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Ultimately, the Bond of all Companionship, Whether in Marriage or in Friendship, is Conversation: Measuring Conversation-Level Social Connection in Adults and Adolescents

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Ultimately, the Bond of all Companionship, Whether in Marriage or in Friendship, is
Conversation:
Measuring Conversation-Level Social Connection in Adults and Adolescents

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Karynna Yuka Okabe-Miyamoto

September 2022

Dissertation Committee:
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       Dr. Brent Hughes
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The Dissertation of Karynna Yuka Okabe-Miyamoto is approved:

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ABSTRACT OF THE DISSERTATION

Ultimately, the Bond of all Companionship, Whether in Marriage or in Friendship, is
Conversation:
Measuring Conversation-Level Social Connection in Adults and Adolescents

by

Karynna Yuka Okabe-Miyamoto

Doctor of Philosophy, Graduate Program in Psychology
University of California, Riverside, September 2022
Dr. Sonja Lyubomirsky, Chairperson

Decades of research have focused on the importance of social connection for

overall functioning and well-being. However, very little work has explored social

connection as experienced during conversations, as opposed to globally or with particular

partners. Because social connection is a property that emerges out of individual

conversations, creating a tool to measure connection felt during specific conversations is

vital to further the understanding of social connection.

Across the three studies described in Chapter 2, I validated the CDCS in a sample

of nearly 1,000 adults. Results revealed that each subscale was uniquely related to

various positive well-being outcomes. Specifically, the Shared Reality subscale was

uniquely associated with conscientiousness; the Affective Experience subscale was

uniquely associated with autonomy and loneliness; and the Partner Responsiveness subscale was uniquely associated with life satisfaction and positive affect in the last seven days.

In an experimental study described in Chapter 3, I validated an adolescent version of the CDCS in a sample of 4,055 adolescents who reported on nearly 6,500 face-to-face and digital conversations combined. Results revealed that adolescents rated conversations that took place over video chat as more connecting than conversations that took place face-to-face, over social media, or over text. When examining the well-being and health outcomes of connection felt during face-to-face and digital conversations, very few differences emerged. However, when comparing the strength of the effect of connection felt during face-to-face and digital conversations, connection felt during face-to-face conversations had a more uniquely powerful influence on positive well-being and health outcomes, such as fewer headaches and more life satisfaction, compared to digital conversations.

Taken together, my two dissertation studies demonstrate the importance of measuring social connection not just globally or for a specific partner, but also at the conversation level. The CDCS is a valuable tool for future researchers to understand social connection felt in specific conversations both face-to-face and digitally. Future research should continue to explore the connection felt in face-to-face and digital conversations, including how individual conversations may aggregate and strengthen over time to positively impact global connection, well-being, and health.

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Chapter 1: Brief Introduction

Social connection, or a sense of belonging, intimacy, and closeness with others, has been widely described as a fundamental human need (Baumeister & Leary, 1995; Maslow, 1943). Research has underscored the importance of social connection for major health outcomes such as reduced risk for mortality and heart disease (Cole et al., 2007; Holt-Lunstad et al., 2010, 2017; House et al., 1988). In addition, a plethora of evidence has identified strong links between aspects of social connection and well-being (Cacioppo et al., 2008; Diener & Seligman, 2002; Lyubomirsky et al., 2005; Margolis & Lyubomirsky, 2020; Sun et al., 2019). Not surprisingly, growing interdisciplinary research has been focused on better understanding the various features of social connection, and how and why it might produce salutary outcomes.

For example, the link between social connection and well-being has been explored using multiple approaches and methodologies. Research using the Electronically Activated Recorder (EAR) has shown that both having frequent conversations and spending more time in conversations are robustly associated with higher levels of well-being (Bernstein et al., 2018; Mehl et al., 2010; Milek et al., 2018). In experimental designs, participants prompted to have conversations report more positive emotion and connectedness than those who did not have conversations (Fritz et al., 2021; Jacques-Hamilton et al., 2019; Margolis & Lyubomirsky, 2020). In a 10-year long study, married or cohabiting couples who reported greater partner responsiveness—that is, feeling understood, valued, and cared for—showed greater well-being (Selcuk et al., 2016).

Psychological scientists have further explored whether all types of connecting experiences are related to well-being. Interestingly, well-being has been related to not only having relatively more conversations, but also to having deeper conversations (compared to small talk; Aron et al., 1992; Kardas et al., 2022; Sun et al., 2019). However, the well-being impact of the quantity and quality of conversations may not be stable across the lifespan; for example, researchers have found that individuals in their 20s prefer higher quantity of conversations, while those in their 30s prefer higher quality (Carmichael et al., 2015; Carstensen et al., 1999). As such, there appears to be more nuance to the association between social connection and well-being, with ripe possibilities for further investigation in future studies.

Some researchers have begun to examine such nuance. For example, the targets of conversations may differentially impact well-being. One study found that the closer the relationship, the more connecting—and positive emotion-inducing—was the conversation (Fritz et al., 2022). Indeed, romantic partners have been shown to be critical for health and well-being (Pietromonaco & Collins, 2017), especially during COVID-19 (Okabe-Miyamoto et al., 2021), and that being in a romantic relationship is one of the strongest predictors of social connection and well-being (Diener & Seligman, 2002; Ryff, 1989). In other work, however, conversations were linked to greater well-being regardless of whether these conversations were with close others (Kahneman et al., 2004) or with strangers (Epley & Schroeder, 2014; Sandstrom & Dunn, 2013, 2014). Taken together, these findings highlight the need to better understand the role of conversation partners on social connection and well-being.

It is important to note that much of the existing research focuses on connection felt globally (e.g., one's overall sense of connectedness, belonging, or intimacy as a whole) or with a specific partner (e.g., how satisfied one feels with the amount and/or quality of social connection with a romantic partner or parent). What is critically missing in the literature is how much social connection people feel from a single social interaction (e.g., how connected one feels with one's interaction partner during a particular conversation). However, social life essentially consists of a series of conversations, and social connection felt globally or with a specific partner is derived from having such conversations. Thus, it is important to create tools to assess people's experiences during and immediately after individual conversations. As such, the goal of this dissertation was to create a tool that assesses social connection felt during a specific conversation—in both adults and adolescents—in an effort to advance our understanding of the role that conversations play in the ecosystem of social connection and well-being.

Chapter 2: Measuring the Experience of Social Connection Within Specific Social Interactions: The Connection During Conversations Scale (CDCS)

Karynna Okabe-Miyamoto, Lisa C. Walsh, Daniel J. Ozer, and Sonja Lyubomirsky

Abstract

Decades of research have demonstrated that social connection is fundamental to health and well-being. The benefits of connection are observed with both close and distant others, within both new and established relationships, and even with exchanges that unfold over a relatively short timeframe. Because social connection is fundamental to well-being, many existing measures in the literature aim to assess either a global sense of connection or partner-specific (relationship-specific) connection. What is missing are measures of connection felt in specific social interactions or conversations. In three studies (Study 1: $N = 351$; Study 2: Time 1 $N = 397$, Time 2 $N = 336$, Time 3 $N = 299$; Study 3: $N = 235$), we developed the Connection During Conversations Scale (CDCS), a 14-item measure of interaction-specific social connection that assesses connection experienced during a social interaction (or conversation). Confirmatory factor analyses demonstrated that a four-factor model fit our samples well, which resulted in four subscales: Shared reality, partner responsiveness, participant interest, and affective experience. The overall CDCS measure, along with its four subscales, was significantly correlated with established measures of loneliness, partner responsiveness, relatedness, positivity resonance, and shared reality. Because of the importance of frequent interactions—whether with family, friends, coworkers, or strangers—our new scale will

allow researchers to better understand how, when, and where such conversations may contribute to social connection and well-being.

Introduction

Social connection (or belonging) is essential for optimal human functioning (Baumeister & Leary, 1995; Maslow, 1943). A great deal of evidence has demonstrated that social connection is associated with well-being (Cacioppo et al., 2008; Diener & Seligman, 2002; Lyubomirsky et al., 2005), and that lack of social connection is a major health risk factor (Cole et al., 2007; Holt-Lunstad et al., 2010, 2017; House et al., 1988). According to self-determination theory (Ryan & Deci, 2000), relatedness (i.e., connectedness)—along with competence and autonomy—is one of the three basic psychological needs that, when fulfilled, promotes well-being. Taken together, research over the past several decades has revealed the fundamental nature of relationships for human health and well-being.

Using a variety of methodologies, a large literature has explored the well-being outcomes associated with feelings of social connection. For example, in a longitudinal study that followed married or cohabiting couples over the course of 10 years, partner responsiveness (that is, feeling understood, valued, and cared for) predicted greater eudaimonic well-being (Selcuk et al., 2016). During the stressful transition into parenthood, parents who reported stronger social support were less depressed during the transition period (Bost et al., 2002). Moreover, using the Day Reconstruction Method, participants who reported greater perceived positivity resonance (i.e., shared positive

affect and mutual concern) with their interaction partner, also reported greater flourishing mental health (Major et al., 2018). As such, correlational evidence suggests that social connection is related to beneficial well-being outcomes.

In addition to correlational studies, experimental work has also explored the link between social connection and well-being. In a study of prosocial spending, those who gave away a gift card were happier than those who kept the gift card for themselves, with the greatest well-being benefits for individuals who reported feeling connected with their gift card recipient (Aknin et al., 2013). These results demonstrate that social connection can be leveraged to develop or strengthen happiness-boosting interventions. Importantly, individuals instructed to engage socially report relatively more connectedness and positive emotion (Fritz et al., 2021; Jacques-Hamilton et al., 2019; Margolis & Lyubomirsky, 2020). Overall, these studies support the notion that stronger self-reported feelings of social connection—assessed and induced in a variety of ways—are related to myriad well-being outcomes throughout the lifespan and during major life transitions.

In addition to well-being outcomes, social connection has also been associated with positive physical health and improved cognitive outcomes. In a meta-analysis of 148 studies, researchers found that individuals who reported having relatively stronger social relationships, regardless of age or gender, had a 50% greater likelihood of surviving than those without strong relationships (Holt-Lunstad et al., 2010). In the longitudinal study of married or cohabiting couples, partner responsiveness also predicted healthier cortisol levels at a 10-year follow-up (Slatcher et al., 2015). In one experiment that administered mock personality tests then provided false personality feedback, participants who were

told that they would have meaningful relationships in the future performed better on verbal, math, and spatial assessments compared to those told that they would end up alone later in life (Baumeister et al., 2002). As such, induced feelings of social connection are not only linked to improved well-being outcomes but improved cognitive functioning as well.

What is it about felt social connection that facilitates well-being? To investigate this question, researchers have begun to use varied methodologies to probe people's social interactions. For example, both self-report and audio recording data using the Electronically Activated Recorder (EAR) have shown that engaging in more conversations is related to greater well-being (Bernstein et al., 2018; Mehl et al., 2010; Milek et al., 2018). Furthermore, people who connect through conversations report to be happier than those who do not, whether those conversations are with close others (Kahneman et al., 2004) or strangers (e.g., baristas, bus strangers; Epley & Schroeder, 2014; Sandstrom & Dunn, 2013, 2014). Moreover, both engaging in a relatively larger number of conversations and having deeper (versus small talk) social interactions have been found to be related to greater well-being (Sun et al., 2019). Interestingly, the quantity and quality of social interactions may be valued differently depending on one's age, such that individuals in their 20s may prefer quantity while those in their 30s may prefer quality (Carmichael et al., 2015; cf. Carstensen et al., 1999). Therefore, not only are the number of conversations important for well-being, but so is their quality—or sense of connection or understanding they provide.

In sum, a number of correlational and experimental studies have provided evidence that social interactions and conversations, with both close others and strangers, are associated with greater happiness (e.g., Epley & Schroeder, 2014; Fritz et al., 2021; Jacques-Hamilton et al., 2019; Kahneman et al., 2004; Margolis & Lyubomirsky, 2020; Sandstrom & Dunn, 2013, 2014). However, little is known about how connected people feel during these conversations or interactions. Most research on social connection relies on either of two approaches to assess felt social connection: global relationship measures (e.g., how satisfied someone feels with the amount and quality of their social connection across all connections) and specific partner measures (e.g., how satisfied someone feels with their connection with a spouse, friend, sister, etc.). An alternative approach might examine the degree of social connection experienced in a specific social interaction (e.g., how satisfied someone feels with their connection during or after a particular conversation). In other words, research is needed to assess the quality of social connection moments, such as a phone call with a parent or a chat with a co-worker. Whether a particular conversation is lengthy or hasty, it has the capacity to influence how connected people feel. Indeed, brief interactions with weak ties, such as chats with baristas or Lyft drivers, have been shown to lead to feelings of social connection and well-being (see Van Lange & Columbus, 2021, for a review), and almost all interpersonal relationships essentially comprise a series of multiple social interactions. Accordingly, it is imperative to possess tools to advance understanding of how individual social interactions influence social connection and well-being. Before we introduce such a tool

in this paper, we first briefly review a selection of measures of social connection previously used in the literature.

Existing Measures of Social Connection

Social connection can be explored at multiple levels, ranging from global (e.g., "Do you feel a sense of intimacy and closeness with others?") to partner-specific (e.g., "Do you feel close to your" husband or parent) to interaction-specific (e.g., "Did you feel a sense of connection during this conversation?"). As a result, many existing relevant measures—global and partner-specific ones, in particular—can be found in the literature. We outline several representative measures below. Additionally, Table 1 presents a full list and description of all existing measures we have identified.

Global Relationship Measures

Global relationship measures typically ask respondents to holistically evaluate their relationships (see first several pages of Table 1). For example, the Social Provisions Scale (Cutrona & Russell, 1987) includes items like "There are people I can depend on to help me if I really need it," and the Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012) has items like "I felt close and connected with other people who are important to me." Similar measures include the Multi-Dimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988), with items such as "There is a special person with whom I can share my joys and sorrows"; the Social Connectedness Scale (Lee et al., 2001), with items like "I feel understood by the people I know"; and the support ("There are people who give me support and encouragement") and belonging ("I feel a sense of belonging in my community") subscales of the Comprehensive Inventory

of Thriving (CITI; Su et al., 2014). The UCLA Loneliness scale (Russell et al., 1980) assesses the general lack of connection, or feelings of loneliness, with items such as "No one really knows me well." These measures are critical vis-à-vis their ability to tap into how much connectedness an individual feels in general. However, they were not designed to examine the strength of a person's connection in specific relationships or during specific conversations.

Partner-Specific Relationship Measures

Another category of connection measures asks individuals about the connection they feel with a specific partner (see Partner-Specific section of Table 1). One type of partner-specific relationship measure assesses the connection people feel *from* their relationship partner. Examples include the Partner Responsiveness Scale (Reis et al., 2011, 2017), with items such as "Compared to most experiences I've had meeting somebody new, I get the feeling that this person sees the 'real' me'"; and the Relationship Closeness Inventory (Berscheid et al., 1989), with items such as "[My partner] influences important things in my life." Another type of partner-specific relationship measure assesses the connection people feel *toward* their relationship partner. Such measures include the Relationship Assessment Scale (Hendrick et al., 1998) with items like, "How much do you love your partner?" Finally, some scales measure both connection people feel *from* and *toward* their relationship partner. These include the Inclusion of Other in the Self Scale (Aron et al., 1992), which displays seven options involving two circles that range from separate to increasingly close (and eventually overlapping) to tap perceived closeness between self and partner; and the Two-Way Social Support Scale

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(Shakespeare-Finch & Obst, 2011), with items like, "I am there to listen to others'

problems" and "There is someone I can talk to about the pressures in my life." In sum,

these three types of partner-specific measures allow researchers to examine connection

with a specific partner, but they do not capture people's sense of connection during a

specific social interaction.

Interaction-Specific Connection

Despite research evidence demonstrating links between well-being and the

frequency of social interactions, to our knowledge, only two measures—both recently

developed—gauge the amount or quality of connection felt during a particular social

interaction. The Positivity Resonance Scale (Major et al., 2018) asks respondents

questions such as, what percentage of time (from 0 to 100%) "Did you feel 'in sync' with

the other(s)?" among other questions about several features of an interaction. Motivated

by the theory of positivity resonance, this 7-item scale aims to measure its three

hypothesized facets—namely, shared positive affect, mutual care and concern, and

behavioral and biological synchrony (Fredrickson, 2016), with some items tapping more

than one facet. However, when assessing social connection felt during an interaction, the

Positivity Resonance Scale might miss important features of the interaction, such as

general affective experience. Furthermore, because the scale follows the positivity

resonance theory, this might be limiting, such that connection might be found not only

during shared positive affect but also shared negative affect (e.g., shared misery).

Additionally, respondents have reported that percent conversation time from 0 to 100 is

complicated to estimate accurately, potentially making the scale relatively time

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consuming and cognitively taxing (Funke et al., 2010). As such, a different measure may be needed to assess types of connecting experiences that may not cover all three of these elements or feature additional elements.

The Generalized Shared Reality Measure (Rossignac-Milon et al., 2021), published after our data collection had completed, is another interaction-specific measure of connection that can be used for both close others and strangers. It includes items such as "during our interaction we thought of things at the same time." However, this measure, which is also theoretically motivated, is designed to focus on only one facet of social connection—namely, shared reality. Overall, the literature is still missing a scale that more broadly assesses felt social connection during specific social interactions which greatly limits the study of social connection. For example, in order to create interventions to help people connect, researchers must understand how people connect in daily conversations. A measure of connection felt during an interaction can help researchers understand what aspects of conversations make for the most connecting experiences (e.g., commonalities). Thus, researchers can identify strategies to target these key aspects of conversations in order to boost overall connection (e.g., arming people with questions to ask others that might reveal commonalities). Additionally, a measure of connection felt during an interaction may allow researchers to identify profiles of those struggling to connect with others, such as those who have trouble finding commonalities with others or those who view all interactions in a negative light. By identifying these profiles, researchers may more easily create overarching strategies to help people who fall under different social connection profiles.

The Present Studies

Our aim was to create a measure of social connection to assess connection felt during interactions or conversations with both close others and strangers in daily life. To this end, we conducted a set of programmatic studies to develop and validate the Connection During Conversations Scale. For Study 1, we collected a broad pool of items from existing measures of social connection, including the Positivity Resonance Scale (Major et al., 2018), the Partner Responsiveness Scale (Reis et al., 2011, 2017) and the Social Provisions Scale (Cutrona & Russell, 1987), to create our new scale (see Table 1 for a full list and description of these existing measures). Next, we evaluated our new measure—the 16-item version in Studies 2a, 2b, and 2c and the 14-item version in Study 3—by correlating it with the most commonly used and most relevant social connection measures in the literature, and provided construct validity evidence by examining correlations with personality, well-being, and demographic variables.

Study 1

Our first study focused on creating the Connection During Conversations Scale (CDCS), designed to be a measure of social connection felt during a specific interpersonal interaction. Based on a comprehensive search of social connection scales (again, see Table 1 for a full list of scales used to develop the CDCS), we selected 53 items (i.e., items that were the most relevant to social connection, adapted, and edited for clarity) to construct our new measure. Additionally, to ensure strong recall and deep reflection of a recent social interaction, we also created an open-ended prompt that asked participants to write about this interaction. Following the prompt, participants completed

the 53-item measure, then provided details about where, when, and with whom the interaction occurred.

Method

Participants

Participants ($N = 351$) were recruited from Prolific Academic, an online platform used to recruit subjects that has been shown to provide good quality online data (Peer et al., 2017). To join the study, they had to be fluent in English and have an "approval rating" of over 90% on Prolific. Participants ranged in age from 18 to 66 ($M = 30.92$, $SD = 10.12$). They were mostly male (56%) and Caucasian (63%), and nearly half were single and never married (42%). They also resided around the world, with 34% from the U.S., 17% from the U.K., 11% from Canada, and the remaining 38% from 26 other international countries (e.g., Australia, South Korea).

Procedure

Participants joined a 15-min study entitled "Social Interaction Psychological Research Study." Following consent, they completed our writing prompt, which asked them to take a few moments to describe a social interaction that had taken place within the last 2 days:

> For the next few minutes, think about *a recent interaction or conversation* you had with another (one) person that lasted for at least a few moments…Now, we would like you to briefly describe this interaction…What happened during the interaction or conversation? What were you thinking and/or feeling during the interaction? Where were you?

The resulting qualitative data from this prompt are beyond the scope of the present study and are not presented here. Next, participants completed our 53-item connection measure, followed by questions about their target social interaction (e.g., whether the interaction was positive, negative, or neutral), their interaction partner (e.g., how long they had known them), and demographic items (e.g., their own age, gender). Participants who completed the study were compensated $2.00 for their time.

Materials

Connection Scale Item Pool

To compile a pool of items, we turned to reliable and valid scales already published in the empirical literature that aim to assess aspects of social connection and interpersonal relationships

(again, see Table 1 for existing scales used in scale creation). While examining each measure, we identified the most relevant items, which resulted in a total of 53 items. Furthermore, we modified and updated some items for clarity (e.g., removed or separated double-barreled questions). Of the 53 items, 33 were categorized as being toward one's partner (e.g., "I felt 'in sync' with them"), 15 were categorized as being from one's partner (e.g., "They were responsive to me"), and 5 were categorized as being general items (e.g., "The interaction brightened my day"). Each of the items within each category was presented together with blocks counterbalanced and items within the blocks randomized. Each category was presented in separate blocks to reduce participant burden, as switching between these types of questions could increase cognitive load. Participants rated their level of agreement with each item on a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scale.

Interaction Partner Demographics and Interaction Details

We asked participants to respond to several questions about their interaction partners, including their partner's gender, age, ethnicity, how long the participant has known their partner (ranging from just met to many years), and who their partner was (e.g., close friend, brother/sister, stranger). We also asked participants to indicate when the interaction occurred, its mode of communication, and the interaction's duration and valence. See Table 2 for a breakdown of demographics and details for this study (as well as Study 2 and 3).

Results

Exploratory Factor Analysis

To determine the number of factors that emerged from our 53 items, we calculated eigenvalues for each of our dimensions and then graphed the eigenvalues[1] using a scree plot. It appeared that 2 or 4 factors may be present in our data. Based on Horn's Parallel Analysis for component retention using 5000 iterations, 4 components were retained. Therefore, we decided to extract four factors with our data. We fit the four-factor model to our data using the *fa* function in the psych package in R. We used the maximum likelihood method with oblimin rotation (because we expected our factors to be correlated), which resulted in a solution that accounted for 57% of the cumulative variance.

The 16-items of the CDCS were correlated (average inter-item $r = .54$). The four subscales of this scale were also correlated (average $r = .63$). The correlation between the Shared Reality latent variable was stronger with the Partner Responsiveness latent variable ($r = .70$) and the Participant Interest latent variable ($r = .51$) than with the Affective Experience latent variance ($r = -.49$). The Partner Responsiveness latent variable were oppositely correlated with the Participant Interest latent variable ($r = .52$) and the Affective Experience latent variable ($r = -.50$). Finally, the Participant Interest latent variable and the Affective Experience latent variable were also negatively correlated ($r = -.37$).

Furthermore, the items within each of the four factors appeared to cluster in ways that represented meaningful constructs in the literature (e.g., partner responsiveness). To

determine the final items within each of our four factors, we first removed items that loaded below .50. If items were semantically similar, the item with the highest factor loading was chosen (e.g., "they respected my beliefs and opinions" over "they valued my beliefs and opinions"). Based on these criteria, 16 final items were chosen (4 items in each factor; see Table 3 for factor loadings). The final four-factor structure closely represents four constructs found in the literature to be theoretically related to social connection: (1) Shared Reality, (2) Partner Responsiveness, (3) Participant Interest, and (4) Affective Experience.

Confirmatory Factor Analysis

Next, we conducted a confirmatory factor analysis (CFA) using the *cfa* function in the lavaan package in R based on our 16-item measure of connection (4 items for each of our 4 subscales) to determine whether our four-factor solution was a good fit. A four-factor CFA fit our connection items well, $\chi^2(98) = 336.84$, CFI = .933, TLI = .918, RMSEA = .083, 90% CI [.074, .093], SRMR = .054 (see Table 3 for factor loadings).

The 16-items of the CDCS were correlated (average inter-item $r = .54$). The four subscales of this scale were also correlated (average $r = .63$). Correlations among latent variables were strong. The Shared Reality latent variable was strongly correlated with the Partner Responsiveness latent variable ($r = .86$), the Participant Interest latent variable ($r = .76$), and the Affective Experience latent variance ($r = -.78$). The Partner Responsiveness was also strongly correlated with the Participant Interest latent variable ($r = .77$) and the Affective Experience latent variable ($r = -.72$). Finally, the Participant

Interest latent variable and the Affective Experience latent variable were also negatively correlated ($r = -.80$).

Brief Discussion

In Study 1, we developed a 16-item, four-factor measure. In Study 2, we aimed to evaluate this 16-item interaction-specific social connection measure in a sample of participants surveyed three times between February 2020 and May 2020, by correlating it with commonly used connection measures (e.g., positivity resonance), as well as with measures of related constructs (e.g., personality, well-being).

<div align="center">

Study 2

</div>

Our second set of studies (involving three timepoints, labeled Time 1, 2, and 3) aimed to test the psychometric properties of the Connection During Conversations Scale. We also correlated this new scale with other similar measures of social connection-relevant constructs—namely, loneliness, relatedness, partner responsiveness, shared reality, and positivity resonance—to establish construct validity.

Method

Participants

At Time 1, a new set of participants ($N = 399$) were recruited from Prolific in January/February 2020, with the same eligibility criteria as Study 1. We removed 2 participants because they reported being younger than 18, yielding a final sample of $N = 397$. Participants at Time 1 ranged in age from 18 to 76 ($M = 31.59$, $SD = 11.87$), with 55% male, 80% Caucasian, and 47% single. Most were from the U.S. (32%) and the U.K. (27%), with the remainder (41%) from 26 other countries (e.g., Ireland, Portugal,

Canada). Participants who returned at Time 2 ($N = 336$; April 2020) and Time 3 ($N = 299$; May 2020) were re-recruited from Time 1 and thus showed almost identical demographics. Those at Time 2 ranged in age from 18 to 72 ($M = 32.03$, $SD = 11.94$), with 55% male, 80% Caucasian, and 45% single. They resided around the world, with 31% from the U.S., 27% from the U.K., and the remaining 42% of participants from 26 international countries. Participants at Time 3 ranged in age from 18 to 69 ($M = 32.13$, $SD = 11.92$), with 53% male, 81% Caucasian, and 43% mostly single, 28% from the U.S., 27% from the U.K., and the remaining 45% of participants from 25 international countries.

Procedure

The procedures and surveys completed at Time 1, 2, and 3 were highly similar. At all three timepoints, participants were reimbursed $3.75 on Prolific for a study titled "A Social Interaction Psychological Research Survey," with their participation lasting 25, 19, and 20 mins, respectively. Following consent, participants first completed our prompt asking them to take a few moments to describe an interpersonal interaction that had taken place within the last 2 days, to ensure the interaction was fresh and cognitively accessible in their minds. Then participants completed our 16-item connection measure, followed by questions about their specific social interaction, their interaction partner, and demographic items about themselves. Participants at Time 1 completed our full set of measures (e.g., positivity resonance, loneliness, personality), while at Time 2 and 4, participants responded to a subset of these measures (outlined below).

Materials

In addition to various demographic and interaction specific variables, seven measures were used in Study 2. The sample means, standard deviations, and alpha reliability coefficients for each measure are reported in Table 4.

Interaction-Specific Measures

Connection During Conversations Scale. Participants were asked to respond to our 16-item measure of interaction-specific social connection developed in Study 1 on a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scale. These items, including those that were reverse coded in analyses, are shown in Table 3.

Interaction Partner Demographics and Interaction Details. Participants again reported the interaction partner demographics and interaction details from Study 1 (see Table 2).

Partner Responsiveness. The 12-item Partner Responsiveness Scale (Reis et al., 2011, 2017), again completed about their interaction partner, contains items like "...understands me" and "…sees the 'real' me" (1 = *strongly disagree*, 7 = *strongly agree*).

Positivity Resonance. Participants completed the 7-item Positivity Resonance Scale about their specific interaction (Major et al., 2018; e.g., "Did you feel a sense of mutual trust with (your interaction partner)?" and "Did thoughts and feelings flow with ease between you and your interaction partner?"). Responses were made as percentages of time spent on the social interaction, on a sliding 0 to 100 percent scale, where higher numbers indicated greater positivity resonance.

Shared Reality. Participants also responded to the 8-item Shared Reality Scale about the social interaction (Rossignac-Milon et al., 2021; e.g., "...the way we thought became more similar" and "...we saw the world in the same way"), using a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scale.

General Measures

Relatedness. Participants responded to the 6-item relatedness subscale of the BMPN (Sheldon & Hilpert, 2012), which has items such as "I felt a sense of contact with people who care for me, and whom I care for" and "I felt close and connected with other people who are important to me," rated on 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scales.

Loneliness. Participants completed the 20-item UCLA Loneliness Scale (Russell et al., 1980). Sample items include "No one really knows me well" and "My social relationships are superficial," rated on 1 (*never*) to 4 (*often*) Likert scales, with higher scores indicating greater loneliness.

Personality. Participants responded to the extraversion facet only (Time 1: $M = 2.90$, $SD = 0.78$, $\alpha = .87$; Time 2: $M = 3.86$, $SD = 1.09$, $\alpha = .89$; Time 3: $M = 3.91$, $SD = 1.10$, $\alpha = .89$) of the 60-item Big Five Inventory-2 (Soto & John, 2017) on 1 (*strongly disagree*) to 5 (*strongly agree*) scales.

Results

Confirmatory Factor Analysis

We conducted CFAs at each of our three timepoints on our 16-item measure of connection to assess whether our four-factor solution was a good fit. All CFAs were

conducted in R using the *cfa* function in the lavaan package. At time 1, the four-factor CFA fit our connection items well, $\chi^2(98) = 378.80$, CFI = .932, TLI = .916, RMSEA = .085, 90% CI [.076, .094], SRMR = .054. At Time 2, again, the four-factor solution was a good fit, $\chi^2(98) = 378.84$, CFI = .925, TLI = .908, RMSEA = .092, 90% CI [.083, .102], SRMR = .059. At Time 3, a four-factor CFA also fit our connection items well, $\chi^2(98) = 367.39$, CFI = .930, TLI = .915, RMSEA = .096, 90% CI [.086, .106], SRMR = .050.

We also conducted correlations among each of the latent variables for each of our three timepoints. The Shared Reality latent variable was strongly correlated with the Partner Responsiveness latent variable ($r = .86$), the Participant Interest latent variable ($r = .76$), and the Affective Experience latent variance ($r = -.78$). The Partner Responsiveness was also strongly correlated with the Participant Interest latent variable ($r = .77$) and the Affective Experience latent variable ($r = -.72$). Finally, the Participant Interest latent variable and the Affective Experience latent variable were also negatively correlated ($r = -.80$).

Correlations Among the Connection During Conversations Scale and Other Measures

Table 4 displays representative correlations for participants at Time 1 between our Connection During Conversations Scale, its four subscales, and similar scales that measure social connection in the literature. First, as expected, our overall scale was highly correlated (*r*s ranging from .68 to .84) with the Positivity Resonance Scale, Partner Responsiveness Scale, and Shared Reality Scale (the latter two being reflected in two of the subscales in our measure) and moderately correlated ([*r*]s ranging from .25 to .34) with the relatedness subscale of the BMPN, loneliness, and extraversion. Again, as

expected, the four subscales were highly correlated with one another, with *r*s ranging from .54 (between the Shared Reality subscale and Participant Interest subscale) to .84 (between the Shared Reality subscale and Partner Responsiveness subscale).

When examining the correlation between the four subscales of our Connection During Conversations Scale and previous social connection measures, the correlations followed similar patterns to the overall scale. For example, our Shared Reality subscale was highly correlated with the Positivity Resonance Scale, Partner Responsiveness Scale, and Shared Reality Scale (*r*s ranging from .76 to .79) and relatively more weakly correlated with relatedness, loneliness, and extraversion (*r*s between .26 and -.15). The other three subscales followed a similar trend, revealing strong correlations with the Positivity Resonance Scale, Partner Responsiveness Scale, and Shared Reality Scale. See Table 4 for the full correlation matrix.

Test-Retest Correlations Among Study 2 Timepoints 1, 2, and 3.

Table 6 displays correlations among each of the timepoints in Study 2 to examine reliability over time on the CDCS, its subscales, and related scales. Correlations of the CDCS from Time 1, 2, and 3 were all significant and moderate (*r*s ranging from .27 – 32).

Study 3

Because two items in all three Study 2 timepoints (items 12 and 13 in Table 3) had factor loadings below .50, the generally accepted cutoff for newly developed items (Awang, 2015), we recruited a new sample to validate the CDCS without these two items.

Method

Participants

In Study 3, a new set of participants ($N = 235$) were recruited from a medium-sized public university and were granted research credit for their participation. The study was approved by the university's Institutional Review Board, and participants consented to the study online. Participants ranged in age from 18 to 40 ($M = 19.82$, $SD = 2.02$) and were slightly more female (58%), plurality Asian (42%), and majority never married (64%). Their parents' highest level of education was some college (25%) or a 4-year college (20%).

Procedure

Participants completed a 30-min survey online, which comprised the Connection During Conversations Scale, as well as a subset of measures used in Study 2 to again assess construct and discriminant validity. In this study, the participants were asked to recall and write about their social interaction, but they were not asked to rate the interaction or their partner. Participants also responded to items about the COVID-19 pandemic, but analysis of these items is beyond the scope of the present study.

Materials

Interaction-Specific Measures

Connection During Conversations Scale. Participants were asked to respond to our reduced 14-item measure of interaction-specific social connection developed in Study 1. These items, including those that were reverse coded in all analyses, are shown in Table 3.

General Measures

Affect. Participants responded to a modified 15-item version of the Affect Adjective Scale (Diener & Emmons, 1984), which includes both high and low arousal positive affect (PA; e.g., joyful, peaceful/serene) and negative affect (NA; e.g., angry/hostile, dull/bored, embarrassed) that participants used to assess their affect in the past 7 days (PA: $M = 4.14$, $SD = 1.17$, $\alpha = .91$; NA: $M = 3.58$, $SD = 1.18$, $\alpha = .85$).

Autonomy, Competence, and Relatedness. Participants in Study 3 completed the full 18-item BMPN, using 1 (*strongly disagree*) to 7 (*strongly agree*) Likert scales, which included the autonomy ($M = 4.19$, $SD = 0.62$, $\alpha = .51$), competence ($M = 3.91$, $SD = 0.74$, $\alpha = .71$), and relatedness subscales ($M = 4.37$, $SD = 0.75$, $\alpha = .69$).

Loneliness. Participants again responded to the UCLA Loneliness Scale ($M = 2.08$, $SD = 0.56$, $\alpha = .93$).

Life Satisfaction. The 5-item Satisfaction with Life Scale (Diener et al., 1985) includes items such as "I am satisfied with my life" (1 = *strongly disagree*, 7 = *strongly agree*; $M = 4.06$, $SD = 1.29$, $\alpha = .86$).

Personality. Participants responded to the 60-item Big Five Inventory-2 for all five facets (Extraversion $M = 3.09$, $SD = 0.69$, $\alpha = .86$; Conscientiousness $M = 3.34$, $SD = .62$, $\alpha = .84$; Neuroticism $M = 3.07$, $SD = .72$, $\alpha = .86$; Openness $M = 3.58$, $SD = .62$, $\alpha = .82$; and Agreeableness $M = 3.67$, $SD = .53$, $\alpha = .77$).

Results

Confirmatory Factor Analysis

We conducted a CFA using the *cfa* function in the lavaan package in R on our reduced 14-item measure of connection to assess whether our four-factor solution was a good fit. A four-factor CFA fit our connection items well, $\chi^2(71) = 149.360$, CFI = .949, TLI = .935, RMSEA = .069; 90%CI [.053, .084], SRMR = .045. Correlations among latent variables were strong. The Shared Reality latent variable was strongly correlated with the Partner Responsiveness latent variable ($r = .86$), the Participant Interest latent variable ($r = .76$), and the Affective Experience latent variance ($r = -.78$). The Partner Responsiveness was also strongly correlated with the Participant Interest latent variable ($r = .77$) and the Affective Experience latent variable ($r = -.72$). Finally, the Participant Interest latent variable and the Affective Experience latent variable were also negatively correlated ($r = -.80$).

Correlations Among the Connection During Conversations Scale and Other Measures

Table 4 displays correlations between the CDCS, its four subscales, and the other social connection scales included in this study. These correlations slightly diverge from Study 2 because we removed two items—one item from the Participant Interest subscale and one item from the Affective Experience subscale. First, as expected, our scale overall was moderately correlated with the relatedness subscale of the BMPN ($r = .58$) and loneliness ($r = -.61$) but relatively more weakly correlated with extraversion ($r = .36$). The four subscales were also highly correlated with one another, with rs ranging from .40

(between Shared Reality and Affective Experience) to .80 (between Shared Reality and Partner Responsiveness).

When examining the associations between the four subscales of our Connection During Conversations Scale and similar scales that assess social connection in the literature, again the correlations replicated the patterns obtained with the full (now) 14-item measure. For example, the Partner Responsiveness subscale was moderately correlated with relatedness ($r = .51$) and loneliness ($r = -.58$) but more relatively weakly correlated with extraversion ($r = .32$). All other subscales followed a similar trend. See Table 5 for the full correlation matrix.

Regression Analyses

Because our subscales were highly inter-correlated (rs ranging from .40 to .80), we conducted a series of regression analyses where each of the various outcome variables was regressed on the four subscales of the CDCS. Indeed, we found that our four subscales uniquely predicted various outcomes. For example, only Partner Responsiveness significantly predicted life satisfaction ($b = .30$, $SE = .13$, $p = .014$) and general PA in the past 7 days ($b = .32$, $SE = .12$, $p = .011$), only Affective Experience significantly predicted general NA ($b = -.30$, $SE = .07$, $p < .001$), and only Shared Reality significantly predicted conscientiousness ($b = -.14$, $SE = .07$, $p = .034$). Additionally, both Partner Responsiveness and Affective Experience significantly predicted relatedness (Partner Responsiveness: $b = .17$, $SE = .07$, $p = .014$; Affective Experience: $b = .16$, $SE = .04$, $p < .001$) and loneliness (Partner Responsiveness: $b = -.16$, $SE = .05$, $p < .001$; Affective Experience: $b = -.09$, $SE = .03$, $p = .001$). Table 7 displays the full set of

regression analyses. In sum, each of our four subscales, despite being highly correlated, uniquely predicted a number of positive and negative psychological outcomes.

Discussion

By compiling and updating items from existing measures in the literature that assess different aspects of social connection and interpersonal relationships, we created a new 14-item measure of social connection felt in a specific social interaction. Across three studies, we documented the reliability and validity of the Connection During Conversations Scale in measuring social connection in different social interactions. Furthermore, in Study 3, we demonstrated the uniqueness of each of our four subscales in predicting different outcomes. For example, the Shared Reality subscale was uniquely associated with conscientiousness; the Affective Experience subscale was uniquely associated with autonomy and loneliness; and the Partner Responsiveness subscale was uniquely associated with life satisfaction and positive affect in the last 7 days. As such, should researchers wish to look at connection as a whole (all 14 items) or a specific facet of connection, our findings provide preliminary evidence that each piece of the CDCS may offer unique information about the conversation and about the respondent.

Our measure fills a gap in the literature, as few existing scales specifically target aspects of social connection experienced during a specific interaction. Both researchers and laypeople have long known that fulfilling relationships are vital for social connection and well-being. However, what are interpersonal relationships but arguably simply a series of joint experiences, interactions, and conversations? Thus, not surprisingly, emerging research demonstrates that happy and socially connected people report having

relatively frequent interactions (see Van Lange & Columbus, 2021, for a review).

Accordingly, we hope the CDCS will allow researchers to advance understanding of the

psychological causes, mechanisms, and consequences of the connection felt during

specific interactions. Future work as such may be able to identify what makes a

conversation feel connecting. As just one example, researchers could test whether the

common social etiquette of "not talking about religion or politics" really is an outdated

sentiment and, if not, to identify potential boundary conditions (e.g., conversation length

or type of interaction partner) that impact when hot-button topics are (or are not)

connecting.

Furthermore, our measure contributes to the literature in that it captures four

important facets or ingredients of social connection: shared reality, partner

responsiveness, participant interest, and affective (or negative) experience. An extensive

literature has already detailed the critical role that the experience of shared reality and

partner responsiveness play in a sense of overall social connection (for reviews, see

Echterhoff et al., 2009; Reis et al., 2004). That is, it is not surprising that two individuals

who feel a commonality between one another (shared reality) or feel especially

understood and valued by their partner (partner responsiveness) would report a strong

sense of connection and a high-quality relationship.

Based on the regression analyses in Study 3, we have preliminary evidence

demonstrating that participant interest and affective experience may also be important for

various psychological outcomes, such as neuroticism and negative affect, respectively.

That is, perhaps some of the items in the CDCS that specifically tap into a person's

subjective experience during the interaction may be related to their personality and emotional state. Indeed, past research has shown that neurotic individuals often focus on the negatives and report relatively worse relationship satisfaction; our measure appears to pick up on this well-established phenomenon (for review, see Ozer & Benet-Martínez, 2006). However, this study did not explicitly test this connection, but rather, the results presented provide preliminary evidence for such a phenomenon. Nonetheless, future research may benefit from aggregating multiple CDCS scores over time to see if this phenomenon holds true. Accordingly, our four subscales may provide meaningful insight into a variety of psychological outcomes.

In Study 2, we found that the 16-item version of the Connection During Conversations Scale was highly correlated with both existing conversation-specific measures of connection—namely, the Shared Reality ($r = .68$) and Positivity Resonance scales ($r = .84$). Although these correlations are high, our measure is different in a few key ways. First, the CDCS comprises three additional subscales beyond shared reality. Second, because our measure was not motivated by positivity resonance theory, it aims to assess social connection both as a broader and more comprehensive construct (i.e., the average of all items) and as tapping into four critical but separate ingredients of connection (i.e., the individual subscales of shared reality, partner responsiveness, participant interest, and affective experience). Furthermore, the CDCS can be used to measure each of these features not only individually but in combination with one or two others (e.g., affective experience and participant interest but not partner responsiveness or shared reality). Such analyses may lead to unexpected insights—for example, what types

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of relationships, partners, or circumstances give rise to conversations that are interesting and engaging but do not lead one to feel in sync, valued, and understood? As such, our measure is not aligned with a specific theory of connection or limited to one feature of connection, but rather can tap into one to four critical ingredients of a connecting interaction depending on the research question.

Limitations

A few limitations need to be addressed. First, the CDCS along with all other measures used across our three studies rely on self-reported data. This is a concern because we may see inflated relationships due to common method variance (Campbell & Fiske, 1959) or overly positive responses due to self-enhancement biases (Heintzelman et al., 2014; John & Robins, 1994; Wojcik & Ditto, 2014), the latter which is a problem for any socially desirable questionnaire such as those that measure happiness or life satisfaction (van de Mortel, 2008; Wojcik & Ditto, 2014). Next, the sample sizes and composition of our samples, while relatively diverse in age (ranging from 18 to 70s), relationship status, and spanning countries around the world (e.g., the U.S., the U.K., Germany), were insufficient to make fine grained and complex comparisons. For example, our samples were too small to examine interactions between participant ethnicity and type of partner. Future investigators could oversample particular demographics or types of conversations and conversation partners in order to test such comparisons and interaction effects.

Another limitation is that our measure is designed to apply only to dyadic interactions—that is, to conversations between two individuals rather than groups of three

or more. Of course, many conversations and social interactions—whether at a dinner party or Zoom brainstorming meeting—occur in a group or team context. Although not validated or intended to be used in this way, future studies could administer the CDCS multiple times (e.g., about Person A, B, and C) to assess felt social connection felt in a group conversation or adapt the instructions to refer to the group (e.g., whether one felt in sync with the group versus with a particular person).

Future Directions

Although we have outlined a few ideas for future directions above, there are further ways in which the CDCS can benefit future theory and research. Future investigators could bolster the generalizability of the CDCS by asking respondents to rate conversations with particular (and relatively infrequent) interaction partners, such as strangers, distant family members, and coworkers, or, alternatively, target long-term committed relationship partners. This approach may help to further establish the validity and reliability of our new scale within different types of relationships. However, as mentioned earlier, it is important to note that, when comparing scores on the CDCS for a single participant across several conversations (and conversation partners), test-retest stability is not likely to be high, because each social interaction is expected to be unique; However, we did find moderate correlations across three points in time on the connection measure in Study 2 (see Table 6).

Additionally, the CDCS can be used to assess whether certain types of interactions are more connecting than others. To address this question, researchers can focus on different aspects of conversations, such as interactions among specific types of

interaction partners (e.g., family versus strangers, same-sex versus opposite sex, same versus different ethnicities, younger versus older dyads), the mode of communication (e.g., phone versus video), and the length of the conversation predicting feelings of connection. Relatedly, the CDCS can help identify which individual characteristics (e.g., personality, religious beliefs, political orientations) or conversation topics (e.g., personal stories, shared opinions, gossip) that make for more or less connecting moments. The results from such studies may help researchers identify both rifts and pinnacles of felt social connection and, thereby, to develop tools to repair or strengthen connecting moments in dyadic conversations.

Future investigators could also leverage a number of different methodologies in using the CDCS in studying human social interactions. For example, daily diary studies could examine how repeated interactions with the same person over time might predict feelings of connection. Furthermore, in experimental studies, participants could be instructed to have different types of conversations—for example, with a stranger who is matched versus mismatched on the Big Five; after a joy versus sadness mood induction, and face-to-face versus on video. Such studies would give researchers the opportunity to compare differences in the features or quality of connection experiences, as measured by the CDCS, after conversations with different types of partners, under different conditions, and using different modes of communication. For example, feelings of shared reality may be stronger for those conversing face-to-face than virtually because of the shared physical space, while negative affective experience may be higher for virtual conversations, due to awkwardness felt when someone is frozen or lagging. Notably, using the CDCS in face-

to-face laboratory studies may also allow researchers to code nonverbal behaviors (e.g., leaning towards partner, arms crossed, fidgeting) during the conversations to add another dimension to help assess the quantity and quality of connection felt in conversation. Additionally, researchers could use the CDCS as part of ecologic momentary assessment to track, in real time, whether people are engaging in a conversation and, in that moment, how connected they are feeling. Such ratings could then be compared to the participants' retrospective self-reports (i.e., using the CDCS to rate the conversation at end of day or next day); differences between the "real-time" and retrospective reports could tap into social cognitive aspects of social connection.

Importantly, the CDCS may be valuable to investigate the antecedents, causes, mechanisms, and consequences of felt social connection. For example, by comparing different types of dyads (e.g., mother-daughter versus mother-son) that vary in closeness (e.g., interact daily versus monthly), mode of interaction (e.g., in person versus phone), conversation starting point (e.g., small talk vs. deep talk), and conversation topics (e.g., small talk versus problem solving versus reminiscing), future investigators may be able to disentangle which conversation features foster felt connection (e.g., begin with genuine interest), which maintain connection (e.g., shared memories), and which predict particular facets of connection, like partner responsiveness (e.g., in person conversations).

Conclusion

An individual's overall sense of closeness, connection, and belonging is arguably derived from multiple conversations or social interactions—not only with partners,

family members, and friends but with coworkers, acquaintances, and strangers. Because

extensive research has shown that connection is vital for both mental and physical well-

being (for review, see Holt-Lunstad et al., 2017), it is imperative for researchers to better

understand how, when, where, and with whom people experience moments of connection

in conversations. To this end, using a bottom-up approach, we developed our new

Connection During Conversations Scale (CDCS), comprising four key facets of

connection. The CDCS joins a very short list of measures that tap social connection felt

during such specific conversations and interactions. We hope that this measure will allow

researchers to identify what factors are associated with and promote the most connecting

conversations in all kinds of dyads (including those diverging in closeness, personality, or

political values) and in all kinds of circumstances (including conversations that are

rushed, virtual, or glitchy). Ultimately, this work aims to inform future interventions that

could both boost overall feelings of connection and help people connect across divides

during specific social interactions.

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Table 1.

List of Connection-Relevant Scales Used in Scale Creation and Other Recent Scales

Name of Scale	Type of Scale	Example Item	Scaling	Citation	Subscales
Scales Used in Scale Creation					
Inventory of Socially Supportive Behaviors	Global	Looked after a family member when you were away	1 (not at all) - 5 (about every day)	Barrera, Sandler, & Ramsay (1981)	
Buckner Neighborhood Cohesion Index	Global	I feel like I belong to this neighborhood	1 (strongly disagree) - 5 (strongly agree)	Buckner (1988)	
Communal Orientation Scale	Global	It bothers me when other people neglect my needs	1 (extremely uncharacteristic of them) - 5 (extremely characteristic of them)	Clark, Oullette, Powell, & Milberg (1987)	3 Subscales: General communal, a desire for other's help, locus of initiation
Relational Interdependent Self-Construal	Global	My close relationships are an important reflection of who I am	1 (very strongly disagree) - 7 (very strongly agree)	Cross, Bacon, & Morris (2000)	
Social Provisions Scale	Global	There are people that I can depend on to help me if I really need it	1 (Strongly disagree) - 4 (Strongly agree)	Cutrona & Russell (1987)	6 Subscales: Attachment, social integration, reassurance of worth, reliable alliance, guidance, opportunity for nurturance

Interpersonal Reactivity Index	Global	After seeing a play or movie, I have felt as though I were one of the characters	0 (does not describe me well) - 4 (describes me very well)	Davis (1980)	4 Subscales: Fantasy items, perspective-taking items, empathic concern items, personal distress items
Measurement of Social Disconnection	Global	Today, I generally felt connected to others	1 (strongly disagree) - 7 (strongly agree)	Eisenberger, Gable, & Lieberman (2007) but adapted from Williams, Cheung, & Choi (2000)	
Facebook Social Connectedness	Global	I feel close to people on Facebook	1 (strongly agree) - 6 (strongly disagree)	Grieve, Indian, Witteveen, Anne Tolan, & Marrington (2013)	
Sense of Belonging Index	Global	Not sure if I fit with friends	1 (not relevant) - 4 (very relevant)	Hagerty & Patusky (1995)	2 Subscales: Psychological state of belonging and antecedents of belonging
Four-Dimensional Connectedness Scale	Global	I am appreciated by the people I work with	1 (strongly disagree) - 7 (strongly agree)	Huynh, Metzer, & Winefield (2012)	
The Social Orientation Scale	Global	It's easy for me to get so caught up in a conversati	1 (very uncharacteristic of me) - 4 (very characteristic of me)	Ickes, Hutchinson, & Mashek (2004)	2 Subscales: Social absorption, social individuation

		on with my partner that I lose all track of time			
The Flow State Scale	Global	I was challenged, but I believed my skills would allow me to meet the challenge	1 (strongly disagree) - 5 (strongly agree)	Jackson & Marsh (1996)	9 Subscales: Challenge-skill, action-awareness, clear goals, unambiguous feedback, concentration, sense of control, loss of self-consciousness, Transformation of time, autotelic experience
Hemingway Measure of Adolescent Connectedness	Global	Spending time with my friends is the best part of my day	1 (not at all) - 5 (very true)	Karcher (2005)	
Conflict Over Emotional Expression	Global	It is hard to find the right words to indicate to others what I am really feeling	1 (strongly disagree) - 7 (strongly agree)	King & Emmons (1990)	
Family Allocentricism Scale	Global	I think it is important to get along with my family at all costs	1 (strongly disagree) - 5 (strongly agree)	Lay, Fairlie, Jackson, Ricci, Eisenberg, Sato, Teeäär, & Melamud (1998)	

Social Connectedness Scale/Social Assurance Scale	Global	I have no sense of togetherness with my peers	1 (agree) - 6 (disagree)	Lee & Robbins (1995)	2 Subscales: Social connectedness & social assurance
Social Connectedness Scale-Revised	Global	I feel understood by the people I know	1 (strongly agree) - 6 (strongly disagree)	Lee, Draper, & Lee (2001)	Revising the Social connectedness Scale with 1 subscale
Psychological Sense of Community	Global	There is a strong feeling of togetherness on campus	1 (strongly disagree) - 5 (strongly agree)	Lounsbury & DeNeui (1996)	
Collective Self-Esteem Scale	Global	I am a worthy member of the social groups I belong to	1 (strongly disagree) - 7 (strongly agree)	Luhtanen & Crocker (1992)	4 Subscales: Membership, private, public, identity
Connectedness With Nature	Global	I think of the natural world as a community to which I belong	1 (strongly disagree) - 5 (strongly agree)	Mayer & Frantz (2004)	
Self-Disclosure Index	Global	My personal habits	0 (discuss not at all) - 4 (discuss fully and completely)	Miller, Berg, & Archer (1983)	
Psychological Sense of Community	Global	I have friends in my local neighborhood, who are part of my everyday activities	1 (very strongly disagree) - 7 (very strongly agree)	Obst, Smith, & Zinkiewicz (2002)	5 Subscales: Ties and friendship, influence, support, belonging, conscious identification

Perceived Social Support from Friends and Family (PSS-Fr and PSS-Fa scales)	Global	My friends/family give me the moral support I need	Yes, No, Don't know	Procidano & Heller (1983)	2 Subscales: Family, friends
ESTCOL Scale	Global	In life, family interests are most important	1 (Strongly disagree) - 5 (Strongly agree)	Realo, Allik, & Vadi (1997)	3 Subscales (subtypes of collectivism): Relations with family (familism), friends (companionship), and society (patriotism)
Register-Connectedness Scale for Older Adults	Global	Wanted to be with my family	1 (not important) - 4 (very important)	Register, Herman, & Tavakoli (2011)	5 Subscales: Self-regulating, facing aging, being part of a family, having friends , being spiritual
UCLA Loneliness Scale	Global	I have a lot in common with the people around me	1 (never) - 4 (often)	Russell, Peplau, & Cutrona (1980)	
Social Support Questionnaire	Global	Who accepts you totally, including both your worst and best points?	Two Parts: (1) Number of available others the individual feels they can turn to; (2) 1 (very dissatisfied) - 6 (very satisfied)	Sarason, Levine, Basham, & Sarason (1983)	2 Subscales: Perceived availability, satisfaction

Emotional Intelligence Scale	Global	I know when to speak about my personal problems to others	1 (strongly disagree) - 5 (strongly agree)	Schutte, Malouff, Hall, Haggerty, Cooper, Golden & Dornheim (1998)	
Steen Happiness Index - Connection Subscale	Global	I feel disconnected from other people	1 (Extremely negative) - 5 (Extremely positive)	Seligman, Steen, Park, & Peterson (2005)	
Two-Way Social Support Scale	Global	There is someone I can talk to about the pressures in my life	0 (not at all) - 5 (always)	Shakespeare-Finch & Obst (2011)	4 Subscales: Receiving emotional support, giving emotional support, receiving instrumental support, giving instrumental support
Balanced Measure of Psychological Needs Scale	Global	I felt close and connected with other people who are important to me	1 (strongly disagree) - 5 (strongly agree)	Sheldon & Hilpert (2012)	
Self-Construal Scale	Global	My happiness depends on the happiness of those around me	1 (strongly disagree) - 7 (strongly agree)	Singelis (1994)	2 Subscales: Interdependent, independent
Big Five Inventory (BFI-2) - Extraversion subscale	Global	I am someone who is outgoing, sociable	1 (disagree strongly) - 5 (agree strongly)	Soto & John (2017)	5 Subscales: Extraversion, agreeableness, conscientiousness, negative emotionality, open-mindedness

Comprehensive Inventory of Thriving - Support, Belonging, Loneliness subscales	Global	Support: There are people that I can depend on to help me Belonging: I feel a sense of belonging in my community. Loneliness: I feel lonely	1 (strongly disagree) - 5 (strongly agree)	Su, Tay, & Diener (2014)	
Interpersonal Relationship Index	Global	I can count on a friend	1 (strongly disagree) - 5 (strongly agree) and 1 (never) - 5 (very often)	Tilden, Nelson, & May (1990)	3 Subscales: Social support, reciprocity, and conflict
Separateness - Connectedness Scale	Global	I often find that I can remain cool in spite of people around me being excited	1 (does not describe me at all) - 5 (describes me very well)	Wang & Mowen (1997)	2 Subscales: Independence/Individuality, self-other boundary
Social Avoidance and Distress Scale	Global	I try to avoid situations which force me to be very sociable	1 (not at all) - 5 (very much)	Watson & Friend (1969)	
Fear of Negative Evaluation Scale	Global	The opinions that important people	1 (not at all) - 5 (very much)	Watson & Friend (1969)	

		have of me cause me little concern		
Multi-Dimensional Support Scale	Global	How often did they really listen to you when you talked about your concerns or problems?	1 (never) - 4 (often); Would have liked: more, less, right	Winefield, Winefield, & Tiggeman n (1992)
Multi-Dimensional Scale of Perceived Social Support	Global	I get the emotional help and support I need from my family	1 (very strongly disagree) - 7 (very strongly agree)	Zimet, Dahlem, Zimet, & Farley (1988)
Inclusion of Others in Self Scale	Partner-Specific	Increasingly overlapping circles		Aron, Aron, & Smollan (1992)
Individuality and Connectedness Q-Sort	Partner-Specific	Speaks first; Initiate's compromise; Asks for partner's opinion	Q-Sort	Bengtson & Grotevant (1999)
Relationship Closeness Inventory	Partner-Specific	_____ influences important things in my life	1 (very strongly disagree) - 7 (very strongly agree)	Berscheid, Snyder, & Omoto (1989)
Fear of Intimacy Scale	Partner-Specific	I would feel uneasy about talking	1 (not at all characteristic of me) - 5 (extremely	Descutner & Thelen (1991)

		with _____ about something that has hurt me deeply	characterist ic of me)		
The Group Attitude Scale	Partner-Specific	I feel included in the group	1 (disagree) - 9 (agree)	Evans & Jarvis (1986)	
Relationshi p Attributions Scale	Partner-Specific	Your partner criticizes something you say	1 (strongly disagree) - 7 (strongly agree)	Fincham & Bradbury (1992)	2 Subscales: Causal-attribution, responsibility-attribution
The Experience s in Close Relationshi ps- Relationshi p Structures Questionnai re	Partner-Specific	I usually discuss my problems and concerns with this person	1 (strongly disagree) - 7 (strongly agree)	Fraley, Heffernan , Vicary, & Brumbau gh (2011)	4 Subscales: Mother, father, romantic partners, best friends
Couples Satisfaction Index	Partner-Specific	I have a warm and comfortabl e relationshi p with my partner	1 (strongly disagree) - 6 (strongly agree)	Funk & Rogge (2007)	
Passionate Love Scale	Partner-Specific	Since I've been involved with _____, my emotions have been on a roller coaster	1 (Not at all true) - 9 (Definitely true)	Hatfield & Sprecher (1986)	

Relationship Assessment Scale	Partner-Specific	How well does your partner meet your needs?	1 (low satisfaction) - 5 (high satisfaction)	Hendrick, Dicke, & Hendrick (1998)
Commitment Scale	Partner-Specific	How likely is it that your relationship will be permanent?	7-pt scale	Lund (1985)
Investment Scale	Partner-Specific	Spending your free time with your partner rather than doing other things or seeing other people.	How large an investment on 7-pt scale	Lund (1985)
Inclusion of Community in Self Scale	Partner-Specific	Increasingly overlapping circles		Mashek, Cannaday, & Tangney (2007)
Miller Social Intimacy Scale	Partner-Specific	How much do you like to spend time alone with him/her?	1 (very rarely) - 10 (almost always)	Miller & Lefcourt (1982)
Measurement of Communal Strength	Partner-Specific	How happy do you feel when doing something that helps ____?	0 (not at all) - 10 (extremely)	Mills, Clark, Ford, & Johnson (2004)

Partner Responsiveness Scale	Partner-Specific	...sees the "real" me	1 (strongly disagree) - 7 (strongly agree)	Reis, Maniaci, Caprariello, Eastwick, & Finkel (2011); Reis et al. (2017)	
Rubin's Loving and Liking Scale	Partner-Specific	Love: I feel that I can confide in ____ about virtually everything Like: When I am with _____, we are almost always in the same mood	1 (not at all true; disagree completely) - 9 (definitely true; agree completely)	Rubin (1970)	
Personal Assessment of Intimacy in Relationships Inventory	Partner-Specific	I think that we share some of the same interests	1 (strongly disagree) - 5 (strongly agree)	Schaefer & Olson (1981)	6 Subscales: Emotional intimacy, social intimacy, sexual intimacy, intellectual intimacy, recreational intimacy, conventionality
Revised Experiences in Close Relationships Questionnaire	Partner-Specific	I often worry that my partner will not want to stay with me	1 (strongly disagree) - 6 (strongly agree)	Sibley, Fischer, & Liu (2005)	2 Subscales: Romantic attachment anxiety and romantic attachment avoidance

Name of Scale	Type of Scale	Example Item	Scaling	Citation	Subscales
Dyadic Adjustment Scale	Partner-Specific	Amount of time spent together	0 (always disagree) - 5 (always agree)	Spanier (1976)	4 Subscales: Dyadic consensus, dyadic satisfaction, dyadic cohesion, affectional expression
Sternberg Intimacy Scale	Partner-Specific	I am able to count on ____ in times of need	1 (not at all) - 9 (extremely)	Sternberg (1997)	3 Subscales: Intimacy, passion, commitment
Positivity Resonance Scale	Interaction-Specific	Did you experience a mutual sense of warmth and concern toward the other(s)?	0 - 100%	Major, Nguyen, Lundberg, & Fredrickson (2018)	

Name of Scale	Type of Scale	Example Item	Scaling	Citation	Subscales

Recent Scales Not Used in Scale Creation

Friendship Network Satisfaction	Global	My friends understand me	0 (Not all agree) - 5 (Completely Agree)	Kaufman, Perez, Reise, Bradbury, & Karney (2021)	2 Subscales: Closeness and socializing
Generalized Shared Reality Measure - Cross Situational	Partner-Specific	We frequently think of things at the exact same time	1 (strongly disagree) - 7 (strongly agree)	Rossignac-Milon, Bolger, Zee, Boothby, & Higgins (2021)	
Generalized Shared Reality Measure - Interaction-Specific	Interaction-Specific	During our interaction ... we thought of things at	1 (strongly disagree) - 7 (strongly agree)	Rossignac-Milon, Bolger, Zee, Boothby, &	

the exact same time	Higgins (2021)

Table 2.

Partner Demographics and Interaction Details

	Study 1	Study 2		
		Time 1	Time 2	Time 3
Interaction Partner Demographics				
Gender	47% Male 52% Female 1% Nonbinary < 1% Unknown	49% Male 51% Female 0% Nonbinary 0% Unknown	46% Male 54% Female 0% Nonbinary 0% Unknown	48% Male 52% Female 0% Nonbinary 0% Unknown
Age	$M = 35.74, SD = 15.88$ Range: 14 – 87	$M = 35.28, SD = 15.63$ Range: 8 – 92	$M = 38.04, SD = 6.71$ Range: 6 – 86	$M = 38.70, SD = 15.73$ Range: 8 – 82
Ethnicity	0% Native American/Alaskan 14% Asian 3% Black/African American 0% Hawaiian/Pacific Islander 66% White/Caucasian 11% Hispanic/Latino 2% Middle-Eastern 1% More Than One 1% Other 3% Unknown	< 1% Native American/Alaskan 8% Asian 5% Black/African American 0% Hawaiian/Pacific Islander 77% White/Caucasian 5% Hispanic/Latino 2% Middle-Eastern 1% More Than One 1% Other < 1% Unknown	< 1% Native American/Alaskan 7% Asian 3% Black/African American 1% Hawaiian/Pacific Islander 79% White/Caucasian 5% Hispanic/Latino 1% Middle-Eastern 1% More Than One 1% Other 2% Unknown	< 1% Native American/Alaskan 8% Asian 4% Black/African American < 1% Hawaiian/Pacific Islander 78% White/Caucasian 5% Hispanic/Latino 1% Middle-Eastern 1% More Than One 1% Other 1% Unknown
How Long Have You Known Your Interaction Partner	11% We Just Met 2% A Few Hours 1% A Few Days 4% A Few Weeks 9% A Few Months 10% About A Year 26% A Few Years 36% Many Years	9% We Just Met 1% A Few Hours 2% A Few Days 3% A Few Weeks 10% A Few Months 9% About A Year 25% A Few Years 42% Many Years	9% We Just Met < 1 % A Few Hours 1% A Few Days 2% A Few Weeks 4% A Few Months 7% About A Year 18% A Few Years 57% Many Years	8% We Just Met 1% A Few Hours 1% A Few Days 2% A Few Weeks 4% A Few Months 6% About A Year 19% A Few Years 59% Many Years
Who Is Your Interaction Partner?	11% Stranger 7% Acquaintance 12% Casual (Non-Romantic) Friend 18% Close (Non-Romantic) Friend 11% Parent 3% Child 4% Brother/Sister 1% Grandparent < 1% Aunt/Uncle 7% Coworker 4% Boss/Supervisor < 1% Someone You Supervise 1% Professor/TA	8% Stranger 7% Acquaintance 12% Casual (Non-Romantic) Friend 25% Close (Non-Romantic) Friend 11% Parent 2% Child 4% Brother/Sister 1% Grandparent 1% Aunt/Uncle 8% Coworker 1% Boss/Supervisor 1% Someone You Supervise 1% Professor/TA	9% Stranger 4% Acquaintance 7% Casual (Non-Romantic) Friend 24% Close (Non-Romantic) Friend 18% Parent 1% Child 7% Brother/Sister 1% Grandparent 1% Aunt/Uncle 5% Coworker 2% Boss/Supervisor < 1 % Someone You Supervise < 1% Professor/TA	7% Stranger 5% Acquaintance 11% Casual (Non-Romantic) Friend 23% Close (Non-Romantic) Friend 19% Parent 1% Child 7% Brother/Sister 0% Grandparent 1% Aunt/Uncle 5% Coworker 2% Boss/Supervisor 0% Someone You Supervise 0% Professor/TA

	6% Husband/Wife	5% Husband/Wife	6% Husband/Wife	6% Husband/Wife
	8% Serious Relationship partner	7% Serious Relationship Partner	8% Serious Relationship Partner	8% Serious Relationship Partner
	1% Casual Relationship Partner	1% Casual Relationship Partner	1% Casual Relationship Partner	1% Casual Relationship Partner
	1% New Romantic Partner	1% New Romantic Partner	2% New Romantic Partner	1% New Romantic Partner
	5% Other	6% Other	4% Other	4% Other

Interaction Details

When Did the Interaction Occur?	46% Today 50% Yesterday 4% Other	48% Today 47% Yesterday 5% Other	57% Today 71% Yesterday 6% Other	31% Today 63% Yesterday 6% Other
Where Did the Interaction Occur?	65% Face-to-Face 10% Phone (Audio) 2% Video Chat 14% Text 4% Social Media 5% Other	63% Face-to-Face 14% Phone (Audio) 4% Video Chat 10% Text 5% Social Media 4% Other	41% Face-to-Face 20% Phone (Audio) 15% Video Chat 13% Text 6% Social Media 4% Other	46% Face-to-Face 21% Phone (Audio) 12% Video Chat 8% Text 8% Social Media 5% Other
How Long Was the Interaction?	19% ≤ 5 mins 46% 5 – 30 mins 15% 30 mins – 1 hour 11% 1 – 2 hours 5% 2 – 3 hours 2% 3 – 4 hours 1% 4 – 5 hours 1 % 5+ hours	19% ≤ 5 mins 49% 5 – 30 mins 14% 30 mins – 1 hour 10% 1 – 2 hours 5% 2 – 3 hours 2% 3 – 4 hours 1% 4 – 5 hours 1% 5+ hours	16% ≤ 5 mins 52% 5 – 30 mins 20% 30 mins – 1 hour 6% 1 – 2 hours 2% 2 – 3 hours 1% 3 – 4 hours 1% 4 – 5 hours 1% 5+ hours	13% ≤ 5 mins 48% 5 – 30 mins 17% 30 mins – 1 hour 13% 1 – 2 hours 6% 2 – 3 hours 2% 3 – 4 hours 0% 4 – 5 hours 1% 5+ hours
Valence *1 = Negative* *4 = Neutral* *7 = Positive*	$M = 5.42$, $SD = 1.51$ 2% Rated as a 1 5% Rated as a 2 6% Rated as a 3 11% Rated as a 4 15% Rated as a 5 37% Rated as a 6 25% Rated as a 7	$M = 5.47$, $SD = 1.59$ 2% Rated as a 1 7% Rated as a 2 6% Rated as a 3 10% Rated as a 4 13% Rated as a 5 31% Rated as a 6 32% Rated as 7	$M = 5.10$, $SD = 1.66$ 2% Rated as a 1 9% Rated as a 2 9% Rated as a 3 13% Rated as a 4 14% Rated as a 5 33% Rated as a 6 21% Rated as a 7	$M = 5.27$, $SD = 1.65$ 4% Rated as a 1 5% Rated as a 2 6% Rated as a 3 14% Rated as a 4 9% Rated as a 5 39% Rated as a 6 23% Rated as a 7

Table 3.

Items and Factor Loadings (Studies 1, 2, and 3)

		Study 1	**Study 2**			**Study 3**
			Time 1	**Time 2**	**Time 3**	
	N	351	397	336	299	235
	Mean	5.24	5.40	5.51	5.48	5.13
	Standard Deviation	1.08	1.11	1.08	1.16	.95
	Alpha	.93	.93	.93	.95	.91
Item	Factor	Loadings				
1	I felt "in sync" with them	SR	.91	.86	.91	.90	.78
2	I felt like we shared a lot in common	SR	.85	.84	.87	.89	.80
3	I felt that we saw the world in the same way	SR	.82	.83	.85	.88	.55
4	They were able to relate to my experiences	SR	.77	.80	.84	.84	.75
5	They were interested in my thoughts and feelings	PR	.86	.87	.88	.85	.78
6	They respected my beliefs and opinions	PR	.81	.82	.84	.88	.75
7	I felt that they cared about me	PR	.80	.85	.87	.79	.74
8	They really understood who I am	PR	.80	.84	.80	.85	.78
9	I was truly attentive during the interaction	PI	.62	.54	.57	.64	.64
10	I was interested in their thoughts and feelings	PI	.79	.70	.80	.81	.68
11	I thought that they were boring (R)	PI	-.75	-.75	-.69	-.79	-.70

12	I was distracted during the conversation (R)	PI	-.52	-.47	-.42	-.55	-
13	I was nervous during the interaction (R)	AE	.57	.44	.37	.47	-
14	I felt that my energy was drained by the interaction (R)	AE	.71	.74	.74	.80	.75
15	I couldn't wait for the interaction to end (R)	AE	.81	.81	.82	.86	.75
16	I felt that it was hard to communicate with them (R)	AE	.81	.80	.78	.84	.57

Note. SR = Shared Reality factor. PR = Partner Responsiveness factor. PI = Participant

Interest factor. AE = Affective Experience factor. The items used in Study 3 are the final

14-items in our measure.

Table 4.

Correlations Among the Connection During Conversations Scale (CDCS), its Four Subscales, and Other Relevant Connection Scales (Study 2)

	CDCS (1)	SR (2)	PR (3)	PI (4)	AE (5)	Extraversion (6)	Loneliness (7)	Relatedness (8)	Partner Responsive (9)	Shared Reality (10)	Positivity Resonance (11)
						Study 2 Time 1					
Mean (SD)	5.40 (1.11)	5.08 (1.40)	5.41 (1.30)	5.70 (1.03)	5.39 (1.44)	2.90 (.78)	2.17 (.65)	4.88 (1.10)	5.37 (1.27)	4.82 (1.21)	70.73 (24.14)
Alpha	.93	.90	.91	.73	.80	.87	.94	.76	.97	.94	.96
1	-										
2	.89**	-									
3	.90**	.84**	-								
4	.77**	.54**	.61**	-							
5	.85**	.64**	.63**	.58**	-						
6	.18**	.11*	.16**	.18**	.17**	-					
7	-.25**	-.15**	-.25**	-.22**	-.23**	-.57**	-				
8	.34**	.26**	.35**	.26**	.29**	.35**	-.70**	-			
9	.79**	.76**	.83**	.51**	.58**	.21**	-.29**	.39**	-		
10	.68**	.76**	.68**	.40**	.47**	.15**	-.18**	.26**	.73**	-	
11	.84**	.79**	.79**	.57**	.70**	.17**	-.26**	.36**	.80**	.70**	-

	CDCS (1)	SR (2)	PR (3)	PI (4)	AE (5)	Extraversion (6)	Loneliness (7)	Relatedness (8)
					Study 2 Time 2			
Mean (SD)	5.51 (1.08)	5.28 (1.41)	5.54 (1.29)	5.79 (.98)	5.44 (1.38)	3.86 (1.09)	2.16 (.49)	4.91 (1.14)
Alpha	.93	.92	.91	.75	.79	.89	.88	.77

1	-							
2	.89**	-						
3	.91**	.83**	-					
4	.74**	.51**	.59**	-				
5	.84**	.64**	.83**	.54**	-			
6	.12+	.13+	.07	.14**	.06	-		
7	-.33**	-.27**	.26**	-.32**	-.29**	-.51**	-	
8	.36**	.27**	.31**	.33**	.34**	.29**	-.64**	-

Study 2 Time 3

	CDCS (1)	SR (2)	PR (3)	PI (4)	AE (5)	Extraversion (6)	Loneliness (7)	Relatedness (8)
Mean (SD)	5.48 (1.17)	5.19 (1.47)	5.43 (1.34)	5.80 (1.02)	5.51 (1.44)	3.91 (1.10)	2.27 (.63)	4.91 (1.16)
Alpha	.95	.93	.91	.81	.83	.89	.93	.80
1	-							
2	.92**	-						
3	.92**	.87**	-					
4	.82**	.66**	.67**	-				
5	.86**	.69**	.68**	.64**	-			
6	.26**	.20**	.20**	.22**	.28**	-		
7	-.33**	-.23**	-.29**	-.34**	-.32**	-.55**	-	
8	.36**	.27**	.30**	.38**	.34**	.34**	-.71**	-

Note. SR = Shared Reality subscale. PR = Partner Responsiveness subscale. PI = Participant Interest subscale. AE = Affective

Experience subscale. Study 3 used a 14-item version of the CDCS. $+p < .05$. $*p < .01$. $**p < .001$.

Table 5.

Correlations Among the Connection During Conversations Scale (CDCS), its Four Subscales, and Other Relevant Scales

(Study 3)

	CDCS (1)	SR (2)	PR (3)	PI (4)	AE (5)	Extraversion (6)	Lonely (7)	Relatedness (8)	Autonomy (9)	Competence (10)	Life Satisfaction (11)	Positive Affect (12)	Negative Affect (13)	Neuroticism (14)	Agreeable (15)	Conscientious (16)	Open (17)
Mean	5.13	5.11	5.45	5.27	4.68	3.09	2.08	3.63	4.19	3.91	4.06	4.14	3.58	3.07	3.67	3.34	3.58
(SD)	(.95)	(1.13)	(1.02)	(1.10)	(1.35)	(.69)	(.56)	(.53)	(.62)	(.74)	(1.29)	(1.17)	(1.18)	(.72)	(.53)	(.62)	(.62)
Alpha	.91	.81	.85	.71	.73	.86	.93	.69	.51	.71	.86	.91	.85	.86	.77	.84	.82
1	-																
2	.84**	-															
3	.87**	.80**	-														
4	.88**	.68**	.72**	-													
5	.77**	.40**	.47**	.58**	-												
6	.36**	.32**	.32**	.23*	.32**	-											
7	-.61**	-.53**	-.58**	-.51**	-.44**	-.47**	-										
8	.58**	.43**	.51**	.53**	.48**	.21*	-.62*	-									
9	0.31**	0.18*	0.32**	0.29**	0.26**	0.26*	-0.46**	0.40**	-								
10	0.27**	0.19**	0.23**	0.29**	0.21**	0.34**	-0.51**	0.37**	0.44**	-							
11	0.31**	0.33**	0.36**	0.24*	0.13+	0.17+	-0.46**	0.38**	0.15**	0.36**	-						
12	0.37**	0.37**	0.41**	0.34**	0.15**	0.26*	-0.49**	0.45**	0.32**	0.49**	0.56**	-					
13	-0.23**	-0.08	-0.08	-0.24**	-0.33**	-0.10	0.39**	-0.43**	-0.35**	-0.46**	-0.16**	-0.23**	-				
14	-0.27**	-0.14	-0.19+	-0.31**	-0.25*	-0.16+	0.50**	-0.42**	-0.31**	-0.54**	-0.33**	-0.38**	0.56**	-			
15	0.40**	0.27**	0.32**	0.37**	0.35**	0.23**	-0.37**	0.31**	0.31**	0.25*	0.16+	0.18+	-0.23**	-0.20**	-		
16	0.21**	0.06	0.16+	0.23**	0.24*	0.22**	-0.35**	0.23**	0.32**	0.49**	0.26**	0.21**	-0.23**	-0.36**	0.39**	-	
17	0.24*	0.24*	0.23*	0.19+	0.14	0.28**	-0.17+	0.15	0.17+	0.15	0.17+	0.16+	-0.03	0.06**	0.20+	0.16**	-

Note. SR = Shared Reality subscale. PR = Partner Responsiveness subscale. PI = Participant Interest subscale. AE = Affective Experience subscale. Study 3 used a 14-item version of the CDCS. +$p < .05$. *$p < .01$. **$p < .001$.

Table 6.

Correlations Among the Connection During Conversations Scale (CDCS), its Four Subscales, and Other Relevant Connection

Scales, Across Three Occasions (Times 1, 2, and 3) in Study 2

	CDCS	SR	PR	PI	AE	Extraversion	Loneliness	Relatedness
Correlations between Time 1 and Time 2								
CDCS	.31**							
SR	.24**	.20**						
PR	.29**	.21**	.30**					
PI	.24**	.14+	.22**	.28**				
AE	.30**	.19**	.24**	.30**	.31**			
Extraversion	.14+	.10	.10	.13+	.15**	.89**		
Loneliness	-.21**	-.13+	-.17*	-.24**	-.20**	-.47**	.80**	
Relatedness	.18**	.10	.13+	.25**	.16**	.24**	-.47**	.50**
Correlations between Time 1 and Time 3								
CDCS	.27**							
SR	.19**	.15**						
PR	.19**	.14+	.21**					
PI	.19**	.19**	.22**	.32**				
AE	.28**	.21**	.26**	.27**	.32**			
Extraversion	.22**	.16*	.17**	.21**	.24**	.89**		
Loneliness	-.29**	-.21**	-.25**	-.28**	-.29**	-.56**	.81**	
Relatedness	.20**	.12**	.17**	.23**	.19**	.33**	-.59**	**.55****
Correlations between Time 2 and Time 3								
CDCS	.32**							
SR	.27**	.28**						
PR	.28**	.26**	.30**					
PI	.32**	.20**	.30**	.37**				
AE	.26**	.19**	.21**	.19**	.30**			

Extraversion	.11	.12+	.07	.10	.07	.92**	
Loneliness	-.34**	-.25**	-.27**	-.30**	-.32**	-.49**	.87**
Relatedness	.32**	.24**	.25**	.29**	.31**	.28**	-.59**	.61**

Note. SR = Shared Reality subscale. PR = Partner Responsiveness subscale. PI = Participant Interest subscale. AE = Affective

Experience subscale. +*p* < .05. * *p* < .01. ** *p* < .001.

Table 7.

Results of Regression Analyses of Each of the Four Subscales of the Connection During

Conversations Scale (CDCS) Predicting Primary Outcomes (Study 3)

	Adj R^2	b(SE)	95% CI	β	t	p
Life Satisfaction	.11					
Shared Reality		.16 (.12)	[-.07, .39]	.14	1.39	.167
Partner Responsiveness		**.34 (.13)**	**[.07, .60]**	**.26**	**2.49**	**.014**
Participant Interest		-.07 (.11)	[-.29, .15]	-.06	-.64	.525
Affective Experience		.01 (.07)	[-.14, .15]	.01	.10	.918
Positive Affect (Last 7 days)	.19					
Shared Reality		.10 (.10)	[-.10, .29]	.09	.98	.330
Partner Responsiveness		**.30 (.12)**	**[.07, .53]**	**.26**	**2.58**	**.011**
Participant Interest		.17 (.10)	[-.02, .36]	.16	1.75	.081
Affective Experience		-.02 (.06)	[-.15, .10]	-.03	-.35	.724
Negative Affect (Last 7 days)	.13					
Shared Reality		.01 (.10)	[-.20, .22]	.01	.09	.925
Partner Responsiveness		.15 (.12)	[-.09, .39]	.13	1.24	.215
Participant Interest		-.15 (.10)	[-.35, .05]	-.14	-1.46	.146
Affective Experience		**-.30 (.07)**	**[-.43, -.17]**	**-.35**	**-4.59**	**< .001**
Relatedness (BMPN)	.35					
Shared Reality		.06 (.06)	[-.06, .17]	.08	.97	.332
Partner Responsiveness		**.17 (.07)**	**[.03, .30]**	**.22**	**2.49**	**.014**
Participant Interest		.09 (.06)	[-.02, .20]	.13	1.55	.212
Affective Experience		**.16 (.04)**	**[.09, .23]**	**.29**	**4.49**	**< .001**
Autonomy (BMPN)	.12					
Shared Reality		-.07 (.05)	[-.18, .03]	-.13	-1.37	.172
Partner Responsiveness		**.24 (.06)**	**[.12, .37]**	**.40**	**3.93**	**<.001**
Participant Interest		.00 (.05)	[-.11, .10]	-.01	-.08	.935
Affective Experience		**.09 (.03)**	**[.02, .15]**	**.19**	**2.51**	**.012**
Competence (BMPN)	.07					
Shared Reality		.06 (.07)	[-.07, .20]	.10	.97	.336
Partner Responsiveness		.05 (.08)	[-.11, .20]	.06	.60	.550
Participant Interest		.03 (.07)	[-.10, .16]	.04	.42	.676
Affective Experience		.08 (.04)	[-.01, .16]	.14	1.79	.074
Loneliness	.38					
Shared Reality		-.08 (.04)	[-.16, .00]	-.16	-1.86	.064
Partner Responsiveness		**-.16 (.05)**	**[-.26, .04]**	**-.30**	**-3.40**	**< .001**

		B (SE)	95% CI	β	t	p
Participant Interest		-.04 (.04)	[-.12, .04]	-.07	-.94	.346
Affective Experience		**-.09 (.03)**	**[-.14, -.03]**	**-.21**	**-3.27**	**.001**
Extraversion	.14					
Shared Reality		.12 (.07)	[-.02, .26]	.20	1.67	.096
Partner Responsiveness		.10 (.08)	[-.06, .27]	.16	1.21	.227
Participant Interest		-11 (.07)	[-.25, .04]	-.17	-1.49	.139
Affective Experience		**.13 (.04)**	**[.05, .21]**	**.27**	**3.04**	**.003**
Neuroticism	.09					
Shared Reality		.08 (.08)	[-.07, .24]	.13	1.06	.290
Partner Responsiveness		-.01 (.09)	[-.19, .17]	-.02	-.11	.910
Participant Interest		**-.22 (.08)**	**[-.38, -.06]**	**-.33**	**2.75**	**.007**
Affective Experience		-.05 (.05)	[-.14, .04]	.10	-1.15	.254
Agreeable	.15					
Shared Reality		-.01 (.06)	[-.07, .24]	-.02	-.21	.837
Partner Responsiveness		.06 (.06)	[.19, .17]	.12	.95	.343
Participant Interest		.09 (.06)	[-.38, -.06]	.18	1.59	.114
Affective Experience		**.08 (.03)**	**[-.14, .04]**	**.20**	**2.33**	**.021**
Openness	.04					
Shared Reality		.08 (.07)	[-.06, .21]	.14	1.09	.278
Partner Responsiveness		.07 (.08)	[-.09, .23]	.12	.90	.369
Participant Interest		.00 (.07)	[-.14, .13]	-.01	-.06	.949
Affective Experience		.01 .04)	[-.07, .10]	.03	.36	.717
Conscientious	.07					
Shared Reality		**-.14 (.07)**	**[-.28, -.01]**	**-.27**	**-2.14**	**.034**
Partner Responsiveness		.10 (.08)	[-.06, .25]	.16	1.24	.212
Participant Interest		.12 (.07)	[-.02, .25]	.20	1.72	.087
Affective Experience		.07 (.04)	[-.01, .15]	.15	1.68	.095

Note. One item in the Participant Interest subscale and all items in the Affective

Experience subscale have been reverse coded. As such, positive values in Affective

Experience indicate a positive experience.

Table 8.

Connection During Conversations Scale

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Please answer the following questions about your recent interaction and interaction partner.

Shared Reality Subscale
1. I felt "in sync" with them
2. I felt like we shared a lot in common
3. I felt that we saw the world in the same way
4. They were able to relate to my experiences

Partner Responsiveness Subscale
5. They were interested in my thoughts and feelings
6. They respected my beliefs and opinions
7. I felt that they cared about me
8. They really understood who I am

Participant Interest Subscale
9. I was truly attentive during the interaction
10. I was interested in their thoughts and feelings
11. I thought that they were boring (R)

Affective Experience Subscale
12. I felt that my energy was drained by the interaction (R)
13. I couldn't wait for the interaction to end (R)
14. I felt that it was hard to communicate with them (R)

Chapter 3: On the Same Wavelength: Face-to-Face and Digital Conversations Have Parallel Effects on Social Connection, Well-Being, and Physical Health Symptoms Among Adolescents During COVID-19

Decades of research have demonstrated that social connection is a fundamental human need (Maslow, 1943) that is vital for human functioning (Baumeister & Leary, 1995), overall well-being (Cacioppo et al., 2008; Diener & Seligman, 2002; Lyubomirsky et al., 2005), and major health outcomes (Cole et al., 2007; Holt-Lunstad et al., 2010, 2017; House et al., 1988). This link between social connection and positive outcomes has been established using a variety of tools and methodologies. In experimental studies, for example, individuals instructed to engage in more social interactions report stronger connectedness and increased positive emotion compared to those instructed to engage in control behaviors (Fritz et al., 2021; Jacques-Hamilton et al., 2019; Margolis & Lyubomirsky, 2020). Research using both self-report and the Electronically Activated Recorder (EAR) has shown that having more conversations is related to higher levels of well-being (Bernstein et al., 2018; Mehl et al., 2010; Milek et al., 2018). Furthermore, a meta-analysis of 148 studies found that self-reports of relatively stronger relationships were related to lower mortality risk (Holt-Lunstad et al., 2010).

However, both researchers and laypeople continue to debate whether all types of conversations, such as those with a barista face-to-face or with a friend on Instagram, are related to positive outcomes. Studies examining whether digital communication hinders or facilitates social connection have produced mixed results. For example, research has shown that digital conversations are less intimate than face-to-face conversations

(Cummings et al., 2002; Fritz et al., 2021), with some investigators finding that digital communication has begun to replace (and harm) face-to-face communication (Twenge, 2013). Furthermore, the mere presence of a phone has been shown to diminish the quality of face-to-face conversations (Kushlev et al., 2017; Ward et al., 2017). Taken together, accumulating research has shown that digital communication can impair human connection.

Alternatively, other work has demonstrated that digital communication actually enhances feelings of connection by providing extra avenues to connect (Valkenburg & Peter, 2007). Additionally, researchers have found that digital communication facilitates in-person relationships (Reich et al., 2012; Valkenburg & Peter, 2009) and empirically does not reduce the likelihood of face-to-face communication (Bargh & McKenna, 2004). Moreover, when social media is used in a positive manner, such as to empower close relationships, research has shown that adolescents report greater self-esteem, well-being, and relationship satisfaction (Best et al., 2014; Uhls et al., 2017). Other research has shown that communicating through some apps, like Snapchat, is associated with greater well-being compared to other apps, like Facebook (Walsh et al., 2021). As such, investigations of the link between digital communication and social connection have generated conflicting results, suggesting possibilities for discovering more nuance when examining both the beneficial and adverse impacts of mode of communication.

One reason for these equivocal findings could stem from a limitation in the way that social connection experienced online has typically been measured (e.g., using the Network of Relationship Inventory, which asks participants "whether their SNS [social

networking site] use had influenced their relationships in any way"; Reich et al., 2012). Some of these measures may not assess connection to the specificity that is needed to fully understand the link between digital conversations and feelings of social connection. Therefore, diving deeper into specific aspects of digital conversations (e.g., how long the interaction was and with whom), rather than asking broad questions about how SNS impact relationships as a whole, for example, may offer valuable insight into why, when, or for whom digital conversations may improve connected feelings.

Furthermore, understanding precisely how digital conversations may foster (or interfere with) social connection is especially vital for adolescent samples, for whom digital communication has become ubiquitous. For example, the Pew Research Center has been following the rise in internet usage among youth across the years and has identified that 95% of teens owned a smartphone in 2018 in the U.S. (Pew Research Center, 2018), highlighting teens' acute reliance on digital communication. Digital communication became especially omnipresent for adolescents as the country—along with most of the world—shifted to emergency distance learning during the COVID-19 pandemic, which led to students limiting both their classwork and social interactions to their homes (Whittle et al., 2020). Because adolescents rely heavily on their peers for social support and development, the transition to widespread remote learning may have especially challenged their feelings of social connection and overall social development (Meuwese et al., 2017; Orben et al., 2020).

With regard to the pandemic, adolescents vitally needed to remain connected with their peers while social distancing. Indeed, researchers have shown that adolescents who

reported lower social connection scores during the pandemic also reported high levels of depression and anxiety (Magson et al., 2021). Of course, this finding is consistent with decades of prior research cementing the tight link between feeling connected and positive outcomes (Baumeister & Leary, 1995; Cacioppo et al., 2008; Cole et al., 2007; Diener & Seligman, 2002; Holt-Lunstad et al., 2010, 2017; House et al., 1988; Lyubomirsky et al., 2005; Maslow, 1943). Not surprisingly, research during the pandemic has shown that many adolescents have been reaching out to friends via text, video chat, or social media to remain connected during lockdowns (Ellis et al., 2020; Hamilton et al., in press). However, like before, mixed research has emerged as to whether all types of communication are related to better outcomes, especially for adolescents.

For example, work during the pandemic identified that many adolescents used social media to cope with feelings of loneliness; however, this social media use was related to less happiness (Cauberghe et al., 2021). Moreover, greater time spent by adolescents on social media during the pandemic was related to higher levels of depression but lower levels of loneliness (Ellis et al., 2020), demonstrating that there might be both costs and benefits associated with connecting digitally. Another study conducted during the pandemic found positive outcomes of connecting digitally. Specifically, researchers found that social connection and social support mediated the role between chatting online and happiness, self-esteem, and loneliness for adolescents during the pandemic (Feng & Tong, 2022). Taken together, these results demonstrate that there may be healthy and unhealthy ways for adolescents to connect using digital platforms. As such, because adolescents rely so heavily on digital communication,

especially during the COVID-19 pandemic, it is critical to understand how adolescents are communicating digitally and to identify what conversation patterns are most strongly related to social connection and well-being.

The Present Study

To these ends, the goal of this manuscript is twofold. First, I aim to better understand face-to-face and digital conversations that adolescents engage in, including how different conversation partners and conversation lengths impact connection felt during face-to-face and digital conversations. Second, I plan to understand precisely how connection felt during face-to-face and digital conversations relate to well-being and health outcomes. To accomplish these goals, I adapted a new validated measure of conversation-level social connection called the Connection During Conversation Scale (CDCS; see Chapter 2) for adolescents (see Table 9 for adolescents scale). Using this adapted measure, I explored the following research questions:

Research Question #1: Is the new adolescent version of the CDCS a valid measure of connection felt in conversations? To test this question, I conducted a confirmatory factor analysis on the full CDCS, as well as for face-to-face and online conversations separately.

Research Question #2: What are the relationships between the adolescent CDCS and health and well-being outcomes? I conducted a series of correlations describing the associations between the full CDCS and its four subscales with each of our measured variables (i.e., life satisfaction, perceived social support, autonomy, competence,

relatedness, loneliness, and physical health symptoms). Furthermore, I examined separate correlations for face-to-face and digital conversations.

Research Question #3: Descriptively, what are the differences and similarities between face-to-face and digital conversations? I explored this question by computing descriptive statistics, such as percentages and means, for features of each type of conversation (i.e., its valence, length of conversation, purpose of conversation, digital conversation medium) and for conversation partners (i.e., their gender, age, ethnicity, partner relationship type, and partner relationship length).

Research Question #4: To what extent do face-to-face and digital conversations differ in CDCS scores and each of the four subscales? I first used *t*-tests to explore potential differences between face-to-face and digital conversations on CDCS scores and scores on each of the four subscales. Then I conducted ANOVAs to test the extent to which specific modes of communication (i.e., face-to-face, video chat, social media, phone, text) differed in reported CDCS scores and scores on each of the four subscales.

Research Question #5: Next, to what extent do features of the conversation and the conversation partner relate to reported CDCS scores, and do these associations differ for face-to-face and digital conversations? Using regressions, I compared face-to-face and digital conversations on CDCS scores, as well as each of the four subscales, based on the features of the conversation (i.e., conversation length, conversation purpose), features of their conversation partner (i.e., partner gender, partner relationship type, and partner relationship length) and conversation valence (i.e., positive, neutral, and negative).

Research Question #6: Do reported CDCS scores for face-to-face and digital social conversations differentially predict well-being (i.e., life satisfaction, loneliness, social support, relatedness, competence, autonomy) and health outcomes (i.e., headache, tiredness, trouble sleeping, stomachache, backache, cold symptoms). To examine this question, I conducted regression analyses to determine the extent to which overall CDCS scores and scores on each of the four subscales for face-to-face and digital conversations predict each of the well-being and health outcomes.

Method

Participants

Participants were adolescents recruited from 6th through 12th grade ($N = 4{,}055$, $M_{age} = 12.78$, $SD_{age} = 1.40$, age range = 10 – 22 years old; 33% 8th grade, 32% 6th grade) during the Winter 2020 semester. The Character Lab Research Network facilitated a partnership with K-12 schools in the U.S. that fell under the categorization of urban schools with mostly Hispanic students and a high number of students who receive free or reduced school lunches (see OSF registration here: https://osf.io/a4zkv). Slightly more participants were female (49% female, 47% male), and 61% were attending school in-person.

Using a between subjects design, participants were randomly assigned to report on either a positive, neutral, or negative conversation to ensure an adequate variety of conversations. Furthermore, each participant reported on two recent conversations (within subjects)—one face-to-face and one digital. Participants provided a written

description of each conversation to bring it to the forefront of their memory and then responded to the CDCS for that specific conversation (see Table 9).

Participants were asked to report on one face-to-face and one digital conversation. As a manipulation check, I asked participants to report where their conversation took place: Face-to-face, video chat, phone (audio), social media, or text. Of the 4,055 in our sample, 2,191 participants reported on face-to-face conversations when instructed to describe a face-to-face conversation (54% compliance) and 2,424 reported on digital conversations when instructed to describe a digital conversation (60% compliance). Although compliance was low for our sample, these rates mirror that of previous research, whereby even adult participants showed low compliance with study instructions (Fritz et al., 2022). In analyses that collapsed over mode of communication, all 4,055 participants were used. However, when examining face-to-face or digital conversations specifically, we only used participants who were compliant with instructions.

Participants were randomly assigned to describe either a positive, negative, or neutral conversation. As a manipulation check, I asked participants to report the valence of their interaction using the following scale anchors: 1 (*extremely negative*), 2 (*moderately negative*), 3 (*somewhat negative*), 4 (*neutral*), 5 (*somewhat positive*), 6 (*moderately positive*), and 7 (*extremely positive*). For the negative condition, participants were considered compliant if they self-reported their conversation valence as 1 to 3. For the neutral condition, participants were considered compliant if they self-reported their conversation valence as a 4. For the positive condition, participants were deemed compliant if they self-reported their conversation valence as a 5 to 7.

Of the 8,088 conversations documented by our sample (with each of our 4,055 students reporting on one face-to-face and one digital conversation), only 44% in the negative condition were compliant; only 38% in the neutral condition were compliant, and 72% of the positive condition were compliant. Again, although compliance was low, these rates mirror previous research (Fritz et al., 2022). As such, because of the low compliance rates, I decided to use self-reported conversation valence rather than assigned valence conditions to improve accuracy for analyses in this manuscript.

Participants also responded to questions about each conversation (e.g., its length and purpose), as well as about their conversation partner (e.g., their gender and age). Finally, they were asked to report on well-being (e.g., life satisfaction, autonomy) and health outcomes (e.g., headaches, trouble sleeping).

Measures

Connections During Conversations Scale (CDCS) – Adolescents

I created an adolescent version of the Connections During Conversations Scale (CDCS), to assess connection felt during recent face-to-face and digital conversations in my 6th to 12th grade sample (see Table 9; Full CDCS: $M = 4.81$, $SD = 1.25$, $\alpha = .91$). To make the CDCS more accessible and readable to adolescents, I edited the items in several ways. First, I included additional explanations of phrases for adolescents who may need additional context. For example, item 1 for adults reads, "I felt 'in sync' with them," while the adolescent version reads, "I felt 'in sync' (or on the same page) with them." I also revised the phrasing of items to be more accessible. For example, item 9 was changed from, "I was truly attentive during the interaction" (adult version) to "I was

really paying attention during the interaction" (adolescent version). In Table 10, I report the means and standard deviations comparing face-to-face and digital conversations.

Conversation Partner Demographics and Features of the Conversation

For both face-to-face and digital conversations, participants provided qualitative descriptions of their conversations (e.g., "I was talking to my brother last night and we were talking about the cookie our mom gave [us]"), completed questions describing the primary features of their conversation partner (e.g., partner relationship type and partner relationship length) and the conversation itself (e.g., its valence and length). However, for this manuscript, I focus only on quantitative data. See Table 10 for all questions about the conversation and conversation partner, along with relevant percentages.

Life Satisfaction – Child

Participants responded to the 5-item Satisfaction With Life Scale – Child (Gadermann et al., 2010) on 1 (*Strongly disagree*) to 7 (*Strongly agree*) scales, with questions such as, "In most ways my life is close to the way I want it to be" ($M = 4.75$, $SD = 1.42$, $\alpha = .90$).

Multidimensional Student Life Satisfaction (MSLS)

I also used the shortened version of the Multidimensional Student Life Satisfaction Scale (MSLS), which includes five subscales (i.e., school, friends, family, self, living environment; Huebner et al., 1998), all rated on 1 (*Strongly disagree*) to 7 (*Strongly agree*) scales (Full MSLS: $M = 4.94$, $SD = .91$, $\alpha = .85$). Participants answered questions such as "I like being in school" (school satisfaction), "I like where I live" (living environment satisfaction), and "My friends treat me well" (friend satisfaction).

Loneliness

Students responded to the 20-item UCLA Loneliness Scale (Russell et al., 1980) on 1 (*Never*) to 5 (*Always*) scales, with questions like, "How often do you feel alone?" ($M = 2.74$, $SD = .53$, $\alpha = .89$).

Multidimensional Scale of Perceived Social Support

Participants also completed the 12-item Multidimensional Scale of Perceived Social Support Scale (MSPSS; Zimet et al., 1988) on 1 (*Strongly disagree*) to 7 (*Strongly agree*) scales (Full MSPSS: $M = 5.32$, $SD = 1.20$, $\alpha = .91$), with questions such as "My family really tries to help me" (family social support) and "I can count on my friends when things go wrong" (friends social support).

Psychological Needs

Participants took the 9-item Balanced Measure of Psychological Needs, which includes three subscales (autonomy, competence, relatedness; Sheldon & Hilpert, 2012), all rated on 1 (*Strongly disagree*) to 7 (*Strongly agree*) scales. Sample questions included "I felt a sense of contact with people who care for me, and whom I care for" and "I felt my choices expressed my 'true self'" (autonomy: $M = 4.92$, $SD = 1.33$, $\alpha = .77$; competence: $M = 4.79$, $SD = 1.31$, $\alpha = .76$; relatedness: $M = 5.15$, $SD = 1.27$, $\alpha = .78$).

Health Symptoms

Participants reported their health symptoms—specifically, how often, on 1 (*Never*) to 5 (*Always*) scales, they have headaches ($M = 2.38$, $SD = 1.14$), nausea ($M = 1.64$, $SD = .94$), tiredness ($M = 3.00$, $SD = 1.32$), trouble sleeping ($M = 2.81$, $SD = .138$),

stomachache ($M = 2.08$, $SD = 1.02$), backache ($M = 2.10$, $SD = 1.21$), or symptoms of a cold ($M = 1.68$, $SD = .89$).

Results

RQ #1: Reliability of the CDCS for adolescents

My first research question addressed the reliability of the adapted version of the CDCS for adolescents (see Table 9). To this end, I conducted CFAs in R using the *cfa* function in the lavaan package. First, I conducted a CFA on the 14-item adolescent measure of the CDCS. The four-factor CFA fit the full CDCS well, demonstrating the reliability of the adolescent CDCS, $\chi^2(71) = 3016.36$, CFI = .946, TLI = .931, RMSEA = .078, 90% CI [.076, .081], SRMR = .054. Next, I conducted two CFAs, one for face-to-face conversations and one for digital conversations, on the same 14-item adolescent CDCS. The four-factor CFA also fit the CDCS for face-to-face conversations, $\chi^2(71) = 1468.292$, CFI = .944, TLI = .929, RMSEA = .080, 90% CI [.077, .084], SRMR = .054, as well as for digital conversations, $\chi^2(71) = 1368.873$, CFI = .949, TLI = .935, RMSEA = .078, 90% CI [.074, .081], SRMR = .053. Because the primary goal of this paper was to explore differences between face-to-face and digital conversations, from this point on I report face-to-face CDCS and digital CDCS scores separately.

RQ #2: Relationships Among the CDCS, Its Subscales, and Health and Well-Being-Related Outcomes

My second research question involved testing the relationships among the CDCS, its subscales, and all the measures I included in the study relevant to health and well-

being. As such, I conducted a series of correlations in R using the *cor* function in the stats package (see Tables 11 – 15).

Correlations Among the Full CDCS and Its Subscales.

I first examined the correlations among the full CDCS and each of its subscales for both face-to-face and digital conversations. Not surprisingly, there were strong (positive) correlations among the face-to-face and digital CDCS scores, including for each of its four subscales, with *r*s ranging from .45 (between the Shared Reality face-to-face subscale and the Participant Interest digital subscale and between the Affective Experience face-to-face subscale and the Shared Reality digital subscale) to .90 (between the full CDCS digital scale and the Partner Responsiveness digital subscale; see Table 11 for full correlation matrix).

Correlations Among Face-to-Face Conversation CDCS, Its Subscales, and Well-Being-Related Outcomes.

I also explored correlations among the CDCS and each of its subscales with each of the other measures in our study for face-to-face conversations. Interestingly, the strongest correlations almost all involved the perceived social support scale (MSPSS). Specifically, perceived social support was most strongly positively correlated with the full CDCS ($r = .37$), as well as with three of its subscales ($r = .34$ for Shared Reality, $r = .38$ for Participant Responsiveness, and $r = .33$ for Participant Interest). The Affective Experience subscale was most strongly (negatively) correlated with loneliness ($r = -.28$; see Table 12 for full correlation matrix).

Correlations Among Digital Conversation CDCS and Its Subscales, and Well-Being-

Related Outcomes.

In parallel, I ran correlations among the full CDCS and each of its subscales for digital conversations with each of the well-being-related measures in our study. Mirroring face-to-face conversations, perceived social support was most strongly positively correlated with the full CDCS ($r = .34$), as well as with three of its subscales ($r = .33$ for Shared Reality, $r = .37$ for Partner Responsiveness, and $r = .29$ for Participant Interest). The Affective Experience subscale was most strongly (negatively) correlated with loneliness ($r = -.23$; see Table 13 for full correlation matrix).

Correlations Among Face-to-Face Conversation CDCS and Its Subscales, and Health

Outcomes.

Next, I examined correlations among the full CDCS and each of its subscales with health outcomes for face-to-face conversations. Tiredness was most strongly negatively correlated with the full CDCS ($r = -.14$), as well as with three of its subscales ($r = -.10$ for Shared Reality, $r = -.13$ for Partner Responsiveness, $r = -.18$ for Affective Experience). The Participant Interest subscale was most strongly (negatively) correlated with trouble sleeping ($r = -.09$; see Table 14 for full correlation matrix).

Correlations Among Digital Conversation CDCS and Its Subscales, and Health

Outcomes.

Finally, I examined correlations among the full CDCS and each of its subscales with health outcomes for digital conversations. Trouble sleeping was most strongly negatively correlated with the full CDCS ($r = -.09$), as well as with three of its subscales

($r = -.06$ for Shared Reality, $r = -.07$ for Partner Responsiveness, and $r = -.13$ for Affective Experience). Finally, the Participant Interest subscale was most strongly (negatively) correlated with cold symptoms ($r = -.07$; see Table 15 for full correlation matrix).

RQ #3: Features of the Conversation and Conversation Partner

Next, the third research question aimed to investigate in an exploratory manner the descriptive features of conversations and conversation partners (see Table 10).

Features of the Conversation.

First, even after collapsing across the three separate valenced conditions, most participants reported that the conversations were positive ($M = 4.76$, $SD = 1.72$). The majority of conversations lasted less than 30 minutes (73% for face-to-face, 56% for digital), and half were described as being "for fun" (51% for face-to-face, 52% for digital). Finally, when examining the different modes of communication used for those reporting digital conversations, the most frequent were over text (35%) and video chat (19%).

Features of the Conversation Partner.

According to participants' descriptions of their conversation partners, approximately half of partners were female (56% for face-to-face conversations and 48% for digital ones). Age differed based on mode of communication. The average age of conversation partners for those having conversations face-to-face was 20.69 years old ($SD = 14.39$ years old) while the average age of conversation partners for those having conversations digitally was 14.45 years old ($SD = 11.78$ years old). Most conversation

partners were Hispanic (48% for face-to-face, 41% for digital), consistent with the demographics of this sample (45% Hispanic).

The length of time participants had known their conversation partners also differed based on mode of communication. For those communicating face-to-face, 53% knew their partners many years and 17% knew them for a few years; for those communicating digitally, 29% knew their partners many years and 28% knew them for a few years. Understandably, the types of people that adolescents were communicating with face-to-face and digitally differed as well. The most common partner types for adolescents communicating face-to-face were close friends (32%), parents (25%), and siblings (14%). The most common partner types for adolescents communicating digitally were close friends (49%), others (usually cousins, 16%), and casual friends (12%).

RQ #4: Comparing Face-to-Face and Digital Conversations on CDCS Scores

My next research question compared the extent to which face-to-face and digital conversations were experienced as "connecting." First, I conducted paired samples *t*-tests to compare differences between face-to-face and digital conversations on overall CDCS scores and scores on each of the four subscales. Then I conducted a series of ANOVAs to explore whether CDCS scores and scores on each of the four subscales differ based on the different modes of communication (e.g., text vs. video chat vs. face-to-face, etc.).

Comparing Face-to-Face and Digital Conversations.

First, participants reported no significant difference between face-to-face ($M = 4.82$, $SD = 1.26$) and digital conversations ($M = 4.84$, $SD = 1.25$) on overall CDCS scores ($t[3116] = -1.11$, $p = .267$, $d = .02$; see Figure 1), Shared Reality subscale scores ($M_{f2f} = $

4.45, SD_{f2f} = 1.51; $M_{digital}$ = 4.48, $SD_{digital}$ = 1.51; t[3146] = -1.09, p = .276, d = .02),

Partner Responsiveness subscale scores (M_{f2f} = 4.84, SD_{f2f} = 1.54; $M_{digital}$ = 4.83, $SD_{digital}$

= 1.56; t[3150] = .12, p = .903, d = .002), and Participant Interest subscale scores (M_{f2f} =

5.19, SD_{f2f} = 1.32; $M_{digital}$ = 5.19, $SD_{digital}$ = 1.32; t[3145] = .16, p = .872, d = .003).

However, participants rated digital conversations (M = 4.86, SD = 1.60) significantly

higher in Affective Experience than face-to-face conversations (M = 4.80, SD = 1.64;

t[3150] = -2.35 p = .019, d = -.04; see Figure 2). Taken together, these results suggest

little difference between how connecting my participants experienced face-to-face and

digital conversations.

Comparing Mode of Communication in Digital Conversations to Face-to-Face

Conversations.

First, I conducted a one-way ANOVA to compare overall CDCS scores based on

mode of communication. Because the Shapiro-Wilks test for normality indicated that data

for all ANOVAs were non-normal (p < .001), I used the Welch's F test for all subsequent

analyses. In addition, all post-hoc analyses were conducted using the Tukey HSD test.

There was a statistically significant difference in the one-way ANOVA comparing

overall CDCS scores based on mode of communication (Welch's F[4, 897] = 8.23, p <

.001; see Table 16). Conversations over video chat (EMM = 5.23, SE = .06) were rated

higher in CDCS scores compared to conversations face-to-face (EMM = 4.86, SE = .03; p

< .001; d = .28), over social media (EMM = 4.91, SE = .07; p = .003, d = .25), and over

text (p = .010; d = .19; see Figure 3).

A nearly identical pattern of results emerged for each of the subscales. Results for Shared Reality mirrored those of the overall CDCS scores (Welch's $F[4, 900] = 8.45$, $p < .001$; see Table 17), such that conversations over video chat (*EMM* = 4..91, *SE* = .07) were rated higher in Shared Reality scores compared to conversations face-to-face (*EMM* = 4.46, *SE* = .03; $p < .001$; $d = .29$), over social media (*EMM* = 4.55, *SE* = .08; $p = .005$, $d = .24$), and over text (*EMM* = 4.55, *SE* = .05; $p < .001$; $d = .19$). For Partner Responsiveness (Welch's F[4, 905] = 5.49, $p < .001$; see Table 18), conversations over video chat (*EMM* = 5.23, *SE* = .07) were rated higher in Partner Responsiveness compared to conversations face-to-face (*EMM* = 4.89, *SE* = .03; $p < .001$; $d = .12$) and over social media (*EMM* = 4.86, *SE* = .08; $p = .005$; $d = .10$).

For Participant Interest (Welch's $F[4, 910] = 5.25$, $p < .001$; see Table 19), conversations over video chat (*EMM* = 5.56, *SE* = .06) were rated higher in Participant Interest compared to conversations face-to-face (*EMM* = 5.27, *SE* = .03; $p < .001$; $d = .12$), over social media (*EMM* = 5.27, *SE* = .07; $p = .012$; $d = .09$), and over text (*EMM* = 5.35, *SE* = .05; $p = .048$; $d = .05$). Finally, for Affective Experience (Welch's $F[4, 904] = 7.04$, $p < .001$; see Table 20), conversations that participants had over video chat (*EMM* = 5.20, *SE* = .08) were rated higher in Affective Experience compared to conversations had face-to-face (*EMM* = 4.83, *SE* = .04; $p < .001$; $d = .12$) and over the phone (*EMM* = 4.73, *SE* = .11; $p = .006$; $d = .44$). Additionally, conversations had over text (*EMM* = 5.04, *SE* = .06) were rated higher in Affective Experience than conversations face-to-face ($p = .017$; $d = .05$).

RQ #5: Comparing Face-to-Face and Digital Conversations on CDCS Scores Based on Features of the Conversation and Conversation Partner

Research Question #5 aimed to test whether face-to-face and digital conversations differentially predict CDCS scores (and each of the four subscales) based on features of the conversation and conversation partner. I explored this by conducting a series of regressions to test whether (1) features of the conversation (e.g., length, purpose) or of the conversation partner (e.g., type, gender), (2) face-to-face versus digital social conversations, and (3) the interaction between features of the conversation or conversation partner and face-to-face versus digital conversation differed in overall CDCS scores and scores on each of the four subscales.

Conversation Length in Face-to-Face and Digital Conversations Predicting CDCS Scores.

Because of small sample sizes for longer conversations (i.e., conversations lasting more than 2 hours), I only compared conversations lasting less than 5 minutes, between 5 – 30 minutes, between 30 minutes and 1 hour, and between 1 – 2 hours. First, participants rated face-to-face conversations lasting 5 minutes or less (*EMM* = 4.56, *SE* = .05) higher in CDCS scores compared to digital conversations lasting 5 minutes or less (*EMM* = 4.39, *SE* = .05), while participants rated digital conversations lasting 5 – 30 minutes (*EMM* = 5.02, *SE* = .05) higher in CDCS scores compared to face-to-face conversations lasting 5 – 30 minutes (*EMM* = 4.93, *SE* = .04; *b* = .27, *SE* = .09, *p* = .005; See Figure 4, top left). For Shared Reality and Partner Responsiveness scores, no interaction terms were significant.

Similar to overall CDCS scores, the interaction between face-to-face and digital conversations lasting 5 minutes or less and 5 – 30 minutes was significant for Participant Interest scores ($b = .44$, $SE = .10$, $p < .001$; see Figure 4, top right) and Affective Experience scores ($b = .24$, $SE = .12$, $p = .046$; see Figure 4, bottom). That is, participants rated face-to-face conversations lasting 5 minutes or less (PI: $EMM = 4.98$, $SE = .05$; AE: $EMM = 4.62$, $SE = .06$) as more connecting than digital conversations lasting 5 minutes or less (PI: $EMM = 4.64$, $SE = .05$; AE: $EMM = 4.56$, $SE = .06$), while participants rated digital conversations lasting 5 – 30 minutes (PI: $EMM = 5.44$, $SE = .05$; AE: $EMM = 5.08$, $SE = .06$) as more connecting than face-to-face conversations lasting 5 – 30 minutes (PI: $EMM = 5.35$, $SE = .04$; AE: $EMM = 4.90$, $SE = .06$).

Additionally, the interaction between face-to-face and digital conversations lasting 5 minutes or less and 30 minutes – 1 hour was significant for Participant Interest scores ($b = .26$, $SE = .12$, $p = .029$) and Affective Experience scores ($b = .26$, $SE = .12$, $p = .029$). Again, participants rated face-to-face conversations lasting 5 minutes or less (PI: $EMM = 4.98$, $SE = .05$; AE: $EMM = 4.62$, $SE = .06$) as more connecting compared to digital conversations lasting 5 minutes or less (PI: $EMM = 4.64$, $SE = .05$; AE: $EMM = 4.56$, $SE = .07$), while participants rated digital conversations lasting 5 – 30 minutes (PI: $EMM = 5.44$, $SE = .05$; AE: $EMM = 5.08$, $SE = .06$) as more connecting compared to face-to-face conversations lasting 5 – 30 minutes (PI: $EMM = 5.35$, $SE = .04$; AE: $EMM = 4.90$, $SE = .06$; See Figure 4).

In sum, for both the full CDCS measure and all four of its subscales (Shared Reality, Partner Responsiveness, Participant Interest, and Affect Experience), longer conversations were more connecting (see Figure 4).

Conversation Purpose Predicting CDCS Scores.

For overall CDCS and each of the four subscales, no significant interactions between conversation purpose and face-to-face versus digital conversations were found. However, participants reported that conversations for the purpose of having fun were more connecting (i.e., higher CDCS, Shared Reality, Partner Responsiveness, Participant Interest, and Affective Experience scores) regardless of whether the conversation was face-to-face or digital (see Figure 5).

Conversation Partner Predicting CDCS Scores.

I collapsed and removed some options due to small sample sizes in partner types such as stranger or grandparent. As a result, I only included the options close friends, casual friends, parents, siblings, and romantic partners (combining boyfriend/girlfriend and crush). Although the interaction between conversation partner and face-to-face versus digital conversations was not significant, close friends emerged as the strongest predictor of overall CDCS scores and each of the four subscales. That is, conversations with close friends were linked to higher connection scores (i.e., higher CDCS, Shared Reality, Partner Responsiveness, Participant Interest, and Affective Experience scores) compared to conversations with casual friends, parents, and siblings, regardless of whether the conversation was face-to-face or digital (see Figure 6). Additionally, conversations with romantic partners and parents were rated as more connecting (i.e.,

higher CDCS, Shared Reality, Partner Responsiveness, and Participant Interest scores)

than conversations with casual friends, regardless of whether the conversation was face-

to-face or digital.

Conversation Partner Gender Predicting CDCS Scores.

Because of sample size issues, I only compared male and female genders. For

overall CDCS scores and each of the four subscales, the interaction between conversation

partner gender and face-to-face versus digital conversation was not significant. However,

a main effect emerged, such that participants rated female partners higher in Partner

Responsiveness and Participant Interest scores, indicating that when conversing with a

female, the participants feel more partner responsiveness and experiences the

conversation as more interesting (see Figure 7).

Conversation Partner Age Predicting CDCS Scores.

For overall CDCS scores ($b = .01$, $SE = .003$, $p = .007$), Shared Reality scores (b

$= .01$, $SE = .004$, $p = .001$), and Affective Experience scores ($b = .01$, $SE = .004$, $p =$

.002), the interaction between partner age and digital conversations compared to face-to-

face conversations ($b = .01$, $SE = .003$, $p = .007$) was significant (see Figure 8). That is,

for face-to-face conversations, the older the conversation partner, the less connecting the

conversation. By contrast, for digital conversations, the older the conversation partner,

the more connecting the conversation.

Conversation Partner Relationship Length Predicting CDCS Scores.

Similar to the conversation partner variable, I collapsed and removed some

options due to small sample sizes. As a result, I created two options—namely, (relatively)

new partners (which included just met, few hours, few days, few weeks, few months, about a year) versus established partners (included a few years and many years). For overall CDCS scores, ratings of face-to-face conversations (*EMM* = 4.90, *SE* = .03) was lower than digital conversations (*EMM* = 5.05, *SE* = .04) when conversing with an established conversation partner. However, ratings of face-to-face conversations (*EMM* = 4.71, *SE* = .05) did not differ from digital conversations (*EMM* = 4.68, *SE* = .04; *b* = .18, *SE* = .08, *p* = .035; see Figure 9) when conversing with a new conversation partner.

I found similar results for Shared Reality scores. That is, when conversing with an established relationship partner, Shared Reality ratings of face-to-face conversations (*EMM* = 4.29, *SE* = .05) were lower than those of digital conversations (*EMM* = 4.68, *SE* = .05). However, when conversing with a new conversation partner, Shared Reality ratings of face-to-face conversation (*EMM* = 4.34, *SE* = .06) did not differ from those of digital conversations (*EMM* = 4.29, *SE* = .05; *b* = .20, *SE* = .06, *p* = .002; see Figure 9).

In summary, those who had conversations with partners with whom they have an established relationship reported a stronger sense of connection, as indicated by higher overall CDCS scores and higher scores for three out of the four subscales. Importantly, conversations with new conversation relationship partners did not differ in connection scores whether they took place face-to-face or digitally.

Valence of Conversation Predicting CDCS Scores.

For overall CDCS, Shared Reality, Partner Responsiveness, and Affective Experience scores, the interaction between reported conversation valence and face-to-face versus digital conversation was not significant. However, not surprisingly, when

people rated a conversation as more positive, then they also rated it as more connecting. For Participant Interest scores, at one standard deviation below the mean of reported conversation valence, digital conversations (*EMM* = 4.76, *SE* = .04) were rated higher in connection compared to face-to-face conversations (*EMM* = 4.72, *SE* = .04). However, at the mean of reported conversation valence, connection ratings for digital (*EMM* = 5.25, *SE* = .03) and face-to-face conversations (*EMM* = 5.28, *SE* = .03) began to shift. At one standard deviation above the mean of reported conversation valence, digital conversations (*EMM* = 5.73, *SE* = .04) were rated as lower in connection than face-to-face conversations (*EMM* = 5.84, *SE* = .04). This pattern highlights that as reported conversation valence increases, the connection (i.e., participant interest) gained from the valence increase is smaller for digital conversations compared to face-to-face conversations (*b* = -.04, *SE* = .02, *p* = .040), indicating that perhaps positive conversations feel more interesting when conversing face-to-face compared to digitally (see Figure 10).

RQ #6: CDCS Scores Predicting Well-Being and Health Outcomes.

My last research question (RQ #6) involved testing whether CDCS scores and scores on each of the four subscales reported for face-to-face versus digital conversations differentially predict (1) child life satisfaction, (2) student life satisfaction (and it's five subscales), (3) loneliness, (4) perceived social support (and its three subscales), (5) relatedness, (6) autonomy, (7) competence, and (8) seven health symptoms. To explore this, I conducted a series of regressions to determine whether connection felt during face-

to-face versus digital conversations differentially predicted each of these well-being and health outcomes. All regression results are presented in Table 21.

Child Life Satisfaction.

Overall CDCS, Shared Reality, Partner Responsiveness, and Participant Interest scores predicted child life satisfaction scores more strongly for face-to-face conversations than for digital conversations (see Figure 11). However, Affective Experience scores for face-to-face and digital conversations did not differentially predict child life satisfaction scores.

Multidimensional Student Life Satisfaction.

Shared Reality, Partner Responsiveness, and Affective Experience scores for face-to-face conversations and digital conversations did not differentially predict MSLS scores. However, overall CDCS and Participant Interest scores for face-to-face conversations more strongly predicted MSLS scores compared to digital conversations. Next, I examined the five subscales of the MSLS scale. There was only a significant difference on the family subscale when comparing connection scores for face-to-face and digital conversations (see Figure 12), such that CDCS, Shared Reality, Partner Responsiveness, and Participant Interest scores for face-to-face conversations were stronger predictors of family satisfaction compared to digital conversations.

Loneliness.

Overall CDCS and each of the four subscale scores for face-to-face and digital conversations did not differentially predict loneliness.

Perceived Social Support.

Overall CDCS, Shared Reality, Partner Responsiveness, Participant Interest, and Affective Experience scores for face-to-face and digital conversations did not differentially predict overall perceived social support (MSPSS). Similar to the MSLS results, when examining the three subscales of the MSPSS, the differential impact of the CDCS and each of the four subscale scores on face-to-face conversations over digital conversations were relatively stronger predictors for family social support (see Figure 13).

Relatedness, Autonomy, and Competence.

With one exception, overall CDCS and each of the four subscale scores for face-to-face and digital conversations did not differentially predict relatedness or competence scores. However, Participant Interest scores for face-to-face conversations was a stronger predictor for autonomy than Participant Interest scores for digital conversations (Figure 14).

Health Outcomes.

I tested the extent to which face-to-face and digital conversation connection scores predicted seven health outcomes: Tiredness, backaches, headaches, trouble sleeping, stomachaches, nausea, and cold symptoms. Face-to-face CDCS, Partner Responsiveness, and Participant Interest scores were stronger (negative) predictors of tiredness compared to digital scores (Figure 15). Face-to-face CDCS and Shared Reality scores were stronger (negative) predictors of backaches compared to digital scores

(Figure 16). Finally, face-to-face Shared Reality scores were a stronger (negative) predictor of headaches compared to digital scores (Figure 17).

Discussion

In a large-scale study of over 4,000 adolescents who reported on nearly 6,500 face-to-face and digital conversations they had during the COVID-19 pandemic, I explored a few broad questions. First, I aimed to validate an adolescent version of the CDCS scale (RQ #1) and correlated it with other similar connection measures (e.g., MSPSS) and well-being and health outcomes (e.g., child life satisfaction; RQ #2). I also investigated features of adolescents' conversations and their conversation partners (RQ #3). I also compared the impact of mode of communication (e.g., face-to-face compared to text) on connection (RQ #4) and compared the impact of features of conversations and conversation partners on face-to-face and digital CDCS scores (RQ #5). Finally, I assessed how the sense of connection adolescents felt during face-to-face and digital conversations related to well-being and health outcomes (RQ #6).

Overall, the adolescent version of the CDCS was a valid measure of connection (RQ #1) and was correlated with conceptually related measures like perceived social support (RQ #2). The conversation partners with whom adolescents spoke were different for face-to-face compared to digital conversations. For face-to-face conversations, nearly half of conversation partners were parents and siblings, whereas for digital conversations, nearly half of conversation partners were close friends (RQ #3). The trend towards speaking with family members in face-to-face conversations may reflect the fact that adolescents were quarantining at home during the pandemic (Whittle et al., 2020). In

addition, previous research has found that most adolescents tend to interact with very good friends on the internet (Reich et al., 2012).

Interestingly, when comparing all modes of communication to one another, CDCS scores associated with video call conversations emerged as the most connecting compared to face-to-face, social media, and text but not significantly different from phone conversations (RQ #4). Research has shown that video chat is vital for the social lives of adolescents, especially those aged 13 to 18. Importantly, video chat is important not only for socializing, flirting, and gossiping with romantic partners, friends, and peers, but video chat also facilitates homework (Buhler et al., 2013). Additionally, these results support previous research showing that digital conversations are not detrimental to social connection and in fact can be more connecting than face-to-face conversations (Best et al., 2014; Orben & Przybylski, 2019; Reich et al., 2012; Valkenburg & Peter, 2009).

Furthermore, some features of the conversation and conversation partner did relate to higher connection scores (RQ #5). With regard to features of the conversation, perhaps unsurprisingly, conversations were more connecting when they were over 5 minutes than less than 5 minutes, and when they were for the purpose of fun than to get something done. Indeed, longer conversations and conversations for the purpose of having fun might better facilitate deeper, rather than shallow, small-talk conversations. Studies have shown that deeper conversations—that is, those in which people reveal relatively more vulnerable and personal information—are associated with greater feelings of connection than small-talk conversations (Aron et al., 1992; Kardas et al., 2022; Sun et al., 2019).

With regard to features of the conversation partner, conversations with close friends were rated as more connecting compared to conversations with casual friends, parents, and siblings. This finding is unsurprising because other research during the pandemic has found similar trends of adolescents remaining connected with friends digitally (Ellis et al., 2020; Hamilton et al., in press). Conversations with female partners were associated with relatively higher feelings of being cared for, appreciated, and understood, as well as having interest in the partner. This result too is consistent with previous work, whereby people report more responsiveness from female family members compared to male family members (Monin et al., 2008).

Finally, connection scores for digital conversations with established relationship partners were higher than connection scores for digital conversation with new relationship partners. Interestingly, no differences in connection scores emerged for face-to-face conversations with established versus new relationship partners. This finding may be accounted for by several factors. First, conversations with stronger versus weaker ties have been linked to greater connection (Vittengl & Holt, 1998; Wheeler et al., 1983). Second, digital conversations have been found to facilitate (Reich et al., 2012; Valkenburg & Peter, 2009) and enhance (Valkenburg & Peter, 2007) face-to-face conversations. However, due to quarantining measures during COVID-19, this vital function of digital conversations was made nearly impossible, which could have been especially detrimental when trying to build bonds with new relationship partners. As such, this may be one explanation as to why connection scores were lower for digital

conversation with new relationship partners compared to digital conversations with established relationship partners.

Finally, when comparing how connection during face-to-face and digital conversations differentially predicted many positive well-being and health outcomes, I found that although video chat conversations were rated as the most connecting, connection felt during face-to-face conversations was a stronger predictor of positive outcomes compared to digital conversations. For example, self-reported connection felt in face-to-face conversations more strongly predicted positive outcomes such as less tiredness, fewer backaches, more perceived social support from family, and greater life satisfaction compared to digital conversations (RQ #6). Of course, digital conversations also predicted the same positive well-being and health outcomes; however, connection felt during face-to-face conversations was a stronger predictor compared to digital conversations.

Although research has demonstrated robust links between social connection and well-being and health outcomes (Baumeister & Leary, 1995; Cacioppo et al., 2008; Cole et al., 2007; Diener & Seligman, 2002; Holt-Lunstad et al., 2010, 2017; House et al., 1988; Lyubomirsky et al., 2005; Maslow, 1943), the relatively weaker impact of digital conversations that I found on feelings of social connection suggests that such conversations may have limited downstream benefits for outcomes such as health. Lending support to this idea, research during the pandemic found that the substitution of face-to-face relationships with online relationships only protected people from feelings of social isolation during strict social isolation; under mild isolation, however, online

relationships did not foster well-being (Marinucci et al., 2022). This finding coupled with evidence from prior research points to possible limitations for the connecting power and scope of digital connection.

Limitations

Several limitations of this study should be considered when interpreting its results. First, this study relies exclusively on self-reported data to assess connection felt in conversations as well as well-being and health outcomes. Because of the concern of common method variance inflation (Campbell & Fiske, 1959), perhaps coupling more behavioral methodology such as the EAR with the CDCS may provide more robust findings.

Furthermore, despite random assignment of participants into positive, negative, and neutral conditions, when asked to self-report the valence of their conversations, half of adolescents reported that their conversations were positive (51% for face-to-face and 50% for digital). This non-adherence may have impaired the quality of the data; furthermore, it is not clear whether adolescents did not adhere to instructions because they were not paying attention or because they were better able to recall or more willing to report on positive (versus neutral or negative) conversations. Only 44% of adolescents in the negative conversation condition and 38% of adolescents in the neutral conversation condition were compliant with instructions, while 72% of adolescents in the positive conversation condition were compliant with instructions. This outcome might signal that it is difficult to recall negative or neutral conversations from the past 2 days compared to

positive conversations. Alternatively, negative or neutral conversations may simply be less common than positive conversations and thus less accessible in people's memories.

Future Directions

My study was conducted during the COVID-19 pandemic, a highly atypical and stressful period (Foa et al., 2020; Loades et al., 2020; Okabe-Miyamoto & Lyubomirsky, 2021) during which 40% of adolescents were learning virtually, meaning that many of the face-to-face conversations that they were having were likely with family members because they were staying at home during the pandemic (Whittle et al., 2020). Follow-up studies conducted after social distancing restrictions are lifted and adolescents are able to connect with friends face-to-face would be useful in replicating and extending these data. This would be especially important for digital conversations as previous research has accounted for the facilitating role that digital conversations play in face-to-face interactions (Reich et al., 2012; Valkenburg & Peter, 2009), such that some people prefer to self-disclosure digitally or choose to continue conversations they had face-to-face, which facilitates and enhances existing face-to-face relationships. As such, future investigators may want to especially home in on digital conversations and investigate what role they may play in the larger ecosystem of connection.

In addition, future research could investigate whether feeling connected during specific conversations may aggregate and strengthen over time, either globally or with a specific interaction partner. For example, researchers could track participants' reports of connection in conversations over the course of a month with a romantic partner, to determine whether stable, positive conversations predict stronger relationship satisfaction

or longevity compared to unstable conversations of varying valences. Similarly, future investigators could investigate how relationships deteriorate over time by examining connection (or disconnection) felt in particularly negative or neutral conversations with unfavorable or disliked interaction partners.

Additionally, future research could consider conducting studies with such devices as the EAR (in naturalistic settings; Bernstein et al., 2018; Mehl et al., 2010; Milek et al., 2018) or video chat technology (in lab settings; Reece et al., 2022), so that researchers may examine how word choices or conversation topics relate to subsequent CDCS scores. For example, conversations with "deep" (non-superficial) topics are likely to be rated especially connecting on the CDCS (Kardas et al., 2022).

Furthermore, because recalling and reporting on negative and neutral conversations appeared to be difficult for adolescents in my sample, in the future, asking participants to rate any recent conversation, rather than instructing them to report on a specific conversation, may be optimal. Similarly, perhaps instructing participants to report on one face-to-face and one digital conversation may have been too restrictive, especially during the pandemic. Future studies could track the types of conversations that adolescents naturally report and determine whether such conversations predict positive outcomes. Additionally, investigators may find it particularly informative to track and examine all conversations in a single day or week, as this approach is relatively more likely to capture a wide range of conversations (e.g., both positive and negative, with both close and weak ties, etc.).

Conclusion

Because of the critical importance of social connection for overall well-being (Baumeister & Leary, 1995; Cacioppo et al., 2008; Diener & Seligman, 2002; Hawkley & Cacioppo, 2010; Holt-Lunstad et al., 2010, 2017; Lyubomirsky et al., 2005; Maslow, 1943), it is important to understand the conversations that adolescents engage in, both face-to-face and digitally. Although some work has demonstrated that digital connection may be harmful for adolescents' well-being (Cauberghe et al., 2021; Ellis et al., 2020; Twenge, 2013; Twenge et al., 2019), the results of this study do not support this finding. First, adolescents reported higher connection scores for conversations over video chat compared to conversations face-to-face, over social media, and over text (but no more or less connecting than phone conversations). Additionally, connection associated with face-to-face and digital conversations did not significantly differ on a variety of well-being and health outcomes such as loneliness, perceived social support, headaches, and cold symptoms. However, when examining the strength of the effect of connection scores for face-to-face compared to digital conversations, connection experienced during face-to-face conversations was indeed more powerfully associated with well-being and health outcomes, including child life satisfaction, the family subscale for both the perceived social support scale and the student life satisfaction scale, tiredness, and backache. My results highlight the unique importance of face-to-face and digital conversations for adolescents, especially for adolescents during COVID-19.

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Table 9.

Connection During Conversations Scale – Adolescent Version

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Please answer the following questions about your recent interaction and interaction

partner.

Shared Reality Subscale
1. I felt "in sync" (or on the same page) with them
2. I felt like I shared a lot in common
3. I felt that we saw the world in the same way
4. They were able to empathize with my experiences

Partner Responsiveness Subscale
5. They were interested in my thoughts and feelings
6. They respected my beliefs and opinions
7. I felt that they cared about me
8. They really understood who I am

Participant Interest Subscale
9. I was really paying attention during the interaction
10. I was interested in their thoughts and feelings
11. I thought that they were boring (R)

Affective Experience Subscale
12. The interaction made me tired (R)
13. I couldn't wait for the interaction to end (R)
14. I felt that it was hard to communicate with them (R)

Table 10.

Scale Information, Partner Demographics, and Interaction Details

	Face-to-Face	Digital
Full CDCS	$M = 4.86$, $SD = 1.30$ $\alpha = .92$, $N = 2152$	$M = 4.89$, $SD = 1.27$ $\alpha = .92$, $N = 2373$
Shared Reality subscale	$M = 4.46$, $SD = 1.54$ $\alpha = .87$	$M = 4.52$, $SD = 1.53$ $\alpha = .87$
Partner Responsiveness subscale	$M = 4.89$, $SD = 1.56$ $\alpha = .89$	$M = 4.86$, $SD = 1.57$ $\alpha = .90$
Participant Interest subscale	$M = 5.27$, $SD = 1.33$ $\alpha = .68$	$M = 5.24$, $SD = 1.31$ $\alpha = .67$
Affective Experience subscale	$M = 4.83$, $SD = 1.70$ $\alpha = .78$	$M = 4.95$, $SD = 1.59$ $\alpha = .78$
Gender	56% Female 41% Male 3% Unknown	48% Female 38% Male 14% Unknown
Age	$M = 20.69$, $SD = 14.39$	$M = 14.45$, $SD = 11.78$
Ethnicity	2% Alaskan /Native American 4% Asian 12% Black/African American < 1% Hawaiian/Pacific Islander 48% Hispanic/Latino < 1% Middle-Eastern 9% More Than One 10% White/Caucasian 5% Other 11% Unknown	% Alaskan /Native American 5% Asian 10% Black/African American < 1% Hawaiian/Pacific Islander 41% Hispanic/Latino < 1% Middle-Eastern 7% More Than One 9% White/Caucasian 6% Other 20% Unknown
How Long Have You Known Your Interaction Partner	3% We Just Met < 1% A Few Hours 2% A Few Days 2% A Few Weeks 10% A Few Months 12% About A Year 17% A Few Years 53% Many Years	9% We Just Met 1% A Few Hours 2% A Few Days 3% A Few Weeks 13% A Few Months 15% About A Year 28% A Few Years 29% Many Years

Who Is Your Interaction Partner?	1% Aunt/Uncle 2% Boyfriend/Girlfriend 14% Brother/Sister 10% Casual (Non-Romantic) Friend 32% Close (Non-Romantic) Friend 3% Crush 2% Grandparent 25% Parent 2% Stranger 2% Teacher 7% Other	< 1% Aunt/Uncle 4% Boyfriend/Girlfriend 3% Brother/Sister 12% Casual (Non-Romantic) Friend 49% Close (Non-Romantic) Friend 4% Crush < 1% Grandparent 6% Parent 5% Stranger 1% Teacher 16% Other
When Did the Interaction Occur?	22% Today 21% Yesterday 42% A Few Days Ago 16% Other	9% Today 23% Yesterday 44% A Few Days Ago 24% Other
Where Did the Interaction Occur?	100% Face-to-Face	9% Phone (Audio) 19% Video Chat 35% Text 16% Social Media 21% Other
How Long Was the Interaction?	34% ≤ 5 mins 39% 5 – 30 mins 14% 30 mins – 1 hour 6% 1 – 2 hours 0% 2 – 3 hours 2% 3 – 4 hours 1% 4 – 5 hours 2 % 5+ hours	26% ≤ 5 mins 30% 5 – 30 mins 16% 30 mins – 1 hour 12% 1 – 2 hours 0% 2 – 3 hours 5% 3 – 4 hours 3% 4 – 5 hours 4% 5+ hours
Valence *1 = Negative* *4 = Neutral* *7 = Positive*	$M = 4.73, SD = 1.73$ 5% Rated as a 1 7% Rated as a 2 8% Rated as a 3 29% Rated as a 4 10% Rated as a 5 22% Rated as a 6 19% Rated as a 7	$M = 4.78, SD = 1.71$ 5% Rated as a 1 6% Rated as a 2 8% Rated as a 3 31% Rated as a 4 8% Rated as a 5 22% Rated as a 6 20% Rated as 7

Purpose of Conversation	22% Get Something Done 51% For Fun 27% Other	15% Get Something Done 52% For Fun 33% Other

Table 11.

Correlations Among CDCS And Its Four Subscales for Face-To-Face and Digital Conversations

		Face-to-Face					Digital				
		CDCS	SR	PR	PI	AE	CDCS	SR	PR	PI	AE
Face-to-Face	CDCS	—									
	Shared Reality	0.89	—								
	Partner Responsiveness	0.89	0.83	—							
	Participant Interest	0.84	0.65	0.68	—						
	Affective Experience	0.79	0.54	0.52	0.58	—					
Digital	CDCS	0.56	0.49	0.53	0.47	0.47	—				
	Shared Reality	0.50	0.48	0.51	0.39	0.35	0.88	—			
	Partner Responsiveness	0.51	0.48	0.53	0.40	0.36	0.90	0.85	—		
	Participant Interest	0.44	0.35	0.40	0.43	0.34	0.84	0.64	0.69	—	
	Affective Experience	0.48	0.36	0.38	0.39	0.53	0.76	0.49	0.50	0.56	—

Note. CDCS = Connections During Conversations Scale. SR = Shared Reality. PR = Partner Responsiveness. PI = Participant

Interest. AE = Affective Experience. All *p*s < .001.

Table 12.

Correlations Among CDCS and Other Measures for Face-to-Face Conversations

	CDCS	SR	PR	PI	AE	Autonomy	Competence	Relatedness	Loneliness	MSLS	SWLS	MSPSS
CDCS	—											
Shared Reality	0.88	—										
Partner Responsiveness	0.89	0.83	—									
Participant Interest	0.84	0.65	0.68	—								
Affective Experience	0.79	0.54	0.52	0.58	—							
Autonomy	0.32	0.31	0.32	0.28	0.16	—						
Competence	0.28	0.29	0.30	0.24	0.13	0.68	—					
Relatedness	0.34	0.32	0.35	0.31	0.19	0.65	0.60	—				
Loneliness	-0.31	-0.27	-0.27	-0.23	-0.28	-0.48	-0.43	-0.45	—			
MSLS	0.35	0.31	0.34	0.32	0.23	0.57	0.57	0.55	-0.69	—		
SWLS	0.29	0.28	0.30	0.23	0.18	0.56	0.55	0.50	-0.60	0.72	—	
MSPSS	0.37	0.34	0.38	0.33	0.21	0.57	0.53	0.63	-0.58	0.69	0.60	—

Note. All ps < .001. CDCS = Connections During Conversations Scale. SR = Shared Reality. PR = Partner Responsiveness. PI = Participant Interest. AE = Affective Experience. MSLS = Multidimensional Student Life Satisfaction. SWLS = Satisfaction with Life Scale. MSPSS = Multi-Dimensional Scale of Perceived Social Support Scale.

Table 13.

Correlations Among CDCS and Other Measures for Digital Conversations

	CDCS	SR	PR	PI	AE	Autonomy	Competence	Relatedness	Loneliness	MSLS	SWLS	MSPSS
CDCS	—											
Shared Reality	0.88	—										
Partner Responsiveness	0.90	0.85	—									
Participant Interest	0.84	0.64	0.69	—								
Affective Experience	0.76	0.49	0.50	0.56	—							
Autonomy	0.25	0.26	0.28	0.20	0.12	—						
Competence	0.24	0.26	0.26	0.19	0.10	0.68	—					
Relatedness	0.32	0.31	0.33	0.28	0.16	0.65	0.60	—				
Loneliness	-0.25	-0.20	-0.23	-0.18	-0.23	-0.48	-0.43	-0.45	—			
MSLS	0.29	0.26	0.31	0.24	0.19	0.57	0.57	0.55	-0.69	—		
SWLS	0.22	0.21	0.24	0.15	0.13	0.56	0.55	0.50	-0.60	0.72	—	
MSPSS	0.34	0.33	0.37	0.29	0.16	0.57	0.53	0.63	-0.58	0.70	0.60	—

Note. All *ps* < .001. CDCS = Connections During Conversations Scale. SR = Shared Reality. PR = Partner Responsiveness. PI = Participant Interest. AE = Affective Experience. MSLS = Multidimensional Student Life Satisfaction. SWLS = Satisfaction with Life Scale. MSPSS = Multi-Dimensional Scale of Perceived Social Support Scale.

Table 14.

Correlations Among CDCS and Physical Health Symptoms for Face-to-Face Conversations

	CDCS	SR	PR	PI	AE	Head-ache	Nausea	Tired-ness	Trouble Sleeping	Stomach-ache	Back-ache	Cold Symptoms
CDCS	—											
Shared Reality	0.89***	—										
Partner Responsiveness	0.89***	0.83***	—									
Participant Interest	0.84***	0.65***	0.68***	—								
Affective Experience	0.79***	0.54***	0.52***	0.58***	—							
Headache	-0.10***	-0.07**	-0.08***	-0.05	-0.13***	—						
Nausea	-0.08***	-0.04	-0.06*	-0.06*	-0.11***	0.43***	—					
Tiredness	-0.14***	-0.10***	-0.13***	-0.08**	-0.18***	0.43***	0.34***	—				
Trouble Sleeping	-0.10***	-0.07**	-0.09***	-0.09*	-0.12***	0.40***	0.34***	0.56***	—			
Stomachache	-0.09***	-0.05*	-0.06**	-0.07**	-0.13***	0.44***	0.48***	0.38***	0.35***	—		
Backache	-0.11***	-0.07**	-0.08***	-0.07**	-0.13***	0.37***	0.38***	0.43***	0.35***	0.36***	—	
Cold Symptoms	-0.08***	-0.03	-0.07**	-0.07**	-0.10***	0.35***	0.49***	0.27***	0.24***	0.41***	0.30***	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CDCS = Connections During Conversations Scale. SR = Shared Reality. PR = Partner Responsiveness. PI = Participant Interest. AE = Affective Experience.

Table 15.

Correlations Among CDCS and Physical Health Symptoms for Digital Conversations

	CDCS	SR	PR	PI	AE	Headache	Nausea	Tiredness	Trouble Sleeping	Stomachache	Backache	Cold Symptoms
CDCS	—											
Shared Reality	0.88***	—										
Partner Responsiveness	0.90***	0.85***	—									
Participant Interest	0.84***	0.64***	0.69***	—								
Affective Experience	0.76***	0.49***	0.50***	0.56***	—							
Headache	-0.05*	-0.003	-0.02	-0.04	-0.11***	—						
Nausea	-0.06*	-0.02	-0.02	-0.05*	-0.10***	0.43***	—					
Tiredness	-0.07**	-0.05*	-0.05*	-0.01	-0.11***	0.43***	0.34***	—				
Trouble Sleeping	-0.09***	-0.06**	-0.07**	-0.02	-0.13***	0.40***	0.34***	0.56***	—			
Stomachache	-0.06**	-0.02	-0.03	-0.05*	-0.10***	0.44***	0.48***	0.38***	0.35***	—		
Backache	-0.04	-0.003	-0.02	-0.01	-0.09***	0.37***	0.38***	0.43***	0.35***	0.36***	—	
Cold Symptoms	-0.07**	-0.04	-0.03	-0.07**	-0.11***	0.35***	0.49***	0.27***	0.24***	0.41***	0.30***	—

Note. *p < .05. **p < .01. ***p < .001. CDCS = Connections During Conversations Scale. SR = Shared Reality. PR = Partner

Responsiveness. PI = Participant Interest. AE = Affective Experience.

Table 16.

Post-Hoc Analyses from ANOVAs Testing CDCS Scores Based on Mode of Communication

Mode		Mode	Mean Difference	SE	df	t	p_{tukey}	Cohen's d	Lower	Upper
Face-to-Face	-	Social Media	-0.04	0.07	4019	-0.60	0.98	-0.03	-0.14	0.08
	-	Text	-0.12	0.05	4019	-2.26	0.16	-0.09	-0.17	-0.01
	-	Video Chat	-0.36	0.07	4019	-5.47	< .001	-0.28	-0.38	-0.18
	-	Phone	-0.08	0.09	4019	-0.84	0.92	-0.06	-0.20	0.08
Social Media	-	Text	-0.08	0.08	4019	-0.94	0.88	-0.06	-0.18	0.06
	-	Video Chat	-0.32	0.09	4019	-3.56	0.00	-0.25	-0.39	-0.11
	-	Phone	-0.03	0.11	4019	-0.31	1.00	-0.03	-0.19	0.14
Text	-	Video Chat	-0.24	0.07	4019	-3.26	0.01	-0.19	-0.30	-0.08
	-	Phone	0.04	0.10	4019	0.42	0.99	0.03	-0.12	0.18
Video Chat	-	Phone	0.29	0.11	4019	2.69	0.06	0.22	0.06	0.38

Note. Comparisons are based on estimated marginal means.

Table 17.

Post-Hoc Analyses from ANOVAs Testing Shared Reality Scores Based on Mode of Communication

Comparison			Mean Difference	SE	df	t	p_{tukey}	Cohen's d	95% Confidence Interval	
Mode		Mode							Lower	Upper
Face-to-Face	-	Social Media	-0.08	0.09	4030	-0.94	0.88	-0.05	-0.16	0.06
	-	Text	-0.08	0.06	4030	-1.29	0.70	-0.05	-0.13	0.03
	-	Video Chat	-0.45	0.08	4030	-5.65	< .001	-0.29	-0.39	-0.19
	-	Phone	-0.18	0.11	4030	-1.65	0.46	-0.12	-0.26	0.02
Social Media	-	Text	-2.14e−4	0.10	4030	0.00	1.00	-1.40e−4	-0.12	0.12
	-	Video Chat	-0.37	0.11	4030	-3.43	0.01	-0.24	-0.38	-0.10
	-	Phone	-0.10	0.13	4030	-0.77	0.94	-0.07	-0.23	0.10
Text	-	Video Chat	-0.37	0.09	4030	-4.10	< .001	-0.24	-0.35	-0.12
	-	Phone	-0.10	0.12	4030	-0.86	0.91	-0.07	-0.22	0.08
Video Chat	-	Phone	0.27	0.13	4030	2.10	0.22	0.17	0.01	0.34

Note. Comparisons are based on estimated marginal means.

Table 18.

Post-Hoc Analyses from ANOVAs Testing Partner Responsiveness Scores Based on Mode of Communication

Comparison			Mean Difference	SE	df	t	p_{tukey}	Cohen's d	95% Confidence Interval	
Mode		Mode							Lower	Upper
Face-to-Face	-	Social Media	0.03	0.09	4038	0.37	1.00	0.02	-0.09	0.13
	-	Text	-0.11	0.06	4038	-1.72	0.42	-0.07	-0.15	0.01
	-	Video Chat	-0.34	0.08	4038	-4.28	< .001	-0.22	-0.32	-0.12
	-	Phone	-0.16	0.11	4038	-1.48	0.58	-0.10	-0.24	0.03
Social Media	-	Text	-0.14	0.10	4038	-1.46	0.59	-0.09	-0.21	0.03
	-	Video Chat	-0.37	0.11	4038	-3.46	0.01	-0.24	-0.38	-0.10
	-	Phone	-0.19	0.13	4038	-1.48	0.58	-0.13	-0.29	0.04
Text	-	Video Chat	-0.23	0.09	4038	-2.59	0.07	-0.15	-0.27	-0.04
	-	Phone	-0.05	0.12	4038	-0.46	0.99	-0.03	-0.18	0.11
Video Chat	-	Phone	0.18	0.13	4038	1.41	0.62	0.12	-0.05	0.28

Note. Comparisons are based on estimated marginal means.

Table 19.

Post-Hoc Analyses from ANOVAs Testing Participant Interest Scores Based on Mode of Communication

Comparison								95% Confidence Interval	
Mode	Mode	Mean Difference	SE	df	t	p_{tukey}	Cohen's d	Lower	Upper
Face-to-Face	- Social Media	0.00	0.07	4037	-0.01	1.00	-7.80e−4	-0.11	0.11
	- Text	-0.08	0.05	4037	-1.56	0.52	-0.06	-0.14	0.02
	- Video Chat	-0.29	0.07	4037	-4.34	< .001	-0.22	-0.32	-0.12
	- Phone	-0.04	0.09	4037	-0.48	0.99	-0.03	-0.17	0.11
Social Media	- Text	-0.08	0.08	4037	-1.02	0.85	-0.06	-0.18	0.06
	- Video Chat	-0.29	0.09	4037	-3.20	0.01	-0.22	-0.36	-0.09
	- Phone	-0.04	0.11	4037	-0.39	1.00	-0.03	-0.20	0.13
Text	- Video Chat	-0.21	0.08	4037	-2.74	0.05	-0.16	-0.27	-0.05
	- Phone	0.04	0.10	4037	0.39	1.00	0.03	-0.12	0.18
Video Chat	- Phone	0.25	0.11	4037	2.30	0.15	0.19	0.03	0.35

Note. Comparisons are based on estimated marginal means

Table 20.

Post-Hoc Analyses from ANOVAs Testing Affective Experience Scores Based on Mode of Communication

Comparison		Mean Difference	SE	df	t	p_{tukey}	Cohen's d	95% Confidence Interval	
Mode	Mode							Lower	Upper
Face-to-Face	- Social Media	-0.10	0.09	4036	-1.13	0.79	-0.06	-0.17	0.05
	- Text	-0.21	0.07	4036	-3.10	0.02	-0.13	-0.21	-0.05
	- Video Chat	-0.37	0.09	4036	-4.35	< .001	-0.22	-0.33	-0.12
	- Phone	0.10	0.12	4036	0.82	0.93	0.06	-0.08	0.20
Social Media	- Text	-0.10	0.10	4036	-1.02	0.85	-0.06	-0.19	0.06
	- Video Chat	-0.27	0.12	4036	-2.32	0.14	-0.16	-0.30	-0.02
	- Phone	0.20	0.14	4036	1.43	0.61	0.12	-0.05	0.29
Text	- Video Chat	-0.16	0.10	4036	-1.68	0.45	-0.10	-0.21	0.02
	- Phone	0.31	0.13	4036	2.43	0.11	0.19	0.04	0.33
Video Chat	- Phone	0.47	0.14	4036	3.43	0.01	0.28	0.12	0.44

Note. Comparisons are based on estimated marginal means.

Table 21.

Regressions of CDCS and its Four Subscale Scores Predicting Positive and Negative

Outcomes

	R²	*b*(SE)	β	95% CI	*t*	*p*
Child's Life Satisfaction						
CDCS * (Digital – Face-to-Face)	**.06**	**.08 (.04)**	**.08**	**[.01, .14]**	**2.32**	**.020**
SR * (Digital – Face-to-Face)	**.06**	**-.06 (.03)**	**-.06**	**[-.13, .00]**	**-2.10**	**.036**
PR * (Digital – Face-to-Face)	**.07**	**-.07 (.03)**	**-.07**	**[-.13, -.01]**	**-2.32**	**.020**
PI * (Digital – Face-to-Face)	**.04**	**-.08 (.03)**	**-.07**	**[-.13, -.01]**	**-2.26**	**.024**
AE * (Digital – Face-to-Face)	.02	-.04 (.03)	-.04	[-.11, .02]	-1.38	.168
Student's Life Satisfaction (MSLS)						
CDCS * (Digital – Face-to-Face)	.10	-.04 (.02)	-.05	[-.11, .01]	-1.77	.077
SR * (Digital – Face-to-Face)	.08	-.03 (.02)	-.06	[-.12, .00]	-1.81	.071
PR * (Digital – Face-to-Face)	.10	-.02 (.02)	-.03	[-.09, .02]	-1.14	.253
PI * (Digital – Face-to-Face)	**.08**	**-.05 (.02)**	**-.08**	**[-.14, -.02]**	**-2.51**	**.021**
AE * (Digital – Face-to-Face)	.05	-.02 (.02)	-,03	[-.09, .03]	-1.04	.299
School Satisfaction (MSLS)						
CDCS * (Digital – Face-to-Face)	.03	-.02 (.03)	-.02	[-.02, -.08]	-.72	.470
SR * (Digital – Face-to-Face)	.03	-.02 (.03)	-.02	[-.08, .04]	-.71	.479
PR * (Digital – Face-to-Face)	.04	-.01 (.03)	-.01	[-.08, .05]	-.48	.634

	R²	b(SE)	β	95% CI	t	p
PI * (Digital – Face-to-Face)	.03	-.05 (.03)	-.05	[-.11, .01]	-1.72	.086
AE * (Digital – Face-to-Face)	.01	.00 (.03)	-.01	[-.07, .06]	-.16	.871
Living Environment (MSLS)						
CDCS * (Digital – Face-to-Face)	.04	-.05 (.03)	-.05	[-.05, -.11]	-1.68	.094
SR * (Digital – Face-to-Face)	.03	-.04 (.03)	-.05	[-.11, .01]	-1.58	.113
PR * (Digital – Face-to-Face)	.03	-.03 (.03)	-.04	[-.10, .02]	-1.16	.246
PI * (Digital – Face-to-Face)	.02	-.05 (.03)	-.06	[-.12, .01]	-1.78	.075
AE * (Digital – Face-to-Face)	.03	-.03 (.02)	-.04	[-.10, .02]	-1.23	.219
Family (MSLS)						
CDCS * (Digital – Face-to-Face)	**.06**	**-.10 (.03)**	**-.10**	**[-.16, -.04]**	**-3.19**	**.001**
SR * (Digital – Face-to-Face)	**.05**	**-.08 (.03)**	**-.09**	**[-.16, -.03]**	**-3.04**	**.002**
PR * (Digital – Face-to-Face)	**.07**	**-.08 (.03)**	**-.10**	**[-.16, -.04]**	**-3.37**	**< .001**
PI * (Digital – Face-to-Face)	**.04**	**-.10 (.03)**	**-.10**	**[-.16, -.04]**	**-3.14**	**.002**
AE * (Digital – Face-to-Face)	.02	-.04 (.02)	-.05	[-.11, .01]	-1.68	.093
Friend (MSLS)						
CDCS * (Digital – Face-to-Face)	.07	.02 (.03)	.02	[-.04, .08]	.606	.545
SR * (Digital – Face-to-Face)	.05	.00 (.02)	.01	[-.05, .07]	.20	.838
PR * (Digital – Face-to-Face)	.06	.03 (.02)	-.04	[-.02, .10]	1.30	.193
PI * (Digital – Face-to-Face)	.06	-.01 (.03)	-.01	[-.07, .05]	-.31	.756

	R²	b(SE)	β	95% CI	t	p
AE * (Digital – Face-to-Face)	.04	.01 (.02)	.02	[-.05, .08]	.50	.618
Self (MSLS)						
CDCS * (Digital – Face-to-Face)	.07	-.04 (.03)	-.04	[-.04, -.10]	-1.41	.158
SR * (Digital – Face-to-Face)	.08	-.04 (.03)	-.05	[-.11, .01]	-1.68	.094
PR * (Digital – Face-to-Face)	.08	-.02 (.02)	-.02	[-.08, .04]	-.65	.516
PI * (Digital – Face-to-Face)	.05	-.05 (.03)	-.05	[-.12, .01]	-1.78	.076
AE * (Digital – Face-to-Face)	.03	-.03 (.02)	-.03	[-.10, .03]	-1.10	.270
Loneliness						
CDCS * (Digital – Face-to-Face)	.11	.02 (.01)	.05	[-.01, .11]	1.73	.084
SR * (Digital – Face-to-Face)	.06	.02 (.01)	.06	[.00, .12]	1.92	.055
PR * (Digital – Face-to-Face)	.07	.01 (.01)	.04	[-.02, .10]	1.28	.201
PI * (Digital – Face-to-Face)	.04	.02 (.01)	.05	[-.01, .11]	1.65	.099
AE * (Digital – Face-to-Face)	.07	.02 (.01)	.04	[-.02, .10]	1.16	.245
Perceived Social Support (MSPSS)						
CDCS * (Digital – Face-to-Face)	.12	-.02 (.03)	-.02	[-.08, .04]	-.64	.521
SR * (Digital – Face-to-Face)	.11	.00 (.02)	.00	[-.06, .06]	-.09	.927
PR * (Digital – Face-to-Face)	.14	-.01 (.02)	-.02	[-.08, .04]	-.59	.552
PI * (Digital – Face-to-Face)	.10	-.03 (.03)	-.04	[-.10, .02]	-1.20	.232

	R²	b(SE)	β	95% CI	t	p
AE * (Digital – Face-to-Face)	.03	-.02 (.02)	-.03	[-.09, .03]	-.96	.336
Friend (MSPSS)						
CDCS * (Digital – Face-to-Face)	.08	.04 (.03)	.04	[-.02, .10]	1.19	.234
SR * (Digital – Face-to-Face)	.08	.03 (.03)	.04	[-.02, .10]	1.19	.236
PR * (Digital – Face-to-Face)	.09	.04 (.03)	.05	[-.01, .11]	1.63	.104
PI * (Digital – Face-to-Face)	.07	.01 (.03)	.01	[-.05, .07]	.40	.688
AE * (Digital – Face-to-Face)	.02	.01 (.03)	.01	[-.05, .07]	.283	.777
Family (MSPSS)						
CDCS * (Digital – Face-to-Face)	**.07**	**-.12 (.04)**	**-.10**	**[-.17, -.04]**	**-3.42**	**< .001**
SR * (Digital – Face-to-Face)	**.06**	**-.09 (.03)**	**-.09**	**[-.15, -.03]**	**-2.93**	**.003**
PR * (Digital – Face-to-Face)	**.08**	**-.11 (.03)**	**-.11**	**[-.17, -.05]**	**-3.69**	**< .001**
PI * (Digital – Face-to-Face)	**.05**	**-.11 (.03)**	**-.10**	**[-.16, -.04]**	**-3.17**	**.002**
AE * (Digital – Face-to-Face)	**.03**	**-.07 (.03)**	**-.07**	**[-.14, -.01]**	**-2.35**	**.019**
Significant Other (MSPSS)						
CDCS * (Digital – Face-to-Face)	.10	.03 (.03)	.03	[-.03, .08]	.85	.396
SR * (Digital – Face-to-Face)	.08	.05 (.03)	.05	[-.01, .11]	1.70	.090
PR * (Digital – Face-to-Face)	.11	.02 (.03)	.03	[-.03, .08]	.84	.401
PI * (Digital – Face-to-Face)	.08	.00 (.03)	.00	[-.06, .06]	-.08	.933
AE * (Digital – Face-to-Face)	.03	-.01 (.03)	-.01	[-.07, .05]	-.23	.818

	R²	b(SE)	β	95% CI	t	p
Relatedness						
CDCS * (Digital – Face-to-Face)	.11	-.01 (.03)	-.01	[-.07, .05]	-.43	.670
SR * (Digital – Face-to-Face)	.10	-.01 (.02)	-.01	[-.07, .05]	-.23	.817
PR * (Digital – Face-to-Face)	.12	-.01 (.02)	-.02	[-.08, .04]	-.59	.553
PI * (Digital – Face-to-Face)	.09	-.02 (.03)	-.02	[-.08, .04]	-.80	.424
AE * (Digital – Face-to-Face)	.03	-.01 (.02)	-.01	[-.07, .05]	-.345	.730
Autonomy						
CDCS * (Digital – Face-to-Face)	.08	-.06 (.03)	-.06	[-.12, .00]	-1.95	.051
SR * (Digital – Face-to-Face)	.08	-.04 (.03)	-.05	[-.11, .02]	-1.53	.125
PR * (Digital – Face-to-Face)	.09	-.05 (.03)	-.05	[-.11, .01]	-1.79	.074
PI * (Digital – Face-to-Face)	**.06**	**-.08 (.03)**	**-.08**	**[-.14, -.02]**	**-2.66**	**.008**
AE * (Digital – Face-to-Face)	.02	-.03 (.03)	-.04	[-.10, .03]	-1.13	.259
Competence						
CDCS * (Digital – Face-to-Face)	.07	-.04 (.03)	-.04	[-.10, .02]	-1.36	.175
SR * (Digital – Face-to-Face)	.08	-.03 (.03)	-.04	[-.10, .02]	-1.28	.202
PR * (Digital – Face-to-Face)	.08	-.03 (.03)	-.04	[-.10, .02]	-1.32	.187
PI * (Digital – Face-to-Face)	.05	-.05 (.03)	-.05	[-.11, .01]	-1.62	.105
AE * (Digital – Face-to-Face)	.01	-.02 (.03)	-.03	[-.09, .03]	-.91	.361
Headache						

	R²	b(SE)	β	95% CI	t	p
CDCS * (Digital – Face-to-Face)	.01	.04 (.03)	.04	[-.02, .10]	1.25	.212
SR * (Digital – Face-to-Face)	**.00**	**.05 (.02)**	**.06**	**[.00, .13]**	**1.96**	**.050**
PR * (Digital – Face-to-Face)	.00	.04 (.02)	.06	[-.01, .12]	1.73	.084
PI * (Digital – Face-to-Face)	.00	.01 (.03)	.01	[-.06, .07]	.24	.808
AE * (Digital – Face-to-Face)	.01	.00 (.02)	.01	[-.06, .07]	.19	.846
Nausea						
CDCS * (Digital – Face-to-Face)	.00	.02 (.02)	.02	[-.04, .09]	.71	.479
SR * (Digital – Face-to-Face)	.00	.01 (.02)	.02	[-.04, .09]	.73	.467
PR * (Digital – Face-to-Face)	.00	.02 (.02)	.04	[-.03, .10]	1.07	.283
PI * (Digital – Face-to-Face)	.00	.01 (.02)	.01	[-.05, .08]	.36	.718
AE * (Digital – Face-to-Face)	.01	.00 (.02)	.00	[-.06, .07]	.06	.951
Tiredness						
CDCS * (Digital – Face-to-Face)	**.01**	**.07 (.03)**	**.07**	**[.01, .14]**	**2.20**	**.028**
SR * (Digital – Face-to-Face)	**.01**	**-.06 (.01)**	**-.07**	**[-.11, -.04]**	**-4.53**	**< .001**
PR * (Digital – Face-to-Face)	**.01**	**.06 (.03)**	**.08**	**[.01, .14]**	**2.37**	**.018**
PI * (Digital – Face-to-Face)	**.00**	**.07 (.03)**	**.07**	**[.00, .13]**	**2.09**	**.037**
AE * (Digital – Face-to-Face)	.02	.05 (.03)	.06	[.00, .12]	1.85	.064
Trouble Sleeping						
CDCS * (Digital – Face-to-Face)	.01	.01 (.03)	.01	[-.05, .07]	.34	.735

	R²	b(SE)	β	95% CI	t	p
SR * (Digital – Face-to-Face)	.01	.01 (.03)	.01	[-.05, .07]	.29	.772
PR * (Digital – Face-to-Face)	.01	.02 (.03)	.02	[-.05, .08]	.55	.584
PI * (Digital – Face-to-Face)	.00	.03 (.03)	.03	[-.03, .09]	.89	.373
AE * (Digital – Face-to-Face)	.02	-.02 (.03)	-.02	[-.08, .05]	-.55	.580
Stomachache						
CDCS * (Digital – Face-to-Face)	.01	.02 (.03)	.03	[-.03, .09]	.94	.345
SR * (Digital – Face-to-Face)	.00	.02 (.02)	.02	[-.04, .09]	.72	.473
PR * (Digital – Face-to-Face)	.00	.02 (.02)	.03	[-.03, .10]	1.01	.312
PI * (Digital – Face-to-Face)	.00	.02 (.02)	.03	[-.04, .09]	.78	.437
AE * (Digital – Face-to-Face)	.01	.01 (.02)	.02	[-.04, .09]	.73	.467
Backache						
CDCS * (Digital – Face-to-Face)	**.01**	**.06 (.03)**	**.07**	**[.00, .13]**	**2.04**	**.041**
SR * (Digital – Face-to-Face)	**.00**	**.06 (.03)**	**.07**	**[.01, .13]**	**2.17**	**.030**
PR * (Digital – Face-to-Face)	.00	.05 (.03)	.06	[.00, .13]	1.91	.057
PI * (Digital – Face-to-Face)	.00	.06 (.03)	.06	[.00, .12]	1.84	.067
AE * (Digital – Face-to-Face)	.01	.02 (.02)	.03	[-.03, .09]	.91	.362
Cold Symptoms						
CDCS * (Digital – Face-to-Face)	.01	.00 (.02)	.00	[-.06, .71]	.036	.972
SR * (Digital – Face-to-Face)	.00	-.01 (.02)	-.02	[-.08, .05]	-.50	.616

	R²	b(SE)	β	95% CI	t	p
PR * (Digital – Face-to-Face)	.00	.02 (.02)	.04	[-.02, .11]	1.29	.196
PI * (Digital – Face-to-Face)	.00	.00 (.02)	.00	[-.07, .06]	-.07	.945
AE * (Digital – Face-to-Face)	.01	-.01 (.02)	-.02	[-.09, .04]	-.69	.491

Note. All significant findings are bolded. Each regression beneath the outcome variable

(e.g., loneliness, stomachache) represents a separate regression analysis. Each analysis

includes the interaction between scores on the full CDCS or one of its subscales with

digital and face-to-face conversations. CDCS = Connections During Conversations Scale.

SR = Shared Reality. PR = Partner Responsiveness. PI = Participant Interest. AE =

Affective Experience. MSLS = Multidimensional Student Life Satisfaction. SWLS =

Satisfaction with Life Scale. MSPSS = Multi-Dimensional Scale of Perceived Social

Support Scale.

Figure 1.

Face-to-Face and Digital Conversations Were Not Rated Significantly Differently on the

CDCS
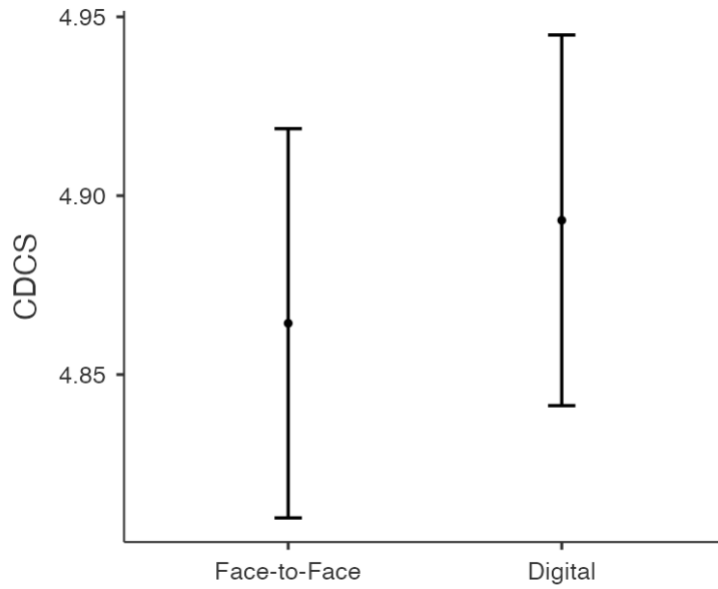
Note. Estimated marginal means shown here.

Figure 2.

Digital Conversations Were Rated Higher in Affective Experience Than Face-to-Face
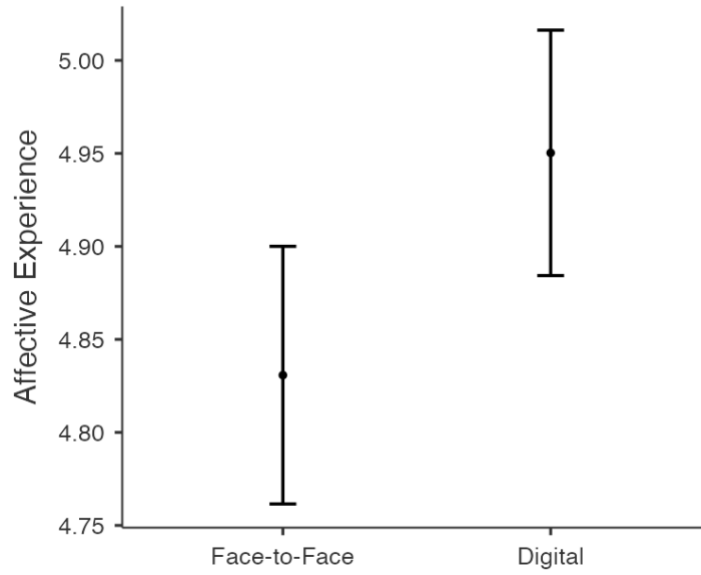
Conversations

Note. Estimated marginal means shown here.

Figure 3.

Conversations Over Video Chat and Text Were Rated Higher on the CDCS Than Face-

to-Face Conversations
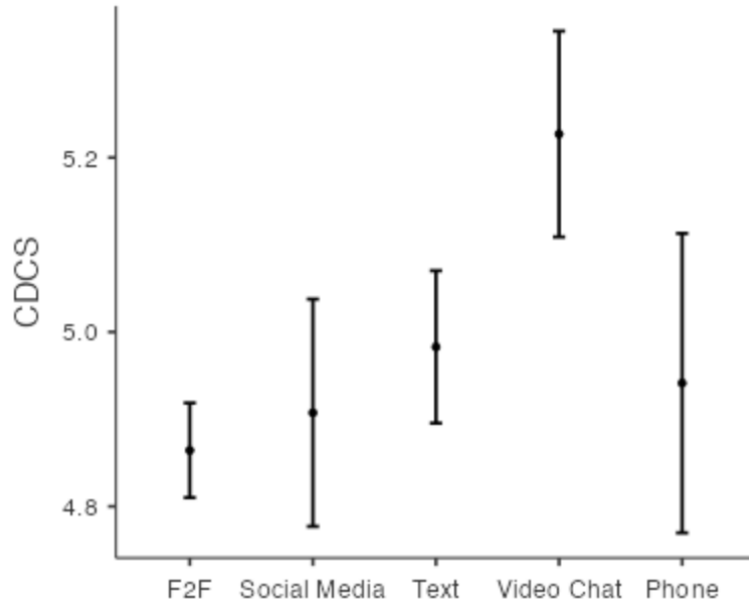
Note. Estimated marginal means shown here.

Figure 4.

Longer Conversations Were Associated with Higher CDCS, Participant Interest, and

Affective Experience Scores
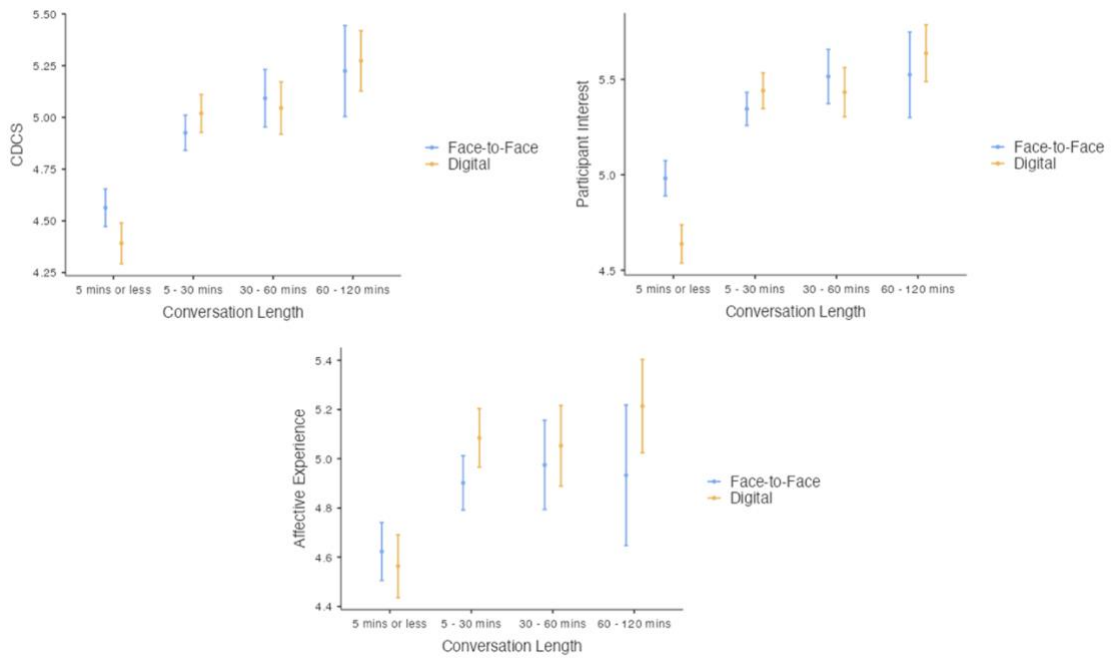
Note. Estimated marginal means shown here.

Figure 5.

Conversations For the Purpose of Having Fun Were Associated with Higher CDCS

Scores Than for The Purpose of Getting Something Done, Regardless of Whether the

Conversation Was Face-to-Face or Digital
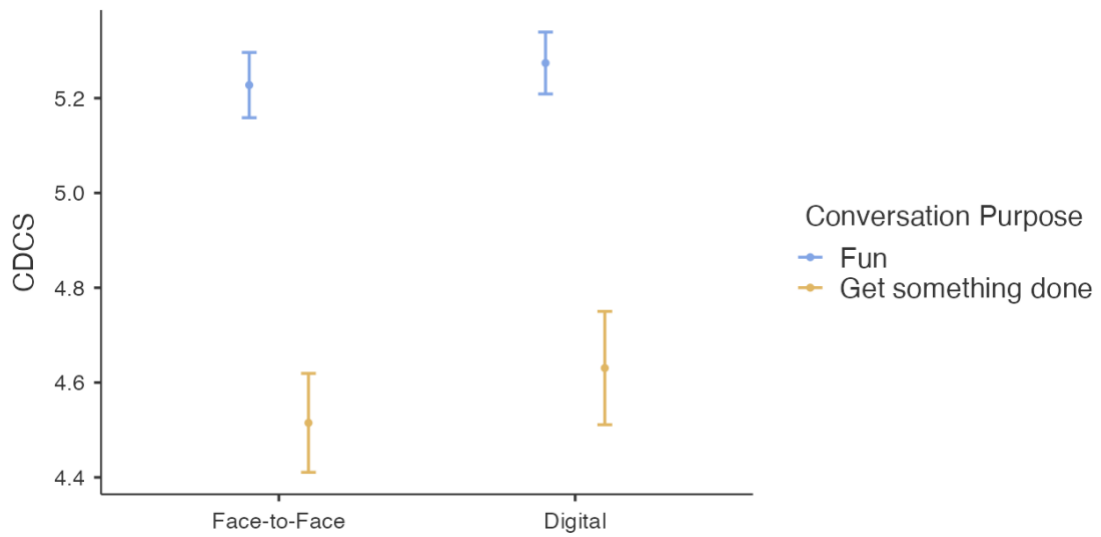
Note. Estimated marginal means shown here.

Figure 6.

Conversations with Close Friends Were Rated Higher on the CDCS Than Conversations with Casual Friends, Parents, or Siblings
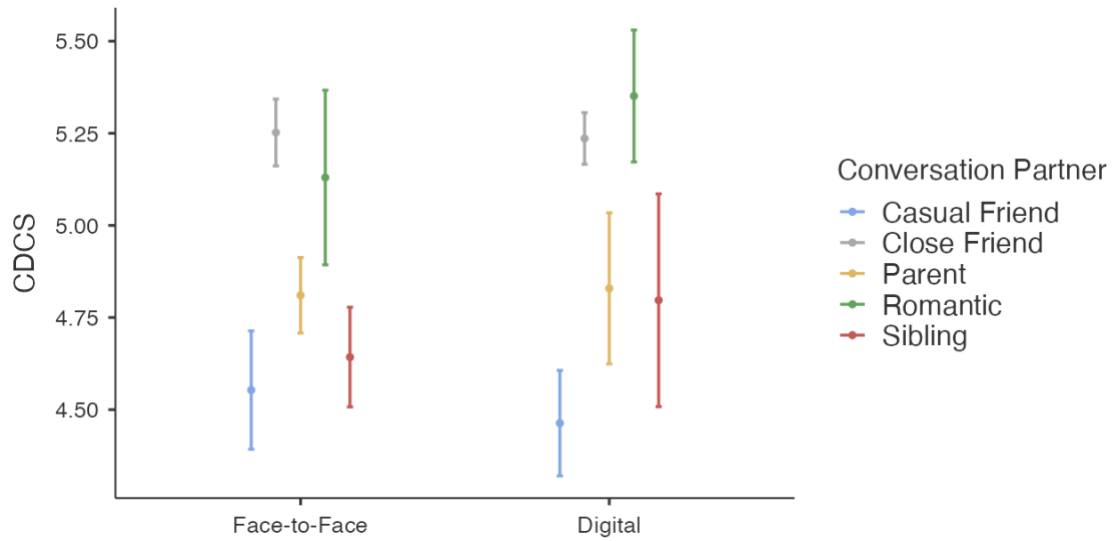
Note. Estimated marginal means shown here.

Figure 7.

Participants Who Had Conversations with Females (Versus with Males) Reported Higher

Partner Responsiveness and Participant Interest Scores
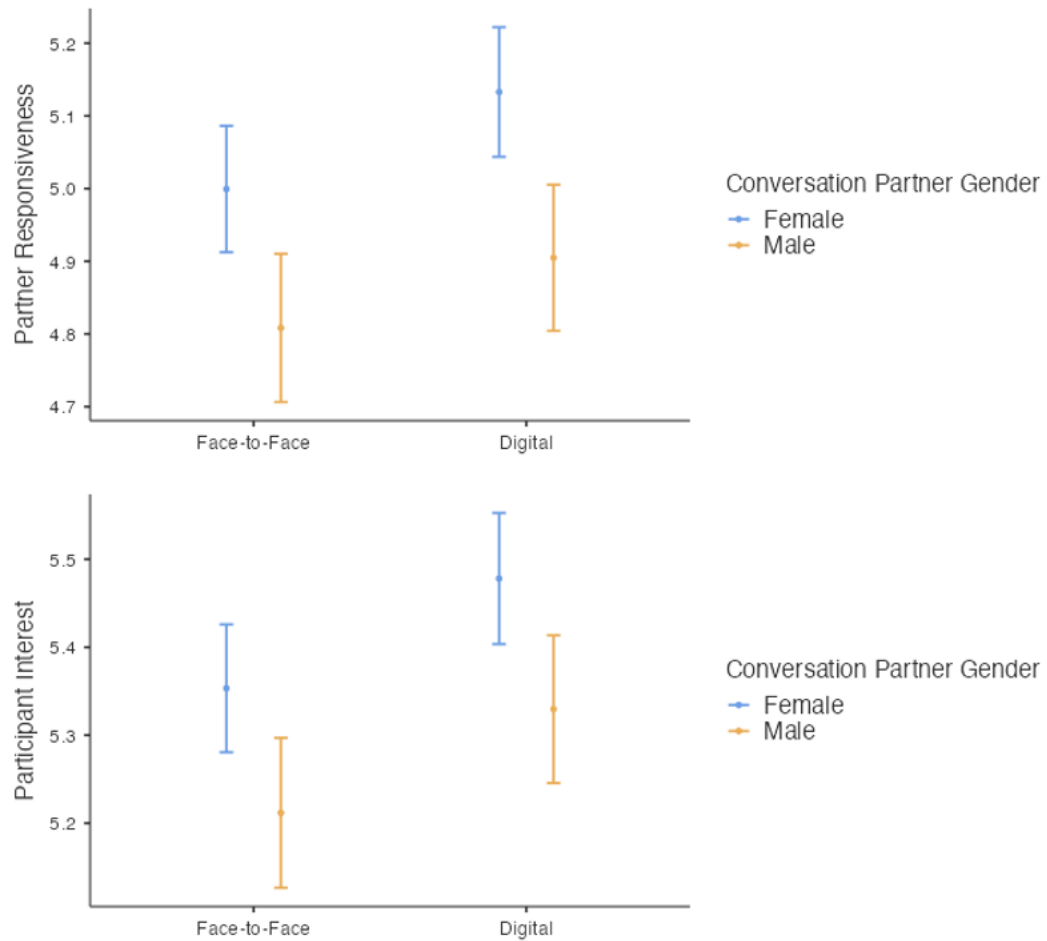
Note. Estimated marginal means shown here.

Figure 8.

For Face-to-Face Conversations, the Older a Conversation Partner Was, the Lower

Participants Rated Their Overall Sense of Connection. For Digital Conversations, the

Older a Conversation Partner Was, the Higher Participants Rated Their Overall Sense of
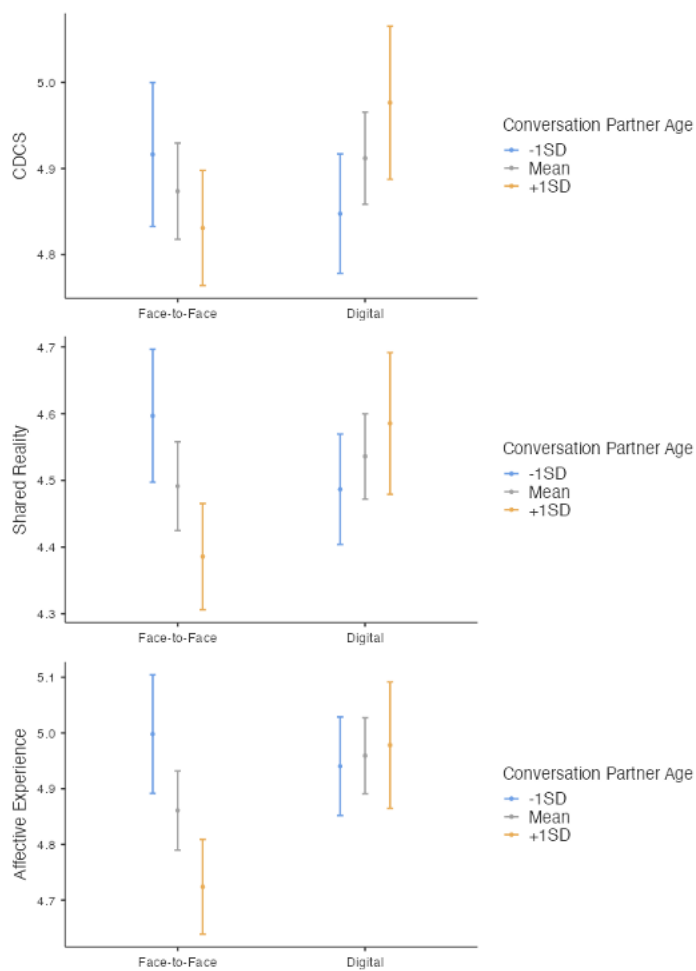
Connection

Note. Estimated marginal means shown here.

Figure 9.

Digital Conversations with an Established Relationship Partner Were Related to Higher

Connection Scores Compared to Face-to-Face Conversations
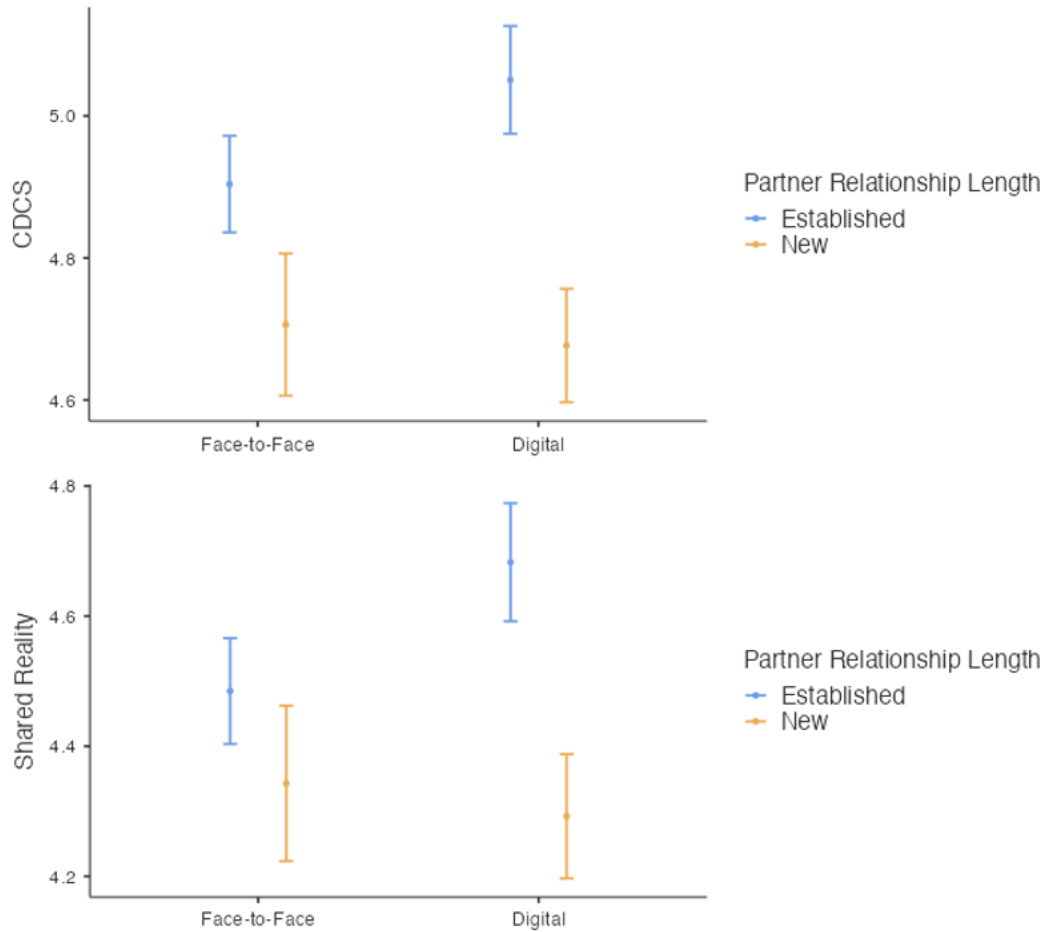
Note. Estimated marginal means shown here.

Figure 10.

As Reported Conversation Valence Increases, the Connection Gained from the Valence

Increase is Smaller for Digital Conversations Compared to Face-to-Face Conversations
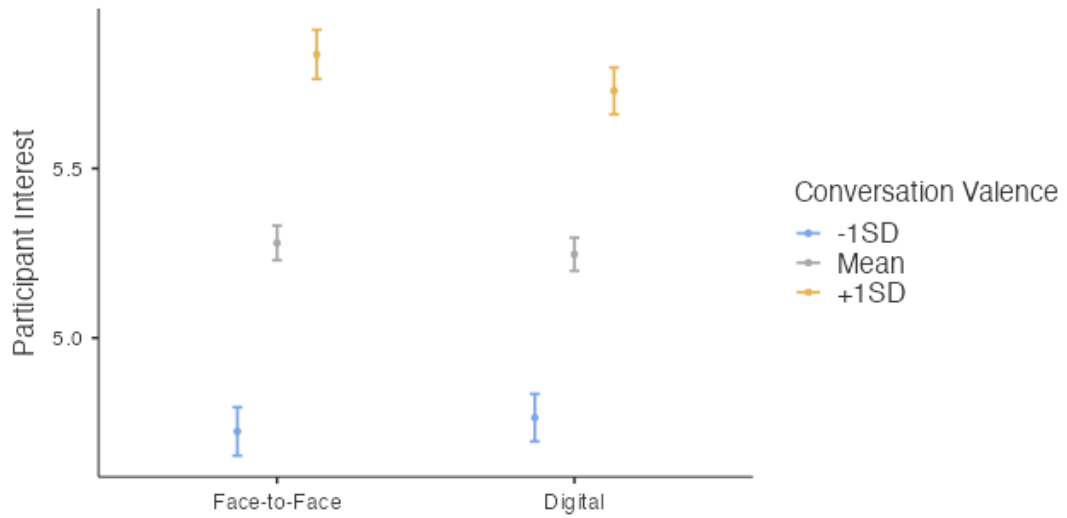
Note. Estimated marginal means shown here.

Figure 11.

Face-to-Face CDCS Scores More Strongly Predicted Children's Life Satisfaction Scores

Compared to Digital CDCS Scores
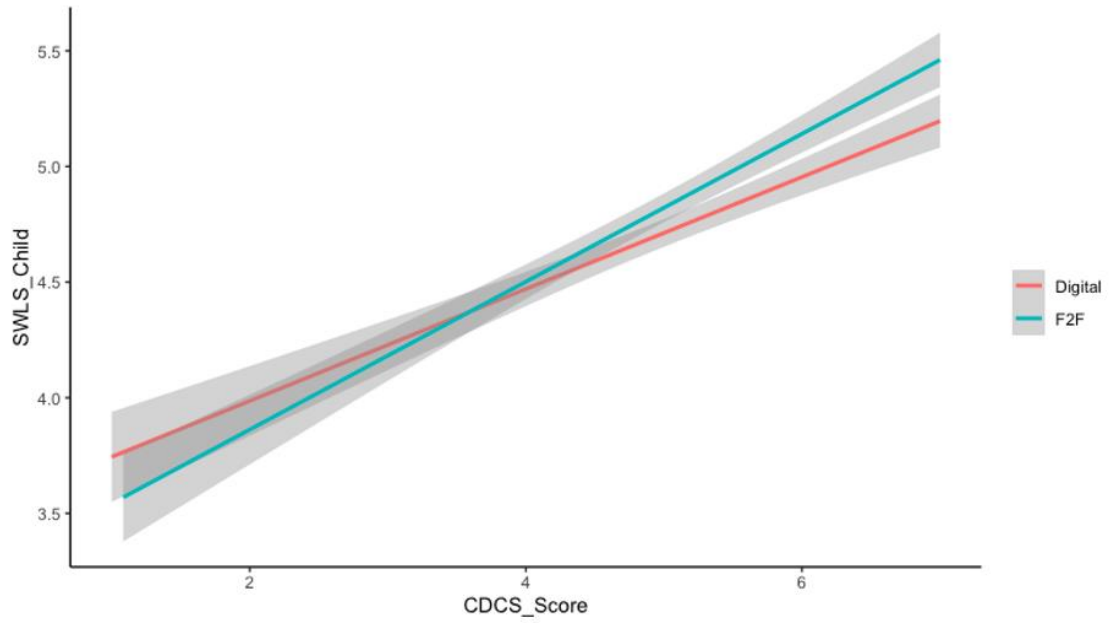
Figure 12.

Face-to-Face CDCS Scores More Strongly Predicted Scores on the Family Subscale of

the MSLS Compared to Digital CDCS Scores
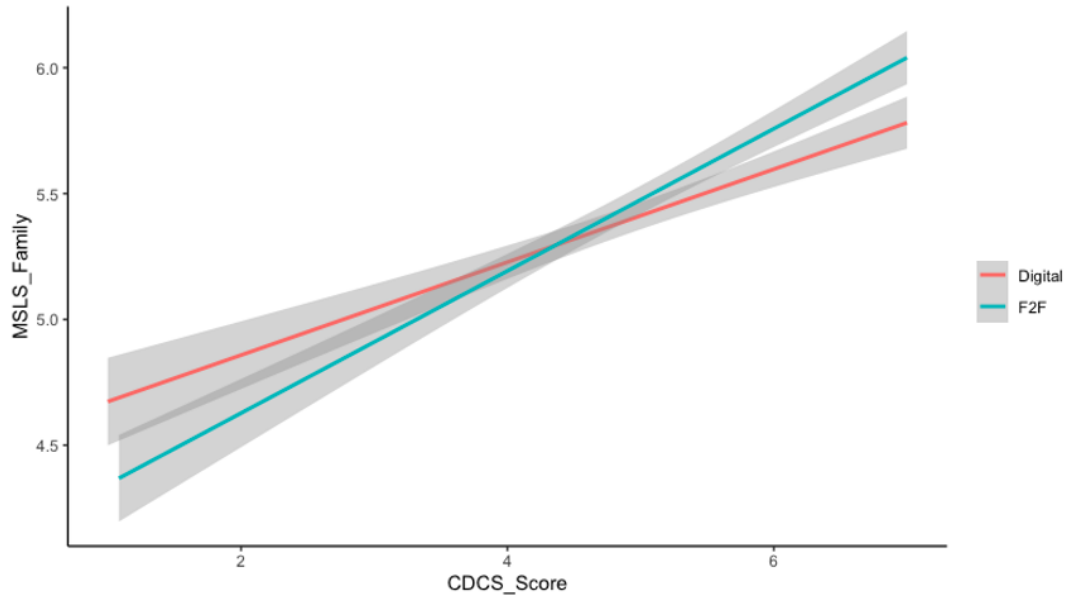
Figure 13.

Face-to-Face CDCS Scores More Strongly Predicted Scores on the Family Subscale of the MSPSS Compared to Digital CDCS Scores
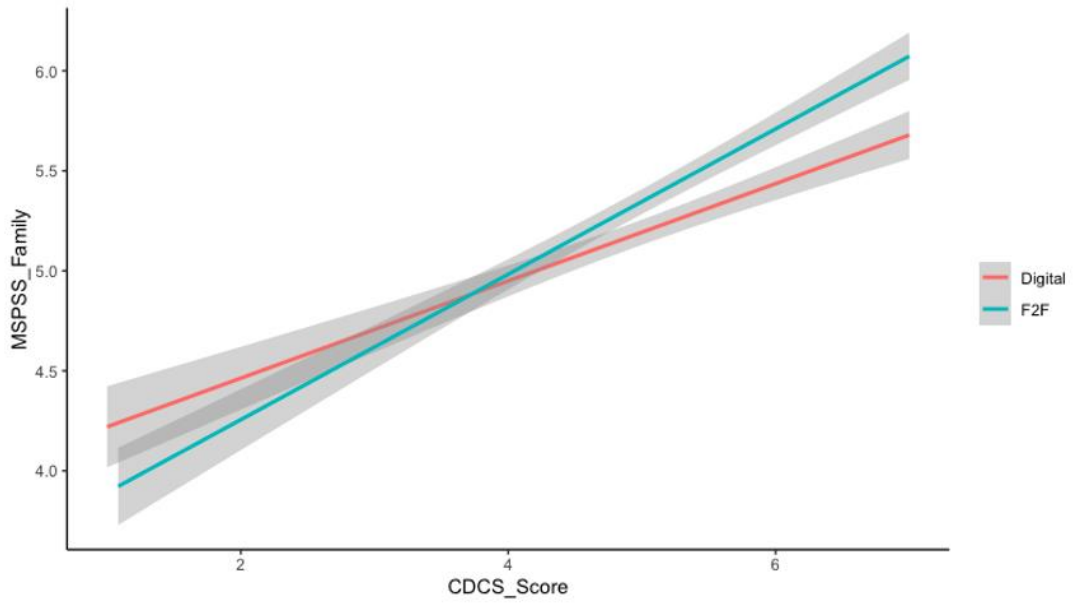
Figure 14.

Face-to-Face Participant Interest Scores More Strongly Predicted Autonomy Compared

to Digital Participant Interest Scores
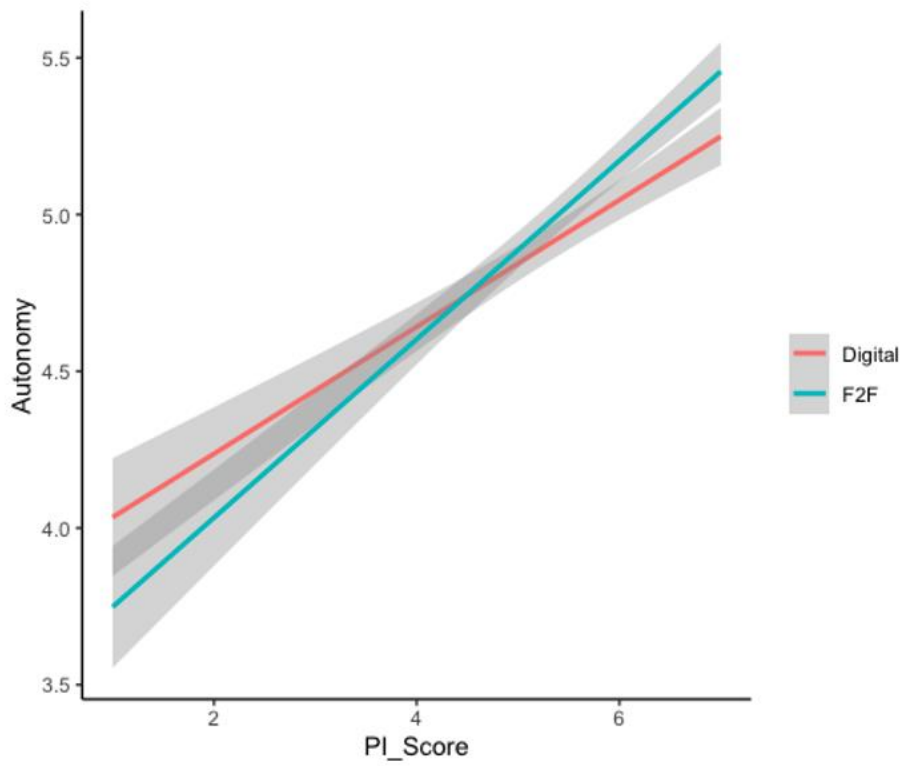
Figure 15.

Face-to-Face CDCS Scores More Strongly (Negatively) Predicted Tiredness Compared
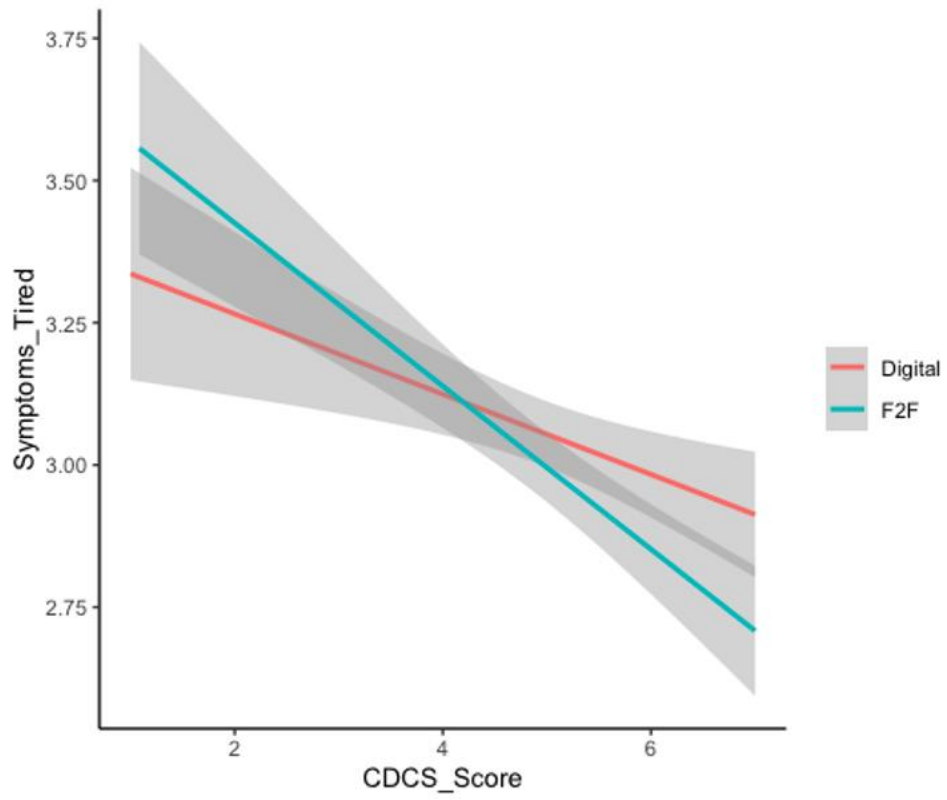
to Digital CDCS Scores

Figure 16.

Face-to-Face CDCS Scores More Strongly (Negatively) Predicted Backaches Compared to Digital CDCS Scores
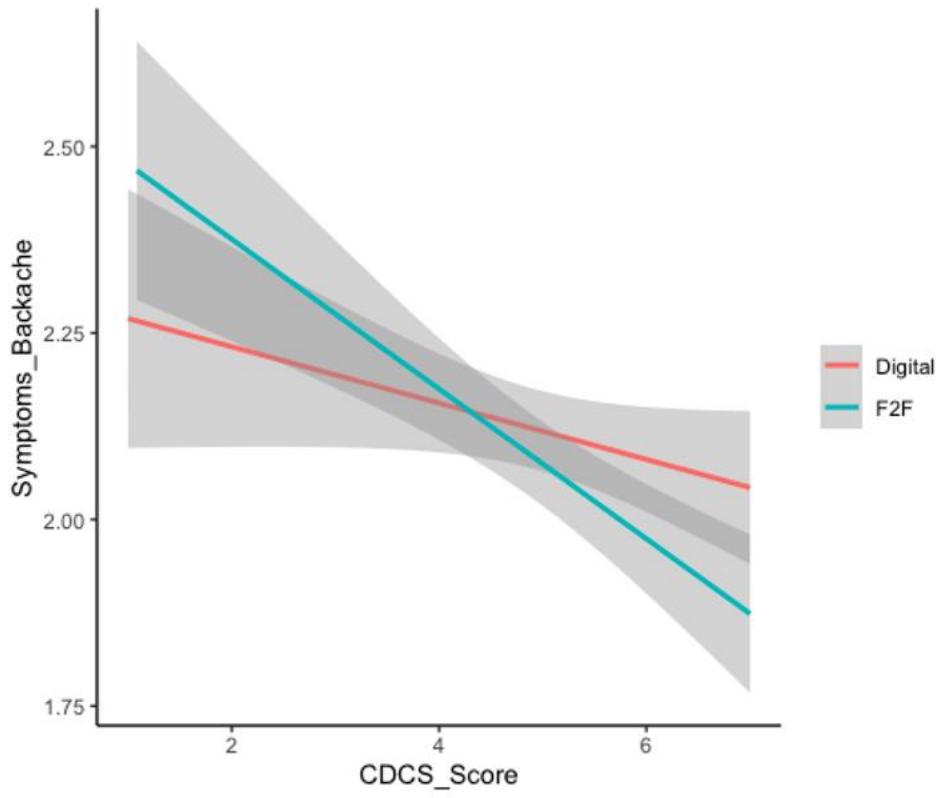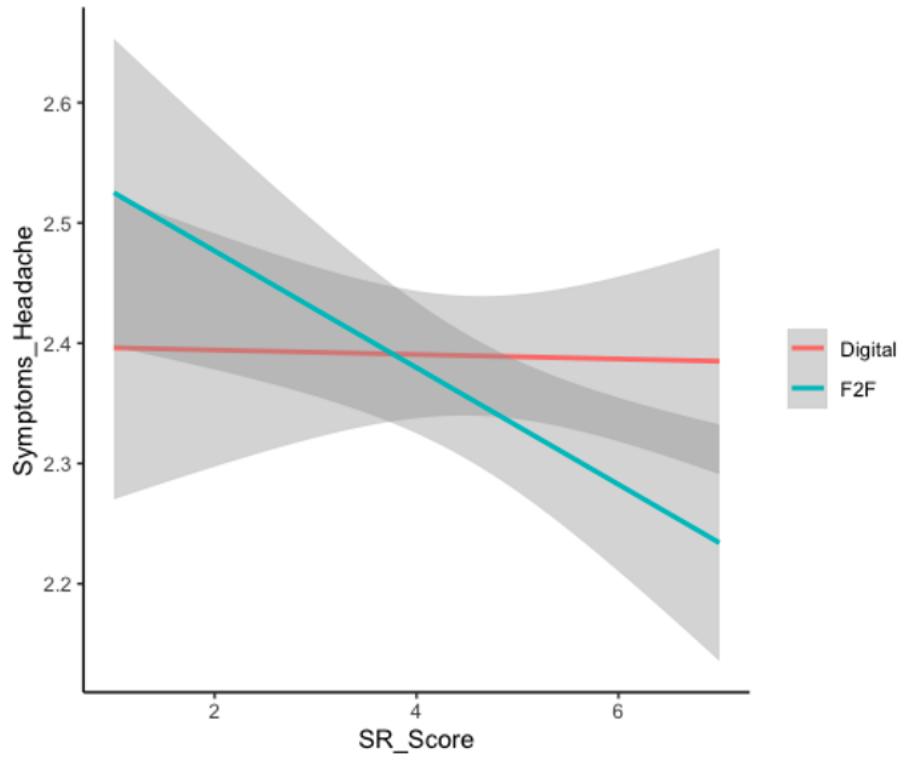
Figure 17.

Face-to-Face Shared Reality Scores More Strongly Negatively Predicted Headaches

Compared to Digital Shared Reality Scores

Chapter 4: Brief Discussion

People's overall sense of social connection is influenced by a series of conversations they hold over time with a range of interaction partners, from romantic partners and friends to acquaintances and complete strangers. Because of the critical role that social connection appears to play in health and well-being (Baumeister & Leary, 1995; Cacioppo et al., 2008; Cole et al., 2007; Diener & Seligman, 2002; Hawkley & Cacioppo, 2010; Holt-Lunstad et al., 2010, 2017; House et al., 1988; Lyubomirsky et al., 2005; Margolis & Lyubomirsky, 2020; Maslow, 1943; Pavot et al., 1990; Sun et al., 2019; Watson et al., 1992), it is of great importance for researchers to better understand how, when, where, and with whom connection is felt in specific conversations. Furthermore, the effects of feeling connected during specific conversations may aggregate and strengthen over time. For all these reasons, I believe that the CDCS can serve as a valuable tool to evaluate the social connection felt during specific conversations.

In Chapter 2, I compiled and updated items from existing measures in the literature that assessed different aspects of social connection and interpersonal relationships in order to develop the new 14-item CDCS measure with four key facets of connection: Shared Reality, Partner Responsiveness, Participant Interest, and Affective Experience. Across three studies with nearly 1,000 adults, the CDCS was revealed to be a valid and robust measure of social connection felt in a variety of conversations. In Chapter 3, I adapted the 14-item CDCS measure for adolescents, keeping the four subscales but altering items for ease of understanding in adolescent samples. In this

particular study, conducted with over 4,000 adolescents, my goal was to better understand how, when, where, and with whom connection is felt in both face-to-face and digital conversations and how these factors relate to health (e.g., backache, tiredness) and well-being (e.g., life satisfaction, loneliness).

The results of the studies presented in Chapters 2 and 3 highlight the unique power of connection felt during conversations. With both adults and adolescents, feeling connected during conversations was related to positive outcomes, such as greater life satisfaction and perceived social support, supporting the plethora of existing research on the topic (Baumeister & Leary, 1995; Cacioppo et al., 2008; Cole et al., 2007; Diener & Seligman, 2002; Hawkley & Cacioppo, 2010; Holt-Lunstad et al., 2010, 2017; House et al., 1988; Lyubomirsky et al., 2005; Margolis & Lyubomirsky, 2020; Maslow, 1943; Pavot et al., 1990; Sun et al., 2019; Watson et al., 1992). Because of the mixed findings in the literature, an especially novel aspect to my second dissertation study (Chapter 3) involved comparing aspects of connection experienced during face-to-face and digital conversations. When considering whether the conversation occurred face-to-face or over a digital platform, adolescents reported that video chat conversations were more connecting that conversations that were face-to-face, over social media, and over text. This finding supports the growing literature that has found that digital conversations meaningfully contribute to social connection and well-being (Best et al., 2014; Feng & Tong, 2022; Reich et al., 2012; Uhls et al., 2017; Valkenburg & Peter, 2007, 2009; Walsh et al., 2021). However, my findings also provide merit for the idea that connection felt in face-to-face conversations has a relatively more powerful influence on positive outcomes,

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such as fewer headaches and greater life satisfaction compared to digital conversations. As such, it appears that although both connection felt in face-to-face and digital conversations are linked to positive outcomes, connection felt in face-to-face conversations have a uniquely powerful influence.

In sum, as described in two chapters of my dissertation, I found that the CDCS is a valuable tool for future researchers to understand social connection felt in specific conversations both face-to-face and digitally, as well as for both adults and adolescents. Importantly, despite research suggesting that digital conversations are harmful—both harmful in general and in terms of interfering with face-to-face interactions (Cauberghe et al., 2021; Ellis et al., 2020; Twenge, 2013; Twenge et al., 2019)—the results of this study did not point to any negative ramifications of having digital conversations. Future research should continue to explore the connection felt in face-to-face and digital conversations, including how each individual conversation may aggregate and strengthen over time to positively impact the ecosystem of social connection and well-being.