

Meaningful Peer Social Interactions and Momentary Well-Being in Context

Mahnaz Roshanaei^{1*}, Sumer S. Vaid¹, Andrea L. Courtney², Serena Soh¹,

Jamil Zaki² & Gabriella M. Harari¹

¹Department of Communication, Stanford University

²Department of Psychology, Stanford University

This is an unedited manuscript accepted for publication in Social Psychological and Personality Science. The manuscript will undergo copyediting, typesetting, and review of resulting proof before it is published in its final form. Please cite this preprint as:

Roshanaei, M., Vaid, S. S., Courtney, A. L., Soh, S., Zaki, J., & Harari, G., M. (in press).

Meaningful Peer Social Interactions and Momentary Well-Being in Context. Retrieved from <https://doi.org/10.31234/osf.io/gu4pv>

Author Note

The data and code needed to reproduce all analyses reported in the paper and supplementary materials are publicly available at the [Open Science Framework](#).

This research was supported by a Stanford Human-Centered AI (HAI) seed award and a National Institute of Health award (R01 MH125974). The funders had no role in study design,

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

data collection and analysis, decision to publish, or preparation of the manuscript. The authors did not report any conflict of interest.

Author contributions for this manuscript were as follows: Conceptualization: MR, SSV, ALC, GMH ; Data Curation: MR, ALC; Formal Analysis: MR; Funding Acquisition: MR, JZ, GMH; Investigation/Data Collection: MR, ALC, JZ, GHM; Methodology: MR, SSV, GHM; Project Administration: MR; Supervision: GMH; Validation: MR, SSV; Visualization: MR; Writing – Original Draft: MR, SSV, GMH; Writing – Review and Editing: MR, SSV, SS, ALC, JZ, GMH.

*Correspondence concerning this article should be addressed to: Dr. Mahnaz Roshanaei, Department of Communication, Stanford University, CA. Email: mroshana@stanford.edu

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Abstract

Using three large-scale longitudinal datasets collected from a cohort of university students over the span of 3 years (total N = 2,896 participants; ecological momentary assessments = 129,414), we found that engagement in meaningful social interactions with peers was associated with lower momentary loneliness and greater affective well-being. We also examined the role of four contextual factors (interaction partners, communication channels, places, and co-occurring activities) in explaining the relationships between meaningful social interactions and momentary well-being. Across samples, we found (1) participants reported experiencing greater loneliness and lower affective well-being after engaging in meaningful social interaction via computer-mediated channels (and via direct messaging in particular), compared to face-to-face, and (2) participants reported experiencing lower affective well-being after engaging in meaningful social interactions while dining and studying or working, compared to while resting. Taken together, our findings provide insight into the relationships between meaningful social interactions, momentary well-being, and contextual factors.

Keywords: Social Interaction, Well-Being, Context, Experience Sampling

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Introduction

A rich social life with a strong support network and interactions with both strong and weak ties is associated with a variety of benefits to people's well-being (e.g., Cohen & Wills, 1985; Sandstrom & Dunn, 2014; Siedlecki et al., 2014; Webster et al., 2021). Research conducted in daily life settings suggests that the effects of socializing on well-being tend to differ based on quality-related aspects of social interaction (e.g., Mehl et al., 2010; Milek et al., 2018; Sun et al., 2020). For example, social interactions characterized by objective measures of conversational and relational quality (e.g., substantive conversations, interactions with people one knows and likes) have been associated with greater feelings of social connection, happiness, and life satisfaction (Milek et al., 2018; Sun et al., 2020). However, social interactions can vary in terms of how they are experienced by those involved – some interactions may be considered meaningful to the people involved even if they are not characterized as such by objective quality characteristics. A recent study of participants across the United States, India, and Japan, found that meaningful social interactions were those deemed to have an emotional or informational impact that enhanced people's lives and their relationships (Litt et al., 2020). Therefore, accounting for subjective perceptions of meaning attributed to social interactions may provide new insights about their beneficial effects for well-being.

Social interactions naturally occur in different social and digital contexts, such as with different interaction partners and via multiple communication channels that may influence their relationship to well-being outcomes. Recent research focused on the moderating effects of interaction partner (Kroencke et al., 2022) found that interactions with people considered to be close ties (e.g., family members) were associated with higher well-being in the moment, compared to interactions with weak ties (e.g., classmates). Similar findings have been

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

documented in other studies on strong and weak tie interactions in daily life settings (e.g., Quoidbach et al., 2019; Sandstrom & Dunn, 2014). Among university students, for example, students who had more interactions with their classmates reported higher levels of happiness and greater feelings of belonging, compared to students with fewer interactions (Sandstrom & Dunn, 2014). Across communication channels, face-to-face and mixed interactions (e.g., combination of face-to-face and computer-mediated interactions) have been found to confer greater benefits to positive affect in the moment, compared to not engaging in social interaction or solely having computer-mediated interactions (Kroencke et al., 2022). Whether the well-being benefits of engaging with certain interaction partners and communication channels over others hold when a social interaction is deemed to be subjectively meaningful remains unclear. However, cross-sectional research suggests that meaningful social interactions are more likely to occur with strong and community ties (e.g., friends, family, neighbors), and are just as likely to occur in person as they are via computer-mediated channels (Litt et al., 2020).

Social interactions also naturally occur in spatial and behavioral contexts. For example, social interactions occur in moments when people are spending time in different places (e.g. home, public places) and while people are simultaneously engaged in other co-occurring activities (e.g., resting, working). Why might such contexts influence the relationship between meaningful social interactions and well-being? Past studies have shown that the places people spend time in (e.g., Müller et al., 2020; Sandstrom et al., 2017) and the activities they engage in (e.g., Brajša-Žganec et al., 2011; Han & Patterson, 2007) are independently associated with various well-being outcomes. For example, spending time at home is associated with experiencing less positive affect and engaging in leisure activities is associated with experiencing greater subjective well-being (Sandstrom et al., 2017, Brajša-Žganec et al., 2011). Given these

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

findings, it seems likely that the places people are in and the co-occurring activities they are engaged in during a social interaction may modulate the relationship between meaningful social interactions and subsequent momentary well-being outcomes.

In this paper, we used three large-scale intensive longitudinal datasets collected over three years (2019, 2020, and 2021) from the undergraduate student population of a university to investigate the following research questions: (RQ1) Does engaging in (a) meaningful social interactions, with certain (b) interaction partners and via certain (c) communication channels lead to improvements in subsequent stress, loneliness, and affective well-being? (RQ2) Is the relationship between meaningful social interactions and momentary well-being moderated by the (a) places and (b) co-occurring activities surrounding the interaction?

We build upon past work on social interactions and well-being in two ways. First, we examine the effect of engaging in meaningful social interactions on a broad range of momentary outcomes across well-being domains, namely stress, loneliness, and affective well-being. Most studies about the effects of social interactions have focused on either social well-being outcomes (e.g., loneliness; Sun et al., 2020) or psychological well-being (e.g., life satisfaction; Milek et al., 2018) independently, whereas few studies have focused on multiple well-being outcomes simultaneously. Second, we provide a comprehensive examination of meaningful social interactions in context by focusing on interaction partners, communication channels, places, and co-occurring activities to determine whether these contextual factors are consequential for strengthening or weakening subsequent changes in well-being.

Open Practices Statement

The data from Studies 1-3 were collected prior to data analysis as part of a broader research project that involves a multi-year longitudinal panel study focused on examining the

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

social factors underlying the mental health of young adults in college. The data (https://osf.io/jur53/?view_only=d06727a2e1184af18d3ae003af9f8635) and code (https://osf.io/7dxb6/?view_only=aeb434a8c28748b6af637520238df99a) needed to reproduce our analyses are accessible on our OSF page. The research materials for the broader research project are not publicly accessible at this time, but the Method section describes the relevant procedure and measures.

We initially conducted exploratory analyses to answer our research questions with data from Study 1, which was conducted in 2019. Based on the findings from Study 1, we preregistered our analytic plan and hypotheses for testing in Study 2, which was conducted in 2020. The pre-registration document is available here: https://osf.io/7dxb6/?view_only=aeb434a8c28748b6af637520238df99a. Given Study 2 data was collected during the first year of the COVID pandemic, we subsequently conducted the same set of analyses using a third sample of data from Study 3, which was conducted in 2021. Our analytic strategy and deviations from our pre-registration are described in more detail in the Method section below.

Method

Participants and Procedure

Participants were undergraduate students at a university on the West Coast of the United States recruited via emails sent to the entire undergraduate student body, inviting students to participate in a longitudinal project about social relationships and well-being in exchange for monetary compensation. Students who consented to participate in the study were asked to complete various survey-based assessments 2 or 3 times during the academic year (during the Fall, Winter, and Spring quarters) and were permitted to participate more than once during their

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

undergraduate career. Thus, some participants only participated once, while others participated multiple times over the years.

For the purposes of the study presented here, we focused our research on subsets of the data that were collected during the Fall quarter in three consecutive years: Study 1 (S1; N = 876) was conducted in 2019 before the COVID-19 pandemic, Study 2 (S2; N = 1,421) was conducted in 2020 during the first year of the pandemic when the campus was on lockdown and students were living off-campus, and Study 3 (S3; N = 2,135) was conducted in 2021 during the second year of the pandemic when the campus had re-opened and students were living on-campus once again. Our samples were generally diverse and representative of the student population at our institution (see Table 1).

The data collected during the Fall quarters included one-time self-report surveys collected through Qualtrics and repeated ecological momentary assessments (EMAs) collected through a mobile app, called WellPing, which is a customized version of the Beiwe research platform (Onnela et al., 2021). Participants downloaded WellPing directly to their Android or iOS smartphones and received survey notifications (i.e., “pings”) to complete EMAs that asked them to report on their meaningful social interactions, momentary well-being, and context. The EMA component of the study lasted three weeks, and participants received four pings per day at randomly selected times within designated four-hour block time windows between 9:00 AM and 11:00 PM. Participants had two hours to complete the EMA associated with each ping, and in total participants could complete up to 84 EMAs during the study. They were compensated \$0.75 per EMA completed and a bonus of \$7 per week if they completed more than 85% (of the 28 possible pings) per week. Across the years, participation rates were high with the total number of EMAs collected ranging from 34k to 103k and the average number of EMAs per participant

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

ranging from 50 to 63 (see Table 1). In the present research, we focus on the EMA data so we do not report further on the one-time surveys.

Table 1*Descriptive Information About the Three Samples*

	Sample 1 (2019)	Sample 2 (2020)	Sample 3 (2021)
Before Data Processing			
Sample size	876	1,421	2,135
Number of observations	34,218	77,012	103,979
Mean number of observations per participant (<i>SD</i>)	50.70 (17.16)	64.01 (15.90)	63.15 (18.10)
After Data Processing			
Sample size	825	916	1,155
Number of observations	28,447	47,505	55,462
Mean number of observations per participant (<i>SD</i>)	43.43 (15.71)	60.90 (16.33)	60.00 (18.60)
Mean response rate per participant (<i>SD</i>)	57.91% (20.95%)	75.17% (20.17%)	71.31% (22.15%)
Demographic Information			
Mean Age (<i>SD</i>)	18.52 (0.95)	18.43 (.99)	19.28 (1.80)
Gender			
Woman	54%	49.98%	45.37%
Man	34%	31.27%	32.37%
Race and Ethnicity			
Black or African American	7.71%	6.07%	4.00%
East Asian	16.41%	12.02%	14.14%
Hispanic or Latino	11.10%	11.24%	9.77%
Middle Eastern	1.42%	< 1%	< 1%
Native American	< 1%	< 1%	< 1%

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Pacific Islander	< 1%	< 1%	< 1%
South Asian	6.29%	3.89%	6.35%
Southeast Asian	2.07%	7.59%	7.94%
White or Caucasian	19.80%	19.65%	16.55%
Two or more races	22.75%	20.84%	22.24%
Family Income Level			
Less than 60k	20.43%	21.57%	17.74%
60k to 120k	26.4%	16.26%	16.53%
120k to 180k	12.41%	10.00%	8.55%
More than 180k	26.47%	22.33%	22.65%

Note. The percentages within each major category do not add up to 100 because not all participants responded to each question and some questions allowed participants to select more than one response option.

Data Processing

We employed several exclusion and filtering steps on the EMA datasets as part of our data processing prior to analysis. First, we excluded all individual EMA observations with extremely high or low response times (i.e., all that fell outside of the 95% confidence interval around the mean response time of 148 seconds in S1, 126 seconds in S2, and 101 seconds in S3). Second, we excluded those participants in each study who completed less than 5 EMA observations.

To keep the samples across the studies independent, we filtered out repeat participants who completed the study multiple times. So, we only included the unique participants for each year to ensure there were no participants overlapping across the three samples. As shown in Table 1, the exclusion criteria and filtering steps resulted in decreasing our raw sample sizes

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

(approximately 5.8% in S1, 35.5% in S2, and 45.9% in S3) and the number of observations analyzed across all samples (approximately 16.8% in S1, 38.3% in S2, and 46.6% in S3).

Measures

Momentary Well-Being. For the momentary well-being questions, participants provided ratings on stress, anxiety, loneliness, happiness, sadness, anger, and fear using a scale bar from 0 to 100 (“*Please use the slider bars to indicate how you feel right now.*”). Affective well-being was calculated based on an average of four items: Happy, Sad (reverse coded), Angry (reverse coded), Anxious (reverse coded). Negative items were reverse coded so that higher values on the affective well-being measure would correspond to “better” affective well-being. Loneliness and stress were assessed using the single items.

Meaningful Social Interactions. Participants were asked to indicate which student peers they had meaningful social interactions with (“*Please nominate the university undergraduate(s) you had the most meaningful interactions with within the past hour.*”). Participants could indicate up to 3 peers by name, with whom they had meaningful social interactions. We created a binary measure to indicate whether participants had or had not engaged in a meaningful social interaction during the past hour. We treated this variable as indicating engagement in meaningful social interactions (vs. not) to examine its relationship to subsequent well-being states.

Interaction Partner. Participants indicated were asked about the people they had meaningful social interactions with (“*How would you best describe your relationship to **UNDERGRADUATE PEER**?*”). We created two categories from the 7 response options: Strong Ties (any interactions with a “Significant Other,” “Dormmate/Roommate,” or “Friend”), Weak Ties (any interactions with a “Teammate,” “Classmate,” “Co-worker,” or “House staff”).

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

In addition, an eighth category (i.e., “Strangers”) was included in Study 1, but was not included in Study 2 or Study 3 so it was dropped.

Communication Channel. Participants were also asked about the communication channels they had used for the meaningful social interaction (“*How did the interaction with **UNDERGRADUATE PEER** take place?*”). We created two categories from the 5 response options: Face-to-face interactions (any “In-Person” interactions) and computer-mediated communication (CMC; any interactions via “Phone Call,” “Video Call,” “Direct Messaging,” or “Social Media”).

Places. Participants were also asked about the places they were spending time in (“*During the past hour, what was your primary location?*”). We created four categories from the 9 response options: Home, Social and Public Places (any observations in a “Cafe/Restaurant/Bar,” “Other’s Home/ Dormitory,” “Fraternity/ Sorority House,” “Gym,” or “Store/Mall”), Study and Work Places (any observations in a “Library,” “Classroom/Lecture Hall,” or “at Work”), and Outdoors.

Activities. Participants were also asked about the activities they were engaged in (“*During the past hour, what was your primary activity?*”) We created five categories from the 9 response options: Resting, Studying and Working (any observations of “Attending Classes/Meetings,” “Studying,” or “Working”), Dining, Exercising, Consuming Media (any observations of “Digital entertainment,” “Social Media,” or “Browsing the internet”). In S1 and S3 (but not S2), the response options also included a “Socializing” category as a primary activity that we excluded from the analyses for consistency across the samples and because we were interested in understanding the moderating role of co-occurring activities surrounding meaningful social interactions as a contextual factor.

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Analytic Strategy

The research presented here is generally exploratory in nature, but we followed a pre-registered analytic plan. We initially explored our research questions in S1, and then sought to replicate the findings as confirmatory hypotheses to be tested in S2. Notably, only the findings for RQ1 replicated in our confirmatory analyses using the S2 dataset, which were those corresponding to the main effects of engaging in meaningful social interactions on momentary well-being, as compared to not engaging in meaningful social interactions. The hypotheses for RQ2 about the moderating effect of contexts failed to replicate in S2, which we suspected was due, in part, to the timing of the data collection occurring in 2020 during the COVID-19 pandemic when students were off-campus due to lockdown restrictions¹. So, we conducted the same analyses as outlined in our pre-registration using data from S3 (conducted in 2021) and found that several of our initial hypotheses for RQ1 and RQ2 (derived from S1) had replicated in S3 when participants had returned to campus (see Table S1 of the Supplemental Materials).

Given the inclusion of a third exploratory sample, we report on findings from a mega-analysis, pooling all the datasets across the three studies and including the years of data collection as control variables for parsimony and to increase statistical power (Scheibehenne et al., 2016; see also Curran & Hussong, 2009). We focus our interpretation on the results from the mega-analysis of Studies 1-3. Table 2 presents the findings from the mega-analysis and indicates which findings replicated across samples. Due to the highly powered design (at the between and within-person level) and the number of analyses conducted, many findings were significant in the mega-analysis and within individual samples (the findings from each sample analyzed

¹ We conducted additional analyses to explore this possibility. We observed that there were main effects of the years (e.g., 2019 vs. 2020) on participant's well-being, meaningful social interactions, and contexts (see Additional Exploratory Analyses on our project's OSF page, Table 3), which suggested that the pandemic onset may help explain the pattern of findings across studies.

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

separately can be found in Table S1 of the Supplemental Materials). To ensure that pooled findings did not reflect the idiosyncrasies of any one sample, we focus our interpretation in the main text of the manuscript on those findings that were deemed to be most reliable due to their replication in at least two of the three samples (i.e., S1 and replicated in either S2 or S3).

Interested readers are directed to the tables for other findings that may be of interest.

Due to the nested structure of our data, we used frequentist multilevel models to answer our research questions, using the lme4 package (Bates et al., 2015) in R version 4.4.1 (R Core Team, 2018). We fit models with momentary data (Level 1) nested within individuals (Level 2). We included a random intercept for each participant in line with recommendations based on the ICC values, which showed a considerable degree of between person variability in our dependent variables (stress ICC = 0.49, loneliness ICC = 0.57, affective well-being ICC = 0.53); (see Tables S2-S4 in the supplemental materials for models with control variables included). We followed recommendations for multilevel models with regard to centering and standardizing variables (Curran & Bauer, 2011; Yaremych et al., 2021). Specifically, repeated-measures continuous and categorical variables that were used as independent and control variables in the models were person-mean centered (at Level 1) (Enders and Tofighi, 2007), whereas between-person variables were sample-mean centered and standardized (at Level 2) (Cowan et al., 2019). Following recommendation for multilevel modeling, we did not center or standardize dependent variables. Finally, following recommendation from lme4, we normalized all independent variables prior to analysis to facilitate model convergence (Bates et al., 2015).

We included a number of control variables in our models, including gender at Level 2, and time of day (morning [9:00 AM - 12:00 PM], afternoon [12:00 PM - 6:00 PM], evening [6:00 PM - 9:00 PM], night [9:00 PM - 1:00 AM]) at Level 1 to account for the fact that both

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

gender and times of the day have been associated with differences in well-being outcomes (e.g., Cox et al., 2018; Matud et al., 2019). We also included the number of observations per person at Level 2 (to account for differences in the total number of EMAs completed by each participant) and a lagged well-being score that was the standardized average of each participant's well-being the previous day at Level 1 (to control for preceding well-being states). Finally, we also included the number of meaningful social interactions participants had for each observation at level 1 (participants could report on 0 to 3 meaningful social interactions during each measurement occasion) to account for the fact that the meaningful social interactions were modeled as separate observations dovetailing on the same well-being DVs (assessed one time per measurement occasion) in the multilevel models.

Furthermore, we observed that the relationships between lagged well-being and momentary well-being varied significantly across people, as did the relationships between meaningful social interactions and momentary well-being (see Figure S1-S3 of the supplemental materials). Based on these observations, we included a random slope for lagged well-being and a random slope for meaningful social interactions to assess this within-person variability (see Tables S2-S4, Supplemental material).

Formally, the model equation for RQ1 about the main effect of engaging in meaningful interactions on subsequent well-being outcomes can be specified as follows:

$$(1) \text{Wellbeing}_{ti} = \beta_{0i} + \beta_{1i} \text{TimeOfDay}_{ti} + \beta_{2i} \text{laggedWellbeing}_{ti} + \beta_{3i} \text{Number of Meaningful Social Interaction}_{ti} + \beta_{4i} \text{Meaningful Social Interactions}_{ti} + e_{ti}$$

where

$$(2) \beta_{0i} = \gamma_{00} + \gamma_{01} \text{Year} + \gamma_{02} \text{Gender}_i + \gamma_{03} \text{Number of Observations}_i + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30}$$

$$\beta_{4i} = \gamma_{40} + u_{4i}$$

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

The analyses examining the main effects of interaction partners and communication channels used the same model specifications for Levels 1 and 2, but instead included terms to capture these variables at Level 1 respectively ($\beta_{4i}People_{ti}$ for interaction partners; $\beta_{4i}Channel_{ti}$ for communication channels).

The analyses examining the moderating effects of places and activities as contextual factors (RQ2) used the same model specifications for Levels 1 and 2, but instead included main effect ($\beta_{5i}Places_{ti}$; $\beta_{5i}Activities_{ti}$) and interaction terms ($\beta_{6i}MSI_{ti} \times Places_{ti}$; $\beta_{6i}MSI_{ti} \times Activities_{ti}$) to capture these variables at Level 1.

Deviations from Pre-Registration

We note three deviations from the pre-registration that were made pertaining to how we analyzed the data and how we interpreted the results.

First, we modified how we categorized weak tie interaction partners to include interactions with “House Staff” (instead of having a separate “University Staff/Stranger” category) given that the question asked participants about student peers who were staffing the dormitories and houses where they reside.

Second, we included (a) the number of meaningful social interactions participants had reported during the past hour (which ranged from 0-3) as an additional control variable in our models, and (b) conducted additional exploratory analyses for each individual response option within the broader interaction partner and communication channel categories (see Table 2).

Third, we pre-registered four research questions but for the purposes of brevity, we only focused on three of the research questions. The question we did not report on focused on

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

psychological dispositions that may moderate the relationship between meaningful social interactions and wellbeing outcomes.

Results

Meaningful Social Interactions and Momentary Well-Being

Across all three samples, our findings showed that engaging in meaningful social interactions with peers was associated with lower momentary loneliness (pooled: $B = -0.019$, $p < 0.001$) and greater momentary affective well-being (pooled: $B = 0.012$, $p < 0.001$; see RQ1a Model, Table 2), as compared to not engaging in a meaningful social interaction. Moreover, the quantity of meaningful social interactions was also beneficial for momentary well-being outcomes, such that having a greater number of such interactions was associated with decreases in stress (pooled: $B = -0.03$, $p < 0.001$) and loneliness (pooled: $B = -0.063$, $p < 0.001$), and increases in affective well-being (pooled: $B = 0.040$, $p < 0.001$; see Covariate Model, Table 2).

With Different Interaction Partners

There were several findings suggesting that engaging in meaningful social interactions with strong and weak tie interaction partners was associated with momentary stress, loneliness, and affective well-being (see RQ1b Models, Table 2), however the findings did not replicate across samples so we do not interpret them further here.

Across Different Communication Channels

Engaging in meaningful social interactions via computer-mediated channels was associated with greater loneliness (pooled: $b = 0.016$, $p < 0.001$) and lower affective well-being (pooled: $b = -0.008$, $p < 0.001$), as compared to face-to-face interactions (see RQ1c Models, Table 2). The findings for loneliness replicated across all three samples, while the findings for affective well-being replicated in S1 and S3. Additional analyses of the individual communication channel

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

categories indicated that these relationships were largely driven by direct messaging being associated with greater loneliness (pooled: $b = 0.023$, $p < 0.001$), and lower affective well-being (pooled: $b = -0.013$, $p < 0.001$), compared to having meaningful interactions face-to-face. A pattern of findings which replicated across all three samples for loneliness and affective well-being. We also observed findings suggesting that phone calls were associated with loneliness and affective well-being, however the findings did not appear to be reliable as they did not replicate across samples.

Table 2

Results from Multilevel Models for Research Questions 1 and 2

Models	Stress	Loneliness	Affective Well-Being
Covariate Model			
Number of Pings	-0.005 [-0.012, 0.002]	-0.008* [-0.015, -0.001]	0.011*** [0.006, 0.017]
Gender	0.039*** [0.031, 0.048]	0.004 [-0.005, 0.012]	-0.012*** [-0.018, -0.006]
Afternoon	0.001 [-0.002, 0.005]	-0.003 [-0.006, 0.000]	0.004*** [0.002, 0.007]
Evening	-0.005** [-0.010, -0.001]	-0.005** [-0.009, -0.002]	0.005*** [0.003, 0.008]
Night	-0.014*** [-0.018, -0.010]	-0.004* [-0.007, -0.000]	0.004*** [0.002, 0.007]
Lagged Wellbeing	0.359*** [0.346, 0.372]	0.288*** [0.274, 0.302]	0.284*** [0.270, 0.297]
Number of Interactions	-0.030*** [-0.035, -0.024]	-0.063*** [-0.069, -0.057]	0.040*** [0.036, 0.044]
Sample 2 (2020)	0.061***	0.039***	-0.030***
Sample 3 (2021)	0.019	0.027*	-0.034**
RQ1a: Meaningful Social Interaction Model			
Engaged in MSI	0.000 [-0.006, 0.006]	-0.019*** [-0.025, -0.013]	0.012*** [0.007, 0.016]

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

RQ1b: Interaction Partner Models**Weak Tie (vs. Strong Tie) Model**

Weak Ties	0.006* [0.001, 0.012]	0.004 [-0.000, 0.009]	-0.004* [-0.008, -0.001]
-----------	---------------------------------	--------------------------	------------------------------------

Interaction Partner Categories Model

Friend	-0.005* [-0.008, -0.001]	-0.005** [-0.008, -0.002]	0.003* [0.001, 0.006]
Significant Other	-0.003 [-0.012, 0.007]	-0.009* [-0.017, -0.001]	0.002 [-0.005, 0.008]
Classmate	0.011** [0.003, 0.019]	0.014*** [0.007, 0.021]	-0.008** [-0.014, -0.003]
Teammate	-0.003 [-0.014, 0.008]	-0.008 [-0.018, 0.001]	0.005 [-0.002, 0.012]
Coworker	-0.001 [-0.027, 0.025]	0.008 [-0.015, 0.030]	0.014 [-0.031, 0.003]
House Staff	0.015 [-0.011, 0.040]	0.027* [0.004, 0.049]	-0.002 [-0.019, 0.015]

RQ1c: Communication Channel Models**CMC (vs. Face-to-Face) Model**

CMC interaction	0.009*** [0.004, 0.014]	0.016*** [0.011, 0.020]	-0.008*** [-0.012, -0.005]
-----------------	-----------------------------------	-----------------------------------	--------------------------------------

Communication Channel Categories Model

Phone Call	0.005 [-0.009, 0.019]	0.013* [0.001, 0.025]	-0.011* [-0.021, -0.002]
Video Call	0.005 [-0.003, 0.013]	0.001 [-0.006, 0.008]	0.001 [-0.004, 0.007]
Direct Messaging	0.012*** [0.006, 0.018]	0.023*** [0.018, 0.028]	-0.013*** [-0.017, -0.009]
Social Media	-0.004 [-0.025, 0.016]	0.016 [-0.001, 0.034]	-0.006 [-0.020, 0.007]

RQ2a: Place Models**Places (vs. Home) Model**

Outdoors	-0.040*** [-0.045, -0.034]	-0.034*** [-0.040, -0.029]	0.029*** [0.025, 0.033]
Social and Public Places	-0.028*** [-0.032, -0.023]	-0.032*** [-0.037, -0.028]	0.026*** [0.022, 0.029]

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

	0.026***	0.001	-0.011***
Study and Work Places	[0.020, 0.033]	[-0.004, 0.007]	[-0.015, -0.007]

Place Moderator Model

	-0.003	-0.013	0.006
MSI x Outdoors	[-0.019, 0.012]	[-0.027, 0.001]	[-0.005, 0.016]
	0.013*	0.001	-0.007
MSI x Social and Public Places	[0.001, 0.026]	[-0.011, 0.012]	[-0.016, 0.001]
	0.003	0.009	-0.008
MSI x Study and Work Places	[-0.012, 0.019]	[-0.005, 0.022]	[-0.019, 0.002]

RQ2b: Co-Occurring Activity Models**Activities (vs. Resting) Model**

	0.006*	-0.002	0.005**
Dining	[0.001, 0.011]	[-0.006, 0.003]	[0.002, 0.009]
	-0.013***	-0.019***	0.018***
Exercising	[-0.020, -0.006]	[-0.025, -0.012]	[0.013, 0.023]
	0.003	0.027***	-0.005**
Consuming Media	[-0.002, 0.008]	[0.022, 0.031]	[-0.009, -0.002]
	0.046***	0.018***	-0.023***
Studying and Working	[0.043, 0.049]	[0.015, 0.021]	[-0.025, -0.021]

Activities Moderator Model

	0.023 ***	0.012	-0.019***
MSI x Dining	[0.010, 0.036]	[-0.000, 0.024]	[-0.028, -0.010]
	0.010	0.003	-0.002
MSI x Exercising	[-0.009, 0.029]	[-0.014, 0.020]	[-0.015, 0.010]
	0.000	-0.002	-0.008
MSI x Consuming Media	[-0.014, 0.014]	[-0.015, 0.010]	[-0.018, 0.001]
	0.009 *	0.007	-0.011***
MSI x Studying and Working	[0.000, 0.017]	[-0.000, 0.014]	[-0.017, -0.006]

Note. MSI = Meaningful Social Interaction (vs. no meaningful social interaction). The reference groups for each of the context variables was as follows: “Strong Ties” was the reference category for the broad “Weak Tie” interaction partner category. “Dorm/Roommates” was the reference category for the individual interaction partner categories. “Face-to-face” was the reference category for both the broad and narrow communication channel categories. “Home” was the reference category for places. “Resting” was the reference category for activities. The analysis in this table is based on pooled participants across the three samples. The dark gray shading indicates that the findings replicated across S1, S2, and S3; Light gray shading indicates that

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

findings replicated in S1 and S3; Medium gray shading indicates that findings replicated in S1 and S2. Only the estimates for the key variables of interest in each model are presented in this table. For the full model results for each set of models computed, please see the complete tables for the pooled analyses, Sample 1, Sample 2, and Sample 3, which can be found in the Supplemental Materials. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In Different Places

Across the three samples, we found main effects for places on momentary well-being such that being outdoors and in social/public places was associated with increased well-being, compared to being at home (see RQ2a Models, Table 2). Notably, we only observed one moderating effect of social and public places on meaningful social interactions and momentary stress in the pooled analysis (Table 2; Figure S8), however, this finding did not replicate across samples.

Co-Occurring Activities

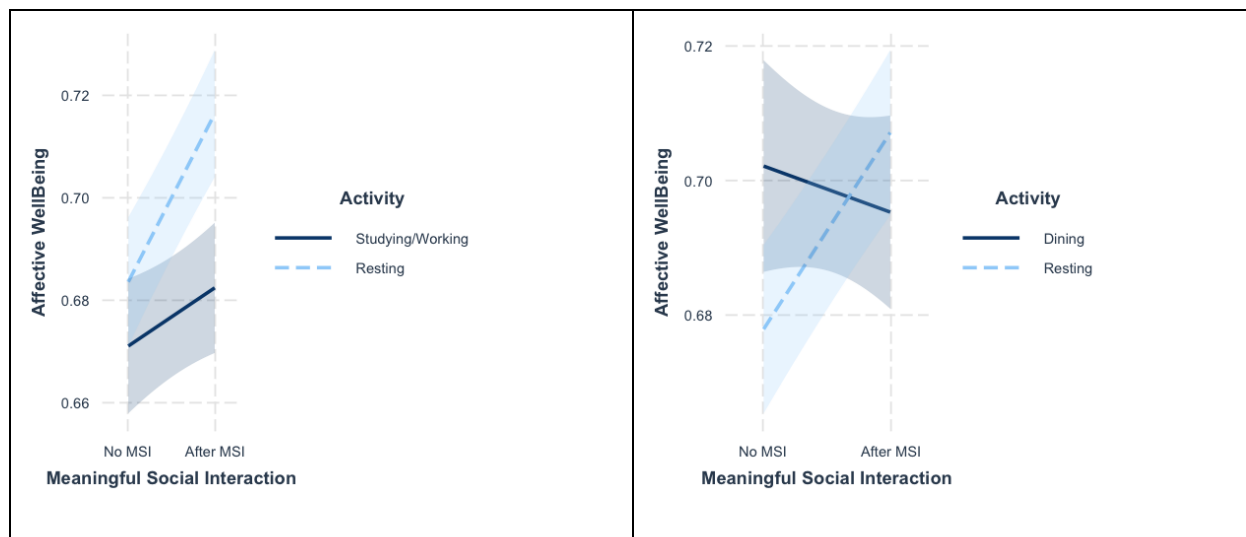
Across the three samples, we found main effects for exercising being associated with increased well-being, while consuming media, and studying or working activities were associated with decreased well-being, compared to resting (see RQ2b Models, Table 2). The few moderating effects of activities on meaningful social interactions and momentary well-being were observed for affective well-being. Specifically, participants reported weaker increases in their affective well-being after engaging in meaningful social interactions while they were studying or working (pooled: $b = -0.011$, $p < 0.001$), and while dining (pooled: $b = -0.019$, $p < 0.001$), compared to when they were resting (Figure 1). The findings for affective well-being

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

replicated in S1 and S3. We also observed findings for studying or working and dining on stress, but these did not replicate across samples (Table 2; Table S1 and Figures S9).

Figure 1

Moderation Effects of Co-Occurring Activities During Meaningful Social Interactions



Discussion

Using three intensive longitudinal datasets, we examined the relationship between engaging in meaningful social interactions and momentary well-being outcomes across a range of different contexts. Across all three samples, we found that meaningful peer social interactions were associated with lower momentary loneliness and greater affective well-being, compared to not engaging in such interactions. Overall, our results for the main effects of meaningful social interactions on subsequent well-being corroborate findings from past research in daily life settings for affective well-being (Choi et al., 2017; Kuper et al., 2023; Mehl et al., 2010; Milek

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

et al., 2018; Quoidbach et al., 2019), and add new findings for loneliness and the role of contextual factors in explaining momentary well-being outcomes.

In regards to interaction partners, the pattern of findings was mixed across samples for both the broader category of strong vs. weak ties, as well as for the narrower interaction partner categories. But for communication channels, we found that engaging in meaningful social interactions via computer-mediated channels (and direct messaging in particular) was associated with subsequent greater loneliness and lower affective well-being, compared to having such interactions in person. These findings support past research by underscoring the relative value of face-to-face communication over computer-mediated communication for momentary well-being (e.g., Kim et al., 2007; Kroencke et al., 2022; Ruppel et al., 2016; Vlahovic et al., 2012), even when the social interactions occurring via computer-mediated channels are deemed to be subjectively meaningful. Here we focused on college students who are likely more comfortable and proficient using digital communication platforms (e.g., direct messages; Haase et al., 2021), so it is unclear whether the associations between meaningful social interactions and computer-mediated communication channels observed also hold among older adults.

In terms of places and activities, our findings suggest that being outdoors, in social and public places, and exercising was associated with positive well-being outcomes, while studying or working and consuming media were associated with negative well-being outcomes. But only two replicable findings were observed for the moderating effect of co-occurring activities: meaningful social interactions occurring while studying or working, and while dining were associated with weaker increases in affective well-being, compared to meaningful social interactions that occurred while resting. These findings suggest that the positive effects of meaningful social interactions on well-being may be reduced when the interaction is co-

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

occurring alongside other activities that demand attention or interfere with goal pursuit. Past research about the negative well-being outcomes associated with multitasking behavior supports this possibility (e.g., negative outcomes have been associated with media multitasking, such as engaging in computer-mediated social interactions while doing other things; van der Schuur et al., 2015).

Cumulatively, our findings suggest that both places and activities have reliable main effects on momentary well-being. However, the co-occurring activities people engage in while having meaningful social interactions may be more relevant for explaining subsequent momentary well-being outcomes, as compared to the places in which the meaningful social interactions occur. The findings provide little evidence for places modulating the effects of social interactions on feelings of wellness, but support past research that emphasizes the role of the physical environment, especially social and public places, in explaining well-being (Farber et al., 2014; Graham et al., 2015; Meagher, 2020; Müller et al., 2020; Oldenburg, 1999; Purnell, 2015). Notably, given the present research was conducted from 2019-2021, the pattern of results might be driven to some degree by changes to people's social lives during these years, including the places and activities that people encountered during their everyday social interactions. For many people, the onset of the pandemic likely homogenized the physical environments in which meaningful social interactions took place (e.g., the home, outdoors), but may have also heterogenized the activities that people engaged in while having such interactions (e.g., playing games online; having virtual dinners).

Limitations and Future Directions

Our findings should be considered with three main limitations in mind that point to directions for future research. First, we examined our research questions using longitudinal

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

datasets and correlational statistical methods, hence we cannot disentangle the causal associations between our variables of interest.

Second, our samples were recruited in the cultural context of a West Coast university community in the United States, so future studies should aim to recruit participants from other populations, countries and cultures to test the external validity of our findings. Given that cultural factors have been linked to patterns of social behavior (Oishi et al., 2008), it is also plausible that the extent to which well-being effects of socializing are moderated by contextual variables is more broadly shaped by the culture in which people are socializing.

Third, the self-report measures used in our study design could be improved upon in future work. For example, the measure of meaningful social interaction we used asked participants to indicate whether one had occurred, instead of asking them to rate the degree to which their interactions were meaningful. Adopting a rating scale would provide more granularity in the assessments and permit a more nuanced assessment of the extent to which the interactions were deemed meaningful. Another potential limitation of our measures is that we did not include subjective perceptions of the contexts in which the social interactions occurred. We assessed relatively objective contextual information (e.g., situational cues such as where the interactions occurred, who was involved), instead of asking people to report on their subjective perceptions of the surrounding context (e.g., situational characteristics; Rauthmann et al., 2015). Thus, a promising future direction lies in better understanding how subjective perceptions of the situations in which meaningful social interactions occur relates to momentary well-being outcomes.

References

- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, *67*(1). <https://doi.org/10.18637/jss.v067.i01>
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary Methods: Capturing Life as it is Lived. *Annual Review of Psychology*, *54*, 579–616.
<https://doi.org/10.1146/annurev.psych.54.101601.145030>
- Brajša-Žganec, A., Merkaš, M., & Šverko, I. (2011). Quality of Life and Leisure Activities: How do Leisure Activities Contribute to Subjective Well-Being? *Social Indicators Research*, *102*(1), 81–91. <https://doi.org/10.1007/s11205-010-9724-2>
- Ceci, S. J., Kahan, D. M., & Braman, D. (2010). The WEIRD are even weirder than you think: Diversifying contexts is as important as diversifying samples. *Behavioral and Brain Sciences*, *33*(2–3), 87–88. <https://doi.org/10.1017/S0140525X10000063>
- Choi, J., Catapano, R., & Choi, I. (2017). Taking Stock of Happiness and Meaning in Everyday Life: An Experience Sampling Approach. *Social Psychological and Personality Science*, *8*(6), 641–651. <https://doi.org/10.1177/1948550616678455>
- Cowan, H. R. (2019). Can a Good Life Be Unsatisfying? Within-Person Dynamics of Life Satisfaction and Psychological Well-Being in Late Midlife. *Psychological Science*, *30*(5), 697–710. <https://doi.org/10.1177/0956797619831981>
- Cox, R. C., Sterba, S. K., Cole, D. A., Upender, R. P., & Olatunji, B. O. (2018). Time of day effects on the relationship between daily sleep and anxiety: An ecological momentary assessment approach. *Behaviour Research and Therapy*, *111*, 44–51.
<https://doi.org/10.1016/j.brat.2018.09.008>

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Curran, P. J., & Bauer, D. J. (2011). The Disaggregation of Within-Person and Between-Person Effects in Longitudinal Models of Change. *Annual Review of Psychology*, *62*, 583–619.

<https://doi.org/10.1146/annurev.psych.093008.100356>

Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods*, *14*(2), 81–100.

<https://doi.org/10.1037/a0015914>

Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction.

Journal of Happiness Studies, *9*(1), 1–11. <https://doi.org/10.1007/s10902-006-9018-1>

Farber, S., Neutens, T., Carrasco, J.-A., & Rojas, C. (2014). Social Interaction Potential and the Spatial Distribution of Face-to-Face Social Interactions. *Environment and Planning B: Planning and Design*, *41*(6), 960–976. <https://doi.org/10.1068/b120034p>

Graham, L. T., Gosling, S. D., & Travis, C. K. (2015). The Psychology of Home Environments: A Call for Research on Residential Space. *Perspectives on Psychological Science*, *10*(3),

346–356. <https://doi.org/10.1177/1745691615576761>

Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, *78*(6), 1360–1380.

Grant, S., Langan-Fox, J., & Anglim, J. (2009). The Big Five Traits as Predictors of Subjective and Psychological Well-Being. *Psychological Reports*, *105*(1), 205–231.

<https://doi.org/10.2466/PRO.105.1.205-231>

Haase, K. R., Cosco, T., Kervin, L., Riadi, I., & O’Connell, M. E. (2021). Older Adults’ Experiences With Using Technology for Socialization During the COVID-19 Pandemic:

Cross-sectional Survey Study. *JMIR Aging*, *4*(2), e28010. <https://doi.org/10.2196/28010>

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

- Han, J., & Patterson, I. (2007). An Analysis of the Influence That Leisure Experiences Have on a Person's Mood State, Health and Wellbeing. *Annals of Leisure Research, 10*(3–4), 328–351. <https://doi.org/10.1080/11745398.2007.9686770>
- Harari, G. M., Lane, N. D., Wang, R., Crosier, B. S., Campbell, A. T., & Gosling, S. D. (2016). Using smartphones to collect behavioral data in psychological science: Opportunities, practical considerations, and challenges. *Perspectives on Psychological Science, 11*(6), 838–854.
- Harari, G. M., Vaid, S. S., Müller, S. R., Stachl, C., Marrero, Z., Schoedel, R., Bühner, M., & Gosling, S. D. (2020). Personality Sensing for Theory Development and Assessment in the Digital Age. *European Journal of Personality, 34*(5), 649–669.
<https://doi.org/10.1002/per.2273>
- Kim, H., Kim, G. J., Park, H. W., & Rice, R. E. (2007). Configurations of Relationships in Different Media: FtF, Email, Instant Messenger, Mobile Phone, and SMS. *Journal of Computer-Mediated Communication, 12*(4), 1183–1207.
<https://doi.org/10.1111/j.1083-6101.2007.00369.x>
- Kroencke, L., Harari, G. M., Back, M. D., & Wagner, J. (2022). Well-being in social interactions: Examining personality-situation dynamics in face-to-face and computer-mediated communication. *Journal of Personality and Social Psychology*.
<https://doi.org/10.1037/pspp0000422>
- Kuper, N., Kroencke, L., Harari, G. M., & Denissen, J. J. A. (2023). Who benefits from which activity? On the relations between personality traits, leisure activities, and well-being. *Journal of Personality and Social Psychology, 125*(1), 141–172.
<https://doi.org/10.1037/pspp0000438>

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

- Matud, M. P., López-Curbelo, M., & Fortes, D. (2019). Gender and Psychological Well-Being. *International Journal of Environmental Research and Public Health*, 16(19), 3531. <https://doi.org/10.3390/ijerph16193531>
- Meagher, B. R. (2020). Ecologizing Social Psychology: The Physical Environment as a Necessary Constituent of Social Processes. *Personality and Social Psychology Review*, 24(1), 3–23. <https://doi.org/10.1177/1088868319845938>
- Mehl, M. R., Vazire, S., Holleran, S. E., & Clark, C. S. (2010). Eavesdropping on Happiness: Well-being is Related to Having Less Small Talk and More Substantive Conversations. *Psychological Science*, 21(4), 539–541. <https://doi.org/10.1177/0956797610362675>
- Milek, A., Butler, E. A., Tackman, A. M., Kaplan, D. M., Raison, C. L., Sbarra, D. A., Vazire, S., & Mehl, M. R. (2018). “Eavesdropping on Happiness” Revisited: A Pooled, Multisample Replication of the Association Between Life Satisfaction and Observed Daily Conversation Quantity and Quality. *Psychological Science*, 29(9), 1451–1462. <https://doi.org/10.1177/0956797618774252>
- Moreton, J., Kelly, C. S., & Sandstrom, G. M. (2023). Social support from weak ties: Insight from the literature on minimal social interactions. *Social and Personality Psychology Compass*, n/a(n/a), e12729. <https://doi.org/10.1111/spc3.12729>
- Müller, S. R., Peters, H., Matz, S. C., Wang, W., & Harari, G. M. (2020). Investigating the Relationships Between Mobility Behaviours and Indicators of Subjective Well-Being Using Smartphone-Based Experience Sampling and GPS Tracking. *European Journal of Personality*, 34(5), 714–732. <https://doi.org/10.1002/per.2262>

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

Oishi, S., Koo, M., & Akimoto, S. (2008). Culture, Interpersonal Perceptions, and Happiness in Social Interactions. *Personality and Social Psychology Bulletin*, 34(3), 307–320.

<https://doi.org/10.1177/0146167207311198>

Oldenburg, R. (1998). *The Great Good Place: Cafés, Coffee Shops, Bookstores, Bars, Hair Salons, and Other Hangouts at the Heart of a Community*. Marlowe.

Onnela, J.-P., Dixon, C., Griffin, K., Jaenicke, T., Minowada, L., Esterkin, S., Siu, A.,

Zagorsky, J., & Jones, E. (2021). Beiwe: A data collection platform for high-throughput digital phenotyping. *Journal of Open Source Software*, 6(68), 3417.

<https://doi.org/10.21105/joss.03417>

Rauthmann, J. F., Sherman, R. A., & Funder, D. C. (2015). Principles of situation research: Towards a better understanding of psychological situations. *European Journal of Personality*, 29(3), 363-381.

Purnell, D. (2015). Expanding Oldenburg: Homes as third places. *Journal of Place Management and Development*, 8(1), 51–62. <https://doi.org/10.1108/JPMD-03-2014-0006>

Sandstrom, G. M., & Dunn, E. W. (2014). Social Interactions and Well-Being: The Surprising Power of Weak Ties. *Personality & Social Psychology Bulletin*, 40(7), 910–922.

<https://doi.org/10.1177/0146167214529799>

Sandstrom, G. M., Lathia, N., Mascolo, C., & Rentfrow, P. J. (2017). Putting mood in context: Using smartphones to examine how people feel in different locations. *Journal of Research in Personality*, 69, 96–101.

Scheibehenne, B., Jamil, T., & Wagenmakers, E.-J. (2016). Bayesian Evidence Synthesis can Reconcile Seemingly Inconsistent Results: The Case of Hotel Towel Reuse.

Psychological Science, 27(7), 1043–1046. <https://doi.org/10.1177/0956797616644081>.

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

- Siedlecki, K. L., Salthouse, T. A., Oishi, S., & Jeswani, S. (2014). The Relationship Between Social Support and Subjective Well-Being Across Age. *Social Indicators Research*, 117(2), 561–576. <https://doi.org/10.1007/s11205-013-0361-4>
- Sun, J., Harris, K., & Vazire, S. (2020). Is well-being associated with the quantity and quality of social interactions? *Journal of Personality and Social Psychology*, 119(6), 1478–1496. <https://doi.org/10.1037/pspp0000272>
- Cox, R. C., Sterba, S. K., Cole, D. A., Upender, R. P., & Olatunji, B. O. (2018). Time of day effects on the relationship between daily sleep and anxiety: An ecological momentary assessment approach. *Behaviour Research and Therapy*, 111, 44–51. <https://doi.org/10.1016/j.brat.2018.09.008>
- Haase, K. R., Cosco, T., Kervin, L., Riadi, I., & O’Connell, M. E. (2021). Older Adults’ Experiences With Using Technology for Socialization During the COVID-19 Pandemic: Cross-sectional Survey Study. *JMIR Aging*, 4(2), e28010. <https://doi.org/10.2196/28010>
- Kuper, N., Kroencke, L., Harari, G. M., & Denissen, J. J. A. (2023). Who benefits from which activity? On the relations between personality traits, leisure activities, and well-being. *Journal of Personality and Social Psychology*, 125(1), 141–172. <https://doi.org/10.1037/pspp0000438>
- Matud, M. P., López-Curbelo, M., & Fortes, D. (2019). Gender and Psychological Well-Being. *International Journal of Environmental Research and Public Health*, 16(19), 3531. <https://doi.org/10.3390/ijerph16193531>
- van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., & Valkenburg, P. M. (2015). The consequences of media multitasking for youth: A review. *Computers in Human Behavior*, 53, 204–215. <https://doi.org/10.1016/j.chb.2015.06.035>

CONTEXTUALIZING MEANINGFUL SOCIAL INTERACTIONS

- Vlahovic, T. A., Roberts, S., & Dunbar, R. (2012). Effects of Duration and Laughter on Subjective Happiness within Different Modes of Communication. *Journal of Computer-Mediated Communication*, 17(4), 436–450. <https://doi.org/10.1111/j.1083-6101.2012.01584.x>
- Webster, D., Dunne, L., & Hunter, R. (2021). Association Between Social Networks and Subjective Well-Being in Adolescents: A Systematic Review. *Youth & Society*, 53(2), 175–210. <https://doi.org/10.1177/0044118X20919589>
- Yaremych, H. E., Preacher, K. J., & Hedeker, D. (2021). Centering categorical predictors in multilevel models: Best practices and interpretation. *Psychological Methods*, No Pagination Specified-No Pagination Specified. <https://doi.org/10.1037/met0000434>