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**Resuming Social Contact After Months of Contact Restrictions: Social Traits
Moderate Associations Between Changes in Social Contact and Well-Being**

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Abstract

Humans possess a need for social contact. Satisfaction of this need benefits well-being, whereas deprivation is detrimental. However, how much contact people desire is not universal, and evidence is mixed on individual differences in the association between contact and well-being. This preregistered longitudinal study ($N = 190$) examined changes in social contact and well-being (life satisfaction, depressivity/anxiety) in Germany during pervasive contact restrictions, which exceed lab-based social deprivation. We analyzed how changes in personal and indirect contact and well-being during the first COVID-19 lockdown varied with social traits (e.g., affiliation, extraversion). Results showed that affiliation motive, need to be alone, and social anxiety moderated the resumption of personal contact under loosened restrictions as well as associated changes in life satisfaction and depressivity/anxiety.

Keywords: social contact, well-being, social traits, need regulation, affiliation motive, mental health, COVID-19

Resuming Social Contact After Months of Contact Restrictions: Social Traits Moderate Associations Between Changes in Social Contact and Well-Being

Humans have an innate need to seek social contact and form relationships (Baumeister & Leary, 1995; Hofer & Hagemeyer, 2018). At the same time, people differ in how they satisfy this need in daily life: Some enjoy being around others a lot and feel unwell in ongoing solitude, whereas others seek less social contact and are less affected in well-being by little contact.

Our study examines social contact and well-being as part of a dynamic need regulation in the context of the COVID-19 pandemic, which required a population-wide reduction in personal contact to curtail virus transmission (Flaxman et al., 2020). Harnessing the unique situation of a gradual reboot of social contact over three months, our study provides insights into social need regulation and individual differences in social behavior during the pandemic. The contact restrictions introduced to reduce the spread of COVID-19 provide an unprecedented opportunity to study social need regulation outside the laboratory. We investigate longitudinally (a) how social contact changes in relation to social traits, and (b) how well-being changes with increased social contact depending on social traits. Under a broad conceptualization of well-being, we examine both life satisfaction and depressivity/anxiety as potential markers of social need satisfaction.

Social Need Regulation

Social need regulation is conceptualized as continuous internal comparisons between a person's ideal level of social contact and the level currently experienced (i.e., both amount and quality; Hall & Davis, 2017; Nezlek, 2001; Sheldon, 2011). Deviations from the ideal level in both directions are theorized to reduce well-being and motivate individuals to align social behavior towards need satisfaction (Hall & Davis, 2017; Sheldon, 2011). For example, experience sampling studies have shown that higher momentary need motivation leads to higher need satisfaction through need-relevant behavior (Neubauer et al., 2018;

Zygar et al., 2018). Social need regulation therefore represents a dynamic process in which past social contact influences future contact through need satisfaction or dissatisfaction (Carver & Scheier, 1998).

Satisfying one's social needs is linked to higher well-being (Demir & Özdemir, 2010; J. Sun et al., 2020; Tay & Diener, 2011). Early motive theories (e.g., McClelland, 1987) and recent empirical work suggest that, depending on social need strength, people's well-being is differently affected by need satisfaction (Dufner et al., 2015; Zygar et al., 2018).

Evidence on the extent to which indirect contact (e.g., texting, videocalls) satisfies social needs remains inconclusive (Kushlev et al., 2019; Orben & Przybylski, 2019, 2020). Indirect contact might substitute personal contact during the pandemic lockdown (Gabbiadini et al., 2020). Daily diary data indicate, however, that only personal contact is robustly related to well-being (Lades et al., 2020; R. Sun et al., 2020). In terms of mental health, the prevalence of depression and anxiety symptoms increased during the COVID-19 pandemic (Ettman et al., 2020; Twenge & Joiner, 2020), and there is associative evidence that being alone due to contact restrictions—thereby unable to satisfy social needs—negatively affects mental health (Benke et al., 2020; Fried et al., 2021).

Social Traits

People differ in the ideal level of social contact to which they compare their current experiences (Sheldon, 2011). Thus, the same situation such as being alone for several days can elicit either an appetitive (i.e., enjoying and maintaining solitude) or an aversive response (i.e., disliking solitude and seeking social contact; Hagemeyer et al., 2013) depending on the individual's ideal level, which is captured in social traits.

Of the Big Five traits (Soto & John, 2017), extraversion is closely related to interpersonal behavior (DeYoung et al., 2013). Extraversion predicts, among other things, how much someone likes the company of others (Breil et al., 2019), and whether someone leaves situations when they are alone (Wrzus et al., 2016).

The affiliation motive describes the need to initiate and maintain close relationships (Hofer & Hagemeyer, 2018). With a higher affiliation motive, people partake in more social interactions such as visiting friends or phone calls and are more likely to crave social contact when alone (Hill, 2009).

Although humans have social needs, they also seek solitude, for example, to pursue a hobby or wind down after a long day of meetings (Lay et al., 2019). Individuals vary in the strength of this need to be alone (Coplan et al., 2019; Hagemeyer et al., 2013). A higher need to be alone reduces the likelihood of social contact (Hall, 2017).

Another reason why people avoid others is that they experience anxiety when anticipating social contact. Subclinically low to moderate anxiety about social contact is prevalent in the general population (Peters et al., 2012). Higher social anxiety is associated with smaller social networks (Van Zalk et al., 2011), being disliked by interaction partners more frequently (Tissera et al., 2020), and lower momentary well-being (Brown et al., 2007).

Current Study

In this longitudinal study, we assessed social contact and well-being four times over three months—beginning during most rigorous contact restrictions and continuing during gradual resumption of social contact. Governmental restrictions limiting personal contact for several weeks in early 2020 constitute a strong situation with limited room to express social traits (Cooper & Withey, 2009). In contrast, person effects of social traits are presumably more pronounced in weak situations that do not constrain social activity and allow behavioral expression of traits (Blum et al., 2018; Schmitt et al., 2013). Successively eased restrictions therefore represent a transition from a strong situation curbing the person-situation interaction into a more normal interplay of the two (Schmitt et al., 2013). However, as Cooper and Withey (2009) state, the “personality-dampening effect of strong situations” (p. 62) has not been shown convincingly because truly strong situations are

difficult to induce in laboratory settings or to observe under regular situational circumstances. The first COVID-19 lockdown, thus, represents a unique opportunity to study social need regulation because it caused long-lasting and pervasive restrictions of social contact with widespread deprivation of social needs, which considerably exceed laboratory-based deprivation.

The “lockdown” to manage the COVID-19 pandemic in Germany in early 2020 initially created strong situational constraints severely restricting everyday mobility in all age groups and regions (Becher et al., 2021; Bönisch et al., 2020). Compared to pre-pandemic levels, social contact frequency was estimated to have decreased by 61-90%, reaching a nadir in April 2020 (Del Fava et al., 2021; Tomori et al., 2021). This time period, during which our longitudinal study started, also represents the maximum extent of governmental contact restrictions in all German federal states during the first COVID-19 wave (Aravindakshan et al., 2020). Following federal decrees on 6 May 2020 (Bundesregierung, 2020), restrictions were gradually eased (until the second wave of infections in the fall of 2020), and people in Germany resumed social contact accordingly, although not yet to pre-pandemic levels by late June 2020 (Tomori et al., 2021). In addition to these mean-level increases of social contact frequency, its variance had substantially increased over this period of eased restrictions (Tomori et al., 2021). This is consistent with evidence that personality traits were associated with differences in precautionary behavior and adherence to contact restrictions (Aschwanden et al., 2021; Götz et al., 2020; Zajenkowski et al., 2020; Zettler et al., 2021).

Although contact restrictions undoubtedly presented a strong situation unprecedented in the second half of the 20th century, evidence is ambiguous regarding resiliency and well-being during this period (Luchetti et al., 2020; Zacher & Rudolph, 2020). German population-representative panel data indicate stability in well-being but an increase in loneliness during contact restrictions, which affects extraverted people more severely (Entringer et al., 2020; Entringer & Gosling, 2021). In contrast, providing

preliminary support for the strong situation hypothesis, the association between extraversion and well-being was lower during lockdown than before the pandemic in a cross-sectional study (Anglim & Horwood, 2021). We go beyond previous work by considering multiple social traits, distinguishing personal and indirect social contact, and making use of the strong situation of the COVID-19 pandemic.

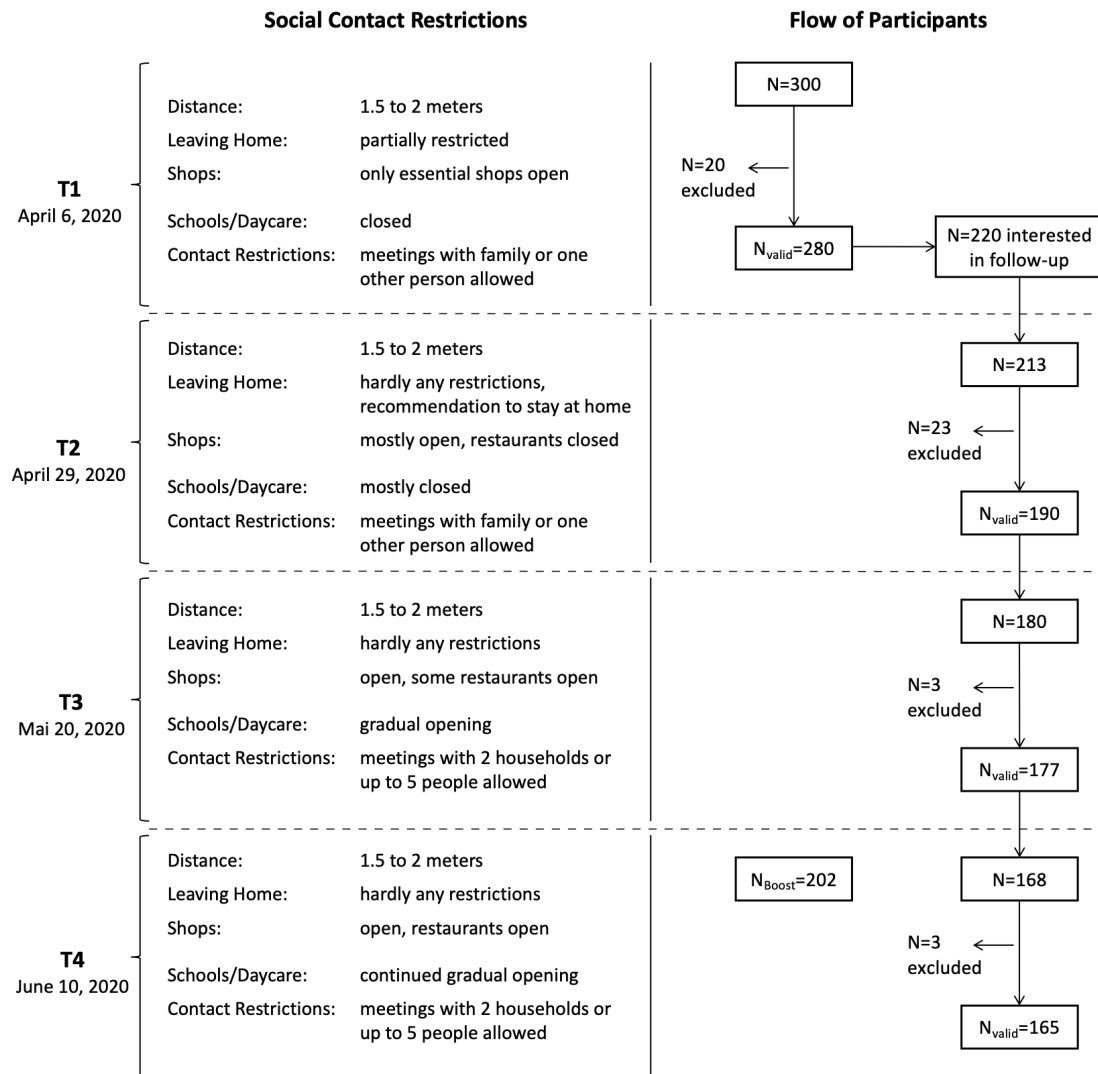
Specifically, we address how social traits influence two steps of social need regulation: First, we investigate whether individual differences in social traits were associated with diverging trends in pursuing social contact when restrictions were gradually being eased. Second, we probe the well-being consequences of increased social contact and differences therein related to social traits.

We preregistered the following hypotheses¹ (<https://osf.io/n8jrv>):

- H1a: Social contact will increase over time more strongly for people higher in extraversion and affiliation motive.
- H1b: Social contact will increase less over time for people higher in the need to be alone and social anxiety.
- H2a: Social contact and personality (extraversion, affiliation motive) will moderate effects of time on well-being, that is, well-being will be lowest for people with low social contact and high extraversion or affiliation motive.
- H2b: With higher need to be alone and social anxiety², well-being will be less strongly related to social contact.

¹ In the preregistration, H1=H2 and H2=H3.

² We intended H2a/H2b to mirror H1a/H1b in constructs but forgot to include social anxiety in H2b in our preregistration. Deviations from our preregistration are listed at <https://osf.io/8xubm/>.

**Figure 1**

Participant flowchart with information on COVID-19 contact restrictions in Germany during the four assessment waves. The start date of each wave is shown on the left. For the analyses in this article we included $N = 190$ participants with valid responses at least for the first and second wave. We did not include the refreshment sample (N_{Boost} at T_4). We also provide a detailed timeline of contact restrictions for two exemplary federal states on the OSF (see document [Timeline_restrictions.pdf](#)).

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. The preregistration (and deviations from it), data, documentation of assessed variables, and R-scripts to reproduce this manuscript are available at <https://osf.io/8xubm/>. The current data stem from a project aimed at developing a questionnaire on social dynamics.

Participants

Our preregistered sample size rationale of $N = 195$ relied on an a-priori power estimation based on a repeated measures ANOVA with $\alpha = .05$, $(1 - \beta) = .90$ and a small effect size of $f = .10$ which we performed when we were uncertain about the ultimate temporal progression of the study (see document *Deviations_preregistration.pdf* on the OSF). Anticipating attrition, we recruited 300 German-speaking participants balanced by gender and five age groups (18-29, 30-39, 40-49, 50-59, 60-75) via the crowdsourcing service www.clickworker.com. Of these, 220 initially agreed to participate in up to three longitudinal follow-ups (see Fig. 1).

We screened participants for non-compliant response behavior (Meade & Craig, 2012) and—out of the 220 interested in follow-ups—excluded those with unrealistically short response times for the longest page of the online survey (< 70 seconds for a 39-item scale on social dynamics; $n = 9$ at T2, $n = 3$ each at T3/T4). We did not need to exclude further participants solely based on other signs of non-compliant responding (unusual response patterns, failed attention check). Additionally, a few participants gave invalid identifiers for follow-up preventing matching to the previous wave ($n = 8$) or opted out of the longitudinal part of the study ($n = 5$).

For longitudinal analyses, we included $N = 190$ participants who provided valid responses at least for the first and second wave. Participants ranged in age from 16 to 70 ($M = 44.24$, $SD = 14.18$) and 47% were women. Most participants were married (34%) or

in a romantic relationship (31%); 42% were parents and 23% had children living in their household. Regarding occupational status, 39% of participants were employed full-time, 9% part-time, 21% were self-employed, 9% were students, 11% were pensioners, and the remaining were marginally employed or not employed. About 46% of participants held a university degree, and 43% came from urban areas.

At the first measurement, 85% of participants reported that they currently stayed at home most of the time, either as a voluntary precaution for themselves and others (52%), because they were working from home (32%), because of closed (pre-)schools (11%), illness (6%), short-time work (6%), unemployment (5%), or compulsory quarantine (1%; multiple answers allowed). 32% indicated that they or someone in their household belonged to an at-risk group for COVID-19. Over three further assessment waves, the proportion of participants staying at home most of the time decreased: 83% at the second (50% as a voluntary precaution; 10% due to closed schools), 76% at the third (38% as a voluntary precaution; 5% due to closed schools), and 67% at the fourth wave (27% as a voluntary precaution; 4% due to closed schools). The proportion of participants staying at home most of the time due to work-related reasons remained roughly the same. Overall, this progression is in line with contact survey data demonstrating that contact frequency had substantially increased by June 2020, though not yet to pre-pandemic levels (Tomori et al., 2021). Note that the phrasing of the item asking whether participants stayed home *most of the time* includes the possibility that changes in social contact occurred even if answered in the affirmative, as we see in the measurement of personal contact frequency (see Table S1).

Attrition Analysis

We performed two kinds of attrition analyses: First, we compared participants who provided valid responses in all four waves (165) with participants who initially expressed interest in participating in follow-ups but later dropped out (55). Those who provided valid responses in all waves had a lower affiliation motive, $d = -0.39$, $p = .013$, were on average

5.82 years younger, $p = .010$, and had a lower indirect contact frequency, $d = -0.42$, $p = .008$. All other variables included in analyses did not differ significantly between the two groups (all $p > .05$). Second, in the final longitudinal analysis sample ($N = 190$), we compared participants who provided valid responses in all four waves (165) with those who dropped out (25), and found no significant group differences (all $p > .05$) as well as smaller mean differences than in the first comparison (in 8 out of 10 variables).

Procedure

Participants answered four online surveys approximately every three weeks—starting on April 6, 2020, and ending on June 14, 2020 (722 longitudinal observations). At the first assessment, to reduce COVID-19 transmissions in Germany, all (pre-)schools, leisure activities, and shops besides supermarkets and drug stores were closed, and people were only allowed to meet with one other person (but were discouraged from doing so). Over the course of the two and a half months of the study, contact restrictions were gradually eased (see Aravindakshan et al., 2020; Tomori et al., 2021). At the time of the last assessment, shops, restaurants, and schools had reopened, recreational activities were again allowed, and warmer weather attracted people to meet outdoors (Yakubenko, 2021). Figure 1 summarizes the progression of the main contact restrictions in Germany. On the OSF, we provide a detailed timeline of restrictions for two exemplary federal states along with federal decrees (document *timeline_restrictions.pdf*).

Participants gave informed consent and received 4.50 to 5.00 euros per wave as compensation. The study adhered to the principles of the Declaration of Helsinki for research involving human subjects and was declared exempt from IRB evaluation.

Measures

Extraversion

Extraversion was assessed at the first wave as part of the Big Five Inventory-2 (BFI-2; Soto & John, 2017; German version: Danner et al., 2016) consisting of 60 items, 12

of which measure extraversion ($\omega = 0.88$). A sample item reads “I am someone who is outgoing, sociable”. Items were answered on a 5-point Likert-scale (1 = *disagree strongly*, 2 = *disagree a little*, 3 = *neutral*, 4 = *agree a little*, 5 = *agree strongly*).

Affiliation Motive

We used the six-item version of the affiliation subscale of the Unified Motive Scales (Schönbrodt & Gerstenberg, 2012) at the first measurement occasion ($\omega = 0.87$). A sample item is “I try to be in company of friends as much as possible”. The Unified Motive Scales include items formulated as statements, which require an agreement rating (1 = *strongly disagree*, 2 = *disagree*, 3 = *rather disagree*, 4 = *rather agree*, 5 = *agree*, 6 = *strongly agree*), and items formulated as goals, which require an importance rating (1 = *not important to me*, 2 = *of little importance to me*, 3 = *of some importance to me*, 4 = *important to me*, 5 = *very important to me*, 6 = *extremely important to me*).

Need to be Alone

The need to be alone was assessed at the first wave using the four-item appetite subscale of the desire for being alone ($\omega = 0.74$) included in the ABC model of social desires (Hagemeyer et al., 2013). A sample item is “I like to be completely alone”. Items were answered on a 7-point frequency scale ranging from 1 to 7 (1 = *never*, 4 = *sometimes*, 7 = *always*).

Social Anxiety

We measured social anxiety at the first wave using the Social Interaction Anxiety Scale (SIAS-6; Peters et al., 2012; German version: Stangier et al., 1999). One of the items reads “I have difficulty talking with other people”. The six items were answered on a 5-point scale (1 = *not at all*, 2 = *slightly*, 3 = *moderately*, 4 = *very*, 5 = *extremely*) and showed high internal consistency, $\omega = 0.85$.

Social Contact

At each wave, participants were asked “How often did you engage in social interactions during the last week?” for three different relationship categories (family, friends, coworkers) and four channels of social contact (personal contact, calls, video calls, texts). Personal contact referred to in-person interactions. These 12 items were answered on a 5-point scale (1 = *not at all*, 2 = *once*, 3 = *multiple days*, 4 = *daily*, 5 = *multiple times a day*). Personal contact frequency was computed as the average of personal contact from all relationship categories. To calculate indirect contact frequency, we averaged the frequency ratings of calls, video calls, and texts from all relationship categories.

Well-Being

To capture several aspects of the broad construct well-being, we measured both life satisfaction, representing a general, cognitive appraisal of well-being, and depressivity/anxiety, representing negative affect, which we deemed likely to have been affected by the pandemic lockdown.

We measured life satisfaction at each wave with an 11-point Likert scale item adapted from the Socio-Economic Panel (SOEP; see Richter et al., 2017): “How satisfied are you with your life, all things considered?” (0 = *completely dissatisfied*, 10 = *completely satisfied*). This single-item measure has been shown to perform very similarly to longer scales in terms of criterion validity (Cheung & Lucas, 2014; Lucas & Donnellan, 2012).

We used the four-item screening tool Patient Health Questionnaire for Depression and Anxiety (PHQ-4; Kroenke et al., 2009; Löwe et al., 2010) to assess depressivity and generalized anxiety symptoms at each wave. We asked “Over the last week, how often have you been bothered by any of the following problems?” The four items “Little interest or pleasure in doing things”, “Feeling down, depressed, or hopeless”, “Feeling nervous, anxious, or on edge”, and “Not being able to stop or control worrying” were each answered on a 4-point scale (1 = *not at all*, 2 = *several days*, 3 = *more than half the days*, 4 = *nearly*

every day). Internal consistency was high, $\omega = 0.81$.

A raw correlation plot of the constructs analyzed is shown in Figure S1.

Analytical Strategy

As preregistered, we winsorized outliers with scores outside $M \pm 3 \times SD$ to the respective upper or lower bound. This procedure was used for eleven observations of depressivity/anxiety, eight observations of social anxiety, two and five observations of personal and indirect contact frequency, respectively.

We employed multilevel modeling (Hoffman, 2015) with observations (Level 1) nested in participants (Level 2). Intra-class correlations for all time-varying variables along with means and standard deviations over time can be found in Table S1. All models were estimated using maximum likelihood with random intercepts. We included random slopes of the Level-1 predictors of interest in those instances where likelihood ratio tests indicated that the addition of the random slope significantly improved model fit (Hoffman & Walters, 2022). If this was the case, we report the results of the random slope model herein and of the fixed slope model in the Supplemental Material (Tables S2-S6), and vice versa. As Level-2 variables, all social traits were grand-mean centered and, thus, represent the between-person effect of deviation from the average trait level in the sample. To test our hypotheses, we estimated two different types of models. First, to predict personal and indirect contact frequency (H1a, H1b), we estimated models with a cross-level interaction of *time* (linear effect, zero at the first wave) and each trait:

$$contact_{ti} = \gamma_{00} + \gamma_{01}trait_i + \gamma_{10}time_{ti} + \gamma_{11}time_{ti}trait_i + v_{0i} + e_{ti} , \quad (1)$$

where at time t for person i $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$ (for a fixed slope model).

We estimated separate models for the two dependent variables personal and indirect contact and each of the four traits, extraversion, affiliation motive, need to be alone, and social anxiety.

Second, we predicted variation in well-being over time (life satisfaction and depressivity/anxiety) with contact frequency as a time-varying predictor (either personal or indirect contact) and each social trait as a Level-2 predictor (person level):

$$\begin{aligned}
 wellbeing_{ti} = & \gamma_{00} + \gamma_{01}trait_i + \gamma_{02}contactBP_i + \gamma_{03}trait_icontactBP_i \\
 & + \gamma_{10}time_{ti} + \gamma_{20}contactWP_{ti} + \gamma_{21}contactWP_{ti}trait_i \\
 & + v_{0i} + e_{ti} ,
 \end{aligned} \tag{2}$$

where $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$ (for a fixed slope model). We included *time* as a linear predictor centered at the first assessment wave to detrend the effects (Wang & Maxwell, 2015). Contact was centered on the person-specific baseline (T1) to distinguish between-person from within-person variation in contact (Hoffman, 2015, 2020): With baseline-centering, the between-person component ($contactBP_i$) was each person's contact frequency at the first assessment, from which the grand mean was subtracted. The within-person component ($contactWP_{ti}$) was the baseline-centered contact frequency, that is, a person's contact frequency at each wave, from which their contact frequency at the first wave was subtracted. Thus, $contactWP_{ti}$ represented the within-person effect of a higher contact frequency at that wave than at the first wave. To test H2a and H2b, we estimated a cross-level interaction between contact frequency (personal or indirect) and each social trait ($contactWP_{ti}trait_i$).

To probe significant cross-level interactions, we utilized simple-slopes plots at conditional values and regions-of-significance plots via the Johnson-Neyman technique (McCabe et al., 2018; Preacher et al., 2006). To compare the models' predictive power, we computed R^2 for the proportion of total variance explained by the model fixed effects (Hoffman, 2015), which is the squared Pearson correlation between the actual outcome and the outcome predicted by the model fixed effects. To gauge how robust the multilevel models were to violated assumptions regarding multivariate normality and contamination

by outliers, we re-estimated all models with robust linear mixed-effects models (see Supplemental Material and Tables S7 to S11; Koller, 2016).

We used R (Version 4.0.4; R Core Team, 2020) and the R-packages *lme4* (Version 1.1.27.1; Bates et al., 2015), and *lmerTest* (Version 3.1.3; Kuznetsova et al., 2017) for multilevel modeling, as well as *tidyverse* (Wickham, Averick, Bryan, Chang, McGowan, François, et al., 2019) for data wrangling, and *papaja* (Aust & Barth, 2020) for reproducible manuscript production. A complete list of software we used and full model equations are provided in the Supplemental Material.

Results

Social Contact

At the first assessment, that is, when shops, restaurants, and schools were closed and people were only allowed to meet with one other person, participants reported on average less frequent personal contact, $\hat{\gamma}_{00} = 1.82$, 95% CI [1.71, 1.93], than indirect contact, $\hat{\gamma}_{00} = 2.30$, 95% CI [2.21, 2.39]. Notably, social traits were not associated with personal contact during the week of the strictest contact restrictions but predicted the level of indirect contact at this time (see Table 1): with higher extraversion, $\hat{\gamma}_{01} = 0.39$, 95% CI [0.26, 0.52], higher affiliation motive, $\hat{\gamma}_{01} = 0.26$, 95% CI [0.17, 0.36], or lower social anxiety, $\hat{\gamma}_{01} = -0.16$, 95% CI [-0.29, -0.04], people reported more frequent indirect contact at the first assessment during the strictest contact restrictions.

As restrictions were eased over time, personal contact frequency rose, $\hat{\gamma}_{10} = 0.14$, 95% CI [0.11, 0.18], while indirect contact frequency decreased, $\hat{\gamma}_{10} = -0.06$, 95% CI [-0.08, -0.03] (see Table 1). Partly supporting H1a, social traits moderated changes in social contact over time: With higher extraversion, decreases in indirect contact frequency were more pronounced, $\hat{\gamma}_{11} = -0.04$, 95% CI [-0.07, -0.01] (see Figs. 2a and 2b). The regions-of-significance analysis reveals that this interaction was significant for values of extraversion above 2.33 (i.e., above -0.70 for the centered variable). In addition, with a

Table 1*Fixed Effects of Social Contact Frequency Predicted by Time and Social Traits*

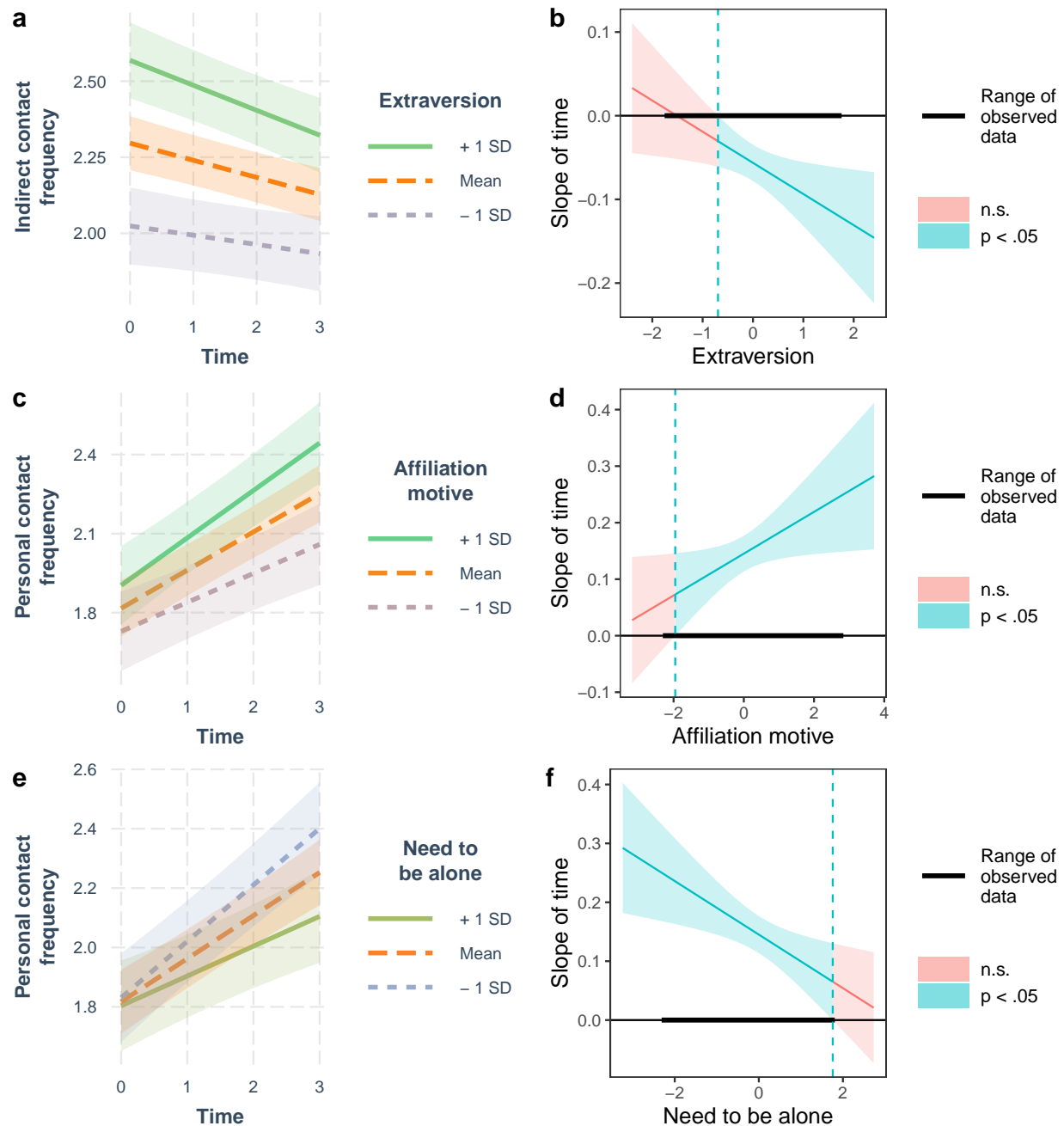
Parameter	Personal contact			Indirect contact		
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI
Extraversion (M1a, M1b)						
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.93]	32.87	< .001	2.30	[2.21, 2.39]
Time, $\hat{\gamma}_{10}$	0.14	[0.11, 0.18]	8.94	< .001	-0.06	[-0.08, -0.03]
Extraversion, $\hat{\gamma}_{01}$	0.05	[-0.11, 0.20]	0.59	.557	0.39	[0.26, 0.52]
Time * Extraversion, $\hat{\gamma}_{11}$	0.01	[-0.03, 0.06]	0.51	.611	-0.04	[-0.07, -0.01]
Affiliation motive (M2a, M2b)						
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.39	< .001	2.30	[2.21, 2.39]
Time, $\hat{\gamma}_{10}$	0.15	[0.11, 0.18]	9.01	< .001	-0.06	[-0.08, -0.03]
Affiliation motive, $\hat{\gamma}_{01}$	0.09	[-0.02, 0.20]	1.63	.105	0.26	[0.17, 0.36]
Time * Affiliation motive, $\hat{\gamma}_{11}$	0.04	[0.00, 0.07]	2.15	.032	-0.01	[-0.03, 0.01]
Need to be alone (M3a, M3b)						
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.10	< .001	2.30	[2.20, 2.40]
Time, $\hat{\gamma}_{10}$	0.15	[0.11, 0.18]	9.02	< .001	-0.06	[-0.08, -0.03]
Need to be alone, $\hat{\gamma}_{01}$	-0.01	[-0.12, 0.09]	-0.25	.799	-0.09	[-0.19, 0.00]
Time * Need to be alone, $\hat{\gamma}_{11}$	-0.05	[-0.08, -0.01]	-2.73	.006	0.00	[-0.03, 0.02]
Social anxiety (M4a, M4b)						
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.93]	32.87	< .001	2.30	[2.21, 2.40]
Time, $\hat{\gamma}_{10}$	0.14	[0.11, 0.18]	8.94	< .001	-0.06	[-0.08, -0.03]
Social anxiety, $\hat{\gamma}_{01}$	0.01	[-0.13, 0.15]	0.16	.876	-0.16	[-0.29, -0.04]
Time * Social anxiety, $\hat{\gamma}_{11}$	-0.04	[-0.08, 0.01]	-1.71	.088	0.02	[-0.01, 0.05]

Note. Two models were computed for each social trait: as predictors of personal contact

frequency (models MXa) and of indirect contact frequency (models MXb). Models MXb feature

random slopes of time. CI = confidence interval. $R^2_{M1a} = 0.04$, $R^2_{M1b} = 0.13$, $R^2_{M2a} = 0.07$,

$R^2_{M2b} = 0.13$, $R^2_{M3a} = 0.05$, $R^2_{M3b} = 0.03$, $R^2_{M4a} = 0.04$, $R^2_{M4b} = 0.04$.

**Figure 2**

Simple-slopes plots (a, c, e) and Neyman-Johnson regions-of-significance plots (b, d, f) for significant cross-level interaction effects predicting contact frequency. Confidence bands represent 95% confidence intervals. Variables presented on the X-axis (b, d, f) are grand-mean centered; original scale values can be computed by adding the mean of the respective variable reported in Table S1.

higher affiliation motive, the increase in personal contact frequency was more pronounced, $\hat{\gamma}_{11} = 0.04$, 95% CI [0.00, 0.07]. This interaction was significant for values of affiliation motive above 1.28 (i.e., above -1.95 for the centered variable), nearly the complete range of observed values (see Figs. 2c and 2d). In partial support of H1b, with a higher need to be alone, increases in personal contact frequency were less pronounced, $\hat{\gamma}_{11} = -0.05$, 95% CI [-0.08, -0.01] (see Table 1 and Figs. 2e and 2f). This interaction was significant for the whole range of observed values in the need to be alone. We did not observe social anxiety to be related to rates of change in personal or indirect social contact.

The practical significance and size of the effects can be inferred from the scaling of personal contact on the y-axis in Figure 2. For example, in Figure 2c, participants low ($-1 SD$) and high ($+1 SD$) in affiliation motive reported roughly the same amount of personal contact at the first assessment, which was a little less than “once” during the last week (corresponding to 2 on the 5-point scale). At the last assessment, participants low in affiliation motive reported on average 0.33 scale points more personal contact just passing 2 on the 5-point scale (i.e., “once” during the last week). In contrast, participants high in affiliation motive reported 0.54 higher personal contact, which corresponded to 2.44 on the 5-point scale (i.e., in between “once” and “multiple days” during the last week).

Well-Being

Over time, life satisfaction declined linearly, $\hat{\gamma}_{10} = -0.11$, 95% CI [-0.20, -0.03], whereas depressivity/anxiety remained stable on average (see Tables 2 to 5). During strict contact restrictions at the first assessment, life satisfaction was higher with higher extraversion, $\hat{\gamma}_{01} = 1.18$, 95% CI [0.76, 1.60], higher affiliation motive, $\hat{\gamma}_{01} = 0.40$, 95% CI [0.08, 0.73], and lower social anxiety, $\hat{\gamma}_{01} = -0.85$, 95% CI [-1.22, -0.47]. At the same time, the lower the participants' extraversion, $\hat{\gamma}_{01} = -0.26$, 95% CI [-0.38, -0.15], and the higher their social anxiety, $\hat{\gamma}_{01} = 0.38$, 95% CI [0.29, 0.47], the higher their depressivity/anxiety. More frequent initial personal and indirect contact (i.e.,

between-person differences at T1) was associated with higher life satisfaction, although these effects were significant in only five out of eight models (see Tables 2 to 5).

Having more indirect contact as compared to the baseline (i.e., during the strictest contact restrictions) was associated with higher life satisfaction for people with a higher affiliation motive, $\hat{\gamma}_{21} = 0.41$, 95% CI [0.07, 0.74] (see Table 3). As Figures 3a and 3b show, life satisfaction increased with more frequent indirect contact for those with a higher affiliation motive, whereas it decreased for those with a lower affiliation motive. The regions-of-significance plot shows that the within-person association between indirect contact and life satisfaction was significant for values of affiliation motive below 2.26 (i.e., below -0.97 for the centered variable) and above 5.18 (i.e., above 1.95 for the centered variable), albeit in opposite directions. Although non-significant at $p = .050$, we found a similar pattern for the cross-level interaction of affiliation motive and more frequent personal contact as compared to the baseline, which we present in Figure S2 for the sake of completeness.

Conversely, more frequent personal contact as compared to the first assessment was associated with higher life satisfaction for people with a lower need to be alone, $\hat{\gamma}_{21} = -0.20$, 95% CI [-0.39, -0.02] (see Table 4 and Figs. 3c and 3d), the slope being significant for people scoring below 5.15 (i.e., below -0.10 for the centered variable) in the need to be alone. Participants' depressivity/anxiety increased with more frequent personal or indirect contact as compared to the baseline among people higher in social anxiety, $\hat{\gamma}_{21} = 0.08$, 95% CI [0.00, 0.15], $\hat{\gamma}_{21} = 0.14$, 95% CI [0.00, 0.27] (see Table 5). Figures 3e to 3h emphasizes the nature of these associations via simple-slopes and regions-of-significance plots: More frequent social contact than at the first wave was associated with higher depressivity/anxiety among people higher in social anxiety (above 3.23 in social anxiety for personal contact, i.e., above 1.47 for the centered variable; and above 3.78 for indirect contact, i.e., above 2.02 for the centered variable).

Overall, we found partial empirical support for H2a and H2b such that affiliation

motive, need to be alone, and social anxiety moderated the effects of increased social contact on well-being over the course of our study as contact restrictions were being eased.

Exploratory Analyses

Following an anonymous reviewer's suggestion to investigate overlap between the social trait constructs, we specified multilevel structural equation models in *Mplus* (Muthén & Muthén, 2019, Version 8.4), in which a latent social trait factor moderated the effects of time and of social contact. This latent factor represented the shared variance of the four social traits. The exploratory analyses suggested significant moderation of the resumption of personal contact by the latent social trait factor (see Table S12). For predicting well-being changes, we did not find significant moderation of the effects of increased contact by the latent social trait factor (see Table S13). This could indicate that the effects for well-being reported in the main manuscript are specific to each social trait.

Table 2

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Extraversion

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.72	[6.41, 7.03]	42.72	< .001	1.66	[1.57, 1.75]	38.07	< .001
Time, $\hat{\gamma}_{10}$	-0.11	[-0.20, -0.03]	-2.56	.011	0.00	[-0.03, 0.02]	-0.36	.717
Personal contact (BP), $\hat{\gamma}_{02}$	0.33	[-0.04, 0.70]	1.77	.078	-0.02	[-0.12, 0.09]	-0.31	.756
Personal contact (WP), $\hat{\gamma}_{20}$	0.19	[-0.02, 0.40]	1.81	.071	0.01	[-0.05, 0.06]	0.24	.810
Extraversion, $\hat{\gamma}_{01}$	1.18	[0.76, 1.60]	5.56	< .001	-0.26	[-0.38, -0.15]	-4.50	< .001
Personal contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.05	[-0.59, 0.49]	-0.19	.847	0.01	[-0.14, 0.16]	0.12	.901
Personal contact (WP) * Extraversion, $\hat{\gamma}_{21}$	-0.03	[-0.30, 0.24]	-0.21	.830	-0.02	[-0.10, 0.05]	-0.63	.530
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.68	[6.36, 7.00]	40.78	< .001	1.66	[1.57, 1.74]	38.19	< .001
Time, $\hat{\gamma}_{10}$	-0.08	[-0.17, 0.00]	-1.99	.047	-0.01	[-0.03, 0.02]	-0.55	.583
Indirect contact (BP), $\hat{\gamma}_{02}$	0.22	[-0.22, 0.67]	0.98	.329	0.13	[0.01, 0.25]	2.12	.035
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.06	[-0.41, 0.29]	-0.35	.730	0.03	[-0.09, 0.14]	0.46	.645
Extraversion, $\hat{\gamma}_{01}$	1.17	[0.73, 1.61]	5.21	< .001	-0.32	[-0.44, -0.20]	-5.31	< .001
Indirect contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.27	[-0.85, 0.32]	-0.90	.368	-0.04	[-0.19, 0.12]	-0.49	.628
Indirect contact (WP) * Extraversion, $\hat{\gamma}_{21}$	0.20	[-0.22, 0.63]	0.94	.350	-0.07	[-0.22, 0.08]	-0.95	.343

Note. Two models were computed for each personal and indirect contact frequency: predicting life

satisfaction (models MXa) and depressivity/anxiety (models MXb). Model M2b features a random slope of

within-person contact. CI = confidence interval; BP = between-person effect; WP = within-person effect.

 $R^2_{M1a} = 0.14$, $R^2_{M1b} = 0.08$, $R^2_{M2a} = 0.13$, $R^2_{M2b} = 0.10$.

Table 3

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Affiliation Motive

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.71	[6.38, 7.04]	39.95	< .001	1.66	[1.57, 1.75]	35.89	< .001
Time, $\hat{\gamma}_{10}$	-0.11	[-0.20, -0.03]	-2.59	.010	0.00	[-0.03, 0.02]	-0.33	.744
Personal contact (BP), $\hat{\gamma}_{02}$	0.31	[-0.09, 0.71]	1.53	.128	-0.02	[-0.13, 0.09]	-0.36	.720
Personal contact (WP), $\hat{\gamma}_{20}$	0.15	[-0.06, 0.36]	1.35	.176	0.01	[-0.05, 0.07]	0.38	.707
Affiliation motive, $\hat{\gamma}_{01}$	0.40	[0.08, 0.73]	2.43	.016	-0.05	[-0.14, 0.04]	-1.08	.280
Personal contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	0.12	[-0.31, 0.54]	0.53	.596	-0.02	[-0.13, 0.10]	-0.29	.774
Personal contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.22	[0.00, 0.43]	1.96	.050	-0.02	[-0.08, 0.04]	-0.70	.481
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.68	[6.35, 7.01]	39.85	< .001	1.66	[1.57, 1.75]	36.42	< .001
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, -0.01]	-2.13	.034	-0.01	[-0.03, 0.02]	-0.50	.619
Indirect contact (BP), $\hat{\gamma}_{02}$	0.48	[0.03, 0.94]	2.08	.039	0.03	[-0.10, 0.15]	0.45	.652
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.14	[-0.49, 0.21]	-0.79	.432	0.02	[-0.09, 0.14]	0.39	.700
Affiliation motive, $\hat{\gamma}_{01}$	0.41	[0.08, 0.74]	2.46	.015	-0.06	[-0.15, 0.03]	-1.34	.183
Indirect contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	-0.29	[-0.70, 0.13]	-1.36	.175	-0.01	[-0.13, 0.10]	-0.21	.830
Indirect contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.41	[0.07, 0.74]	2.39	.017	-0.04	[-0.16, 0.07]	-0.72	.476

Note. Two models were computed for each personal and indirect contact frequency: predicting life satisfaction (models MXa) and depressivity/anxiety (models MXb). Model M2b features a random slope of within-person contact. CI = confidence interval; BP = between-person effect; WP = within-person effect. $R^2_{M1a} = 0.06$, $R^2_{M1b} = 0.01$, $R^2_{M2a} = 0.08$, $R^2_{M2b} = 0.01$.

Table 4

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Need to be Alone

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.75	[6.42, 7.07]	40.64	< .001	1.65	[1.57, 1.74]	36.60	< .001
Time, $\hat{\gamma}_{10}$	-0.12	[-0.21, -0.04]	-2.80	.005	0.00	[-0.03, 0.02]	-0.23	.816
Personal contact (BP), $\hat{\gamma}_{02}$	0.42	[0.03, 0.80]	2.11	.037	-0.04	[-0.14, 0.07]	-0.66	.513
Personal contact (WP), $\hat{\gamma}_{20}$	0.19	[-0.02, 0.40]	1.77	.077	0.01	[-0.05, 0.06]	0.21	.836
Need to be alone, $\hat{\gamma}_{01}$	0.28	[-0.03, 0.58]	1.75	.082	-0.04	[-0.13, 0.04]	-1.05	.295
Personal contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	-0.26	[-0.70, 0.18]	-1.15	.252	0.08	[-0.04, 0.20]	1.26	.210
Personal contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.20	[-0.39, -0.02]	-2.17	.030	0.02	[-0.03, 0.07]	0.67	.502
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.61	[6.29, 6.93]	40.68	< .001	1.66	[1.57, 1.74]	37.85	< .001
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, -0.01]	-2.08	.038	-0.01	[-0.03, 0.02]	-0.52	.602
Indirect contact (BP), $\hat{\gamma}_{02}$	0.71	[0.27, 1.14]	3.20	.002	-0.01	[-0.13, 0.11]	-0.15	.877
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.01	[-0.35, 0.33]	-0.04	.965	0.01	[-0.11, 0.13]	0.19	.848
Need to be alone, $\hat{\gamma}_{01}$	0.29	[-0.03, 0.60]	1.80	.074	-0.05	[-0.14, 0.03]	-1.20	.231
Indirect contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	0.07	[-0.36, 0.50]	0.32	.751	-0.02	[-0.13, 0.10]	-0.30	.767
Indirect contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.18	[-0.49, 0.14]	-1.10	.270	-0.01	[-0.13, 0.10]	-0.24	.808

Note. Two models were computed for each personal and indirect contact frequency: predicting life satisfaction

(models MXa) and depressivity/anxiety (models MXb). Model M2b features a random slope of within-person

contact. CI = confidence interval; BP = between-person effect; WP = within-person effect. $R^2_{M1a} = 0.04$, $R^2_{M1b} = 0.02$, $R^2_{M2a} = 0.06$, $R^2_{M2b} = 0.01$.

Table 5

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Social Anxiety

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.76	[6.45, 7.07]	42.89	< .001	1.65	[1.57, 1.73]	42.23	< .001
Time, $\hat{\gamma}_{10}$	-0.11	[-0.20, -0.03]	-2.57	.011	0.00	[-0.03, 0.02]	-0.27	.786
Personal contact (BP), $\hat{\gamma}_{02}$	0.48	[0.11, 0.85]	2.54	.012	-0.05	[-0.14, 0.04]	-1.04	.299
Personal contact (WP), $\hat{\gamma}_{20}$	0.18	[-0.02, 0.39]	1.73	.085	0.01	[-0.04, 0.07]	0.51	.613
Social anxiety, $\hat{\gamma}_{01}$	-0.85	[-1.22, -0.47]	-4.37	< .001	0.38	[0.29, 0.47]	8.07	< .001
Personal contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.62	[0.08, 1.16]	2.27	.024	-0.11	[-0.24, 0.02]	-1.67	.097
Personal contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.07	[-0.20, 0.35]	0.52	.602	0.08	[0.00, 0.15]	2.02	.044
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.65	[6.34, 6.96]	42.07	< .001	1.66	[1.58, 1.73]	44.18	< .001
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, -0.01]	-2.09	.037	-0.01	[-0.03, 0.02]	-0.44	.660
Indirect contact (BP), $\hat{\gamma}_{02}$	0.50	[0.08, 0.92]	2.34	.020	0.08	[-0.02, 0.18]	1.60	.112
Indirect contact (WP), $\hat{\gamma}_{20}$	0.00	[-0.34, 0.33]	-0.03	.978	0.02	[-0.09, 0.13]	0.35	.731
Social anxiety, $\hat{\gamma}_{01}$	-0.86	[-1.24, -0.48]	-4.49	< .001	0.43	[0.34, 0.51]	9.42	< .001
Indirect contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.27	[-0.28, 0.83]	0.97	.331	0.07	[-0.05, 0.20]	1.15	.252
Indirect contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.14	[-0.28, 0.55]	0.65	.519	0.14	[0.00, 0.27]	2.00	.048

Note. Two models were computed for each personal and indirect contact frequency: predicting life

satisfaction (models MXa) and depressivity/anxiety (models MXb). Model M2b features a random slope of

within-person contact. CI = confidence interval; BP = between-person effect; WP = within-person effect.

$R^2_{M1a} = 0.12$, $R^2_{M1b} = 0.23$, $R^2_{M2a} = 0.11$, $R^2_{M2b} = 0.23$.

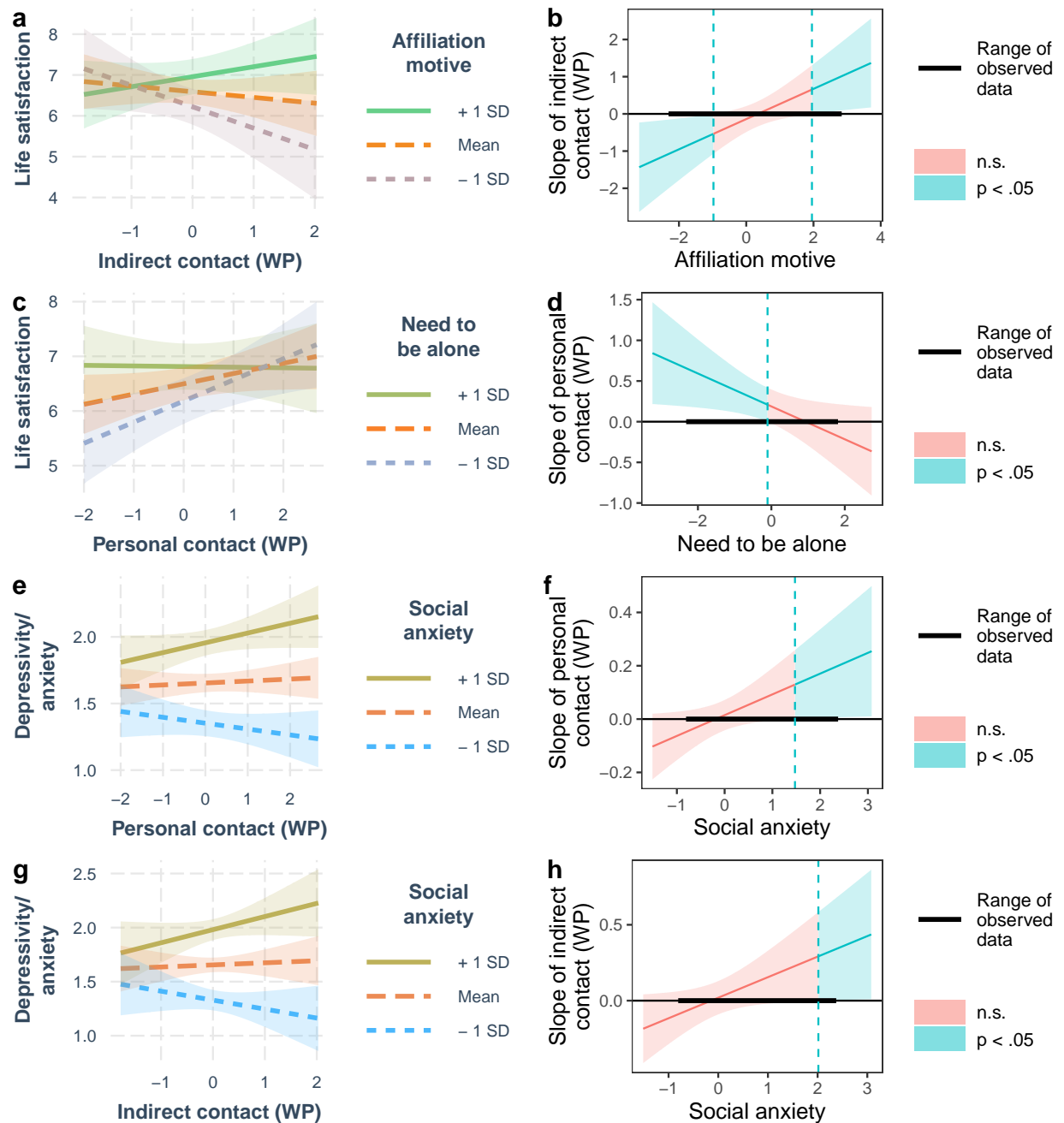


Figure 3

Simple-slopes plots (a, c, e, g) and Neyman-Johnson regions-of-significance plots (b, d, f, h) for significant cross-level interaction effects predicting well-being. Confidence bands represent 95% confidence intervals. Variables presented on the X-axis (b, d, f, h) are grand-mean centered; original scale values can be computed by adding the mean of the respective variable reported in Table S1.

Discussion

Based on the assumption that people differ in the need to maintain social relationships (Hall & Davis, 2017; Nezlek, 2001; Sheldon, 2011), we investigated how four social traits predicted changes in both contact frequency and well-being during successively eased contact restrictions.

At the first assessment when personal contact was severely restricted (Aravindakshan et al., 2020; Becher et al., 2021; Bönisch et al., 2020; Del Fava et al., 2021; Tomori et al., 2021), only indirect but not personal contact varied with individual differences in social traits: Extraversion and affiliation motive were associated with more frequent indirect contact (Harari et al., 2019), and higher social anxiety with less frequent indirect contact. These results are especially noteworthy given robust associations between higher extraversion or affiliation motive and more frequent social contact under unrestricted circumstances (Breil et al., 2019; Hall, 2017; Wrzus et al., 2016). The difference between personal and indirect contact further suggests that governmental contact restrictions created a strong situation overriding individual differences (Cooper & Withey, 2009). As restrictions were eased, social traits predicted the resumption of personal contact. People with a higher affiliation motive increased their personal contact more, whereas people with a higher need to be alone increased their personal contact less. This supports our preregistered hypotheses and theoretical considerations of social need regulation (Hall & Davis, 2017; Sheldon, 2011): People experienced contact restrictions—on average—as deviations from their ideal level of social contact (Entringer & Gosling, 2021). With increasing situational opportunities to pursue their social needs, people resumed personal contact. The intensity of this increase varied depending on people's affiliation motive and need to be alone. Likewise, recent studies have found personality traits to be associated with differences in self-reported pandemic precautions and adherence to governmental contact restrictions (Aschwanden et al., 2021; Götz et al., 2020; Zajenkowski et al., 2020; Zettler et al., 2021).

The results for well-being offer further insights into how social traits shape the response to this strong situation: Well-being was still higher with higher extraversion when social contact was severely restricted during lockdown, yet extraverts' well-being did not benefit more from resumed social activity. This is in line with research that extraverts' higher well-being is due primarily to the energy level facet and not to being more active socially (Anglim et al., 2020; Lucas et al., 2008; Margolis et al., 2020). Instead, differences in affiliation motive, need to be alone, and social anxiety moderated how well-being changed with increased contact: As predicted, more frequent indirect or personal contact compared to the first assessment during strict contact restrictions was associated with higher life satisfaction among people with a higher affiliation motive or a lower need to be alone, respectively—in line with previous research on romantic relationships (Zygar et al., 2018). In addition, people high in social anxiety increased in depressivity/anxiety as their social contact increased. Possibly, unwanted social contact amid an ongoing pandemic increased worries and fears among socially anxious people (Brown et al., 2007; Olivera-La Rosa et al., 2020). Results for indirect contact further emphasize the importance of individual differences in social need regulation: Affiliation motive and social anxiety moderated effects of changes in indirect contact frequency on well-being. This could explain divergent results on the role of digital technologies regarding well-being and coping with COVID-19-related distress (Boursier et al., 2020; Gabbiadini et al., 2020). The moderating effects of social traits on well-being, however, only occurred with certain trait manifestations (see Fig. 3) and, thus, warrant further investigation. It is possible that the regulation of life satisfaction, a cognitive component of well-being, is more closely linked to affiliation motive and need to be alone, whereas the regulation of depressivity/anxiety, an affective component of well-being, is linked to social anxiety.

Together, these results provide novel, real-life evidence of differential regulation of social needs (Hall & Davis, 2017; McClelland, 1987) under unique nationwide external constraints on social contact that would not be possible in laboratory experiments or in

observational studies under regular circumstances. After initial social deprivation during strict contact restrictions, people resumed personal contact to differing degrees, and increases in social contact were differentially associated with changes in well-being—with both effects depending on people’s social traits.

Limitations

Despite following an age- and gender-stratified sample longitudinally during governmental contact restrictions, some limitations need to be addressed. First, we did not measure participants’ pre-pandemic traits, contact frequency, and well-being. We assume that personal contact was at a nadir in Germany in early April 2020 (see mobility and social contact survey data, Bönisch et al., 2020; Becher et al., 2021; Del Fava et al., 2021; Tomori et al., 2021) and social need satisfaction thwarted at the first measurement. Relatedly, we assessed experiences during the previous week instead of moment to moment. Combined with an average time lag of 22 days between assessments, our design may have missed more short-term fluctuations in social contact and well-being as well as reciprocal links. For example, unmet social needs presumably reduce well-being within the next hours, and low well-being likely initiates seeking social contact (Zygar et al., 2018). Instead, the present study’s timing and reference frame of contact measurements allowed for an examination of a particular person-situation interaction, with changes to the strong situation unfolding over the course of weeks. Second, more culturally diverse samples would have allowed us to test effects of contact restrictions in different countries. Given previous cross-cultural work on social relationships and need satisfaction (Chen et al., 2015; Tay & Diener, 2011), however, we assume that the current results generalize relatively broadly to cultures other than Germany, when they underwent similar contact restrictions. Third, we focused on life satisfaction and depressivity/anxiety, yet did not measure positive affect, which was also affected in the COVID-19 pandemic (e.g., Anglim & Horwood, 2021; Lades et al., 2020), and is important to social need satisfaction (Tay & Diener, 2011). Fourth, we

cannot completely rule out nonrandom attrition over time. Attrition analyses indicate differences in affiliation motive and indirect contact frequency between participants completing the study and those initially indicating interest in participating in follow-ups but not taking part in all waves. There are no meaningful differences if only attrition in the longitudinal analysis sample is considered. Still, attrition might have led us to underestimate effects involving affiliation motive and indirect contact frequency. Finally, relying on self-reports, our results are subject to common method bias (Podsakoff et al., 2003). Future studies could incorporate experience sampling and smartphone sensing data (Harari et al., 2019; Zygari et al., 2018), for which we expect similar results.

Conclusions

Our study demonstrates that social traits such as affiliation motive and need to be alone play an important role in the regulation of social contact. Experiencing a situation that imposed strict constraints on the expression of social traits, people nonetheless demonstrated trait differences in their levels of indirect contact and well-being. Afterwards—as the situation opened up—social traits moderated both the resumption of personal contact and changes in well-being associated with more frequent contact. This illuminates the regulation of social needs and also provides support to the theoretical assumption that social need satisfaction feels different depending on someone’s traits. The COVID-19 pandemic has restricted many people in their satisfaction of social needs with little leeway to evade. Our study adds further evidence that the ways in which people react or adapt to this restricted situation differ depending on their personality traits, in this case their affiliation motive, need to be alone, and social anxiety.

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Appendix

Supplemental Material

Full Equations

First, to predict personal and indirect contact frequency (H1a, H1b), we estimated models with a cross-level interaction of $time_{ti}$ (linear effect, zero at the first wave) and each trait:

$$\begin{aligned}
 contact_{ti} &= \beta_{0i} + \beta_{1i}time_{ti} + e_{ti} \\
 \beta_{0i} &= \gamma_{00} + \gamma_{01}trait_i + v_{0i} \\
 \beta_{1i} &= \gamma_{10} + \gamma_{11}trait_i
 \end{aligned} \tag{A1}$$

$$contact_{ti} = \gamma_{00} + \gamma_{01}trait_i + \gamma_{10}time_{ti} + \gamma_{11}time_{ti}trait_i + v_{0i} + e_{ti} , \quad (\text{Reduced-form})$$

where at time t for person i $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$ (for a fixed slope model). We estimated separate models for the two dependent variables, personal and indirect contact, and for each of the four traits. Second, to predict well-being, that is, life satisfaction and depressivity/anxiety (H2a, H2b), we estimated cross-level interactions of the within-person effect of higher-than-baseline contact (either personal or indirect contact), $contactWP_{ti}$, with each social trait:

$$\begin{aligned}
 wellbeing_{ti} &= \beta_{0i} + \beta_{1i}time_{ti} + \beta_{2i}contactWP_{ti} + e_{ti} \\
 \beta_{0i} &= \gamma_{00} + \gamma_{01}trait_i + \gamma_{02}contactBP_i + \gamma_{03}trait_icontactBP_i + v_{0i} \\
 \beta_{1i} &= \gamma_{10} \\
 \beta_{2i} &= \gamma_{20} + \gamma_{21}trait_i
 \end{aligned} \tag{A2}$$

$$\begin{aligned}
 wellbeing_{ti} &= \gamma_{00} + \gamma_{01}trait_i + \gamma_{02}contactBP_i + \gamma_{03}trait_icontactBP_i \\
 &\quad + \gamma_{10}time_{ti} + \gamma_{20}contactWP_{ti} + \gamma_{21}contactWP_{ti}trait_i \quad (\text{Reduced-form}) \\
 &\quad + v_{0i} + e_{ti} ,
 \end{aligned}$$

where $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$ (for a fixed slope model). Again, we estimated separate models for the two dependent variables life satisfaction and depressivity/anxiety, for personal and indirect contact, and for each social trait.

Robustness Check

In order to judge how robust the multilevel models were to violated assumptions regarding multivariate normality and contamination by outliers, we re-estimated all models presented in the main part of the article with robust linear mixed-effects models using the *robustlmm* package (Koller, 2016, 2019). Based on the random effects contamination model and the central contamination model, this method supports hierarchically grouped data structures such as observations nested in participants. There is no universally accepted way to obtain confidence intervals or p -values based on the method implemented in the *robustlmm* package (Koller, 2019) which is why we decided not to report these robust models in the main part of the article. Generally, the results reported in the main part of the article were very similar to these robust estimates (see Tables S7, S8, S9, S10, & S11), especially for models related to hypotheses H1a and H1b. Differences between robust and non-robust models were slightly larger for models testing hypotheses H2a and H2b, where *trait * contactWP* effects were slightly reduced in magnitude for affiliation motive and social anxiety in the robust models.

971 **Supplemental Tables****Table S1***Means and Standard Deviations of the Included Variables Over Time and their ICCs*

	M_1	SD_1	M_2	SD_2	M_3	SD_3	M_4	SD_4	ICC
Personal contact frequency	1.85	0.78	1.9	0.83	2.14	0.78	2.25	0.83	0.62
Indirect contact frequency	2.30	0.69	2.25	0.72	2.15	0.64	2.13	0.64	0.8
Life satisfaction	6.75	2.36	6.46	2.42	6.44	2.37	6.48	2.32	0.74
Depressivity/anxiety	1.67	0.65	1.67	0.62	1.6	0.59	1.65	0.68	0.72
Extraversion	3.05	0.70							
Affiliation motive	3.25	0.96							
Need to be alone	5.23	1.01							
Social anxiety	1.76	0.77							

Note. Presented are the uncentered variables. Personal and indirect contact frequency have a range from 1 to 5 (observed ranges: 1 – 4.5, 1 – 4.25), life satisfaction from 0 to 10, depressivity/anxiety from 1 to 4 (observed range: 1 – 3.6), extraversion from 1 to 5 (observed range: 1.25 – 4.75), affiliation motive from 1 to 6, need to be alone from 1 to 7 (observed range: 2.75 – 7), and social anxiety from 1 to 5 (observed range: 1 – 4.08). M_1 = mean at the first wave. SD_1 = standard deviation at the first wave. ICC = intra-class correlation, that is, proportion of variance that lies at the between-person level.

Table S2

Fixed Effects of Social Contact Frequency Predicted by Time and Social Traits (Alternative Random Slope Configuration to Table 1)

Parameter	Personal contact				Indirect contact			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Extraversion (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.60	< .001	2.30	[2.21, 2.38]	52.25	< .001
Time, $\hat{\gamma}_{10}$	0.15	[0.11, 0.18]	8.29	< .001	-0.06	[-0.08, -0.04]	-5.70	< .001
Extraversion, $\hat{\gamma}_{01}$	0.05	[-0.11, 0.20]	0.60	.552	0.39	[0.27, 0.52]	6.24	< .001
Time * Extraversion, $\hat{\gamma}_{11}$	0.01	[-0.04, 0.06]	0.50	.616	-0.04	[-0.07, -0.01]	-2.72	.007
Affiliation motive (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.79	< .001	2.30	[2.21, 2.38]	52.31	< .001
Time, $\hat{\gamma}_{10}$	0.15	[0.11, 0.18]	8.41	< .001	-0.06	[-0.08, -0.04]	-5.63	< .001
Affiliation motive, $\hat{\gamma}_{01}$	0.09	[-0.02, 0.20]	1.65	.100	0.26	[0.17, 0.35]	5.77	< .001
Time * Affiliation motive, $\hat{\gamma}_{11}$	0.04	[0.00, 0.07]	1.97	.051	-0.01	[-0.03, 0.01]	-0.98	.326
Need to be alone (M3a, M3b)								
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.53	< .001	2.30	[2.21, 2.39]	49.25	< .001
Time, $\hat{\gamma}_{10}$	0.15	[0.11, 0.18]	8.45	< .001	-0.06	[-0.08, -0.04]	-5.62	< .001
Need to be alone, $\hat{\gamma}_{01}$	-0.01	[-0.12, 0.09]	-0.26	.796	-0.09	[-0.18, 0.00]	-1.97	.050
Time * Need to be alone, $\hat{\gamma}_{11}$	-0.05	[-0.08, -0.01]	-2.53	.012	0.00	[-0.02, 0.02]	-0.40	.690
Social anxiety (M4a, M4b)								
Intercept, $\hat{\gamma}_{00}$	1.82	[1.71, 1.92]	33.58	< .001	2.30	[2.21, 2.39]	49.43	< .001
Time, $\hat{\gamma}_{10}$	0.14	[0.11, 0.18]	8.31	< .001	-0.06	[-0.08, -0.04]	-5.66	< .001
Social anxiety, $\hat{\gamma}_{01}$	0.01	[-0.13, 0.15]	0.17	.868	-0.16	[-0.28, -0.04]	-2.65	.009
Time * Social anxiety, $\hat{\gamma}_{11}$	-0.04	[-0.08, 0.01]	-1.63	.106	0.02	[-0.01, 0.04]	1.27	.205

Note. Two models were computed for each social trait: as predictors of personal contact frequency (models MXa) and of indirect contact frequency (models MXb). CI = confidence interval. Models MXa feature random slopes of time.

Table S3

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Extraversion (Alternative Random Slope Configuration to Table 2)

Parameter	Life satisfaction			Depressivity/anxiety		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Personal contact frequency (M1a, M1b)						
Intercept, $\hat{\gamma}_{00}$	6.73	[6.42, 7.04]	42.33	1.66	[1.58, 1.75]	38.24
Time, $\hat{\gamma}_{10}$	-0.11	[-0.20, -0.03]	-2.60	0.00	[-0.03, 0.02]	-0.28
Personal contact (BP), $\hat{\gamma}_{02}$	0.33	[-0.03, 0.70]	1.78	-0.02	[-0.12, 0.09]	-0.32
Personal contact (WP), $\hat{\gamma}_{20}$	0.22	[0.00, 0.44]	1.96	0.00	[-0.06, 0.06]	-0.01
Extraversion, $\hat{\gamma}_{01}$	1.16	[0.74, 1.58]	5.37	-0.26	[-0.38, -0.15]	-4.51
Personal contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.09	[-0.62, 0.44]	-0.33	0.01	[-0.14, 0.16]	0.12
Personal contact (WP) * Extraversion, $\hat{\gamma}_{21}$	-0.01	[-0.29, 0.27]	-0.07	-0.02	[-0.10, 0.06]	-0.51
Indirect contact frequency (M2a, M2b)						
Intercept, $\hat{\gamma}_{00}$	6.68	[6.36, 7.00]	41.16	1.66	[1.57, 1.75]	37.10
Time, $\hat{\gamma}_{10}$	-0.08	[-0.17, 0.00]	-1.99	0.00	[-0.03, 0.02]	-0.39
Indirect contact (BP), $\hat{\gamma}_{02}$	0.23	[-0.21, 0.68]	1.03	0.13	[0.00, 0.25]	2.03
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.11	[-0.49, 0.27]	-0.56	0.01	[-0.09, 0.11]	0.22
Extraversion, $\hat{\gamma}_{01}$	1.16	[0.72, 1.60]	5.20	-0.32	[-0.44, -0.20]	-5.23
Indirect contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.26	[-0.84, 0.33]	-0.86	-0.03	[-0.19, 0.13]	-0.37
Indirect contact (WP) * Extraversion, $\hat{\gamma}_{21}$	0.19	[-0.30, 0.67]	0.76	-0.09	[-0.21, 0.03]	-1.49

Note. Two models were computed for each personal and indirect contact frequency: predicting life

satisfaction (models MXa) and depressivity/anxiety (models MXb). CI = confidence interval; BP =

between-person effect; WP = within-person effect. Models M1a, M1b, and M2a feature random slopes of within-person contact.

Table S4
Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Affiliation Motive (Alternative Random Slope Configuration to Table 3)

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.71	[6.38, 7.05]	39.54	< .001	1.66	[1.57, 1.75]	36.09	< .001
Time, $\hat{\gamma}_{10}$	-0.11	[-0.20, -0.03]	-2.61	.009	0.00	[-0.03, 0.02]	-0.22	.825
Personal contact (BP), $\hat{\gamma}_{02}$	0.30	[-0.10, 0.69]	1.45	.149	-0.02	[-0.13, 0.09]	-0.38	.703
Personal contact (WP), $\hat{\gamma}_{20}$	0.17	[-0.05, 0.39]	1.54	.126	0.00	[-0.06, 0.07]	0.14	.891
Affiliation motive, $\hat{\gamma}_{01}$	0.41	[0.08, 0.74]	2.43	.016	-0.05	[-0.14, 0.04]	-1.08	.280
Personal contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	0.12	[-0.30, 0.54]	0.56	.575	-0.02	[-0.13, 0.10]	-0.27	.786
Personal contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.21	[-0.02, 0.43]	1.80	.076	-0.03	[-0.09, 0.04]	-0.84	.403
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.68	[6.36, 7.01]	40.19	< .001	1.66	[1.57, 1.75]	35.61	< .001
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, -0.01]	-2.11	.035	0.00	[-0.03, 0.02]	-0.27	.789
Indirect contact (BP), $\hat{\gamma}_{02}$	0.49	[0.03, 0.95]	2.10	.037	0.03	[-0.10, 0.15]	0.41	.684
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.17	[-0.55, 0.21]	-0.89	.373	0.01	[-0.09, 0.11]	0.20	.840
Affiliation motive, $\hat{\gamma}_{01}$	0.41	[0.09, 0.74]	2.49	.014	-0.07	[-0.16, 0.03]	-1.41	.161
Indirect contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	-0.29	[-0.70, 0.12]	-1.40	.164	0.00	[-0.12, 0.11]	-0.08	.933
Indirect contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.40	[0.03, 0.77]	2.14	.035	-0.07	[-0.17, 0.02]	-1.55	.122

Note. Two models were computed for each personal and indirect contact frequency: predicting life satisfaction (models MXa) and depressivity/anxiety (models MXb). CI = confidence interval; BP = between-person effect; WP = within-person effect. Models M1a, M1b, and M2a feature random slopes of within-person contact.

Table S5

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Need to be Alone (Alternative Random Slope Configuration to Table 4)

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Personal contact frequency (M1a, M1b)								
Intercept, $\hat{\gamma}_{00}$	6.75	[6.42, 7.08]	40.48	< .001	1.65	[1.57, 1.74]	36.81	< .001
Time, $\hat{\gamma}_{10}$	-0.12	[-0.21, -0.04]	-2.79	.006	0.00	[-0.03, 0.02]	-0.10	.917
Personal contact (BP), $\hat{\gamma}_{02}$	0.41	[0.03, 0.80]	2.10	.037	-0.04	[-0.14, 0.07]	-0.67	.501
Personal contact (WP), $\hat{\gamma}_{20}$	0.21	[-0.01, 0.43]	1.87	.064	0.00	[-0.06, 0.06]	-0.02	.980
Need to be alone, $\hat{\gamma}_{01}$	0.27	[-0.04, 0.58]	1.69	.093	-0.04	[-0.13, 0.04]	-1.04	.300
Personal contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	-0.27	[-0.71, 0.17]	-1.20	.233	0.08	[-0.04, 0.19]	1.25	.214
Personal contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.19	[-0.39, 0.00]	-1.93	.057	0.02	[-0.03, 0.08]	0.87	.385
Indirect contact frequency (M2a, M2b)								
Intercept, $\hat{\gamma}_{00}$	6.61	[6.30, 6.93]	40.99	< .001	1.66	[1.57, 1.75]	36.96	< .001
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, 0.00]	-2.06	.040	0.00	[-0.03, 0.02]	-0.32	.748
Indirect contact (BP), $\hat{\gamma}_{02}$	0.71	[0.27, 1.14]	3.19	.002	-0.01	[-0.13, 0.11]	-0.21	.835
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.07	[-0.45, 0.31]	-0.35	.724	-0.02	[-0.11, 0.08]	-0.35	.727
Need to be alone, $\hat{\gamma}_{01}$	0.28	[-0.03, 0.59]	1.76	.079	-0.05	[-0.14, 0.03]	-1.24	.216
Indirect contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	0.08	[-0.34, 0.51]	0.37	.711	-0.02	[-0.13, 0.10]	-0.28	.782
Indirect contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.20	[-0.56, 0.16]	-1.10	.274	-0.01	[-0.10, 0.07]	-0.31	.753

Note. Two models were computed for each personal and indirect contact frequency: predicting life satisfaction (models MXa) and depressivity/anxiety (models MXb). CI = confidence interval; BP = between-person effect; WP = within-person effect. Models M1a, M1b, and M2a feature random slopes of within-person contact.

Table S6

Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Social Anxiety (Alternative Random Slope Configuration to Table 5)

Parameter	Life satisfaction			Depressivity/anxiety		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Personal contact frequency (M1a, M1b)						
Intercept, $\hat{\gamma}_{00}$	6.77	[6.46, 7.08]	42.68	1.65	[1.57, 1.73]	42.61
Time, $\hat{\gamma}_{10}$	-0.12	[-0.20, -0.03]	-2.63	0.00	[-0.03, 0.02]	-0.22
Personal contact (BP), $\hat{\gamma}_{02}$	0.48	[0.11, 0.85]	2.55	-0.05	[-0.14, 0.04]	-1.07
Personal contact (WP), $\hat{\gamma}_{20}$	0.20	[-0.02, 0.43]	1.79	0.01	[-0.06, 0.07]	0.18
Social anxiety, $\hat{\gamma}_{01}$	-0.84	[-1.22, -0.46]	-4.28	0.39	[0.30, 0.48]	8.27
Personal contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.64	[0.10, 1.17]	2.32	-0.11	[-0.24, 0.03]	-1.58
Personal contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.07	[-0.23, 0.36]	0.43	0.07	[-0.01, 0.15]	1.64
Indirect contact frequency (M2a, M2b)						
Intercept, $\hat{\gamma}_{00}$	6.65	[6.34, 6.96]	42.38	1.66	[1.58, 1.73]	42.43
Time, $\hat{\gamma}_{10}$	-0.09	[-0.17, 0.00]	-2.07	0.00	[-0.03, 0.02]	-0.36
Indirect contact (BP), $\hat{\gamma}_{02}$	0.50	[0.08, 0.92]	2.33	0.08	[-0.03, 0.18]	1.46
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.07	[-0.45, 0.31]	-0.37	0.00	[-0.09, 0.09]	0.05
Social anxiety, $\hat{\gamma}_{01}$	-0.86	[-1.23, -0.48]	-4.46	0.43	[0.34, 0.52]	9.24
Indirect contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.27	[-0.28, 0.82]	0.95	0.05	[-0.08, 0.18]	0.73
Indirect contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.14	[-0.31, 0.60]	0.62	0.16	[0.05, 0.27]	2.76

Note. Two models were computed for each personal and indirect contact frequency: predicting life

satisfaction (models MXa) and depressivity/anxiety (models MXb). CI = confidence interval; BP =

between-person effect; WP = within-person effect. Models M1a, M1b, and M2a feature random slopes of within-person contact.

Table S7*Robust Estimates: Fixed Effects of Social Contact Predicted by Time and Social Traits*

Parameter	Personal contact				Indirect contact			
	$\hat{\gamma}_r$	SE	t	Δ	$\hat{\gamma}_r$	SE	t	Δ
Extraversion								
Intercept, $\hat{\gamma}_{00}$	1.77	0.06	30.36	0.04	2.18	0.05	45.77	0.12
Time, $\hat{\gamma}_{10}$	0.14	0.01	9.64	0.00	-0.05	0.01	-6.26	0.00
Extraversion, $\hat{\gamma}_{01}$	0.04	0.08	0.46	0.01	0.39	0.07	5.70	0.00
Time * Extraversion, $\hat{\gamma}_{11}$	0.01	0.02	0.62	0.00	-0.04	0.01	-2.94	0.00
Affiliation motive								
Intercept, $\hat{\gamma}_{00}$	1.78	0.06	30.70	0.04	2.16	0.05	47.15	0.13
Time, $\hat{\gamma}_{10}$	0.14	0.01	9.78	0.00	-0.05	0.01	-5.98	0.00
Affiliation motive, $\hat{\gamma}_{01}$	0.08	0.06	1.33	0.01	0.28	0.05	5.83	-0.02
Time * Affiliation motive, $\hat{\gamma}_{11}$	0.04	0.02	2.62	0.00	-0.01	0.01	-0.72	0.00
Need to be alone								
Intercept, $\hat{\gamma}_{00}$	1.77	0.06	30.50	0.04	2.18	0.05	43.92	0.12
Time, $\hat{\gamma}_{10}$	0.14	0.01	9.78	0.00	-0.05	0.01	-5.95	-0.01
Need to be alone, $\hat{\gamma}_{01}$	-0.03	0.06	-0.49	0.01	-0.13	0.05	-2.54	0.03
Time * Need to be alone, $\hat{\gamma}_{11}$	-0.04	0.02	-2.60	-0.01	-0.01	0.01	-0.79	0.00
Social anxiety								
Intercept, $\hat{\gamma}_{00}$	1.78	0.06	30.32	0.04	2.19	0.05	42.48	0.11
Time, $\hat{\gamma}_{10}$	0.14	0.01	9.69	0.00	-0.05	0.01	-6.01	0.00
Social anxiety, $\hat{\gamma}_{01}$	0.02	0.08	0.21	0.00	-0.12	0.07	-1.71	-0.05
Time * Social anxiety, $\hat{\gamma}_{11}$	-0.03	0.02	-1.70	0.00	0.01	0.01	1.03	0.00

Note. CI = confidence interval. SE = standard error. Δ = difference between non-robust and robust estimates.

Table S8

Robust Estimates: Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Extraversion.

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}_r$	SE	t	Δ	$\hat{\gamma}_r$	SE	t	Δ
Personal contact frequency								
Intercept, $\hat{\gamma}_{00}$	6.93	0.15	46.20	-0.22	1.60	0.04	40.68	0.06
Time, $\hat{\gamma}_{10}$	-0.10	0.03	-3.44	-0.02	-0.01	0.01	-0.91	0.00
Personal contact (BP), $\hat{\gamma}_{02}$	0.33	0.19	1.76	0.01	-0.01	0.05	-0.13	-0.01
Personal contact (WP), $\hat{\gamma}_{20}$	0.12	0.07	1.73	0.07	0.01	0.02	0.28	0.00
Extraversion, $\hat{\gamma}_{01}$	1.22	0.21	5.78	-0.04	-0.26	0.05	-4.86	0.00
Personal contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.06	0.27	-0.23	0.01	0.00	0.07	-0.04	0.01
Personal contact (WP) * Extraversion, $\hat{\gamma}_{21}$	-0.04	0.09	-0.50	0.01	-0.02	0.03	-0.68	0.00
Indirect contact frequency								
Intercept, $\hat{\gamma}_{00}$	6.92	0.16	44.01	-0.24	1.56	0.04	38.60	0.10
Time, $\hat{\gamma}_{10}$	-0.08	0.03	-2.91	-0.01	-0.01	0.01	-0.79	0.00
Indirect contact (BP), $\hat{\gamma}_{02}$	0.27	0.23	1.18	-0.04	0.13	0.06	2.35	0.00
Indirect contact (WP), $\hat{\gamma}_{20}$	0.02	0.11	0.16	-0.08	0.04	0.04	1.07	-0.02
Extraversion, $\hat{\gamma}_{01}$	1.21	0.22	5.40	-0.04	-0.27	0.06	-4.80	-0.05
Indirect contact (BP) * Extraversion, $\hat{\gamma}_{03}$	-0.40	0.30	-1.35	0.13	-0.08	0.07	-1.15	0.05
Indirect contact (WP) * Extraversion, $\hat{\gamma}_{21}$	0.05	0.14	0.37	0.15	-0.07	0.05	-1.39	-0.01

Note. $\hat{\gamma}_r$ = robust estimate; Δ = difference between non-robust and robust estimate; BP = between-person effect; WP = within-person effect.

Table S9

Robust Estimates: Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Affiliation Motive.

Parameter	Life satisfaction			Depressivity/anxiety		
	$\hat{\gamma}_r$	SE	Δ	$\hat{\gamma}_r$	SE	Δ
Personal contact frequency						
Intercept, $\hat{\gamma}_{00}$	6.97	0.16	43.58	-0.26	1.59	0.04
Time, $\hat{\gamma}_{10}$	-0.10	0.03	-3.42	-0.02	-0.01	0.01
Personal contact (BP), $\hat{\gamma}_{02}$	0.33	0.20	1.62	-0.01	-0.01	0.05
Personal contact (WP), $\hat{\gamma}_{20}$	0.08	0.07	1.21	0.06	0.01	0.02
Affiliation motive, $\hat{\gamma}_{01}$	0.46	0.16	2.79	-0.05	-0.04	0.04
Personal contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	-0.01	0.21	-0.03	0.12	-0.01	0.06
Personal contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.12	0.07	1.69	0.10	-0.02	0.02
Indirect contact frequency						
Intercept, $\hat{\gamma}_{00}$	6.93	0.16	43.29	-0.25	1.53	0.04
Time, $\hat{\gamma}_{10}$	-0.08	0.03	-3.06	-0.01	-0.01	0.01
Indirect contact (BP), $\hat{\gamma}_{02}$	0.52	0.23	2.24	-0.03	0.03	0.06
Indirect contact (WP), $\hat{\gamma}_{20}$	-0.04	0.11	-0.37	-0.10	0.02	0.04
Affiliation motive, $\hat{\gamma}_{01}$	0.48	0.17	2.88	-0.06	-0.03	0.04
Indirect contact (BP) * Affiliation motive, $\hat{\gamma}_{03}$	-0.36	0.21	-1.72	0.07	-0.03	0.05
Indirect contact (WP) * Affiliation motive, $\hat{\gamma}_{21}$	0.22	0.11	1.98	0.19	-0.05	0.04

Note. $\hat{\gamma}_r$ = robust estimate; Δ = difference between non-robust and robust estimate; BP = between-person effect; WP = within-person effect.

Table S10

Robust Estimates: Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Need to be Alone.

Parameter	Life satisfaction				Depressivity/anxiety			
	$\hat{\gamma}_r$	SE	t	Δ	$\hat{\gamma}_r$	SE	t	Δ
Personal contact frequency								
Intercept, $\hat{\gamma}_{00}$	7.01	0.16	44.29	-0.26	1.58	0.04	38.69	0.07
Time, $\hat{\gamma}_{10}$	-0.10	0.03	-3.67	-0.02	-0.01	0.01	-0.77	0.00
Personal contact (BP), $\hat{\gamma}_{02}$	0.41	0.19	2.13	0.00	-0.02	0.05	-0.43	-0.01
Personal contact (WP), $\hat{\gamma}_{20}$	0.12	0.07	1.72	0.07	0.00	0.02	0.11	0.00
Need to be alone, $\hat{\gamma}_{01}$	0.29	0.16	1.88	-0.02	-0.06	0.04	-1.55	0.02
Personal contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	-0.18	0.22	-0.84	-0.07	0.04	0.06	0.64	0.04
Personal contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.15	0.06	-2.55	-0.05	0.01	0.02	0.41	0.01
Indirect contact frequency								
Intercept, $\hat{\gamma}_{00}$	6.84	0.16	43.57	-0.23	1.52	0.04	37.65	0.14
Time, $\hat{\gamma}_{10}$	-0.08	0.03	-2.99	-0.01	-0.01	0.01	-0.84	0.00
Indirect contact (BP), $\hat{\gamma}_{02}$	0.71	0.22	3.20	0.00	0.00	0.06	0.07	-0.01
Indirect contact (WP), $\hat{\gamma}_{20}$	0.03	0.11	0.26	-0.04	0.00	0.04	0.00	0.01
Need to be alone, $\hat{\gamma}_{01}$	0.30	0.16	1.86	-0.01	-0.07	0.04	-1.69	0.02
Indirect contact (BP) * Need to be alone, $\hat{\gamma}_{03}$	-0.01	0.22	-0.05	0.08	-0.02	0.05	-0.28	0.00
Indirect contact (WP) * Need to be alone, $\hat{\gamma}_{21}$	-0.13	0.10	-1.31	-0.04	-0.03	0.04	-0.83	0.02

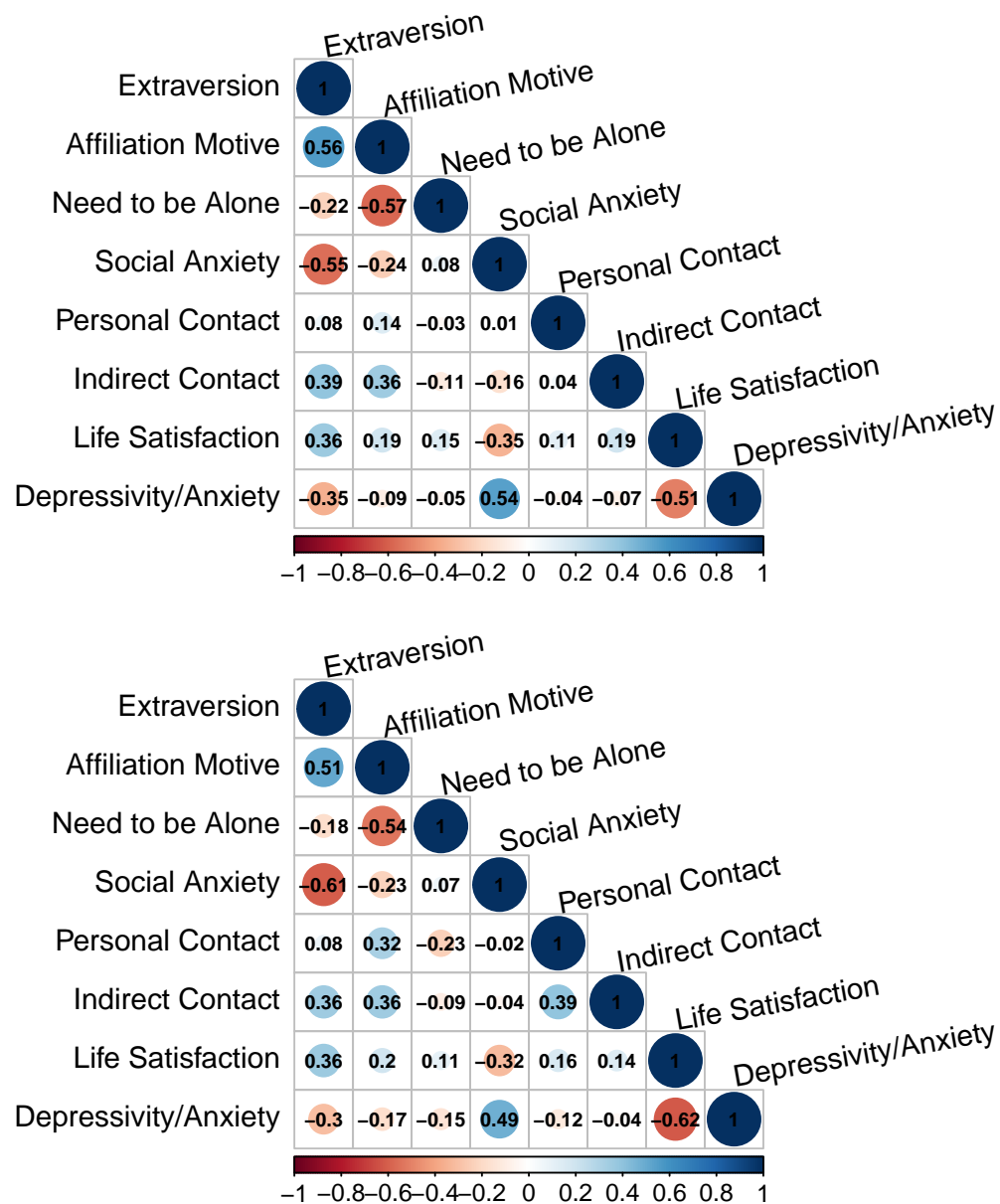
Note. $\hat{\gamma}_r$ = robust estimate; Δ = difference between non-robust and robust estimate; BP = between-person effect; WP = within-person effect.

Table S11
Robust Estimates: Fixed Effects of Well-Being Predicted by Time, Contact Frequencies, and Social Anxiety.

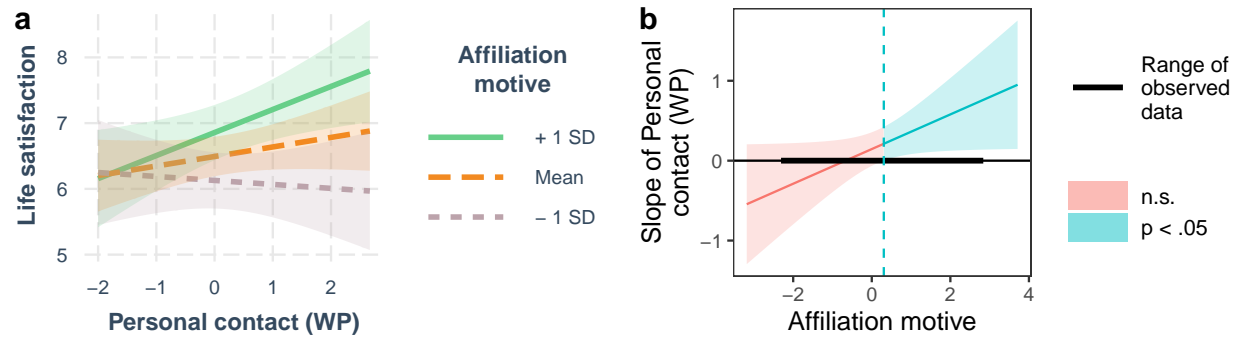
Parameter	Life satisfaction			Depressivity/anxiety		
	$\hat{\gamma}_r$	SE	t	$\hat{\gamma}_r$	SE	t
Personal contact frequency						
Intercept, $\hat{\gamma}_{00}$	6.95	0.15	46.16	-0.19	1.61	0.04
Time, $\hat{\gamma}_{10}$	-0.09	0.03	-3.37	-0.02	-0.01	0.01
Personal contact (BP), $\hat{\gamma}_{02}$	0.60	0.19	3.24	-0.13	-0.07	0.04
Personal contact (WP), $\hat{\gamma}_{20}$	0.12	0.07	1.79	0.06	0.02	0.02
Social anxiety, $\hat{\gamma}_{01}$	-0.96	0.19	-4.99	0.12	0.37	0.04
Personal contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.74	0.27	2.71	-0.11	-0.16	0.06
Personal contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.14	0.09	1.57	-0.07	0.05	0.03
Indirect contact frequency						
Intercept, $\hat{\gamma}_{00}$	6.86	0.15	45.01	-0.21	1.58	0.04
Time, $\hat{\gamma}_{10}$	-0.08	0.03	-2.94	-0.01	-0.01	0.01
Indirect contact (BP), $\hat{\gamma}_{02}$	0.60	0.22	2.80	-0.10	0.05	0.05
Indirect contact (WP), $\hat{\gamma}_{20}$	0.04	0.11	0.40	-0.05	0.07	0.04
Social anxiety, $\hat{\gamma}_{01}$	-0.87	0.19	-4.52	0.01	0.39	0.04
Indirect contact (BP) * Social anxiety, $\hat{\gamma}_{03}$	0.47	0.28	1.66	-0.19	0.05	0.06
Indirect contact (WP) * Social anxiety, $\hat{\gamma}_{21}$	0.10	0.14	0.75	0.03	0.15	0.05

Note. $\hat{\gamma}_r$ = robust estimate; Δ = difference between non-robust and robust estimate; BP = between-person effect; WP = within-person effect.

981 Supplemental Figures

**Figure S1**

Raw correlation plots (Wei & Simko, 2017a) between the constructs included in analyses based on data from the first assessment (top plot; N = 190), and from the last assessment (bottom plot; N = 165).

**Figure S2**

Simple-slopes plot (**a**) and Neyman-Johnson regions-of-significance plot (**b**) for the non-significant cross-level interaction effect of affiliation motive and higher-than-baseline personal contact predicting well-being. Confidence bands represent 95% confidence intervals. The variable presented on the X-axis (**b**) is grand-mean centered; original scale values can be computed by adding the mean of the respective variable reported in Table S1.

Complete Software and Session Information

We used R (Version 4.0.4; R Core Team, 2020) and the R-packages *car* (Version 3.0.12; Fox & Weisberg, 2019; Fox et al., 2020; Yentes & Wilhelm, 2018), *carData* (Version 3.0.4; Fox et al., 2020), *careless* (Version 1.1.3; Yentes & Wilhelm, 2018), *citr* (Version 0.3.2; Aust, 2019), *corrplot2017* (Wei & Simko, 2017b), *cowplot* (Version 1.1.1; Wilke, 2020), *dplyr* (Version 1.0.7; Wickham, François, et al., 2020), *effects* (Version 4.2.0; Fox & Weisberg, 2018; Fox, 2003; Fox & Hong, 2009), *forcats* (Version 0.5.1; Wickham, 2020a), *Formula* (Version 1.2.4; Zeileis & Croissant, 2010), *ggplot2* (Version 3.3.5; Wickham, 2016), *GPArotation* (Version 2014.11.1; Bernaards & I.Jennrich, 2005), *Hmisc* (Version 4.6.0; Harrell Jr, 2021), *interactions* (Version 1.1.5; Long, 2019), *jtools* (Version 2.1.4; Long, 2020), *lattice* (Version 0.20.41; Sarkar, 2008), *lme4* (Version 1.1.27.1; Bates et al., 2015), *lmerTest* (Version 3.1.3; Kuznetsova et al., 2017), *magick* (Version 2.7.3; Ooms, 2021), *MASS* (Version 7.3.53; Venables & Ripley, 2002), *Matrix* (Version 1.3.2; Bates & Maechler, 2019), *MplusAutomation* (Hallquist & Wiley, 2018), *multcomp* (Version 1.4.18; Hothorn et al., 2008), *mvtnorm* (Version 1.1.1; Genz & Bretz, 2009), *nlme* (Version 3.1.152; Pinheiro et al., 2021), *papaja* (Version 0.1.0.9997; Aust & Barth, 2020), *patchwork* (Version 1.1.1; Pedersen, 2020), *png* (Version 0.1.7; Urbanek, 2013), *psych* (Version 2.1.9; Revelle, 2020), *purrr* (Version 0.3.4; Henry & Wickham, 2020), *readr* (Version 2.1.1; Wickham & Hester, 2020), *robustlmm* (Version 2.5.0; Koller, 2019), *scales* (Version 1.1.1; Wickham & Seidel, 2020), *shiny* (Version 1.7.1; Chang et al., 2020), *simr* (Green & MacLeod, 2016), *stringr* (Version 1.4.0; Wickham, 2019), *survival* (Version 3.2.7; Terry M. Therneau & Patricia M. Grambsch, 2000), *TH.data* (Version 1.0.10; Hothorn, 2019), *tibble* (Version 3.1.6; Müller & Wickham, 2020), *tidyr* (Version 1.1.4; Wickham, 2020b), *tidyverse* (Version 1.3.1; Wickham, Averick, Bryan, Chang, McGowan, François, et al., 2019), and *tinylabels* (Version 0.2.2; Barth, 2020) for data wrangling, analyses, and plots.

The following is the output of R's *sessionInfo()* command, which shows information to aid analytic reproducibility of the analyses.

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1009      R version 4.0.4 (2021-02-15) Platform: x86_64-apple-darwin17.0 (64-bit) Running
1010 under: macOS Big Sur 10.16
1011      Matrix products: default BLAS:
1012 /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRblas.dylib LAPACK:
1013 /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRlapack.dylib
1014      locale: [1]
1015 en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
1016      attached base packages: [1] grid stats graphics grDevices utils datasets methods
1017 [8] base
1018      other attached packages: [1] png_0.1-7 magick_2.7.3 corrplot_0.84
1019 [4] careless_1.1.3 car_3.0-12 scales_1.1.1
1020 [7] patchwork_1.1.1 effects_4.2-0 carData_3.0-4
1021 [10] cowplot_1.1.1 jtools_2.1.4 interactions_1.1.5
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1025 [22] purrr_0.3.4 readr_2.1.1 tidyr_1.1.4
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