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Why Being Social and Active Boosts Psychological Wellbeing: A Mediating Role of Momentary Positive Emotions

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Abstract

Social interactions and active activities are key to psychological wellbeing, but *how* do these activities improve wellbeing? Building on work showing that positive emotional experiences help build psychological resources, we test the prediction that momentary positive emotional experiences mediate the relationships between social interactions, active activities, and wellbeing. In a preregistered experience sampling study, 106 participants reported their wellbeing, momentary emotional experiences, and activities linked to intense emotions five times per day for 15 days (7,110 observations). Participants reported experiencing more intense positive emotions when interacting with others (especially face-to-face), and when engaged in active (versus passive) activities. As predicted, positive emotional experiences partially mediated the positive relationships between social interactions and wellbeing, and between active activities and wellbeing (explaining 25% and 12% of variance, respectively). These findings show that intense emotional experiences can be elicited by social and active activities, helping explain how these activities aid our psychological wellbeing.

Keywords

wellbeing, social interactions, active activities, positive emotions, experience sampling method

Introduction

A wealth of research has documented that the way people spend their time shapes their wellbeing (e.g., Newman et al., 2014; Zuzanek & Zuzanek, 2015). Social interactions with others—be they family, friends, acquaintances, or strangers—are particularly crucial for our wellbeing (e.g., Hudson et al., 2020), as is spending time engaging in active activities, like exercising or volunteering (e.g., Wiese et al., 2018). However, despite these well-established associations, little is known about the underlying mechanisms: how does the way we spend our time shape how we evaluate our life? Addressing this question can help inform interventions for improving wellbeing. In the present study, we propose and test the hypothesis that momentary positive emotional experiences help explain the relationship between social and active activities and wellbeing.

How We Spend Our Time

An important feature of how we spend our time is whether it involves other people. A large body of research has found that enhanced wellbeing is associated with more social engagement—whether measured by the amount of time spent with others (Huebner & Mancini, 2003; J. Sun et al., 2020), number of social interactions (Russell et al., 2012; Sandstrom & Dunn, 2014), or number of interaction partners (Sandstrom & Dunn, 2014). These findings are consistent across different cultures, ages, and genders, but not across communication means. People increasingly communicate using technology, such as video calls, phone calls, texts, and social media (Drago, 2015). However, whereas the wellbeing boost of face-to-face communication is clear (Fiorillo & Sabatini, 2011; Mehl et al., 2010; Milek et al., 2018), technology-mediated communication is less beneficial (Holtzman et al., 2017; Sacco & Ismail, 2014; Wohn et al., 2017) and effects less consistent (R. Sun et al., 2022). However, it remains unclear how social contact increases wellbeing, and why face-to-face interactions and technology-mediated communications differentially relate to wellbeing.

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A second key feature of time use relates to whether the activities we engage in are active or passive. Active activities involve high levels of mental and/or physical engagement, and include exercising, walking, volunteering, and praying, as well as engaging in social interactions. In contrast, passive activities require low mental and/or physical engagement and include listening to music, watching TV, and relaxing (Lee et al., 2017; Smeets et al., 2020). A wealth of research has established that active activities are more beneficial for wellbeing than passive activities (Holder et al., 2009; Richards et al., 2015; Walker et al., 2011), but little is known about the underlying mechanisms.

A Pathway to Wellbeing Through Emotional Experience

Although the links between different kinds of activities and wellbeing are well established, it is not established *how* activities influence wellbeing. Here, we sought to connect the literature on time use with research on momentary emotional experiences, which play an important role in experienced wellbeing. Activities elicit emotional experiences (Csikszentmihalyi & Hunter, 2014; Machell et al., 2015; Sonnentag, 2001; Wang et al., 2012; White & Dolan, 2009). For example, interacting with others boosts momentary feelings of happiness (Lucas et al., 2008) and people report feeling happier during active compared to passive activities (Choi et al., 2017; Kim & McKenzie, 2014). Similarly, connections between positive emotions and wellbeing have been suggested: For example, the broaden-and-build theory of positive emotions proposes that positive emotional experiences aid wellbeing because they help us build psychological and social resources (Fredrickson, 2001; Fredrickson & Joiner, 2002, 2018). In the domain of wellbeing interventions, Lyubomirsky and Layous (2013) have proposed that activities like expressing gratitude or meditating may improve wellbeing by increasing positive emotions. However, the literature has not yet empirically established a mediating pathway from activities to wellbeing via positive emotions. Here, we tested whether momentary experiences of positive emotions constitute a mediating mechanism from social and active activities to wellbeing.

The Present Study

We used the experience sampling method (ESM), which involves data collection in naturalistic settings, with participants responding to prompts at multiple time points during their everyday life (Scollon et al., 2003). Because ESM samples experiences close to the moment, it reduces issues with memory-based judgments that tend to reflect general beliefs rather than actual experience (Csikszentmihalyi & Larson, 2014; Scollon et al., 2003). In addition to between-person effects, ESM also allows for the examination of within-person effects by comparing a specific observation to an individual's mean (e.g., probing whether a person's wellbeing is higher at time points when they engage in active activities than at other times).

We sought to test the following hypotheses:

H1: Social interactions (face-to-face interactions, technology-mediated communication, as compared to being alone) positively predict wellbeing (H1a), and this relationship is mediated by momentary positive emotional experiences (H1b). We expected that this effect on wellbeing and momentary positive emotional experiences would be more pronounced for face-to-face interactions than for technology-mediated interactions (H1c).

H2: Active (as compared to passive) activities positively predict wellbeing (H2a), and this link is mediated by momentary emotional experiences (H2b).

Method

Participants and Procedure

The study received ethical approval from the Department of Psychology, University of Amsterdam. All participants gave written consent prior to taking part. We recruited 111 participants through the University of Amsterdam psychological participant pool. Assuming small-to-medium effects, power analyses of two-level models (Arend & Schäfer, 2019; Green & MacLeod, 2016) indicate that our study should be well-powered to detect within-person effects (1.00, 95% CI = [0.996, 1.00]) and underpowered to detect between-person effects (0.49, 95% CI = [0.46, 0.52]; see Supplemental Materials Section 1). This suggests that our sample size was appropriate for testing the key predictions, which concern within-person mediation effects. We excluded five participants who responded to less than half of the prompts, to ensure enough observations per participant to make within-person comparisons. The final sample thus consisted of 106 participants (56 women, 50 men) between 18 and 31 years old (M = 21.9, SD = 2.5). To increase compliance, we offered participants who had not reached a finish rate of at least 80% at the end of the 15-day data-gathering period the possibility of three additional days. Data collection took place between June 2019 and January 2020.

We used surveysignal.com to deliver survey links from Qualtrics.com. Participants received a beep on their phones five times a day for 15 days, with a semi-random sampling design. Notifications were sent in a 14-hr time window divided into five equal time periods; participants could choose for the first window to start at 7, 8, 9, or 10 a.m. Within each of the periods, participants received a notification at a random time to fill out the survey. First, participants were asked to report their emotional experiences since the last beep. Then, they answered questions relating to the situation they were in during the most intensely experienced emotion since the last beep (see below).

Finally, participants reported their wellbeing. Participants completed between 42 and 75 surveys ($M = 66.7$, $SD = 5.8$) out of a possible number of 75-115[1] surveys, with an average compliance of 87.4% ($SD = 9.9\%$). This resulted in a total dataset of 7,110 effective surveys. Participants received proportionate monetary compensation.

Materials

Time Variant Measures

Positive Emotions. At the beginning of each survey, we assessed participants' momentary emotional experiences with the question: "What emotions have you experienced since the last beep (for the first time point of the day: since you woke up)?." Participants rated their emotional experience of 22 distinct positive emotions and five negative emotions: anxiety, admiration, anger, compassion, gratitude, sadness, euphoria, amusement, respected, hope, inspiration, interest, nervous, determination, moved, awe, relief, excitement, positive surprise, tenderness, satisfaction, triumph, pride, connection, bored, peaceful/calm, sensory pleasure. These 22 positive emotions had been pre-tested in a similar sample prior to the ESM study, which established that participants could understand these emotions, and judged them to be positive (R. Sun et al., 2021). The emotions were presented in alphabetical order to minimize cognitive burden. Participants could select as many emotions as they wanted. Then, they were asked to report the intensity of each of the emotions they had selected on a scale from 0 to 100. The most intensely experienced emotion was carried over to the next question, in which participants were asked to confirm that this emotion was indeed the most intense in the period since the last beep. Further questions were then asked about the situation involving this emotion. The study was set up to focus on activities relating to the most intensely experienced emotion, to keep the strain on participants to a minimum. Since the present study focused on positive emotional experiences, following our pre-registered analysis plan, observations in which participants listed a negative emotion to be the most intense were removed from further analyses ($N = 1{,}118$).

Active Activities. Next, participants were asked to report what they had been doing at the time when they experienced the most intense positive emotion. We used a list of 20 different activities, adapted from Smeets and colleagues (2020), with active activities defined as activities that require either mental or physical engagement (see Supplemental Materials Section 2). Active activities were praying, eating, hobbies, household chores, intimate relations, watching children, cooking, being on the way, communicating online, personal hygiene, socializing with people, exercising, volunteering, working/ studying, shopping, and video/phone calls. Activities that were considered passive were waiting, relaxing and doing nothing, resting, and watching TV. The activities were presented in a random order on each trial. Participants could select more than one activity; we considered any survey involving minimally one active activity to constitute an active activity; all other activities were considered passive.

Social Interactions. We then asked participants if they were interacting with anyone when they were experiencing their most intense emotional experience. Participants could choose one of four options: no interaction ($N = 2{,}687$), online interaction (e.g., e-mail, social networks, and text messages) ($N = 502$), interacting through video/phone calls ($N = 178$), and face-to-face interaction ($N = 3{,}739$). Given that there were relatively few observations involving online interactions and video/phone calls, we combined these two categories into one technology-mediated communication category ($N = 680$).

Wellbeing. Participants' wellbeing was measured using 10 questions about health, eudaimonic wellbeing (Rosenberg, 1965; Waterman et al., 2010), resilience (Block & Kremen, 1996; Hou & Ng, 2014), and life satisfaction (Lucas & Donnellan, 2012), with items presented in random order on each trial (see Supplemental Materials Section 3). We rescaled all 10 wellbeing items to a 7-point scale and reverse-scored the items on stress and tiredness. We then created a composite wellbeing score by averaging the transformed items, which demonstrated excellent internal consistency ($\alpha = .86$).

Time-Invariant Measures. We recorded time-invariant measures of participants' age, gender, and subjective SES (Adler et al., 2000; see Supplemental Materials Section 4) in a pre-ESM questionnaire.

Statistical Analyses

Our research questions and analyses were pre-registered at https://aspredicted.org/rn85n.pdf. The ESM data consisted of multiple repeated measurements ($N_1 = 7{,}110$ observations) of multiple variables per person ($N_2 = 106$ participants), that is, nested time series data. Because repeated observations at Level 1 are nested within persons at Level 2, we pre-registered multilevel regression analyses to test our hypotheses. The statistical analyses were conducted with *R* (R Core Team, 2020; see Supplemental Materials Section 6) and Mplus Version 8 (Muthén et al., 2017). The data and code can be found here: https://osf.io/hg9f2/

Results

Descriptive Results and Building Multilevel Models

First, we explored the descriptive statistics of the main variables of interest (see Tables 1 and 2). In total, participants reported having engaged in active activities in 5,602 surveys, of which 68.7% also involved some form of social

Table 1. *Descriptive Results of Main Variables*

Variable	*M*	*SD*	Minimum	Maximum	ICC
Face-to-face social interaction	52.6%	17.7%	15.4%	86.8%	
Technology-mediated social interaction	9.5%	8.4%	0%	48.0%	
No social interaction	37.9%	17.9%	2.9%	84.3%	
Active activities	81.5%	10.2%	50.0 %	98.7%	
Passive activities	18.5%	10.2%	1.3%	50.0%	
Positive Emotional Experience	84.3%	8.5%	57.6%	100%	
Positive Emotion Intensity	67.9	17.4	8	100	.59
Wellbeing	4.39	0.8	0	6	.62

Note. The descriptive results of the predictors denote the percentage of surveys the participant reported being engaged in a specific type of activity out of all completed timepoints (e.g., on average, participants reported a positive emotion as most intense for 84.3% of their completed surveys). This was calculated by first averaging within participants and then across participants. ICC = intraclass correlation.

Table 2. *Average Intensity of Positive Emotions During Activities*

Variable	*M*	*SD*	Minimum	Maximum
Face-to-face social interaction	70.4	16.2	15	100
Technology-mediated social interaction	67.9	17.8	15	100
No social interaction	64.8	18.5	8	100
Active activities	68.6	16.9	10	100
Passive activities	65.2	18.6	8	100

Note. These descriptive results of the main variables relate to the intensity of experienced positive emotions during different forms of time use (e.g., during face-to-face interactions, participants on average rated their most intensely experienced positive emotions at 70.4 out of a possible 100).

interaction. In comparison, 4,419 completed surveys involved a social interaction (either technology-mediated or face-to-face), of which 87.1% additionally involved an active activity. As expected, participants experienced positive emotions more intensely during social (especially face-to-face) interactions, compared to during moments with no social interaction, and during active activities compared to passive activities.

Then, we determined whether a multilevel approach was justified based on the intraclass correlation (ICC) of the wellbeing and positive emotion measures. For wellbeing, 38% of the outcome's variance could be explained by within-person longitudinal variations; for positive emotions, it was 41%. The nested data structure thus needed to be taken into account (Hoffman, 2015).

Next, we checked linear trends of time on wellbeing to establish if observation number or specific day needed to be considered (see Supplementary Materials Section 7). We also specified the appropriate error covariance structure with a second-order autoregressive, first-order moving-average structure, ARMA(2,1) model to take the autocorrelation of wellbeing and positive emotions into account (Hoffman, 2015; see Supplemental Materials Section 8).

Subsequently, we tested if we needed to take Level 2 control variables gender, age, and subjective SES into account. None of these variables significantly predicted wellbeing or positive emotions nor improved the fit of the baseline models; hence, we did not include them in subsequent analyses.

To test our predictions, we first created a fixed-effects model testing social interactions (adding the face-to-face interaction and technology-mediated interaction variables, both dummy-coded with no interactions as the reference) as predictors of wellbeing (H1a) and a fixed-effects model with active activities as a predictor of wellbeing (H2a). Then, we added a random intercept for each participant, which allowed us to account for baseline differences in participants' wellbeing. We additionally included random slopes for the predictors, as we expected the effects of the predictors on wellbeing to vary between participants. If the models failed to converge when random effects were allowed to correlate, we simplified the model by including independent random effects. Finally, we added the mediating variable positive emotion intensity into the models to test our mediation hypotheses (H1b and H2b; see Supplemental Materials Section 5). The predictors' and mediator's effects on wellbeing varied considerably between participants as indexed by models including random slopes outperforming equivalent models with random intercepts only. All reported results thus refer to the random-slope models.

Hypothesis Tests

Social Interactions and Wellbeing. We hypothesized that the positive effect of social interaction on wellbeing is mediated by momentary positive emotion experiences (H1).

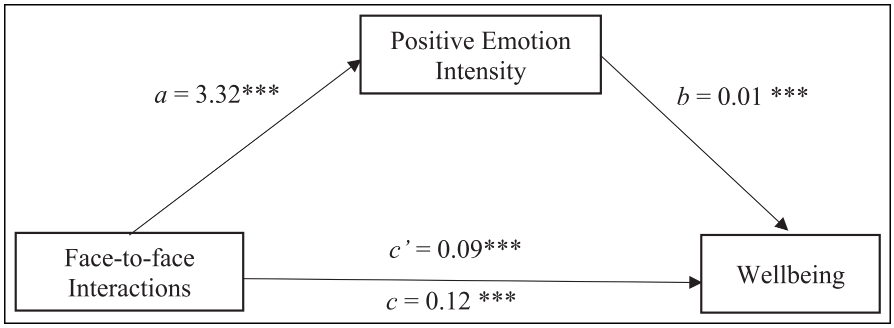

Figure 1. *Visual Representation of the Mediation Model for H1*
Note. ***$p < .001$.

Effects on Wellbeing. We found significant within-person effects of face-to-face social interaction on wellbeing, b = .13, 95% CI = [.10, .15], $t(5, 852) = 9.15$, $p < .001$, and technology-mediated social interaction on wellbeing, b = .04, 95% CI = [.00, .08], $t(5, 852) = 2.09$, $p = .04$. As expected, the effect of face-to-face social interaction on wellbeing was significantly bigger than the effect of technology-mediated social interaction ($z = 3.87$, $p < .001$) For between-person effects, we found a positive relationship between face-to-face interactions and wellbeing, b = .78, 95% CI = [.13, 1.43], $t(103) = 2.37$, $p = .02$; but no relationship between technology-mediated communication and wellbeing, b = .43, 95% CI = [-.94, 1.80], $t(103) = .62$, $p = .54$. These results confirm that participants had better wellbeing when they were engaged in face-to-face social interaction or in technology-mediated social interaction compared to when they were not engaged in social interaction (supporting H1a). In addition, those participants who reported more face-to-face interactions compared to others also reported higher wellbeing. Moreover, these results confirm our prediction (H1c) that face-to-face social interactions are significantly more beneficial to wellbeing than technology-mediated social interactions.

Effects on Positive Emotions. Next, we examined the relationship between social interactions and positive emotions. Within-person, we found significant effects of both face-to-face social interaction, b = 3.72, 95% CI = [2.75, 4.70], $t(5, 878) = 7.48$, $p < .001$, and technology-mediated social interaction, b = 1.87, 95% CI = [.74, 3.00], $t(5, 878) = 3.24$, $p = .001$. The effect of face-to-face social interaction was significantly larger than the effect of technology-mediated social interaction on positive emotions ($z = 2.74$, $p < .01$). For between-person effects, we found a positive relationship between positive emotions and face-to-face, b = 24.61, 95% CI = [10.86, 38.36], $t(103) = 3.55$, $p < .001$, but not technology-mediated interaction, b = 9.05, 95% CI = [−19.90, 37.99], $t(103) = 0.62$, $p = .54$. This shows that, as predicted, participants experienced more intense positive emotions when they were engaged in face-to-face social interaction or technology-mediated social interaction than when they were alone. Only participants who reported more face-to-face interactions than others also reported more intense positive emotional experiences; this advantage was not found for technology-mediated social interactions.

Mediation Effect. After establishing a positive link between social interactions and wellbeing, social interactions, and positive emotions, we fit a multilevel mediation model testing the path face-to-face, technology-mediated social interactions -> positive emotions -> wellbeing (H1b). We fit the mediation analysis at both the within-person and between-person levels simultaneously; mediation effects were only found at the within-person, but not between-person, level. Within participants, face-to-face interaction still significantly predicted wellbeing (c'-path, b = 0.09, 95% CI = [0.06, 0.12], $p < .001$), which indicates that the mediator does not fully explain the relationship between face-to-face interactions and wellbeing. Technology-mediated communication no longer predicted wellbeing (b = 0.02, 95% CI = [−0.02, 0.06], $p = .18$). Positive emotions had a significant positive effect on wellbeing (b-path, b = 0.01, 95% CI = [0.01, 0.01], $p < .001$). Although the effect of face-to-face interactions on wellbeing was still significant, we found support for partial mediation as the results showed a significant within-person indirect effect (b = 0.03, 95% CI = [0.02, 0.05], $p < .001$). The total effect was 0.12, 95% CI = [0.09, 0.15], $p < .001$. Positive emotions thus explained 0.03/0.12 = 25% of the relationship between face-to-face interactions and wellbeing. These results show that when people have more face-to-face interactions, they experience enhanced wellbeing, which is in part explained by the fact that face-to-face interactions increase momentary experiences of positive emotions, see Figure 1.

Active Activities and Wellbeing. We also hypothesized that the positive effect of active activities on wellbeing would be mediated by momentary positive emotional experiences (H2).

Effect on Wellbeing. For within-person effects, we found a significant positive relationship between active activities

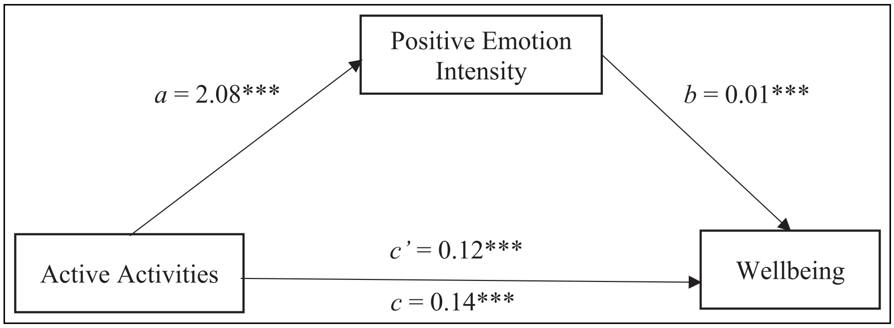

Figure 2. *Visual Representation of the Mediation Model for H2*
Note. *** $p < .001$.

and wellbeing, $b = 0.13$, 95% CI = [.10, .16], $t(5, 643) = 7.78$, $p < .001$, but for between-person effects, we did not find a significant relationship, $b = 0.59$, 95% CI = [−.54, 1.72], $t(104) = 1.03$, $p = .30$. Participants thus reported higher wellbeing at time points when they were engaged in active activities as compared to when they were engaged in passive activities.

Effect on Positive Emotions. Active activities also significantly predicted positive emotions both at the within-person, $b = 2.03$, 95% CI = [1.13, 2.92], $t(5, 669) = 4.44$, $p < .001$, and between-person level, $b = 29.18$, 95% CI = [5.11, 53.26], $t(104) = 2.30$, $p = .02$. This means that participants experienced more intense positive emotions at time points when they were engaged in active activities compared to when they were engaged in passive activities, and those participants who engaged in more active activities experienced more intense positive emotions than those who engaged in fewer active activities.

Mediation Effect. Similar to testing H1, we then fit a full mediation model including all slopes simultaneously. We fit the mediation analysis at both the within-person and between-person levels simultaneously; mediation effects were only found at the within-person, but not between-person, level. Within participants, active activities still significantly predicted wellbeing (c'-path, $b = 0.12$, 95% CI = [0.08, 0.16], $p < .001$). Positive emotions also had a significant positive effect on wellbeing (b-path, $b = 0.01$, 95% CI = [0.01, 0.01], $p < .001$). Although the effect of active activities on wellbeing was still significant, we found support for partial mediation as the results showed a significant within-person indirect effect ($b = 0.02$, 95% CI = [0.007, 0.030], $p = .03$). The total effect was 0.137, 95% CI = [0.10, 0.17], $p = .001$. Positive emotions thus explained .017/0.137 = 12.4% of the relationship between active activities and wellbeing. Our within-person mediation analysis shows that when people engage in more active activities, they experience enhanced wellbeing, and this is partially explained by active activities increasing positive emotion intensity (see Figure 2).

Exploratory Analyses

For exploratory purposes, we examined the lagged effects of social interactions and active activities on wellbeing to probe whether the effects would be sustained over time (see Supplemental Materials Section 9). Our findings suggest that there is no direct effect of social interactions or active activities on wellbeing outside of the current moment, but the effect of positive emotions on wellbeing last longer, benefiting wellbeing for several hours. We also exploratorily tested whether engagement in social interactions and active activities would have long-term effects on wellbeing (6 months post ESM-period; see Supplemental Materials Section 10). We did not find any long-term effects of engaging in social interactions or active activities on wellbeing, after controlling for pre-existing levels of wellbeing.

Discussion

Spending time with others and being active is good for our wellbeing, but little is known about *how* such activities benefit us. Here, we tested the hypothesis that momentary positive emotional experiences act as a mediating mechanism. In a pre-registered 15-day experience sampling study, we find support for the notion that positive emotional experiences partially mediate the relationship between how we spend our time and our wellbeing.

The Mediating Role of Positive Emotions

Consistent with previous research (e.g., Sandstrom & Dunn, 2014; Wohn et al., 2017), we found enhanced wellbeing when people interacted with others, as compared to when they were alone, and when they were interacting face-to-face compared to through technology (within-person effect). We also found that people who generally had more face-to-face interactions had better wellbeing than people who reported fewer face-to-face interactions (between-person effect). In addition, we found that when people experience intense positive emotions, they are more likely to be engaged in social interaction than to be on their own. Both face-to-face interactions and technology-mediated communication positively predicted positive emotion fluctuations within person; for between-person effects, only face-to-face interactions positively predicted the level of positive emotions. The current study thus supports the well-established boost in happiness that individuals experience while interacting with others (Lam & García-Román, 2020).

These results indicate that people experience more positive emotions and greater wellbeing during face-to-face social interactions as compared to technology-mediated social interaction. Some scholars have argued for wellbeing benefits of technology-mediated interactions, for example, via a reduced risk of loneliness and reduced negative mood (Sacco & Ismail, 2014; Teo et al., 2019). Our results provide partial support for this claim but arguable align better with arguments highlighting the fact that technology-mediated interactions are less beneficial for wellbeing than face-to-face social interactions (Sherman et al., 2013; Wohn et al., 2017). Importantly, our results show that technology-mediated interactions are associated with less intense positive emotions than face-to-face interactions, which may explain why they are less beneficial for wellbeing.

Moreover, our results show that people experience improved wellbeing when they are engaging in active activities compared to when they are only engaged in passive activities. This result replicates the common finding that active activities benefit wellbeing (e.g., Biddle & Murie, 2007; Smeets et al., 2020). We additionally show that people experience more intense positive emotions when they are engaging in active activities compared to when they are only engaged in passive activities, which confirms that spending one's time actively elicits positive emotions (Kim & McKenzie, 2014).

To date, research has not shown *how* engagement in social interactions and active activities boosts wellbeing. Our study provides novel evidence of a mediating role of momentary positive emotions. In line with our predictions, we found that positive emotional experiences account for 25% of the positive effect of face-to-face (but not technology-mediated) interactions, and 12% of the positive effect of active activities on wellbeing. While these indirect effects are relatively small, it is worth noting that our models only included the most intensely experienced emotions. Although this approach arguably captures the most important emotional experiences, it likely underestimates the role of emotion as a mediator since the potential effects of less intense emotional experiences are not modeled.

Our results show that the beneficial effect social interactions and active activities have on wellbeing is partly due to the intense positive momentary emotions that people experience during social interactions and active activities. This finding fits the broaden-and-build theory of positive emotions (Fredrickson, 2004), which suggests that positive emotional experiences generate an upward psychological spiral that leads to enhanced wellbeing. Our findings also show that the mediating effect of positive emotions applies more broadly than via wellbeing interventions, such as writing gratitude letters and meditating (Lyubomirsky & Layous, 2013). The present findings build on this work to show that face-to-face interactions in general and a wide range of active activities can benefit wellbeing through the positive emotions they elicit.

Limitations and Future Directions

The current study has several limitations. First, these data do not allow for causal conclusions. Social interactions do not only elicit emotions, but are also shaped by emotional experiences. For example, individuals who experience positive feelings are more likely to subsequently engage in social interactions (Elmer, 2021). Similarly, for active activities, it remains unclear if experiencing a positive emotion is the antecedent or the consequence (or both) of active activities like exercise (Ekkekakis et al., 2008; Fredrickson & Joiner, 2018; Kruk et al., 2019). Our lagged effects results suggest that the effects of activities on positive emotions or wellbeing do not last beyond the current moment, while the experience of positive emotions still influences wellbeing hours after. Experimental data will be needed to establish the causal relationships between these factors.

Second, it was not feasible to investigate the full range of emotional intensity in the present study. This means that our analysis focused on activities that elicit relatively intense positive emotional experiences. It may be that social and/active activities that elicit less intense positive emotions have a different relationship with wellbeing. In particular, activities that involve emotional experiences below a certain threshold may not be meaningfully related to wellbeing at all. It will be important to probe these potential boundary conditions in future research.

Third, while the current study asked what participants were experiencing and doing at a specific time point, we have no data on the duration of activities or emotional experiences. We therefore cannot draw any inferences regarding the amount of time participants engaged in different activities, which may be of considerable importance (Smeets et al., 2020). It would be worthwhile to investigate how the duration of activities relates to momentary positive emotions and wellbeing. In practice, however, a major challenge for this type of research question is the reliance on approaches that are sensitive to memory bias (Diener & Tay, 2014).

Fourth, different emotions of the same valence can relate to wellbeing in different ways (R. Sun et al., 2023). The focus of the present study was to test for a mediating pathway using all positive emotional experiences to allow for robust, well-powered analyses, but specific positive emotions may have a stronger relationship with wellbeing than others. It will be of interest for future studies to examine if momentary experiences of specific emotions influence wellbeing in different ways. In addition, the current study was not set up to model the role of negative emotional experiences, but it could be interesting to examine if and how negative emotions shape the relationships between social interactions, active activities, and wellbeing.

Finally, it would be valuable to investigate the relationship between the effects of social and active activities. Positive emotions elicited from engaging in physical exercise may evoke more social interactions (Kim & McKenzie, 2014), while social networks and social contact influence how much people engage in active activities (Carlson et al., 2012; de la Haye et al., 2010; Yu et al., 2011). It would be worthwhile to investigate if doing something active together with others leads to stronger positive emotions and wellbeing benefits than engaging in active non-social activities or social passive activities, particularly in the context of potential implications for wellbeing interventions.

Conclusion

Why is it helpful for our wellbeing to spend time with others and being active? Using experience sampling, we show that the way we spend our time influences wellbeing in part through the positive emotions we experience during specific types of activities. Thus far, initiatives to improve wellbeing have primarily been aimed at negative emotions, specifically anxiety (MacLeod & Clarke, 2015) and loneliness (Masi et al., 2011). The current results point to the promise of focusing on improving wellbeing by encouraging time-use interventions to stimulate positive emotional experiences. In light of recommendations from the World Health Organization (Guthold et al., 2018) on the importance of being active, we hope that these results provide encouragement to seeking out active and social activities that are experienced as enjoyable in the moment. Moreover, our results highlight the added emotional value of spending time with others face-to-face, in contrast to technology-mediated social interactions. In sum, the brief moments of happiness we experience from social or active activities play a key role in determining our levels of wellbeing.

Declaration of Conflicting Interests

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Availability of Data and Materials

All data and materials reported for this manuscript are publicly available online and can be accessed at https://osf.io/hg9f2/
Pre-registration link: https://aspredicted.org/rn85n.pdf

Supplemental Material

The supplemental material is available in the online version of the article.

Note

1. Some participants completed extra observations a few days after the 15-day data collection period had ended rather than instantly; we report all possible observations of the days in between as missed beeps.

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