistic Accuracy Model of the process of accurate judgment.

Personality and Affective Sate Perception Accuracy.

Applying the RAM to the study of personality traits and affective state perception accuracy is a useful approach for understanding whether accurate judgments are made, and

when. However, there are a variety of additional methodological distinctions to consider when examining accuracy for these two interpersonal features. For instance, researchers differ in the accuracy criteria they employ (e.g., whether it's the target's self-reported states/traits, the consensus of outside judges, or a state/trait that a target was instructed to act out), the accuracy medium (e.g., assessed via live dyadic or round-robin interactions versus standardized tests), response options (e.g., are judgments made on continuous scales, are they categorical, or are they dichotomous?), and acquaintanceship with target (e.g., are they friends or family, are they strangers who have just interacted, or are perceiver's judgments taken when no interaction with a target has actually occurred?). Each of these methodological distinctions strongly relates to individuals' accuracy, and therefore makes it difficult to compare mean levels of accuracy for assessing personality traits and affective states across studies (Hall et al., 2016; Schlegel et al., 2017). In general, however, it appears as though individuals on average have a relatively easy time assessing the affective states of others (Carney et al., 2007), and are moderately accurate in assessing the personality traits of others (Connelly & Ones, 2010). Interestingly, while interpersonal accuracy for some personality traits is greater than chance even when no interaction with the target has occurred (i.e., zero-acquaintance; Ambady et al., 1995; Brown & Bernieri, 2017), accuracy for judgments of strangers' personality seems to reach its peak and stabilize after a simple getting-to-know-you conversation, and does not change much with increasing acquaintanceship thereafter (Brown & Bernieri, 2017).

The intricate differences in methodological approaches to interpersonal accuracy have also made it so that the relationship between personality perception accuracy and affective state perception accuracy is less well-known. Theory suggests, however, that one's ability to judge the affective states of another should relate to their ability to judge one's personality, as personality

is often revealed through affective states (Funder, 2013; Hall et al., 2017). Some evidence supports this theory, with the relationship between personality perception accuracy and affective state perception accuracy from live interactions seemly dependent upon which states and traits are being examined (e.g., accuracy for judging fear and neuroticism are related, r = .23, whereas accuracy for judging happiness and extraversion are not, r = -.01; Hall et al., 2017). Meta-analytic efforts have found similar positive, yet small, correlations between these two skills across standardized tests (meta r = .09; Schlegel et al., 2017). Thus, it appears as though personality perception accuracy and affective state perception accuracy are distinct, yet related, skills.

Outcomes Related to Interpersonal Accuracy.

Much like how synchronous interactions seem to be rife with positive social outcomes, researchers have found that interpersonal accuracy is often related to a variety of affiliative interaction outcomes (Schmid Mast & Hall, 2018). Those who are more accurate in judging others are often rated much more positively by these others, such as accurate teachers who are rated as more effective by their students (Kurkul, 2007), accurate superiors who are rated as more satisfying to cooperate and work with by their subordinates (Schmid Mast et al., 2012), and accurate providers who develop greater rapport with their patients (DiMatteo et al., 1979). Interpersonal accuracy may also be related to how positively a perceiver feels about the person they are judging. For instance, it may be that the more one likes or feels rapport with an individual they are interacting with, the more likely one is to judge them accurately. Researchers have made little progress in identifying the processes by which accurate individuals come to be viewed more positively, however some have posited that one's behavioral adaptability (i.e., a person's ability to adapt their behavior to the needs of their interaction partner) may mediate the

relationship between interpersonal accuracy and affiliative outcomes (Schmid Mast & Hall, 2018). As such, it appears as though it is less of a single behavior (e.g., smiling more) that characterizes highly accurate individuals, but an overall social interaction style that is related to the affiliative feelings a perceiver has towards a target, as well as the affiliative feelings that the target has towards the perceiver.

As with synchrony, the accuracy of an individual's judgments of the states and traits of another often is related to the perceiver's biological sex. The pioneering work of Hall (1978) has uncovered a robust and consistent sex difference in interpersonal accuracy, with females showing a consistent advantage over males in terms of accuracy. Regarding emotions, a recent meta-analysis by Thompson and Voyer (2014) replicated this finding, where women were found to be more accurate judges for every affective state they examined. Women have also been found to be more accurate in judging a variety of different personality traits in comparison to men (Ambady et al., 1995; Hall et al., 2016; Vogt & Colvin, 2003). While the reason for this consistent female advantage is unknown, researchers have speculated that evolutionary challenges, motivational differences, socialization pressures, or some combination of these factors may help explain these differences (Brody, 1985; Hall et al., 2016).

Pilot Data on Synchrony and Interpersonal Accuracy

Given that the same affiliative interaction outcomes have been associated with individuals who are more accurate in assessing the personality traits and affective states of others as have also been associated with synchrony, it seems plausible that synchrony may generate affiliative interaction outcomes by means of facilitating interpersonal accuracy. Some evidence exists to suggest that there may indeed be a relationship between synchrony and interpersonal accuracy (Stosic et al., in prep; Vicaria, 2017). As part of a larger study aimed at uncovering how

younger and older adults experience rapport, researchers at a large northeast urban university asked 100 female-female dyads of varying ages to plan a dream vacation around the world during a 10-minute in-person interaction that was video recorded. Afterwards, they completed a series of questionnaires, including rating their own personality as well as their perceptions of their partner's personality using the Ten-Item Personality Inventory (TIPI; Gosling et al., 2003), which assess the five factor traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness. Personality perception accuracy was operationalized as the Fisher's *z* transformed correlation between the perceiver's ratings of their partner's personality, and their partner's self-reports of their own personality. Interactions were later coded for interpersonal synchrony by independent raters using Berneri and Rosenthal's (1991) gestalt methodology described above where tempo similarity, simultaneous movement, and coordination/smoothness were combined into a single synchrony composite ($\alpha = .91$). Multilevel Modeling (MLM; Kenny et al., 2006) with a random intercept model was used to analyze whether a relationship existed between levels of synchrony within dyads, and personality perception accuracy (for a brief discussion on interpreting MLM parameters, see Results section below). Higher levels of synchrony within dyads predicted marginally greater levels of personality perception accuracy (*SPE* = .21, $p = .070$, $\Delta = .18$; Stosic et al., in prep). The size of this effect was small (Cohen, 1988).

While the preceding results are encouraging, they still leave some questions unanswered. For example, because the participants only rated their personality as well as their partner's using a simple ten-item scale as opposed to a more comprehensive personality inventory, several measurement artifacts may confound accuracy (for a thorough discussion, see Cronbach, 1955; Gage & Cronbach, 1955). Additionally, because the dyads in this study were grouped according

to age (i.e., young-young, old-old, young-old dyads), the relationship between interpersonal accuracy and synchrony may have been moderated by the extent to which dyads were either age congruous or incongruous. Unfortunately, the sample size of this study does not afford enough power to explicitly test dyad age congruency as a moderating variable. Therefore, in order to address these issues, replicate this preliminary effect, and extend this effect to different facets of interpersonal accuracy such as affective state perception, more research regarding the relationship between synchrony and interpersonal accuracy is needed.

The Impact of Technology on Synchrony and Interpersonal Accuracy

While a considerable amount of interaction between individuals takes place face-to-face (FTF), a growing amount of human interaction has begun to shift into the realm of technology-mediated communication. This shift has allowed individuals to continue to communicate with one another despite geographical differences, time differences, and more recently, social distancing recommendations and requirements due to the COVID-19 pandemic. Indeed, administrators at Zoom (i.e., a popular videoconferencing platform) reported an incredible 300 million daily Zoom meeting participants; a figure that was up from 10 million as of December 2019 (Zoom, 2020). While these numbers clearly reflect the transition of millions of individuals across the world to working from home in response to the COVID-19 pandemic, it is likely that much of the transition of FTF interactions to technology-mediated platforms will become more frequent and permanent. In light of this, it is becoming increasingly important for social psychological research to address how relationships observed within FTF contexts may be changed (i.e., strengthened, weakened, or unaffected) by technology-mediated communication.

The question regarding the relationship between synchrony and interpersonal accuracy is particularly interesting to investigate over a videoconferencing (VC) platform given that this

form of technology-mediated communication affects three important factors directly relevant to both synchrony and interpersonal accuracy; eye contact, mental workload, and self-awareness (Ferrán-Urdaneta & Storck, 1997). In terms of eye contact, it has been theorized that, because mutual gaze facilitates social connection, interpersonal synchrony is facilitated through eye contact (Macrae et al., 2008). Additionally, some research has found that increased eye contact is linked to greater accuracy in judging one's partner (Vrij et al., 2010). Unfortunately, VC platforms do not allow for individuals to engage in mutual eye contact given that the location of a computer camera is not the same as the location where interactants' eyes appear on the screen. Therefore, even though VC participants may be looking into the eyes of their interaction partner as they appear on screen, to their partner it may appear that they are looking slightly away.

VC platforms also require additional mental processing by asking users to manage social interaction and technology at the same time (Hinds, 1999). Beyond regulating issues resulting from one's own device (e.g., microphone malfunctions) as well as internet connectivity issues, VC users must alter their information processing from two-dimensional to three-dimensional, which increases mental workload (Shepard & Metzler, 1988). Given that interpersonal accuracy is a cognitive task, measurable increases in cognitive load (or even the subjective belief that workload is increasing) should decrease accuracy by causing perceivers to miss the detection of relevant behavioral cues due to exceeded cognitive processing capacity (Hart & Staveland, 1988; Welford, 1978). Additionally, if one devotes more cognitive processing towards these external issues, it is likely that their ability to be fully present within the interaction, and therefore synchronized with their partner, may be directly affected. Further, one can assume that with every additional internet glitch, interruption, or malfunction that occurs, synchrony lowers. In

this way, it may be possible that VC hinders synchrony *across time*, relative to the outset of the interaction.

Finally, research has shown that engaging with another via VC produces greater self-awareness (Storck, 1995). Greater self-awareness can impact one's natural tendency to synchronize by depressing one's ability to engage in self-other overlap and entrainment processes critical to inducing synchrony (Miles et al., 2010). Additionally, it may be that the more self-aware an individual is, the less likely they are to be paying attention to the relevant behavioral cues another is emitting, and will therefore not detect them. Thus, the more one is concerned about their self-image from being in front of a camera, the less likely they may be to become synchronized with, and accurately judge, their interaction partner.

Given these additional constraints inherent within a VC platform such as Zoom, it may be that the amount of interpersonal synchrony and accuracy generally observed in FTF relationships may be reduced and constrained, or perhaps may not even be achievable through VC. Additionally, given that synchrony is generally measured via entire body movements, there is also the question of whether it is even possible to measure it over VC (i.e., can synchrony be measured with only the face and upper torso available to coders?). In the only known research to investigate synchrony over a VC platform, Dunbar and colleagues (2014) found evidence to suggest that synchrony over a VC platform is significantly lower than levels observed in FTF communication. However, researchers have yet to investigate how VC affects the accurate perception of personality traits and affective states.

Although theoretical accounts, as well as limited preliminary evidence, suggest that VC may hinder both synchrony and accuracy, and therefore make it difficult to assess the relationship between the two, certain VC technologies may be becoming sophisticated enough

that they do not create large issues with eye gaze, mental workload, and self-awareness, and therefore may not impact the process of synchrony or accuracy considerably (Grayson & Monk, 2003). Additionally, given the recent large-scale shift in interpersonal interactions from FTF to VC in response to the COVID-19 pandemic, it may be that individuals have already begun adapting to the mental and behavioral processes that VC hinders in ways that no longer cause them to be considerable issues. Given the limited work in the intersectional field of VC and social psychology, the question of whether synchrony and interpersonal accuracy can be achieved and measured through a technology-mediated platform is relevant and necessary.

The Present Research

Provided that relatively little is known regarding how synchrony and interpersonal accuracy are revealed through VC platforms, the present research will explore whether each of these constructs share similar properties to those of synchrony and interpersonal accuracy generally observed in FTF interactions. While an experimental design is not being used in the present research to test for differences in FTF versus VC interactions, the *mean levels* as well as the *predictive validity* of synchrony and accuracy over VC can be used to infer whether VC seems to hinder these two interpersonal processes. First, mean levels of synchrony displayed over VC will be examined. It is possible that synchrony is impacted by VC *over time* (e.g., by technological disruptions), such that mean levels of synchronous behaviors may be similar to FTF interactions at the outset, but decrease over time on VC platforms. In addition to investigating whether mean levels of synchrony change over time on VC platforms, the predictive relationships that synchrony displays over VC will be examined. If synchrony displays the same predictive validity relationships with a variety of affiliative outcomes such as rapport, liking, perceived similarity, willingness to cooperate, and displays theorized sex differences, then

it is likely that synchrony can be achieved by interacting partners and can be measured by researchers over VC platforms.

Mean levels of interpersonal accuracy, as well as sex differences in accuracy will also be investigated. If personality traits and affective states are able to be judged at above chance levels, and if females tend to be relatively better judges of both characteristics, then it is likely that VC does not significantly hinder interpersonal accuracy processes. Additionally, if interpersonal accuracy over VC reveals the same predictive validity relationships as those observed from the FTF literature, such that more interpersonally accurate individuals are perceived in a more affiliative manner by their partners, as well as judge their partners with greater affiliation, then it is likely that interpersonal accuracy can be achieved and measured over VC platforms.

The primary objective of the present research, however, is to examine the relationship between synchrony and interpersonal accuracy over a technology-mediated platform. Discerning the functions of humans' innate tendency to synchronize seems to be fundamental for understanding the ways humans engage with their social environment. While research thus far has made a concentrated effort to explore the function of synchrony as a marker of affiliation, more concentrated efforts are needed in order to fully understand the nomological network of constructs related to the manifestation of synchrony among social interaction partners. Scholars have posited that synchrony may influence the ways in which individuals perceive one another, which subsequently may allow them to become more accurate judges of one another's internal attributes (Hoehl et al., 2021; Miles et al., 2010). Notably, no empirical attempts have been made to test this precise theoretical contribution. The following research aims to address this core question by explicitly examining the relationship between synchrony and two distinct facets of interpersonal accuracy. The following set of hypotheses are posited:

H1: Participants who display greater levels of synchrony with their interaction partner will be more accurate judges of their partner's personality traits

H2: Participants who display greater levels of synchrony with their interaction partner will be more accurate judges of their partner's affective states

CHAPTER 2

METHOD

Participants

Participants were 196 undergraduate students (N = 98 dyads) from the University of Maine's introductory participant pool.[1] Of these 196 participants, 69 were males and 127 were females (14 male-male dyads, 43 female-female dyads, 41 male-female dyads). Participants' ages ranged from 18 to 50 years (M = 20.40, SD = 3.49). A total of 177 participants were Caucasian (90%), 8 were African American (4%), 1 was American Indian/Alaskan Native (1%), 6 were Asian (3%), and 3 selected *other* (2%). Additionally, 12 (6%) identified as Hispanic or LatinX. The study was approved by the University of Maine Institutional Review Board and informed consent was obtained from all individuals included in the study. Participants were treated in accordance with the *Ethical Principles of Psychologists and Code of Conduct* (American Psychological Association, 2002).

A power analysis conducted using G*Power (Faul et al., 2007) indicated that 166 participants were required to achieve 80% power to detect small associations ($f^2 = 0.048$; $\alpha = 0.05$, two-tailed) based upon the only known effect of the relationship between synchrony and interpersonal accuracy (Stosic et al., in prep). However, in order to account for nesting within the data, a new N was calculated using the following formula: $N_{non\text{-}nested} = N_{nested}/([1+(m-1)ICC]$,

[1]An additional 32 participants were flagged for failing to pass at least one of two attention check questions embedded in the survey. A series of independent samples t-test compared this group to those who had passed all attention check questions for any significant differences in mean personality perception accuracy, affective state perception accuracy, and synchrony. No significant differences between those who had passed the attention check questions and those who did not were found (p's > .18). Therefore, in order to maintain appropriate power, these 32 participants were retained for analyses.

where $N_{non\text{-}nested}$ is the sample size determined from G*Power (i.e., 166), and m is the how many people are nested within units (i.e., 2 people per dyad; Diggle et al., 1994). The intraclass correlation (ICC) of .14 for personality perception accuracy from Stosic and colleagues (in prep) was taken as the closest approximated ICC estimate. A nested sample of 194 participants (i.e., 97 dyads) would be needed in order to achieve full power. Therefore, this sample was sufficiently powered.

Measures

Participants completed a large number of personality scales and interpersonal accuracy ability measures. These measures included the Big Five Inventory (John et al., 1991), the Positive and Negative Affect Schedule (Watson et al., 1988), the Interpersonal Reactivity Index (Davis, 1980; 1983), the Emotion Contagion Scale (Doherty, 1997), the Liebowitz Social Anxiety Scale (Heimberg et al., 1999), the Geneva Emotion Recognition Test (Schlegel et al., 2014), the Fatigue Assessment Scale (Michielsen et al., 2003), a series of ratings of the interaction and of one's interaction partner, and a demographic questionnaire (See Appendix A). Only the measures relevant to the present thesis are discussed below.

Personality Traits. The Big Five Inventory (BFI; John et al., 1991) is a 44-item self-report assessment of personality that yields scores for each of the Big Five personality factors of neuroticism, extraversion, openness, agreeableness, and conscientiousness. The BFI was selected as the personality criterion for the current study as it has shown to have strong psychometric properties (Gosling et al., 2003; Srivastava et al., 2003) and can be completed in under five minutes. Participants completed this measure twice: once with the instruction to "indicate the extent you agree or disagree with the following statements <u>in regards to how you usually are</u>" and once with the instruction to "indicate the extent you agree or disagree with the following

statements in regards to how your partner usually is". Participants rated each of the 44-items (e.g., "I am someone who is reserved") on a 5-point Likert scale (1 = "Strongly disagree" to 5 = "Strongly agree"). Cronbach alpha coefficients for this sample were acceptable regarding participants' ratings of their own personality (neuroticism: $\alpha = .77$, extraversion: $\alpha = .67$, openness: $\alpha = .86$, agreeableness: $\alpha = .69$, conscientiousness: $\alpha = .76$), as well as for participants' ratings of their partner's personality (neuroticism: $\alpha = .77$, extraversion: $\alpha = .72$, openness: $\alpha = .74$, agreeableness: $\alpha = .78$, conscientiousness: $\alpha = .78$).

Affective States. The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a 20-item self-report assessment of state affect. Like the BFI, participants completed this measure twice (e.g., "Indicate to what extent you (your partner) felt these emotions during the course of the previous task"). Participants were presented with 20 different affective state words ranging in valence (e.g., excited, distressed), and rated each item on a 5-point Likert scale (1 = "Very Slightly or Not at all" to 5 = "Extremely"). Cronbach alpha coefficients for this sample were good regarding participants' ratings of their own affective state (positive valence: $\alpha = .85$, negative valence: $\alpha = .71$), as well as for participants' ratings of their partner's affective state (positive valence: $\alpha = .84$, negative valence: $\alpha = .75$).

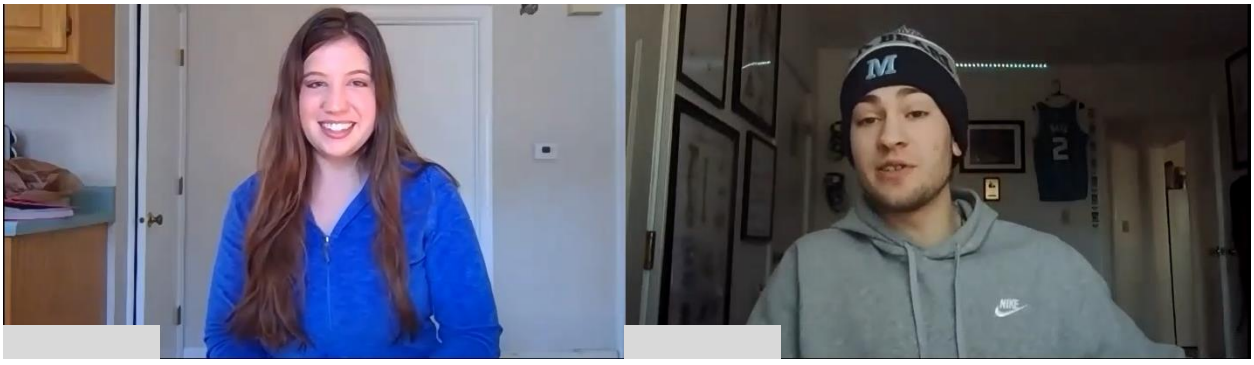
Partner Ratings and Demographics. Participants also completed a series of questions regarding their impressions of their partner. *Rapport* with one's partner was measured by asking partners to "Rate the level of rapport (i.e., closeness, agreement, mutual understanding) you felt between you and your partner" on a scale from 1 "No rapport" to 8 "High Rapport". *Liking* of one's partner (i.e., "How much did you like your partner") and perceptions of *similarity* with one's partner (i.e., "How similar are you and your partner") were measured on a scale from 1 "Not at all" to 8 "Extremely". *Willingness to cooperate* with one's partner was measured by

asking “How likely would you be to work with this person” on a scale from 1 “Not at all” to 8 “Extremely”. Finally, participants completed a demographic questionnaire which included their age, race, and ethnicity, and biological sex.

Procedure

Unacquainted participants in groups of two logged onto a secure VC platform (Zoom) on a desktop computer, laptop, tablet, or phone with an experimenter already present. Upon arrival, participants were asked to follow a series of set up instructions including ensuring their face, torso, and laps were visible, that their self-view was hidden (or turned off), and that full screen mode had been entered. Participants were then informed that they would be interacting for a period of five minutes with the task to “identify as many things in common with each other as you can.” The purpose of this prompt was simply to stimulate conversation that would evoke different cues relevant to their personality and affective states. In addition, semi-structured “getting-to-know-you” tasks such as these are commonly used to study paradigms involving synchrony as well as interpersonal accuracy (e.g., Bernieri et al., 1996; Vicaria, 2017). The experimenter then turned off their own camera and microphone, so that participants could only see their interaction partner on screen, and began recording the five-minute long interaction (Figure 2.1).

Figure 2.1 Sample of Participants Engaging in Five-Minute Long “Getting-to-Know-You” Conversation Over VC.



Note. Although videos were recorded with participants side-by-side, participants could only see their partner, and not themselves, during the conversation.

Once the five-minute period had finished, the experimenter sent a link to a Qualtrics survey in the chat window and informed participants that there were a few questionnaires left to complete before the study session was over. During this time, participants were asked to turn both their video camera and microphone off in order to ensure full privacy. Participants were first asked to make confidential ratings of their partner's personality traits (i.e., BFI) and affective states during the interaction (i.e., PANAS). Each participant then rated their own personality traits and affective states during the interaction, completed a demographic questionnaire, and finally finished with a few questions about their affiliative feelings towards their interaction partner.

Coding of Videoconferencing Sessions

Synchrony.

Eight research assistants were trained to become synchrony coders for the present study. Training sessions consisted of practice ratings of a selection of 10 video clips of the "getting-to-know-you" interactions from Vicaria's (2017) study. Any coders who were unreliable ($\alpha < .70$) after this initial training session received a second training session and additional practice clips to rate until acceptable reliability was achieved ($\alpha > .70$).

Short segments of video clips have been shown to be sufficient for detecting behavior to a similar degree as watching an entire interaction (i.e., thin slices; Murphy, 2005; Murphy et al., 2015). For example, Ambady and Rosenthal (1992) found no differences in terms of the predictive power of expressive behavior taken from 30-second clips versus entire 5-minute-long observations. Given that accurate information about synchrony can likewise be gleaned from

short experts of social interactions (Bernieri 1988; Bernieri & Rosenthal, 1991), 30-second clips were taken from the beginning (first minute; T1), middle (third minute; T2), and end (fifth minute; T3) of each recorded interaction which resulted in three clips from each dyad. The eight trained coders watched these 294 clips (98 dyads x 3 clips/dyad) in unique randomized orders in order to control for order effects. Each clip was rated on an 8-point Likert scale (1 = "Not at all" to 8 = "Very Much") on the following five codes derived from Bernieri and Rosenthal's (1991) synchrony coding system: simultaneous movement ($\alpha = .75$), tempo similarity ($\alpha = .70$), coordination/smoothness ($\alpha = .71$), gestural mimicry ($\alpha = .78$), and postural similarity ($\alpha = .72$; see Appendix B for full definitions of each code). Given acceptable reliability, the three codes that represent synchrony (simultaneous movement, tempo similarity, and coordination/smoothness) were averaged together to form a synchrony composite for the beginning of the interaction (T1; $\alpha = .87$), middle of the interaction (T2; $\alpha = .87$), end of the interaction (T3; $\alpha = .90$), as well as a global synchrony composite averaged across these three time periods ($\alpha = .88$).

CHAPTER 3

RESULTS

The results will be divided into four sections. First, I will examine whether mean levels of synchrony differ across the three time periods in participant's 5-minute long interactions (i.e., beginning, middle, end). Additionally, I will attempt to replicate the relationships between synchrony at each of these three time periods and the various affiliative outcomes that have been most robustly related to synchrony throughout the literature. Next, I will examine the mean levels accuracy achieved for personality perception and affective state perception, and likewise attempt to replicate the relationships between these two skills and a collection of affiliative outcome variables. Finally, I will test my main hypotheses regarding whether synchrony displayed during a VC interaction predicts how accurately participants are able to judge their partner's personality traits (H1) and affective states (H2).

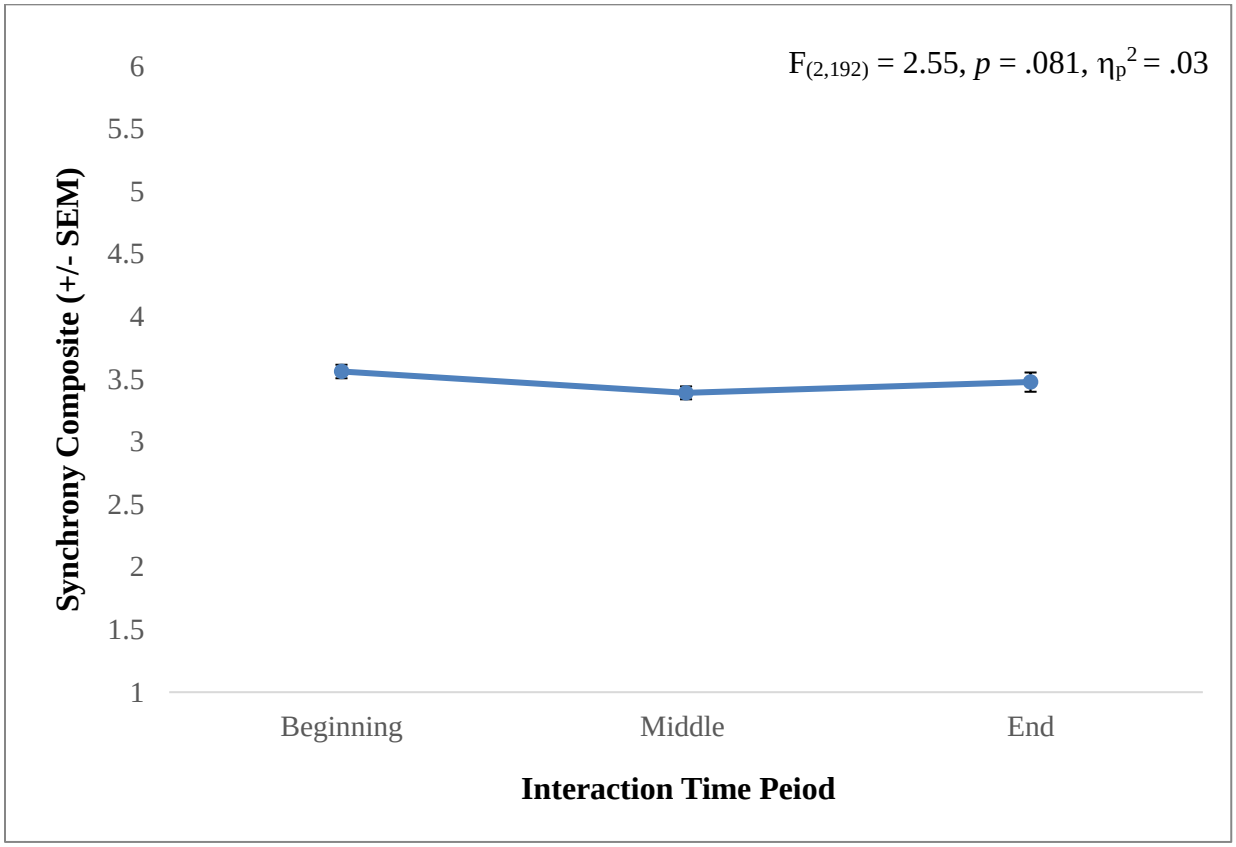
Synchrony

Synchrony Across Time

In order to test whether there were actual observable differences in the manifestation of synchrony across interaction time, a repeated measures analysis of variance (ANOVA) was conducted where interaction time period (T1, T2, T3) was entered as a 3-level repeated measure predictor variable and synchrony was entered as the dependent variable at the dyad level (i.e., N = 98; Figure 3.1). A marginally significant main effect of interaction time period on synchrony was observed ($F_{(2,192)} = 2.55$, $p = .081$, $\eta_p^2 = .03$). The size of this effect was small to medium (Cohen, 1988). Pairwise comparisons with a Least Significant Difference (LSD) correction for multiple comparisons revealed that synchrony was greatest during the beginning of interactions ($M = 3.56$, $SD = .75$), and that this difference was significantly greater than the mean level of

synchrony displayed in the middle of the interaction (M = 3.39, SD = .72; p = .034, d = .22). While the mean level of synchrony at the beginning of the interaction was also greater than that observed during the end of interactions (M = 3.48, SD = .75) this difference was not statistically significant (p = .263, d = .11). Additionally, the mean level of synchrony observed during the middle of the interaction was not significantly different from the end of the interaction (p = .235, d = .13). These results suggest that synchrony may not be one constant behavioral stream, but instead may vary across time during a VC interaction.

Figure 3.1. Mean Synchrony Across the Beginning, Middle, and End of the Five-Minute Long Interaction



Note. Synchrony was rated on a 1 “Not at all” to 8 “Very Much” scale. Mean synchrony scores ranged from 1.86 to 5.86.

Predictive Validity.

Given that synchrony has been most robustly related to affiliative outcomes throughout the FTF literature, these relationships were examined in the present data collected from VC interactions. Each affiliative outcome variable was computed by averaging together the responses of both partners in a given dyad on the variable of interest. For example, dyadic rapport was formed by averaging both dyad partners' responses to the question "Rate the level of rapport (i.e., closeness, agreement, mutual understanding) you felt between you and your partner", where higher scores would reflect greater mutual rapport. In addition to dyadic rapport, dyads were averaged together regarding their *liking* for one another, how much *perceived similarity* they felt between themselves and their partner, and how willing they would be to work, or *cooperate*, with their partner in the future. Although these four variables were significantly correlated ($.39 < r's < .66$; Table 3.1), suggesting that they are each measuring a kind of affiliative attitude or behavioral intention, the relationships were not strong enough to suggest that these four variables were simply measures of the same construct. Therefore, each of these variables were kept separate opposed to forming a single affiliation composite. Also speaking to the validity of these variables, each seemed to relate to biological sex in the theorized manner (Wilkinson et al., 2013; Van Vugt et al., 2007), such that female-female dyads ($M = 6.58$, $SD = 1.12$) indicated greater willingness to cooperate, for example, than male-male dyads ($M = 5.64$, $SD = 1.63$; $p = .016$, $d = .75$; Table 3.1).

Table 3.1 Interrelationships between Affiliative Dyadic Outcomes and Dyad Sex Makeup (*N* = 98)

		Dyad Sex Makeup *M* (SD)[a]				Affiliative Dyadic Outcomes			
		Total	Male-Male[b]	Female-Female[c]	Male-Female[d]	1.	2.	3.	4.
1.	Rapport	5.67 (1.21)	5.32[e] (1.49)	5.65[e] (1.30)	5.82[e] (1.00)	**.26*****			
2.	Liking	6.18 (0.84)	5.96[e] (1.12)	6.30[e] (0.85)	6.13[e] (0.72)	.54***	**-.02**		
3.	Perceived Similarity	4.58 (1.08)	4.43[e] (1.40)	4.65[e] (1.18)	4.57[e] (0.83)	.66***	.51***	**.27*****	
4.	Willingness to Cooperate	6.35 (1.27)	5.64[e] (1.63)	6.58[f] (1.12)	6.34[ef] (1.22)	.45***	.39***	.45***	**.18***

Note. Correlations between a participant's ratings of their partners and their partner's ratings of the participant appear in bold. $^{*}p < .05$, $^{***}p < .001$
[a]Means within the same row were significantly different at $p < .05$ with pairwise comparisons with an LSD correction from a one-way ANOVA.
[b]N = 14 dyads, [c]N = 43 dyads, [d]N = 41 dyads

Table 3.2 presents the relationships between synchrony and each of these various affiliative outcome variables, as well as the mean synchrony displayed by dyads of different biological sex makeups. Given the potentially moderating impact of interaction time period, synchrony was correlated with each of these various outcomes by the time period in the interaction that synchrony was measured (i.e., T1, T2, T3), as well as for synchrony averaged across these three interaction time periods. If synchrony displayed over VC was similar to synchrony displayed during FTF interactions, then the predictive validity relationships between synchrony and various interaction outcomes would be expected to be approximately equivalent to these same relationships reported throughout the FTF interaction literature.

Consistent with results from past research (Bernieri, 1988; Isabella & Belsky, 1991; Tarr et al., 2016; Wiltermuth & Heath, 2009), synchrony averaged across all three interaction time periods was significantly related to how much rapport ($r = .31$, $p = .002$), liking ($r = .45$, $p <$

.001), similarity (r = .24, p = .020), and willingness to work and cooperate together (r = .36, p < .001) that the dyad experienced. The size of these effects were medium to large (Cohen, 1988). Additionally, these effects were the largest when examined for the first 30-seconds of the interaction (T1; .25 < *r's* < .44). This pattern of results suggest that synchrony observed during VC interactions is significantly predictive of the same affiliative outcome variables as synchrony observed during FTF interactions.

Regarding biological sex, limited research has suggested that female-female dyads tend to display more synchrony that male-male dyads (Fujiwara et al., 2019; Thorson & West, 2018). This pattern was replicated and extended in the present sample, where there were significant differences in synchrony depending upon the biological sex makeup of the dyad across all three interaction timepoints, as well as for synchrony averaged across time. Specifically, female-female dyads (average synchrony M = 3.72, SD = .63) were rated as significantly more synchronous than male-female dyads (average synchrony M = 3.36, SD = .51; p = .004, d = .63), and significantly more synchronous than male-male dyads (average dyad synchrony M = 3.10, SD = .47; p = .001, d = 1.04). In addition, although male-female dyads were rated as more synchronous than male-male dyads, and the size of this effect was medium, the difference did not achieve statistical significance (p = .145, d = .52). All of these effects for synchrony averaged across all three time periods were medium to large (Cohen, 1988). Although these effects were medium to large at each interaction time period in isolation, these effects were largest for thin slices of synchrony taken from the beginning of interactions (T1; .53 < *d's* < .95). In this way, replicating past research (e.g., Fujiwara et al., 2019; Thorson & West, 2018), it seems as though dyads that contained females displayed greater levels of synchrony than those that contained males, especially during the first 30-seconds of an interaction.

Table 3.2 Mean Synchrony by Dyad Sex Makeup and Relationships between Synchrony and Affiliative Dyadic Interaction Outcomes (N = 98)

	Dyad Sex Makeup *M* (SD)[a]				Affiliative Dyadic Outcomes			
	Total	Male-Male[b]	Female-Female[c]	Male-Female[d]	Rapport	Liking	Perceived Similarity	Willing to Cooperate
Synchrony (T1)	3.56 (.75)	3.11[f] (.55)	3.84[g] (.83)	3.43[fh] (.62)	.30**	.44***	.25*	.40***
Synchrony (T2)	3.39 (.72)	3.15[f] (.55)	3.62[g] (.80)	3.24[fh] (.63)	.24*	.36***	.18†	.21*
Synchrony (T3)	3.48 (.75)	3.03[f] (.66)	3.70[g] (.81)	3.40[fg] (.63)	.21*	.29**	.15	.26*
Average Synchrony[e]	3.48 (.60)	3.10[f] (.48)	3.72[g] (.63)	3.36[fh] (.52)	.31**	.44***	.24*	.36***

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

[a]Means within the same row were significantly different at p < .05 with pairwise comparisons with an LSD correction from a one-way ANOVA.

[b]N = 14 dyads

[c]N = 43 dyads

[d]N = 41 dyads

[e]Average synchrony was a composite formed by averaging synchrony across the beginning (T1), middle (T2), and end (T3) of the interaction.

Interpersonal Accuracy

Next, mean levels of accuracy for perceptions of personality traits and affective states were examined. Accuracy coefficients for judgments of personality traits as well as judgments of affective states were operationalized as the correlation between a given participant's judgment of their interaction partner, and their partner's self-reported state or trait (i.e., judgment criterion; Brunswik, 1956). This approach generates accuracy coefficients that do not reflect one's ability to judge the point estimates of their partner (e.g., "*My partner is a 4 out of 5 on extraversion*") but rather reflects one's ability to relatively order the states or traits of their partner (e.g., "*My partner is more extraverted than they are conscientious*"). For personality perception accuracy, each participant's judgments of their partner's personality on the BFI were correlated with their

partner's own self-reported personality on the BFI. Likewise, for affective state perception accuracy, each perceiver's judgments of their partner's affective state from the previous interaction on the PANAS were correlated with their partner's self-reported affective state on the PANAS. These correlations were Fisher-*z* transformed for all subsequent analyses and returned back to a Pearson *r* metric for presentation purposes.

Although much research has examined interpersonal accuracy, it is difficult to compare mean levels of accuracy in an absolute sense given such diversity across studies in terms of accuracy criteria used, dyadic or group makeup, and overall methodology. However, generally speaking, personality has been shown to be judged with relatively moderate levels of accuracy, while affective states are generally assessed with higher levels of accuracy (Hall et al., 2008; Matsumoto et al., 2000). Consistent with this, Table 3.3 shows that participants who interacted with another over a VC platform were moderately accurate in their judgments of their interaction partner's personality traits (*Mr* = .33; Cohen, 1988). A one-sample t-test revealed that this correlation was significantly greater than guessing level of Mean $r = 0$ ($t_{(195)} = 18.25$, $p < .001$, $d = 1.31$). In addition, participants displayed generally high levels of accuracy for their partner's affective states (*Mr* = .67; Cohen, 1988). A one-sample t-test revealed that this correlation was significantly greater than guessing level of Mean $r = 0$ ($t_{(195)} = 31.62$, $p < .001$, $d = 2.53$).

Table 3.3 Mean Interpersonal Accuracy by Participant Sex and Relationships between Interpersonal Accuracy and Affiliative Judgment Outcomes (N = 196)

	Participant Sex M (SD)[a]			Perceiver's Judgments of Partner				Partner's Judgments of Perceiver			
	Total	Male[b]	Female[c]	Rapport	Liking	Perceived Similarity	Willing to Cooperate	Rapport	Liking	Perceived Similarity	Willing to Cooperate
Personality Perception Accuracy	.33[d] (.26)	.28[e] (.25)	.35[f] (.26)	.14*	.10	.14*	.12†	.18*	.15*	.15*	.04
Affective State Perception Accuracy	.67[d] (.32)	.66[e] (.37)	.68[e] (.36)	.30***	.17*	.22**	.16*	.31***	.23**	.25***	.22**

Note. $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.
[a]Means within the same row for males and females with different superscripts are significantly different at $p < .10$ with an independent-sample t-test.
[b]N = 69
[c]N = 127
[d]Means differ from 0 (i.e., guessing-level) at $p < .001$ with a one-sample t-test.

Predictive Validity.

Table 3.3 presents the relationships between interpersonal accuracy and participants' sex, as well as the same interpersonal outcome variables as those examined for synchrony, except at the individual level (N = 196) instead of the dyad. Specifically, participant's ratings of *rapport, liking, perceived similarity,* and *willingness to cooperate* with their partner, as well as their partner's ratings of these same variables regarding the participant were examined. A positive relationship between accuracy and any of these outcomes at the level of the participant would suggest that those who are more accurate judges of their partner also felt more positively *towards* their partner, whereas a positive relationship between accuracy and any of these outcomes at the partner level would suggest that participants who are more accurate judges elicited more positive judgments *from* their partner. Akin to the interrelationships between these affiliation variables

observed on the dyadic level, these four variables were highly correlated on the individual level (.41 < *r's* < .61; Table 3.4), suggesting that each seems to be a separate facet of a global affiliation construct. Some theoretically expected sex differences were also observed between these variables, where females (*M* = 6.30, *SD* = 1.11) self-reported liking their partner to a marginally greater degree than males (*M* = 5.97, *SD* = 1.31; *p* = .066, *d* = .27; Table 3.4).

Table 3.4 Mean Affiliation by Participant Sex and Interrelationships between Participants' and Partners' Judgments of Affiliation

	Participant Sex *M* (*SD*)[a]			Judgements of Affiliation		
	Total	Male[b]	Female[c]	1.	2.	3.
1. Rapport	5.67 (1.52)	5.57[d] (1.60)	5.73[d] (1.48)			
2. Liking	6.18 (1.19)	5.97[d] (1.31)	6.30[e] (1.11)	.52***		
3. Perceived Similarity	4.59 (1.35)	4.41[d] (1.33)	4.69[d] (1.35)	.61***	.43***	
4. Willingness to Cooperate	6.35 (1.65)	6.10[d] (1.86)	6.48[d] (1.51)	.40***	.41***	.37***

Note. †*p* < .10, **p* < .05, ***p* < .01, ****p* < .001.
[a]Means within the same row for males and females with different superscripts are significantly different at p < .10 with an independent-sample t-test.
[b]*N* = 69
[c]*N* = 127

Again, if interpersonal accuracy displayed over VC was similar to accuracy during FTF interactions, then similar predictive validity relationships would be expected to be observed such that partners of interpersonally accurate individuals would rate these individuals higher on rapport, liking, perceived similarity, and willingness to cooperate (Schmid Mast & Hall, 2018). Additionally, it might be expected that perceivers who are more accurate judges of their partner would also report feeling more rapport, liking, similarity, and willingness to cooperate towards their partner. Finally, females would be expected to be more accurate perceivers than males for

both personality traits (Ambady et al., 1995; Hall et al., 2016; Vogt & Colvin, 2003) as well as for affective states (Thompson & Voyer, 2014). Table 3.3 displays these relationships.

As predicted, interpersonal accuracy generated a series of relationships with positive perceptions *from* one's partner. Interaction partners reported feeling significantly greater rapport (r = .18, p = .011), liking (r = .15, p = .040), and perceptions of similarity (r = .15, p = .040) when they interacted with individuals who were more accurate perceivers of their *personality*. However, interaction partners did not report a significantly greater willingness to work and cooperate with individuals who were more accurate in their personality judgments (r = .04, p = .622). Similarly, participants who were better judges of their partner's *affective states* generated higher ratings of rapport (r = .31, p < .001), liking (r = .23, p = .001), perceptions of similarity (r = .25, p < .001) and willingness to cooperate (r = .22, p = .002) from their interaction partners. The size of these effects were small to medium (Cohen, 1988).

Participants who were more accurate judges of their partners also seemed to feel more positively towards their partners on the variables mentioned above. Those who were better judges of their partner's *personality* indicated that they felt significantly greater rapport towards their partner (r = .14, p =.049), felt more similar to their partner (r = .14, p = .043), and were marginally more willing to cooperate with their partner in the future (r = .12, p = .094). Individuals who were more accurate judges of their partners' *affective state* likewise felt significantly greater rapport with their partner (r = .30, p < .001), liked their partner more (r = .17, p = .018), felt more similar to their partner (r = .22, p = .002), and were more willing to cooperate with their partner (r = .17, p = .020). The size of these effects were all small to medium (Cohen, 1988).

Finally, consistent with this past research (Ambady et al., 1995; Hall et al., 2016; Vogt & Colvin, 2003), females (*Mr* = .35, *SD* = .26) were marginally more accurate perceivers for the personality of their partners than males (*M*r = .28, *SD* = .25; $t_{(194)} = 1.86$, $p = .064$, $d = .27$). However, there was no difference between females (*Mr* = .68, *SD* = .37) and male perceivers (*Mr* = .66, *SD* = .36) regarding their accuracy for judging the affective states of their partners ($t_{(194)} = .32$, $p = .749$, $d = .05$). These patterns of results demonstrate that interpersonal accuracy achieved over VC displays many of the same properties, both in mean levels as well as in predictive relationships, as interpersonal accuracy achieved via FTF interactions.

The Relationship Between Synchrony and Interpersonal Accuracy

Finally, I sought to directly test my main hypotheses (H1 & H2) regarding whether dyads whose nonverbal behavior was coded as more synchronous would be more accurate judges of their partner's personality traits as well as their affective states from the prior interaction. Zero-order correlations between synchrony and interpersonal accuracy appear in Table 3.5.[2] The first point that can be taken away from this table is the correlation between personality perception accuracy and affective state perception accuracy ($r = .26$, $p < .001$). While these two constructs are clearly related, the strength of their relationship suggests that these two measures of interpersonal accuracy are distinct constructs, and therefore each measuring a distinct skill/ability, as suggested by previous research (e.g., Schlegel et al., 2017). The second point of interest is the relationship between synchrony and these two different measures of interpersonal accuracy. Given that the degree of synchrony dyads displayed with one another differed

[2]Correlations between synchrony and interpersonal accuracy are slightly biased due to nesting within synchrony.

depending on the point of time in the conversation (i.e., T1-beginning, T2-middle, and T3-end), the relationship between accuracy and synchrony at each of these time periods, as well as across the average of these three-time periods, was examined. More synchronous behavior displayed within the first 30-seconds of a conversation was significantly and positively correlated with an individual's ability to judge the personality traits of their partner (r = .17, p = .015), as well as their ability to judge the affective states of their partner (r = .201, p = .005). The size of these effects were small to medium (Cohen, 1988). While each of the remaining correlations between synchrony and interpersonal accuracy across time, as well in sum, were positive, these relationships only achieved significance for both accuracy coefficients when examined at the beginning (T1) of the interaction.

Table 3.5 Correlations between Synchrony, Personality Perception Accuracy, and Affective State Perception Accuracy

	1.	2.	3.	4.	5.
1. Synchrony (T1)					
2. Synchrony (T2)	.44***				
3. Synchrony (T3)	.51***	.54***			
4. Average Synchrony[a]	.80***	.80***	.84***		
5. Personality Perception Accuracy	.17*	.01	.02	.08	
6. Affective State Perception Accuracy	.20**	.05	.11	.15*	.26***

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

[a]Average synchrony was a composite formed by averaging synchrony across the beginning, middle, and end of the interaction.

Multilevel Models.

The assumption that observations between subjects are independent is violated within the present study due to the dyadic design that was employed, which renders conventional parametric methods (e.g., traditional OLS regression) unsuitable for formally testing the relationship between synchrony and interpersonal accuracy. In order to separate the within- and between-dyad effects of synchronous behavior on interpersonal accuracy, a series of multilevel models (MLM's) were conducted where synchrony was the predictor variable and interpersonal accuracy was the dependent variable (Kenny et al., 2006). All models reported are random-intercept models, which allowed for between-dyad differences in personality perception accuracy and affective state perception accuracy to be freely estimated (Hox, 2002). Additionally, because MLM does not provide standardized regression coefficients, all continuous variables were standardized at the grand mean of the sample ($M = 0$, $SD = 1$) in order to enhance the interpretability of the regression coefficients, referred to as Standardized Parameter Estimates (SPE's).

There are several coefficients to be interpreted from the following models. First, SPE coefficients can be interpreted in a similar manner to a standardized regression coefficient such that every standard deviation increase in the predictor variable will lead to an increase in the dependent variable equivalent to the SPE. Second, an effect size for each SPE is calculated following Tymms (2004) formula:

$$\Delta = 2 \times B \times SD_{\text{predictor}}/\sigma_e$$

where B is the unstandardized SPE, $SD_{\text{predictor}}$ is the standard deviation of the predictor variable, and σ_e is the residual standard deviation at level-1 in the model. This effect size measure can be interpreted in an equivalent way to Cohen's *d* (Cohen, 1988), such that .20 is considered small, .50 is considered medium, and .80 is considered large. Finally, an effect size measure related to

the variance explained by the overall model is f^2, which can be calculated using Cohen's (1992) and Snijders and Bosker's (2012) formula:

$$f^2 = 1 - \frac{1 - [\sigma^2{}_F - \sigma^2{}_F / \sigma^2{}_E - \sigma^2{}_E]}{1 - (1 - [\sigma^2{}_F - \sigma^2{}_F / \sigma^2{}_E - \sigma^2{}_E])}$$

where $\sigma^2{}_F$ and $\tau^2{}_F$ are the residual variance at level-1 and level-2, respectively, from the full model and $\sigma^2{}_E$ and $\tau^2{}_E$ are the residual variance at level-1 and level-2, respectively, from the empty (or null) model.

Personality Perception Accuracy. Concerning personality perception accuracy, five separate multilevel models were conducted in order to investigate whether more synchronous dyads were more likely to display greater accuracy in judging their dyad member's personality. The first of these models was a null model (also known as an unconditional or empty model) where only personality perception accuracy was entered as the dependent variable without any predictor variables. This model allows the estimation of the degree that participants' personality perception accuracy differed between-dyads relative to the overall variance via the calculation of an intraclass correlation (ICC; Table 3.6). The ICC indicated that approximately 10% of the total variability in personality perception accuracy was due to between-dyad differences. That is, on average, participants' personality perception accuracy was correlated at approximately .10 within any given dyad.

In order to explain some of this variance, our next four analyses modeled synchrony as a predictor of personality perception accuracy at three different time periods during the interaction (i.e., T1-beginning, T2-middle, T3-end), as well as for synchrony collapsed across these three time periods (Table 3.6). As hypothesized, the more synchronous individuals were within a given dyad during the first 30-seconds of an interaction, the better they were at accurately perceiving their partner's personality (*SPE* = .17, p = .020, Δ = .38) such that for every one standard

deviation increase in synchrony, personality perception accuracy would be expected to increase by .17. The size of this effect was small to medium (Cohen, 1988), although only 2% of the total variability in personality perception accuracy was explained by synchrony in this model (f^2 = .02). The relationship between synchrony and accuracy, however, was not statistically significant when examined in the middle (*SPE* = .01, p = .887, Δ = .02) or end of interactions (*SPE* = .02, p = .809, Δ = .06), as well as for average synchrony (*SPE* = .08, p = .265, Δ = .20). In other words, only when the dyad was more in sync during the first 30-seconds of an interaction were they more accurate in judging their partner's personality post-interaction.

Table 3.6 Multilevel Model of the Relationship between Synchrony and Personality Perception Accuracy

	Interaction Time Period									
	Null Model		T1		T2		T3		Average	
	SPE	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE
Level 2										
Synchrony			.17*	.07	.01	.08	.02	.08	.08	.08
Variance components										
Level 1 residual variance, σ^2	.90		.91		.91		.91		.91	
Level 2 residual variance, τ^2	.10		.07		.10		.10		.10	
Total f^2			.02		.00		.00		.00	
ICC[a] = $\tau^2 / (\tau^2 + \sigma^2)$ = .10 / (.10+.90) = .10										

Note. *p < .05
[a]Intra-class correlation.

Affective State Perception Accuracy. Likewise, in order to further explore the relationships between synchrony and interpersonal accuracy, five separate MLMs were conducted where affective state perception accuracy was the dependent variable. A null model for affective state perception accuracy was computed where affective state perception accuracy was entered as a dependent variable and no predictor variables were included. An ICC revealed that 54% of the variance in affective state perception accuracy could be attributed to between-dyad differences. In other words, participants' affective state perception accuracy was correlated .54 within any given dyad on average, which suggests there was a substantial amount of dependence within affective state perception accuracy that must be accounted for using MLM.

Four additional MLMs were used to examine whether synchronous behavior within dyads was significantly related to greater affective state perception accuracy (H2). Synchrony at the beginning (T1), middle (T2), and end (T3) of the interaction, as well as average synchrony across these three time periods, was entered as predictor variables, and affective state perception accuracy was entered as the dependent variable (Table 3.7). In a similar pattern to personality perception accuracy, synchrony measured during the beginning of participants' interactions was significantly related to their ability to judge their partner's affective state from the interaction (*SPE* = .20, p = .024, Δ = .60), such that for every one standard deviation increase in synchrony, affective state perception accuracy would be expected to increase by .20. The size of this effect was medium (Cohen, 1988), although synchrony only accounted for 2% of the total variance in affective state perception accuracy (f^2 = .02). Once again, this was the only time period during the interaction where synchrony and affective state perception accuracy were related to a statistically significant degree. Specifically, synchrony measured during the middle (*SPE* = .05, p = .562, Δ = .17) and end of interactions (*SPE* = .11, p = .240, Δ = .30), as well as synchrony

averaged across the entire interaction (*SPE* = .15, p = .101, Δ = .43) was not significantly related to affective state perception accuracy.

Table 3.7 Multilevel Model of the Relationship Between Synchrony and Affective State Perception Accuracy

	Interaction Time Period									
	Null Model		T1		T2		T3		Average	
	SPE	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE	*SPE*	SE
Level 2										
Synchrony			.20*	.09	.05	.09	.11	.09	.15	.09
Variance components										
Level 1 residual variance, σ^2	.46		.46		.46		.46		.46	
Level 2 residual variance, τ^2	.54		.51		.55		.54		.53	
Total f^2			.02		.00		.00		.01	
ICC[a] = $\tau^2 / (\tau^2 + \sigma^2)$ = .54 / (.54+.46) = .54										

Note. *p < .05
[a]Intra-class correlation.

CHAPTER 4

DISCUSSION

The seemingly omnipresent drive of biological and physical systems to synchronize to one another has left many with the question of *why do we sync*? According to predictive processing theories (Friston, 2005), human brains are constantly attempting to form internal models of the external world to have navigate its complexity and uncertainty. Scholars have suggested that, in order to alleviate some of the uncertainty that social interactions engender, "it seems plausible that behavioral synchrony within dyads and groups might render the interacting partners' actions more predictable", thereby giving greater insight into that person's internal attributes (Hoehl et al., 2021, p. 13). Yet, the idea that synchrony may increase individual's ability to *detect* behavioral cues to interpersonal characteristics has never been empirically tested. Therefore, the purpose of the current thesis was to explore this possible benefit of synchrony in dynamic human interactions. Specifically, individuals who were more synchronized during a 5-minute long "getting-to-know-you" interaction were expected to be more accurate judges of each other's personality traits (H1) and affective states (H2).

Both of these hypotheses were supported with the present data. Dyads whose behavior was rated as more synchronous during the first 30-seconds of their interaction were significantly more accurate in their judgments of their interaction partner's personality traits and affective states. The size of these effects were small to medium. That the relationship between synchrony and interpersonal accuracy held for two distinct facets of accuracy (personality trait and affective state judgments), for an interaction that took place over a VC platform instead of in person, and despite methodological limitations (see limitations section) is quite compelling. It could be that

in-person studies and studies without these limitations will produce even larger effects between synchrony and accuracy.

What was not expected, however, was that the relationship between synchrony and accuracy *only* held when synchrony from the first 30-seconds of these interactions was examined. Further, synchrony was the most predictive of every single outcome variable we measured at the first 30-seconds of interaction. In this way, it appears as though interaction time may be a moderator of the relationship between synchrony and certain outcomes.

Regarding accuracy specifically, it is possible that synchrony mattered the most at the beginning of the interaction, as this is when first impressions tend to be formed and solidified (e.g., Ambady & Rosenthal, 1993; Bar et al., 2006). It is possible that while individuals' first impression processes were occurring during this beginning phase, synchronous individuals were being tuned into the relevant and available behavioral cues of their partner, which would allow them to become more accurate. If technological disruptions (see below) or other issues then caused a dyad's synchronous behavior to decrease, it would matter less for personality and affective state accuracy as these judgments would have already been solidified at an earlier stage of the interaction. The possibility that *when* synchrony occurs during an interaction may matter seems to be an important avenue for future research to more thoroughly explore.

Technology-mediated Communication and Interpersonal Processes

A secondary objective of the present thesis was to explore whether technology-mediated communication disrupted both the process of synchrony as well as individuals' ability to form accurate judgments of one another (i.e., interpersonal accuracy). Some have theorized that because VC doesn't allow for users to engage in mutual eye contact, increases mental workload, and creates a heightened sense of self-awareness, individuals' ability to engage in key

interpersonal process such as synchrony and accuracy may be hindered (Ferrán-Urdaneta & Storck, 1997). However, evidence from the present study calls these assumptions into question. It did not appear as though VC hindered individuals' ability to become synchronized to one another or to accurately judge their interaction partner's states and traits, at least to a substantial degree. Indeed, some research has suggested that if VC equipment is optimally configured, then some of the issues described above (e.g., the ability to interpret eye gaze direction) are less impactful for participants (Grayson & Monk, 2003). It is especially likely that these issues mattered less during the time of this study given that many individuals have adapted to VC interactions as increasingly "normal" across the year of 2020 and 2021 because of the COVID-19 pandemic that resulted in many hours spent on these platforms. Therefore, individuals likely adaption to these platform may have rendered them less cognitively demanding or disruptive than once thought.

Synchrony.

The present data suggested that it may be possible to achieve synchrony over a VC platform. Although the present experiment does not allow for a certain baseline of synchronous movements that would be expected by chance to be established (for a review see Capella, 1981), and therefore it cannot be explicitly argued that the synchrony observed here is greater than what would be expected by chance, an argument for the validity of synchrony measured in the present study can be made by its predictive validity relationships. Specifically, synchrony was significantly and strongly related to each theorized affiliative outcome variable, such that dyads who were more synchronous reported greater mutual feelings of rapport, liking, perceived similarity, and greater willingness to cooperate with one another. Additionally, in line with previous research (Fujiwara et al., 2019; Thorson & West, 2018), female-female dyads displayed

substantially more synchrony than male-male dyads. These results not only suggest that it is reasonable to assume that synchrony *did* occur over VC at above chance levels, but also suggest that it functions in a similar manner to synchrony assessed via FTF interactions. Thus, following those who have argued that synchrony may be one of the most pervasive drives in all of nature (Strogatz, 2012), it seems as though humans' biological propensity for coordinating their behaviors may be so strong that it manifests even when another is not physically present in the same room.

Although it appears synchrony was still able to occur over VC, we also found evidence to suggest that mean levels of synchrony *changed* over time. Most interesting, perhaps, is that synchrony was at its peak during the first 30-seconds of the 5-minute-long interactions. It is possible that the issues inherent within VC platforms (e.g., internet connectivity issues, reduced mutual eye contact) have the ability to "break" the state of synchrony between two individuals, which would explain the significant reduce in synchrony observed around 3-minutes time. It is also possible that the task itself, and not specifically VC technology, was responsible for the relationship between synchrony and time. Specifically, since we asked participants to "Find as many things in common with one another as you can", it is possible that dyads were quick to begin identifying commonalities within the first minute of the interaction, but had run out of potential areas of overlap by minute three. Although it is difficult to determine whether VC truly hindered individuals' ability to synchronize across time, it is a potential avenue for future research that is worth investigating given the increasing prominence of these technologies in society.

Interpersonal Accuracy. Regarding accuracy, individuals were able to judge the personality traits of their partner to a moderate degree (r = .33) and their partner's affective states

to a substantial degree (r = .67). Both of these values were also significantly, and substantially greater than guessing level. Although it is difficult to compare these mean levels of accuracy for states and traits to those generally observed in FTF interactions given many methodological distinctions (e.g., accuracy criteria, response scale, length of acquaintanceship or interaction, etc.), these two effect sizes replicate the general pattern of accuracy effect sizes throughout the literature, where perceivers tend to be moderately accurate in their perceptions of another's personality traits, and largely accurate in their perceptions of another's affective states (Hall et al., 2008; Matsumoto et al., 2000). While this is presumably the first research to examine accuracy for assessments of personality traits and affective states over VC, complementary research for assessments of autism likewise found no differences in clinicians' accuracy for diagnosing this state in clients in FTF interactions versus over VC (Reese, et al., 2013), nor differences between FTF and VC for the detection of lies by interviewers (Ferrán-Urdaneta & Storck, 1997).

Interpersonal accuracy assessed via VC also displayed the same predictive validity as interpersonal accuracy assessed in FTF interactions. Individual's ability to judge their partner's personality traits and affective states was related to a collection of affiliative outcomes variables that have been robustly linked to this skill in FTF interactions (Schmid Mast & Hall, 2018). Interpersonal accuracy was related to positive judgments of the accurate individual *from* their interaction partner (e.g., more liking, rapport, greater perceived similarity, and willingness to cooperate) as well as these same positive judgments from more accurate individuals *towards* their interaction partner. Further, replicating a wealth of past literature demonstrating females' advantage in being accurate judges (Hall, 1978), women were marginally better judges of personality in the present study. As such, it appears as though VC platforms may be suitable for

the assessment of personality or affect, which is good news for professions that have transitioned partially or fully to technology-mediated platforms (e.g., telehealth, online education, and remote industry positions) where making accurate judgements of others is a central part of the job.

Limitations

Given the correlational nature of these data, our results cannot determine a causal relationship between synchrony and interpersonal accuracy. While it has been argued here that synchrony facilitates interpersonal accuracy, it is possible that the reverse causal path is true in that interpersonal accuracy facilitates synchrony. Perhaps those who accurately assessed the needs, intentions, emotions, and personality of their partner possessed the prerequisite needed to adapt their behavior to their partner, and therefore achieve synchrony (Carrad & Schmid Mast, 2015; Schmid Mast & Hall, 2018). It is also possible that there is a third variable (e.g., attention towards one's partner) that facilitates both synchrony and accuracy. Only by finding ways to experimentally manipulate synchrony or interpersonal accuracy will researchers be able to explore this causal pathway more thoroughly.

Another limitation of the present study is that the dyadic paradigm currently employed does not allow for the separation of the decoding (perception) efforts of one individual in the dyad from the encoding (expression) efforts of the other individual in the dyad (Hall et al., 2006; Noller, 1980; Snodgrass et al., 1998). While it was posited that synchrony facilitates accuracy for personality and affective states by impacting a perceiver's *detection* of relevant nonverbal cues to these attributes, an alternative interpretation is that synchrony facilitates accuracy by impacting the target's *encoding* of nonverbal cues. That is, perhaps individuals in synchronous interactions express their states and traits more authentically or intensely, and are therefore the source of greater accuracy, often termed "good targets" (Human & Biesanz, 2013). A solution to

this problem would be to employ a round-robin design where participants would interact and rate multiple targets in order to avoid the issue where perceiver data is confounded with target data (Bernieri et al., 1994; Cronbach, 1955; Gage & Cronbach, 1955; Kenny, 1994; Snodgrass, 2001).

Future Directions

For the purposes of the present thesis, interpersonal accuracy was operationalized as the extent to which individuals can discriminate between the different states and traits of their partner. However, according to Funder's (1995, 1999) RAM, the accuracy with which an individual can detect another's state or trait is constrained by the degree to which cues of that state or trait are *available*. Whereas a picture of an individual's bedroom or office, for example, has been shown to provide relevant information about that person's openness and conscientiousness (Gosling et al., 2002), brief social interactions have been found to be the most relevant to the expression of extraversion (Borkenau et al., 2009; Brown & Bernieri, 2017). It may be that personality traits such as neuroticism, or affective states such as feeling guilty, are not available during the first 5-minutes of an interaction with a stranger. By aggregating all of these states and traits together, it is possible that the strength of the relationships between synchrony and accuracy were diluted. That is, although we observed small to medium effects regarding the relationships between synchrony and accuracy, these relationships may be much stronger if accuracy was limited to the detection of extraversion, or other states and traits that are most likely to be revealed during a 5-minute getting-to-know-you conversation with a stranger. For this reason, future research should take a more specified approach to the operationalization of personality and affective state accuracy.

Additionally, given that synchrony seems to facilitate the accurate perception of personality traits and affective states, future research could seek to explore the relationship

between synchrony and a variety of other interpersonal accuracy domains (e.g., *lie detection*, Aamodt & Custer, 2006; *thoughts and feelings*, Ickes, 1993, 2001; *pain*, Ruben & Hall, 2013; *status and dominance*, Schmid Mast & Hall, 2004; and *intelligence*, Borkenau et al., 2004). In the area of lie detection, for example, if a target is purposely trying to deceive a perceiver by concealing relevant nonverbal cues or expressing irrelevant cues, then synchrony may actually hinder accuracy by "tuning" a perceiver in to the expression of incorrect cues. Further explorations into the way synchrony facilities interpersonal accuracy will assist future researchers in determining when synchrony is a desirable state, and perhaps when it could be a hinderance.

Conclusion

Notably, the area of synchrony research has remained relatively unexplored and potentially misunderstood. Many questions ranging from *how* do we synchronize with others, *when* do we synchronize with other, and *why* do we synchronize with others remain to be thoroughly examined. Researchers have noted that "[i]t is surprising that a phenomenon potentially so important can have been so seldom investigated" (Bernieri & Rosenthal, 1991, p. 430) as well as that synchrony may be "the key to understanding the social brain" (Schirmer et al., 2021, p. 1).

The present results suggest that synchrony is such a pervasive drive that it can likely manifest with another even when the other can only be seen through a small screen from the waist up. More importantly, the present results suggest that synchrony may be connected to core aspects of social cognition such as accuracy for judging the internal states of others. These findings certainly have applications for healthcare professionals, teachers, or industry professionals. Inaccuracy in each of these professions can have stark consequences for the

individual being perceived, such as a patient receiving an incorrect mental health diagnosis, a student failing to receive the educational assistance they need, or an applicant being biasedly judged during a job interview. It is necessary to understand when accurate judgments of personality traits and affective states are made and to develop strategies or interventions that will increase accuracy, such as by facilitating synchrony. Only by making these continued efforts to theoretically explore the behavioral manifestation of synchrony will researchers be able to more precisely understand what role it plays in our social lives.

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Appendix A - Post-Task Questionnaires

Demographic Questionnaire

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? _____

Which of the following do you currently identify most closely with?

Lesbian, gay or homosexual
Straight or heterosexual
Bisexual
Queer
Questioning/Unsure
Something else, please describe_____

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

BIG FIVE INVENTORY (BFI)

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1	**2**	**3**	**4**	**5**
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited
32. _____ Is considerate and kind to almost everyone

33. _____ Does things efficiently

34. _____ Remains calm in tense situations

35. _____ Prefers work that is routine

36. _____ Is outgoing, sociable

37. _____ Is sometimes rude to others

38. _____ Makes plans and follows through with them

39. _____ Gets nervous easily

40. _____ Likes to reflect, play with ideas

41. _____ Has few artistic interests

42. _____ Likes to cooperate with others

43. _____ Is easily distracted

44. _____ Is sophisticated in art, music, or literature

BIG FIVE INVENTORY (BFI-Partner)

How my partner is in general

Here are a number of characteristics that may or may not apply to your partner. For example, do you agree that your partner is someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement in regards to your partner.**

1	**2**	**3**	**4**	**5**
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

My partner is someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited

32. _____ Is considerate and kind to almost everyone

33. _____ Does things efficiently

34. _____ Remains calm in tense situations

35. _____ Prefers work that is routine

36. _____ Is outgoing, sociable

37. _____ Is sometimes rude to others

38. _____ Makes plans and follows through with them

39. _____ Gets nervous easily

40. _____ Likes to reflect, play with ideas

41. _____ Has few artistic interests

42. _____ Likes to cooperate with others

43. _____ Is easily distracted

44. _____ Is sophisticated in art, music, or literature

Positive and Negative Affect Schedule (PANAS-Self)

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 you felt these emotions during the course of the previous task.**

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

Positive and Negative Affect Schedule (PANAS-Partner)

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 you believe you partner experienced these emotions during the course of the previous task.**

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

Interpersonal Reactivity Index

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: 1-5. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

1	2	3	4	5
DOES NOT DESCRIBE ME VERY WELL				DESCRIBES ME VERY WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me.

2. I often have tender, concerned feelings for people less fortunate than me.

3. I sometimes find it difficult to see things from the "other person's" point of view.

4. Sometimes I don't feel very sorry for other people when they are having problems.

5. I really get involved with the feelings of the characters in a novel.

6. In emergency situations, I feel apprehensive and ill-at-ease.

7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.

8. I try to look at everybody's side of a disagreement before I make a decision.

9. When I see someone being taken advantage of, I feel kind of protective towards them.

10. I sometimes feel helpless when I am in the middle of a very emotional situation.

11. I sometimes try to understand my friends better by imagining how things look from their perspective.

12. Becoming extremely involved in a good book or movie is somewhat rare for me.

13. When I see someone get hurt, I tend to remain calm.

14. Other people's misfortunes do not usually disturb me a great deal.

15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.

16. After seeing a play or movie, I have felt as though I were one of the characters.

17. Being in a tense emotional situation scares me.

18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.

19. I am usually pretty effective in dealing with emergencies.

20. I am often quite touched by things that I see happen.

21. I believe that there are two sides to every question and try to look at them both.

22. I would describe myself as a pretty soft-hearted person.

23. When I watch a good movie, I can very easily put myself in the place of a leading character.

24. I tend to lose control during emergencies.

25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.

27. When I see someone who badly needs help in an emergency, I go to pieces.

28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

29. I think of myself as someone who feels a lot of empathy

30. I think of myself as someone who often shows empathy to others

31. If I had to list 5 words to describe myself, the words "empathic" (or its synonym "empathetic") be among them

EC SCALE

Please indicate how often each of the following statements applies to you. Below is an example of the scale you will be using.

1 2 3 4 5
Never Always

1. If someone I'm talking with begins to cry, I get teary-eyed.

1 2 3 4 5

2. Being with a happy person picks me up when I'm feeling down.

1 2 3 4 5

3. When someone smiles warmly at me, I smile back and feel warm inside.

1 2 3 4 5

4. I get filled with sorrow when people talk about the death of their loved ones.

1 2 3 4 5

5. I clench my jaws and my shoulders get tight when I see the angry faces on the news.

1 2 3 4 5

6. When I look into the eyes of the one I love, my mind is filled with thoughts of romance.

1 2 3 4 5

7. It irritates me to be around angry people.

1 2 3 4 5

8. Watching the fearful faces of victims on the news makes me try to imagine how they might be feeling.

1 2 3 4 5

9. I melt when the one I love holds me close.

1 2 3 4 5

10. I tense when overhearing an angry quarrel.

1 2 3 4 5

11. Being around happy people fills my mind with happy thoughts.

1 2 3 4 5

12. I sense my body responding when the one I love touches me.

1 2 3 4 5

13. I notice myself getting tense when I'm around people who are stressed out.

1 2 3 4 5

14. I cry at sad movies.

1 2 3 4 5

15. Listening to the shrill screams of a terrified child in a dentist's waiting room makes me feel nervous.

1 2 3 4 5

Liebowitz social anxiety scale (lsas-sr)

This measure assesses the way that social phobia plays a role in your life across a variety of situations. Read each situation carefully and answer two questions about it; the first question asks how anxious or fearful you feel in the situation; the second question asks how often you avoid it. If you come across a situation that you ordinarily do not experience, we ask that you imagine "what if you
were faced with that situation", and then rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it (using the 0 to 3 scales below). Please base your ratings on the way that situations have affected you in the last week (or other agreed time period).

fear or anxiety	none	mild	moderate	severe
	0	1	2	3
avoidance	never (0%)	occasionally (1-33%)	often (33-67%)	usually (67-100%)

		anxiety	**avoidance**
1	telephoning in public (p)		
2	participating in small groups (p)		
3	eating in public places (p)		
4	drinking with others in public places (p)		
5	talking to people in authority (s)		
6	acting, performing or giving a talk in front of an audience (p)		
7	going to a party (s)		
8	working while being observed (p)		
9	writing while being observed (p)		
10	calling someone you don't know very well (s)		
11	talking with people you don't know very well (s)		
12	meeting strangers (s)		
13	urinating in a public bathroom (p)		
14	entering a room when others are already seated (p)		
15	being the centre of attention (s)		

16	speaking up at a meeting (p)		
17	taking a test (p)		
18	expressing a disagreement or disapproval to people you don't know very well (s)		
19	looking at people you don't very well in the eyes (s)		
20	giving a report to a group (p)		
21	trying to pick up someone (p)		
22	returning goods to a store (s)		
23	giving a party (s)		
24	resisting a high pressure salesperson (s)		
	total performance (p) subscore		
	total social interaction (s) subscore		
	total score		

Liebowitz, M. R. (1987) "Social phobia" Modern Problems in Pharmacopsychiatry
Fresco, D. M. (2001) "The Liebowitz Social Anxiety Scale: A comparison of the psychometric properties of self-report and clinician-administered formats" Psychological Medicine 1025-1035.

Geneva Emotion Recognition Test - Long Form

This test measures your ability to recognize emotions expressed in a speaker's face and voice.

It will take you about 20 minutes to complete the test.

You will see a series of short videos in which actors express different emotions. Your task is to select the emotion word which best describes the emotion the actor wanted to express.
In some cases this can be quite difficult. Just trust your intuition - people's first guesses are usually the best.

Please put on your headphones to hear the sound. It is essential that you complete the test in one go, without any interruption.

After each video, 14 emotion words are presented, arranged in a circle that will help you to rapidly select the appropriate emotion:

Example still frame from short video clip.

Fatigue Assessment Scale (FAS)

The following 10 statements refer to how you usually feel. For each statement you can choose one out of five answer categories, varying from *never* to *always*. 1 = *never*; 2 = *sometimes;* 3 = *regularly*; 4 = *often*; 5 = *always*.

	Never	Sometimes	Regularly	Often	Always
1. I am bothered by fatigue (WHOQOL)	1	2	3	4	5
2. I get tired very quickly (CIS)	1	2	3	4	5
3. I don't do much during the day (CIS)	1	2	3	4	5
4. I have enough energy for everyday life (WHOQOL)	1	2	3	4	5
5. Physically, I feel exhausted (CIS)	1	2	3	4	5
6. I have problems starting things (FS)	1	2	3	4	5
7. I have problems thinking clearly (FS)	1	2	3	4	5
8. I feel no desire to do anything (CIS)	1	2	3	4	5
9. Mentally, I feel exhausted	1	2	3	4	5
10. When I am doing something, I can concentrate quite well (CIS)	1	2	3	4	5

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Note: The abbreviations after the items indicate the scale from which the items has been abstracted. The following are the scales:
CIS - Checklist Individual Strength
WHOQOL - World Health Organization Quality of Life assessment instrument
FS - Fatigue Scale

Final Partner Ratings

Acquaintanceship: Please circle the number below which reflects how well you knew your partner **prior to your interaction today**

1. I **did not** know my partner prior to our interaction today
2. I have seen my partner before today (e.g., on campus, around town), but have never spoken to them before
3. I have spoken with my partner a few times before (e.g., in class, around mutual friends), but we are not close friends
4. I am well acquainted with my partner

Rapport: Please circle the picture below that best describes your interaction with your partner, where "self" indicates you and "other" indicates your partner.

Please rate the level of rapport (i.e., closeness, agreement, mutual understanding) you felt

between you and your partner.

NO RAPPORT HIGH RAPPORT

1 2 3 4 5 6 7 8

Please rate the level of rapport you think your partner would give the interaction

NO RAPPORT HIGH RAPPORT

1 2 3 4 5 6 7 8

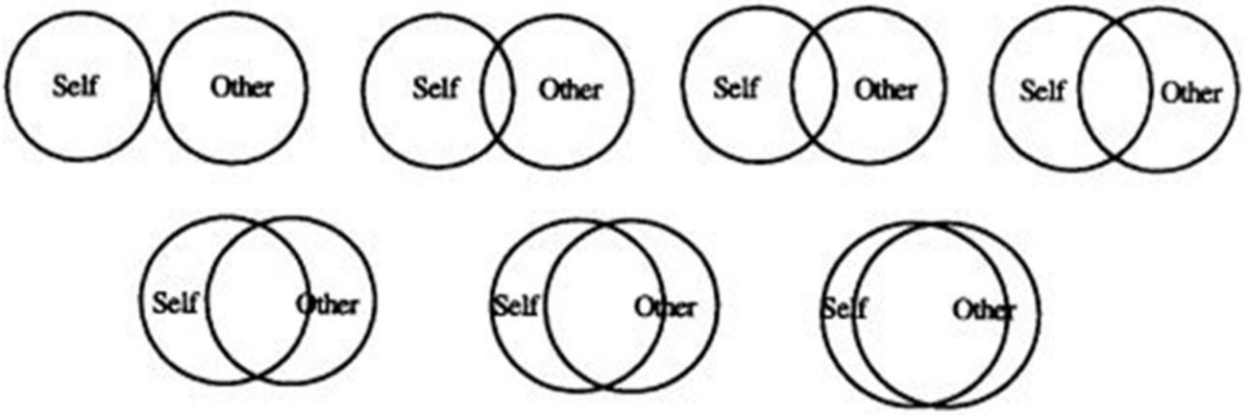
How did the interaction with your partner compare to interactions you have with close others in your daily life (with friends, family, etc.?)

WORSE BETTER

1 2 3 4 5

DIFFERENT TYPICAL

1 2 3 4 5



Overall Impressions: Please rate your partner on each of the following categories on a scale of 0-10**.**

0 1 2 3 4 5 6 7 8 9 10
Not at all Extremely

1. How much did you like your partner?

   0 1 2 3 4 5 6 7 8 9 10

2. How much did your partner like you?

   0 1 2 3 4 5 6 7 8 9 10

3. How similar are you and your partner?

   0 1 2 3 4 5 6 7 8 9 10

4. How much warmth, or feelings of compassion for others do you think your partner feels for others in distress?

   0 1 2 3 4 5 6 7 8 9 10

5. How much does your partner see the world from other's viewpoints (i.e., try to understand the perspective and experiences of others?)

0 1 2 3 4 5 6 7 8 9 10

6. How much does your partner experience distress and discomfort in response to distress in others?

0 1 2 3 4 5 6 7 8 9 10

7. How much does your partner imaginatively transpose themselves into fictional situations (i.e., how much do they get involved with the feelings of characters is films, novels, etc.)

0 1 2 3 4 5 6 7 8 9 10

8. Does your partner *feel* empathy for others?

0 1 2 3 4 5 6 7 8 9 10

9. Does your partner *show* empathy to others?

0 1 2 3 4 5 6 7 8 9 10

10. If your partner had to list 5 words to describe themselves, how likely would the word "empathic" would be among them?

0 1 2 3 4 5 6 7 8 9 10

Please use the scale below to answer the following questions about the person with whom you interacted.

0 1 2 3 4 5 6 7 8 9 10
Not at all Extremely

1. How likely would you be to seek advice from this person? _____
2. How likely would you be to sit next to this person on a three-hour bus ride? _____
3. How likely would you be to share an apartment with this person? _____
4. How likely would you be to invite this person to your home? _____
5. How likely would you be to approve if a relative married this person? _____
6. How likely would you be to work with this person? _____
7. How likely would you be to admit this person to your circle of friends? _____

Attractiveness Ratings: Please rate your partner on each of the following categories by writing a number between 1-100**.** Please note that 50 is average. **REMEMBER: Your responses are confidential; your partner will not see how you rated them.**

Sexy/Hot:

0% 50% 100%

Natural Beauty:

0% 50% 100%

Attention to partner: Please indicate the percentage of time throughout the interaction that you believe you were making eye contact with your partner

0% 50% 100%

Technology Ratings:

1. Did you have any technology interruptions during your interaction with your partner (i.e., freezing, voice not syncing to talking?

Yes No

2. If yes, how much did these technology interruptions distract/impact your overall experience during the interaction

0 1 2 3 4 5 6 7 8 9 10
Not at all Extremely

3. How often have you used Zoom or other videoconferencing platforms *in your life*?

0 1 2 3 4 5 6 7 8 9 10
Not at all often Extremely often

4. How often have you used Zoom or other videoconferencing platforms *in the past year*?

0 1 2 3 4 5 6 7 8 9 10
Not at all often Extremely often

Friends and Family Follow up Survey

BIG FIVE INVENTORY (BFI-Friend/Family)

How my friend/family member is in general

Here are a number of characteristics that may or may not apply to your friend/family member. For example, do you agree that your friend/family member is someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement in regards to your friend/family member.**

1	**2**	**3**	**4**	**5**
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

My friend/family member is someone who…

1._____ Is talkative

2._____ Tends to find fault with others

3._____ Does a thorough job

1. _____ Is depressed, blue

2. _____ Is original, comes up with new ideas

3. _____ Is reserved

4. _____ Is helpful and unselfish with others

5. _____ Can be somewhat careless

6. _____ Is relaxed, handles stress well.

7. _____ Is curious about many different things

8. _____ Is full of energy

9. _____ Starts quarrels with others

10. _____ Is a reliable worker

11. _____ Can be tense

12. _____ Is ingenious, a deep thinker

13. _____ Generates a lot of enthusiasm

14. _____ Has a forgiving nature

15. _____ Tends to be disorganized

16. _____ Worries a lot

17. _____ Has an active imagination

18. _____ Tends to be quiet

19. _____ Is generally trusting

20. _____ Tends to be lazy

21. _____ Is emotionally stable, not easily upset

22. _____ Is inventive

23. _____ Has an assertive personality

24. _____ Can be cold and aloof

25. _____ Perseveres until the task is finished

26. _____ Can be moody

27. _____ Values artistic, aesthetic experiences

28. _____ Is sometimes shy, inhibited

29. _____ Is considerate and kind to almost everyone

30. _____ Does things efficiently

31. _____ Remains calm in tense situations

32. _____ Prefers work that is routine

33. _____ Is outgoing, sociable

34. _____ Is sometimes rude to others

35. _____ Makes plans and follows through with them

36. _____ Gets nervous easily

37. _____ Likes to reflect, play with ideas

38. _____ Has few artistic interests

39. _____ Likes to cooperate with others

40. _____ Is easily distracted

41. _____ Is sophisticated in art, music, or literature

Appendix B

Synchrony Coding Sheet

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

Simultaneous Movement: Rate the extent to which movement from one partner generally appears at beginning or end at the same moment as the other. The nature or similarity of movements is irrelevant; the *timing* of the movements is what matters. For example, if one person kicks their foot at the precise instant another swings their arm it is to be considered a simultaneous movement.

1 2 3 4 5 6 7 8 9
Not at all Extremely

Tempo Similarity: Assume that all people have built in tempos and rates of speed with which their behaviors occur, such as the tempo an orchestra follows at a concert. Rate the degree to which two people seem to be “marching to the beat of the same drummer”.

1 2 3 4 5 6 7 8 9
Not at all Extremely

Coordination and Smoothness: Rate the degree of behavior unity or "smoothness" achieved by the interactants. Assume you are viewing a choreographed dance rather than a social interaction. How smoothly do the interactants' behaviors intertwine? Are there any false starts or hesitations? Do they act *at* each other or *with* each other? To what extent do their behaviors mesh or combine evenly and smoothly?

1 2 3 4 5 6 7 8 9
Not at all Extremely

Posture Similarity: Rate the degree to which the posture of one interactant matched the other. Are they both sitting upright?

1 2 3 4 5 6 7 8 9
Not at all Extremely

Gestural Mimicry: Rate the degree to which the movements of one interactant matched the other. Do they both have one leg crossed over the other? Are they both smiling? Do they both have their hands resting on their lap?

1 2 3 4 5 6 7 8 9
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 then moved to Orono, Maine to pursue her Ph.D. in Psychological Science at the University of Maine where she is currently finishing her second year. For the duration of her time at UMaine, she plans to continue studying nonverbal behavior and the dynamics of first impressions in social interactions. Morgan is a candidate for the Master of Arts degree in Psychological Science from the University of Maine in June 2021.