

Exploring the Association between Quantitative and Qualitative
Social Interactions on Well-Being Moderated by Depression: An
Experience Sampling Study

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Abstract

Background: Research shows that more and more people are feeling lonely nowadays, which acts as an accelerator and risk factor for the development of depression. It is well known that positive social interactions and meaningful relationships play an important part in a person's overall well-being. However, there is less research about the importance of social interactions and contacts during everyday life. Thus, this study examines the relationship between quantity and perceived quality of social interactions on well-being. Depression is included as a moderator variable to test whether the relationship between the quality of social interactions on well-being differs according to the individual's level of depression.

Method: The Experience Sampling Method was used to collect the data in the present study. In total 37 participants (mean age = 24.68, 70.30% female) were included in the analysis who filled out the questionnaire three times a day over two weeks. Momentary well-being was assessed using the Positive and Negative Affect Schedule. Social contact has been measured by asking participants whether they had a contact and, if yes, how they perceived this contact in terms of perceived quality. Lastly, depression was measured by using the PHQ-9 questionnaire. Linear mixed models were used to analyse the associations. The Johnson Neymann method was applied to probe the interaction.

Results: The findings of this study show that a higher number of social interactions can be associated with increased positive affect ($B = .29, p < .001$). The quality of the contacts had an even stronger relation on wellbeing showing that perceived positive contacts have a positive association on positive affect ($B = 1.49, p < 0.001$). Further, when depression is included in the analysis described previously, the interaction effect on positive affect is significant ($B = 0.59, p < 0.01$). Testing the interaction on negative affect the findings for positive perceived social interaction show a decrease in negative affect ($B = -0.99, p < 0.01$).

Conclusion: Especially, the preliminary finding that depression works as a moderator, showing that with higher levels of depression, the association between quality social interactions on well-being increases, is unique. Thus, positively perceived interactions can be an important factor in improving the momentary well-being, especially in depressed people. Nevertheless, the findings need to be taken with caution considering the limitations. As this study only entails a low amount of people having a severe depression it is advised to analyse the relation again having a representative sample with more people suffering from a severe depression.

Introduction

In Western societies, loneliness is becoming an increasing problem (Hysing et al., 2020; Demarinis, 2020), so some researchers even speak of "loneliness at epidemic levels" (Demarinis, 2020; Lemay et al., 2019). According to Hysing et al. (2020, p.1) "Loneliness reflects the subjective feeling of disconnectedness and not belonging". The feeling or perception that the quality or quantity of social contacts are not covered can lead to a feeling of loneliness (Houghton et al., 2016). Quantity of a social contact can be defined by the mere number of social interactions someone has and quality by the respondent's evaluation of that contact (Gibson, 1987).

A study by the health insurer Cigna (2020, as cited in Demarinis 2020) shows that the feeling of loneliness is increasing as three out of five Americans (61%) felt lonely in 2019 in comparison to 51% in 2018. The rapid increase in technological innovations is one of the main reasons for this. Virtual social contacts often do not lead to a feeling of belonging as intended, but paradoxically more often to the opposite result (Rumas et al., 2021; Lemay et al., 2019). The social isolation that is associated with the Corona pandemic acts as an accelerant and contributes to increased loneliness (Rumas et al, 2021). Feelings of loneliness lead to severe consequences, thus increasing the risk of suffering from depression (Erzen & Cikrikci, 2018; Houghton et al., 2016), anxiety disorders (Houghton et al., 2016) and committing suicide (Waern et al., 2003).

Having social contacts and relationships is something that gives meaning to most people and has proven to have an influence on the quality of life (Reis & Gable, 2003). Moreover, social contacts are an important component of well-being, with both social support and social networks having an influence on mental health (Kawachi & Berkman, 2001). As loneliness is increasing it could be of great value to investigate and analyse the impact of having social contacts in the context of daily life. So far, research on the association of social relationships on daily momentary experiences is scarce.

In addition, this study aims to investigate whether the quality of social contacts has the same influence on well-being depending on a person's level of depression. Previous literature has shown that depression is associated with increased loneliness (Erzen & Cikrikci, 2018) and that people suffering from depression generally perceive social interactions more negatively (Kube et al., 2020). The focus was often problem-focused, neglecting the importance of positive experiences in social settings for people with depression (Algoe, 2019). This study raises the question if there is a difference when depression is used as a

moderator testing the relationship between a positively valued social interaction on well-being.

Well-Being and Social Contacts

Various scholars emphasise that people with increased social interactions and higher levels of social support tend to have a better mental health (House et al., 1988; Sandstrom & Dunn, 2014; Tay et al., 2013). The World Health Organization (WHO) defines mental health as a "state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2004, p.111 as cited in Westerhof & Keyes 2010). Based on that, the two-continuum model of mental health stresses that "[...] mental health is not merely the absence of mental illness, but it also includes the presence of positive feelings (emotional well-being) and positive functioning in individual life (psychological well-being) and community life (social well-being)" (Lamers et al., 2011). According to Keyes (2005) people with a high well-being and low symptoms of psychopathology are in a state of complete mental health also referred to as flourishing. This perspective on well-being therefore actively incorporates negative and positive emotions (Lamers et al., 2011) which is in line with the broaden-and-build theory developed by Fredrickson (2004). The broaden-and-build theory states that positive emotions lead to a broadened perspective and attention. This in turn serves as a resilience factor and catalyst for the development of positive resources that can be protective in times of adversity. Fredrickson (2004) speaks of an upward spiral, as the increased ability to see and recognise positive things leads to more positive emotions and vice versa, suggesting a reciprocal relationship.

For example, Rohrer et al. (2018) showed that people who tend to socialise are experiencing more positive emotions which is beneficial for well-being according to the broaden-and-build theory and two-continuum model. Moreover, positive interactions and relationships can increase the feeling of belonging, social connectedness, and social support (Jetten et al., 2014). A study by Sandstrom & Dunn (2014) indicates that even a short social interaction has a significant association on a person's mood. In their study they tested if a social interaction with a barista at Starbucks led to a difference in mood. They concluded that positive affect and satisfactions increased and were mediated by the feeling of belonging by having a pleasant social interaction with the barista (Sandstrom & Dunn, 2014). Additionally, Wheeler et al. (1983) found in one of their studies that perceived meaningful social contacts, were associated with lower levels of loneliness, indicating that the quality of contacts is important. Therefore, it can be said that positive relationships have a positive association on

general well-being and thus contribute to better overall mental health (Keyes, 2005).

One of the most important theories which explains the importance of social contacts is Baumeister's Need-to-Belong theory (Baumeister, 2011). This theory describes that people feel an intrinsic motivation to belong to at least a small group of people. Social contacts play an important factor for our mental well-being as basic concepts such as self-esteem depend upon social contacts (Baumeister, 2011). The importance of social contacts is also scientifically justified from a purely evolutionary viewpoint and is based on the finding that early humans who were able to have social contacts and bonds had a higher probability of surviving (Baumeister & Leary, 1995). However, being rejected or losing social ties has a negative impact on self-esteem (Baumeister & Leary, 1995).

The Importance and Need to Analyse the Quality of Social Relationships

It is important to measure the perceived quality of social interactions (Reis & Gable, 2003; Jetten et al., 2014) as people can also suffer both psychologically and physically from destructive relationships (Solferino & Tessitore, 2019, Reis & Gable, 2003). Relationships are therefore not always experienced as positive and can impact the most basic psychological processes such as coping with stress, self-perception and identity formation (Reis & Gable, 2003 p. 131; Baumeister & Leary, 1995). The previously cited study by Sandstrom & Dunn (2014) emphasises in their introduction that a short but negative interaction can have a significant impact to our mood or to the feeling of belonging and not belonging. Even short unpleasant disruptions of a brief silence in a conversation can cause negative feelings of rejection (Koudenbourg et al., 2011). It is not only the mere number of social interactions but more importantly how we as humans perceive these social interactions and contacts (Wheeler et al., 1983; Gibson et al., 1987). Thus, positive relationships are beneficial for overall well-being, but negative or dysfunctional relationships may have an even greater impact than positive connections on well-being (Jetten, et al., 2014).

Positive and Negative Affect and Social Interactions

Psychologists are often interested in differences in the way how people perceive and describe their emotional experience and literature confirms that humans tend to view social interactions differently depending on their current mood (Reis & Gable, 2003). Some people have the tendency to see things more positively and some people have the tendency to view things more negatively (Berry & Hansen, 1996). This is also referred to *high positive affect* or *high negative affect*. High positive affect is associated with more desirable events and refers to the "[...] extent to which a person feels enthusiastic, active, and alert" while negative affect

is associated with “[...] subjective distress and unpleasurable engagement” (Watson et al., 1988, p. 1063). Higher positive affect is associated with a higher emotional, social and psychological well-being (Fredrickson, 2013). Mood or affect nowadays is often measured using the Positive Affect (PA) and Negative Affect (NA) dimensions of the affect schedule (PANAS).

When being in a positive mood, it is more likely that the experienced contact with another person is also perceived as positive (Reis & Gable, 2003). Moreover, people who have higher positive affect scores are spending more hours with their friends per day in comparison to people with high negative affect scores. People who score high in negative affectivity are experiencing high emotional distress from mild to moderate provocation in relationships which often leads to relationship dissatisfaction (Karney & Bradbury, 1997).

Depression and Social Interactions

The tendency to perceive things negatively is particularly the case for people with depression (Beck, 1979). Against this background depression is incorporated in this study to analyse the relation of social interactions and the level of depression more specifically. Past literature has shown that depression is closely related to the feeling of loneliness (Erzen & Cikrikci, 2018) and that increasing social interactions are an important part for the treatment of depressive patients (Cuijpers et al., 2007). However, there is a need to understand the relation of depression and social interactions as best as possible to offer a suitable and functional treatment (Renner et al., 2014). No existing study has analysed whether the association of the quality of a social interaction on well-being is different depending on the level of depression.

Symptoms of depression are a depressed mood (e.g., feeling sad, irritable, empty) or a loss of pleasure or interest in activities (WHO, 2021, p.1). Moreover, other symptoms are “[...] poor concentration, feelings of excessive guilt or low self-worth, hopelessness about the future, thoughts about dying or suicide, disrupted sleep, changes in appetite or weight, and feeling especially tired or low in energy” (WHO, 2021 p. 1). People who are scoring high on depression scales have the tendency to view things more negatively. This is explained as the cognitive triad in which the world, oneself and the future is perceived as negative (Beck, 1979).

Moreover, according to Bosc (2000) “[...] an impairment of social functioning is a significant aspect of depression distinct from the symptoms of depression” (p 1.). As a result, people suffering from depression feel particularly alone. The feeling of being alone leads to social interactions often being described as stressful and exhausting, which in turn leads to

people behaving more reservedly in interactions. This creates a vicious circle in which thinking and the tendency to negative affectivity becomes a negative affirmation (Van Roekel et al., 2014). Therefore, depression is closely associated with the increasing problem of loneliness and negative affect (Erzen & Cikrikci, 2018).

Past literature has shown that the connection between positive contacts and well-being is essential, especially for people suffering from depression. Experiencing positive relations is related with less depressive symptoms (Stafford et al., 2011). Scientific articles confirm that depressed people are experiencing fewer positive social relations (Stafford et al., 2011, Van Roekel et al., 2014) and have the tendency to perceive things more negatively (Beck, 1979). However, is there an association on well-being if someone with a high depressive level perceives a social interaction as pleasant? Is the association on affect or well-being the same as for people with low symptoms of depression? There is no current literature examining this relationship, although there is a high importance of analysing and promoting positive experiences and emotions among depressed people (Lambert et al., 2012).

Momentary influences of positive social interactions on positive and negative affect

Additionally, it needs to be highlighted that the momentary social interactions on mental health have not yet been extensively studied. Exploring the association of social contacts and mental health in daily situations is important as affect is often context dependent and varies (Van Roekel et al., 2014). There are several studies which have analysed the association cross sectionally therefore missing out the variations and fluctuations of affect (Van Roekel et al., 2014).

To collect everyday differences both within and between person and capturing not only trait but also state constructs, the Experience Sampling Method (ESM) can be applied. ESM is a method in which participants are asked about different constructs in relatively short surveys several times a day. According to Myin-Germeys & Kuppens (2021) the ESM has several advantages. It is possible to analyse data which is produced by participants in the real word and in real time (p. 10). This leads to a high ecological validity, i.e. capturing real life experiences. It also reduces a memory bias by asking about the momentary experience and not about events which have already happened several days ago (Scollon et al., 2009).

Research questions and hypotheses

The present study analyses the relationship between social interactions and positive and negative affect by using the ESM method. Existing research suggests that social interactions have an impact on well-being. Nevertheless, loneliness increases and has a detrimental effect on mental health as it is associated with higher symptoms of depression.

There is a broad consensus that social interactions are beneficial for overall mental health (Passmann, 2022). However, previous studies have rarely measured the direct day-to-day relationship of social interactions on well-being. With the use of the ESM method, it is possible to measure the quality, i.e. the evaluation of the individual social interactions, more precisely. This was shown for example by Mote & Fulford (2020) who examined the ESM method with regards to social problems in schizophrenia patients. According to Mote & Fulford (2020), ESM is “[...] more suitable for understanding in-the-moment feelings or thoughts about specific contexts, situations, and relationships” (p. 65).

Furthermore, in this study depression is integrated as a moderating variable because the impact of social interactions on positive or negative affect may be different for people with symptoms of depression. The aim is to assess the social experiences of people with different levels of depressive symptoms and to see whether the influence on well-being is different. Testing a relation with a possible moderator variable can give new insights into “[...] what condition certain effects occur or not occur, how their magnitude varies, and how their direction can change” (Montoya, 2016, p.2).

The following research questions were created based on the literature summarized above.

(RQ1) How are momentary social contacts associated with well-being over time?

(RQ2) How are positively perceived daily social contacts compared to contacts perceived as neutral or low in positivity associated with well-being over time?

(RQ3) Does depression act as a moderator for the association of perceived social contacts on well-being over time?

Method

Participants

In total 69 participants were recruited using a non-probability convenience sampling. Convenience sampling meets practical criteria like easy accessibility for the researcher or high availability of participants (Etikan et al., 2016). This is especially useful when conducting a long-term study in which a high willingness and time investment of participants is expected (Dejonckheere & Erbas, 2021). Inclusion criteria were: 1) a reasonable understanding of the English or the German language; 2) at least 18 years old; and 3) access to a mobile device to download the Ethica app (<https://ethicadata.com/>) which was used to ask participants the questions. Moreover, Participants were only included in the data analysis if they had at least a fifty percent response rate (Conner & Lehman, 2012).

ESM Protocol

This study was approved by the ethics committee of the Faculty of Behavioural, Management and Social Sciences of the University of Twente (Approval code: 211225). Moreover, the study was conducted as a secondary analysis using an existing dataset which was collected by two psychology students as part of their master thesis at the University of Twente (Passman, 2022; Schleich, 2022).

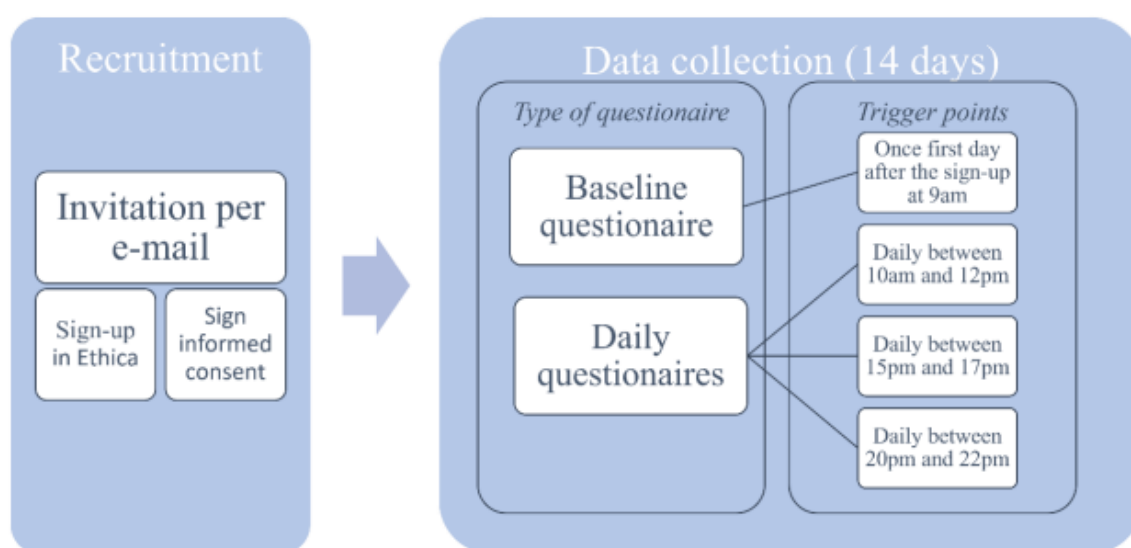
The Experience Sampling Method (ESM) was applied to measure different constructs. The Ethica application (<https://ethicadata.com/>) was selected as a tool in which it is possible to collect data from Android and iOS devices. The study duration was set on 14 consecutive days which is in line with the assumption of Conner & Lehmann (2012) who indicated that “Studies involving multiple reports per day (variable or fixed) typically run from three days to three weeks” (p. 15). Berkel et al., (2017) conducted a literature review and identified 14 days as the median study duration. As the participant burden could be high due the repeated measurement occasion participant burden needs to be minimised. However, 14 days results normally in a good response rate and is recommended by several researchers (Heron & Smyth, 2010; Stone et al., 1991; Berkel et al., 2017). The study started and ended for all participants on the same day (22nd of November 2021 until the 5th of December 2021).

Participants received an invitation by email that included information about the study and instructions on how to download the Ethica app. After downloading the app an informed consent was signed digitally to register for the study (Appendix A). A baseline questionnaire was administered one day after the sign up to assess demographics and trait-like measures (Appendix B). Daily questionnaires were used to measure state-like constructs (Appendix C). For the daily questionnaires a semi-random sampling strategy was chosen in which

participants are asked on different times during the day. To ask participants on a random time between a fixed time period has several advantages. First, people cannot completely anticipate the time in which they have to answer the questions which is an advantage as the ESM method's aim is it to capture the momentary state in everyday people's life. Therefore, anticipating the questionnaire can bias the results. However, having an indication when to answer something is also helpful in order decrease the burden on the participants (Conner & Lehmann, 2012). Participants received three daily questionnaires on their phones on three different time intervals. The first questionnaire was filled out between 10 am and 12 am, the second between 3 pm and 5 pm, and the third one between 8 pm and 10 pm. Participants had two hours after the notification to complete the questionnaires and a reminder was sent after 60 minutes. Researchers were available during the data collection to help participants if they encountered problems. The measurement design is visualized in Figure 1.

Figure 1

Measurement design of the questionnaire



Note. *Exploring the Associations between Gratitude, Stressful Events, and Emotional Well-Being and Distinguishing Between-and Within-Person Associations of Gratitude and Emotional Well-Being: an Experience Sampling Study* (p. 12) by A. Schleich (2022).

Retrieved from <http://purl.utwente.nl/essays/89783>

Materials

All questionnaires which were used have been administered in English or in German. The questionnaire consists of various baseline surveys, measuring sociodemographic data and trait questionnaires as well as multiple questionnaires which are intended to measure the momentary state assessments of different constructs. It will be only described how social interactions, positive/negative affect and depression were operationalised, as these variables are the focus of the present study. To check the reliability of the items, a test-retest reliability was performed. For each state measurement used, the average and standard deviation of the first half of the week was correlated with the second week. According to Cohen (1988), a Pearson coefficient r of $> .1$ ($-.1$) indicates a weak association, $r > .3$ ($-.3$) indicates a moderate correlation, and $r > .5$ ($-.5$) assumes as a strong correlation.

Demographics. To measure the demographics five questions were asked about age, gender, nationality, current occupation status, and the highest level of completed education.

Trait Depression. Depression was measured with the Patient Health Questionnaire (PHQ-9), which consists of 9 items. An example item would be: *“Over the last 2 weeks, how often have you been bothered by any of the following problems: Little interest or pleasure doing things”*. The items were answered on a four-point Likert-scale ranging from *“not at all”* to *“nearly at all”*. If individuals scored 0-4, they were most likely not depressed, scoring 5-9 shows mild depression, 10-14 moderate depression, 15-19 moderately severe depression and 20-27 severe depression (Hayat et al., 2021). The questionnaire was used already in multiple other studies (Maurer et al., 2018; Levis et al., 2019) and showed good convergent validity as well as good internal consistency (Kim & Lee, 2019). The Cronbach’s alpha for the PHQ-9 in this study was .75 which can be indicated as acceptable.

State Positive and Negative Affect. To assess the mood of the participants in daily situations the 8-item version of the PANAS-SF was used. There were four items for positive affect (e.g. *“Please indicate the extent you currently feel cheerful/enthusiastic/satisfied/relaxed”*) and four items for negative affect (e.g. *“Please indicate the extent you currently feel anxious/insecure/down/guilty”*). These items were answered on a seven-point Likert-scale ranging from *“not at all”* to *“very much”*. Depending on the item a high score is associated with positive or negative affect. The psychometrics of the PANAS-SF questionnaire with 10 items was already tested and the internal reliability, convergent and criterion related validity were found to be acceptable (Thompson, 2007). The test-retest reliability of the PANAS-SF in this study was .90 (SD = .62) which shows an excellent reliability.

State Positive Relations. First it was measured whether participants had a social contact and with whom if so. In the questionnaire it was formulated like this: “*Who did you spend time with since the last time you answered a questionnaire for this study? (online or offline). If more answers apply, only choose the longest contact)*”. Following options were possible to answer after the first question: “*Family member, friend, romantic partner, co-worker/fellow student, other, and I did not spend time with anyone*”.

After that it needs to be identified how pleasant/positive the contact was perceived. That was asked through the questions “*How pleasant did you experience the contact you had?*” and “*How positive did you experience the contact you had?*”. Participants answered on a seven-point Likert scale (“*not all*” to “*very much*”). A high score is associated with pleasant and positive feelings concerning the contact.

Data Analysis

The programs SPSS version 26 and R were used to perform the data analysis. First, the three different data sets were merged. To prepare the dataset, all participants with a response rate below 50% were excluded. In the end, the dataset consisted of 37 participants and 1537 data points of which 227 rows were missing. Furthermore, the dataset was prepared for the individual research questions. A continuous time variable was added for each participant. The individual items of the measurement scales were combined into constructs. The last 4 items of the scale for positive and negative affect were recoded to get the construct *positive affect*. For *negative affect* the first 4 items of the scale were recoded. Moreover, different linearity assumptions were checked for all conducted linear mixed models. For that the symmetry of the independent variables were checked as well as the multicollinearity by taking into account the variable inflation factors (VIF). Lastly the homoscedasticity (distribution of residuals) was checked using a scatterplot of residuals versus predicted values (Van den Berg, 2021). Multilevel mixed models were used to analyse the data and to answer the research questions. All linear mixed model were tested once for *positive affect* and once for *negative affect*. The nlme package was used to run linear mixed models in R and ggplot2 was used to visualize different effects (Pinheiro et al., 2020). Moreover, a first-order autoregressive (AR1) covariance matrix was applied. According to Kraiss et al., (2022) this covariance structure is [...] “based on the assumption that correlations between measurements decline exponentially over time, and because AR1 showed a significantly better fit versus a model with a variance components or compound symmetry structure” (p. 5).

For the first research question a dummy variable was developed to categorise social contacts in either 1 for social contact or 0 if no contact took place. For the first model *social*

interaction and *time* was used as fixed effect and *well-being* (*positive* and *negative affect*) as the depended variable. A linear mixed model was run. This gave a regression coefficient indicating how strong the relationship between *social interactions* and *well-being* (*positive* and *negative affect*) is across all time points.

For the second research question a similar procedure was chosen. However, a total score was calculated for the items "How pleasant did you experience the contact you had?" and "How positive did you experience the contact you had". This scale was then categorized into low "negative" (<3), moderate "neutral" (3-5), and high "positive" (>5). Again, the different assumptions were tested, and a linear mixed model was run using *positive* and *negative affect* as dependent variable.

Finally, the interaction effect of *depression* on the *perception of social contact* on *affect* was tested. Again, a linear mixed model was run to test the interaction. For that *depression* was used as a moderator on the relation of *perceived social interactions* on *well-being* (*positive* and *negative affect*). Additionally, the Johnson-Neyman procedure was applied. Probing with the help of the Johnson-Neyman procedure can help to understand and to visualise the moderation effect better. Through this procedure, it is possible to see the different regions of the moderation and to check where the association is smaller than the critical α value. One can therefore examine the significance and direction of the relationship between the quality of social interaction on depression in more detail (Montoya, 2016). Lastly, to compare the different results with other scientific findings all variables were standardised into z-scores.

Results

Sample Characteristics

The age of the participants ranged from 18 to 57 years with an average of 25 ($M=24.68$, $SD=9.46$). The sample consisted of 11 males and 26 females. 19 participants were from Germany, 13 from the Netherlands and 5 people from other countries. The demographics are summarised in Table 1. To assess the distribution of mood and depression, the mean, as well as the minimum and maximum values, were calculated for these variables (Table 2).

Table 1*Sample Characteristics (N = 37)*

Variable	Category	Frequency	%
Sex			
	Male	11	29.7
	Female	26	70.3
Nationality			
	Germany	19	51.3
	Dutch	13	35.1
	Other	5	13.5
Status of Employment			
	Studying	20	54
	Working	5	13.5
	Self-Employed	2	5.4
	Studying and Working	10	27

Table 2

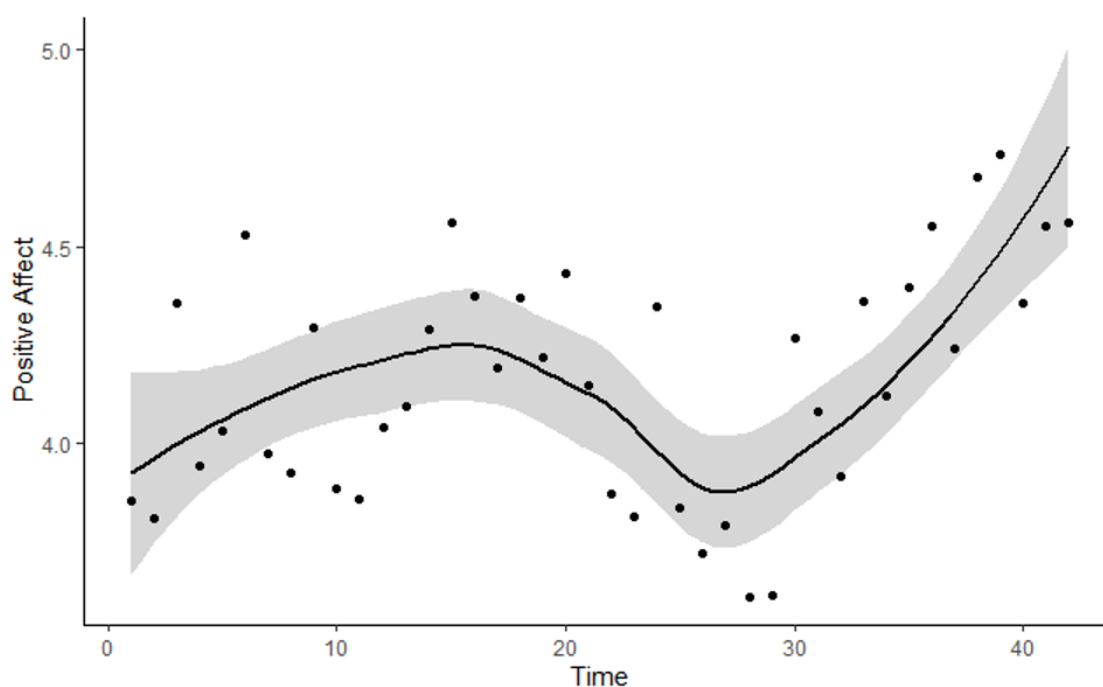
Mean, standard deviations and minimum/maximum of variables

Variable	Mean	Std	min	max
Positive Affect	4.15	1.25	1	7
Negative Affect	2.41	1.26	1	7
Depression	6.94	4.06	0	18

To lead further the distribution of the mean of positive affect across all time is visualised in Figure 2. The mean of positive affect varies and is especially at the end of the measurement period the highest.

Figure 2

Distribution of Mean Positive Affect across time points

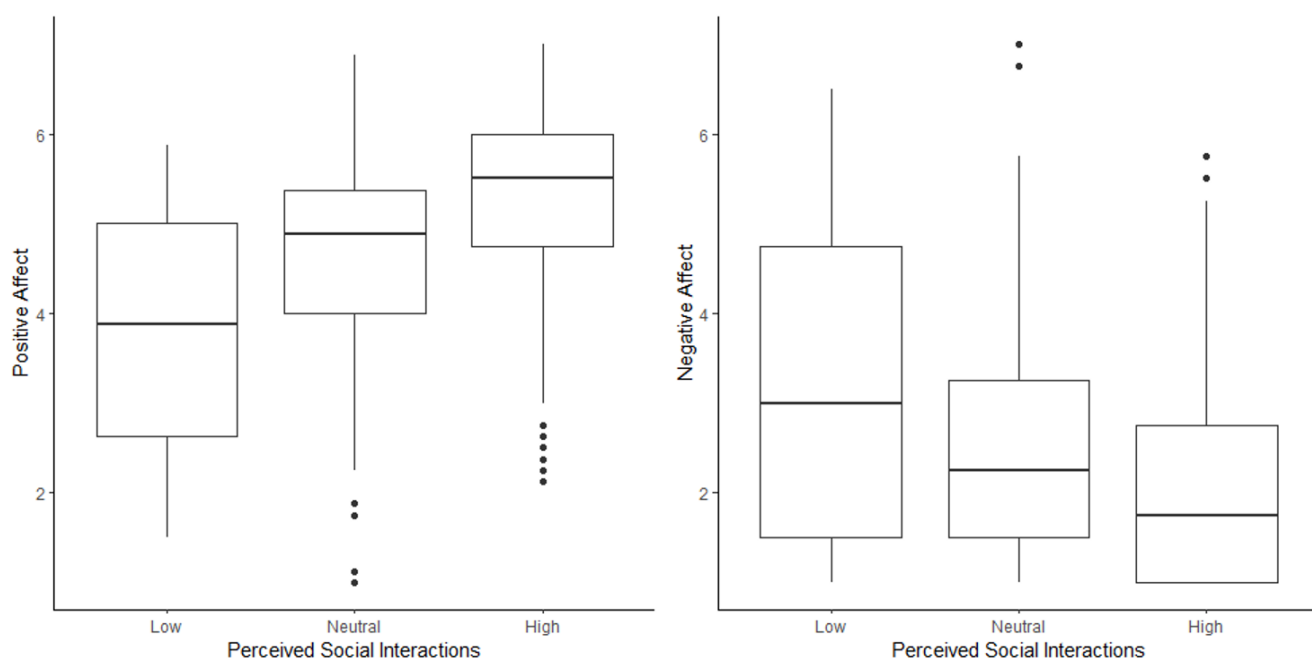


Furthermore, the variable of perceived social interactions will be used in the following linear mixed analyses. To get a first impression on how perceived social interaction is

associated with well-being a boxplot was created. Figure 3 shows that the mean of *positive affect* increases and *negative affect* decreases the more positive a social interaction was rated.

Figure 3

Perceived Social Interactions on Positive Affect and Negative Affect



Association of Social Contact on Well-being

With the first linear mixed model a significant association between social contacts and *positive affect* was found ($B = .29, p < .001$). The second linear mixed model is significant as well showing a negative association between social interaction and *negative affect* ($B = -.19, p < .01$). The results are summarised in Table 3.

Table 3

Estimates of fixed effects of social interaction (yes/no) on positive and negative affect as dependent variable

Predictor	Dependent Variable	Estimate	Standardized Estimate	SE	t value	p value
Intercept	Positive Affect	4.54	-.29	.14	32.41	<.001
Social Contact	Positive Affect	.29	.26	.08	3.67	<.001
Intercept	Negative Affect	2.56	.11	.17	14.81	<.001
Social Contact	Negative Affect	-.19	-.15	.08	-2.37	<.001

Note. The standard deviation, t value and p value refer to the unstandardized estimates.

Association of Subjective Quality of Social Contacts on Well-being

The second research question was again tested with two linear mixed models (Table 4). The first model analysed the relationship between a *positive/pleasant rated social interaction* on *positive affect*. If the contact was perceived as *neutral* the influence on *positive affect* increases ($B = 0.89, p < 0.001$). The effect becomes significantly stronger when the contact was rated as *positive/pleasant* ($B = 1.49, p < 0.001$).

The same analysis was tested again for *negative affect*. If a *social interaction* was perceived as *neutral*, *negative affect* decreases significantly ($B = -0.68, p < 0.01$). The effect becomes even stronger when an interaction was perceived as *positive/pleasant* ($B = -1.05, p < 0.01$).

Table 4

Estimates of fixed effects perceived social interaction (negative/neutral/high) on positive and negative affect as dependent variable

Predictor	Dependent Variable	Estimate	Standardized Estimates	SE	t value	p value
Intercept	Positive Affect	3.76	-.95	.17	22.13	.001
Neutral interaction	Positive Affect	.89	.81	.13	11.13	.001
Positive Interaction	Positive Affect	1.48	1.35	.13	11.13	.001
Intercept	Negative Affect	3.13	.611	.20	15.54	.001
Neutral Interaction	Negative Affect	-.68	-.54	.14	-5.04	.001
Positive Interaction	Negative Affect	-1.05	-.84	.13	-7.63	.001

Note. The standard deviation, t value and p value refer to the unstandardized estimates.

Interaction Analysis using Depression as a Moderator

Lastly the interaction effect was tested. Again, a linear mixed model was run analysing the interaction between *depression* on *perceived social interaction* on *positive affect* (Table 5). *Depression* alone has a significant negative association on *positive affect* ($B = -1.34, p < 0.01$). The interaction effect of perceiving a social contact as *positive* and *depression* is significant and has a positive direction ($B = 0.59, p < 0.01$). Moreover, the interaction effect of perceiving a contact as *neutral* with the interaction of *depression* on *positive affect* is significant as well also showing a positive direction ($B = 0.52, p < 0.02$).

Table 5

Interaction effect of depression on perceived social interaction on positive affect

Predictor	Dependent Variable	Moderator	Estimate	Standardized Estimates	SE	t value	p value
Intercept	Positive Affect		6.22	-.92	.55	11.32	.01
Perceived as neutral	Positive Affect		-.06	.77	.45	-.13	.89
Perceived as Pleasant	Positive Affect		.45	1.32	.45	.99	.32
Depression	Positive Affect		-1.34	-.54	.28	-4.74	.001
Perceived as neutral	Positive Affect	Depression	.52	.20	.07	2.26	.02
Perceived as Pleasant	Positive Affect	Depression	.59	.22	.23	2.64	.001

Note. The standard deviation, t value and p value refer to the unstandardized estimates.

The same interaction analysis was repeated using *negative affect* as the dependent variable (Table 6). The association between depression and negative affect is significant ($B = 1.84, p < 0.01$). Moreover, the interaction effect of *depression* on perceiving a social contact as *pleasant* is significant ($B = -0.99, p < 0.01$) as well as the interaction of *depression* and perceiving a contact as *neutral* ($B = -0.77, p < 0.01$).

Table 6*Interaction effect of depression on perceived social interaction on negative affect*

Predictor	Dependent Variable	Moderator	Estimate	Standardized Estimates	SE	t value	p value
Intercept	Negative Affect		-.11	.56	.64	-.16	.87
Perceived as neutral	Negative Affect		.69	-.50	.47	1.47	.14
Perceived as Pleasant	Negative Affect		.69	-.79	.46	1.49	.14
Depression	Negative Affect		1.84	.64	.23	5.22	.001
Perceived as neutral	Negative Affect	Depression	-.77	-.25	.24	-3.23	.001
Perceived as Pleasant	Negative Affect	Depression	-.99	-.33	.24	-4.22	.001

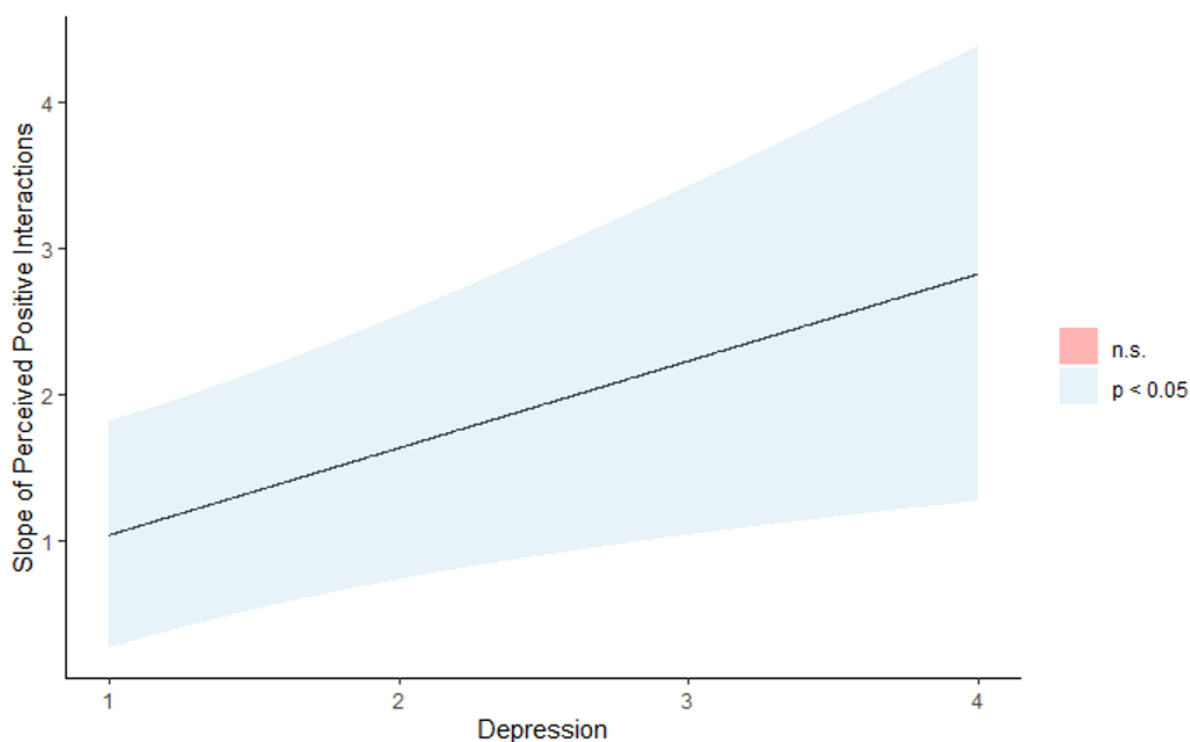
Note. The standard deviation, t value and p value refer to the unstandardized estimates.

Johnson Neyman Analysis

A Johnson Neyman analysis was conducted to check whether all regions from the *depression* level show a significant interaction effect on *positive affect*. Figure 4 shows that the moderation is significant in all regions when analysing the relation of *positive perceived social interactions* on *positive affect* using *depression* as the moderator. In addition, the analysis shows that the association increases with increasing depression level.

Figure 4

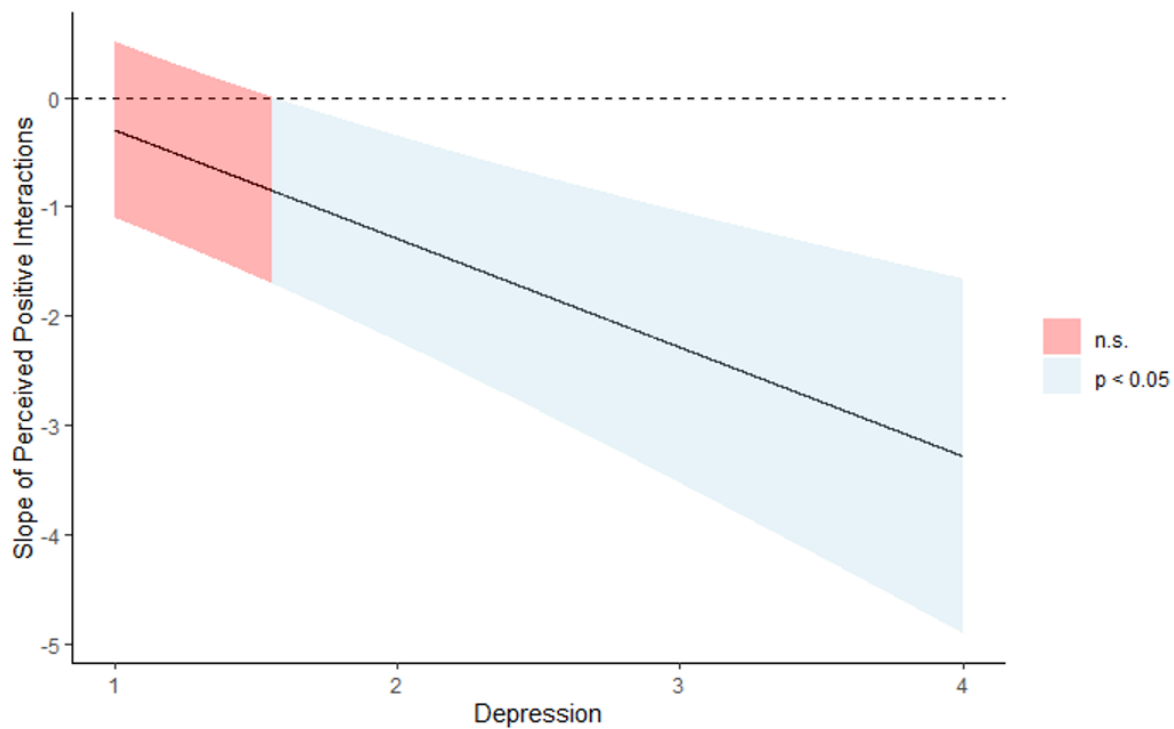
Johnson-Neyman marginal effects or regions of significance plots of the interaction between depression and positive social interaction predicting positive affect



Moreover, this interaction was tested again only using *negative affect* as the dependent variable. The Johnson Neyman analysis shows that a low level of depression has no association on the relation between a positive contact on *negative affect*. However, the more *depression* increases the higher is the interaction of *depression* on the relation of *perceived positive social interaction* on *negative affect* (Figure 5).

Figure 5

Johnson-Neyman marginal effects or regions of significance plots of the interaction between depression and positive social interaction predicting negative affect



Discussion

The aim of this study was to analyse the association between social interaction and well-being by explicitly distinguishing between the quantity and quality of social interactions. Furthermore, for both positive and negative affect a moderation analysis was conducted to analyse whether the relation between the quality of social interactions and well-being is different depending on the level of depression a person has.

The results show that social interaction has a positive relation on well-being, positive affect increases with social interaction and negative affect decreases. Furthermore, this study also shows that the greatest improvement in well-being occurred with perceived positive social interactions. The more positive the social interaction, the higher positive affect and the lower negative affect. Social interactions which were perceived as low in positivity led to a decline in participants' well-being in comparison to contacts which were perceived as neutral or positive.

Finally, the interaction analysis shows that the higher the depression level, the lower the level of well-being. However, depression as a moderator of the relationship between neutral and positive social interaction on positive affect leads to a significant increase in well-being. In particular, the Johnson-Neyman analysis shows that the strength of the interaction increases according to the level of depression. The higher the depression, the stronger the association of a positive or neutral social interaction on well-being. This interaction was tested again using negative affect as the dependent variable. Negative affect declines after a perceived positive contact using depression a moderator on this relationship.

Main findings

The finding that the number of daily social interactions is related to momentary well-being is in line with the results of previous studies (Sandstrom & Dunn, 2014; Berry & Hansen, 1996). Sandstrom & Dunn (2014) showed in their study that even a small social interaction with a barista can significantly improve people's mood. Moreover, an increased level of social interaction has been shown to counteract depressive affectivity therefore increasing positive affect (Kuczynski et al., 2022). Furthermore, a cross-sectional study conducted by Fiorillo & Sabatini (2011) analysed the impact of social interactions on health in a representative study of the Italian population. According to Fiorillo & Sabatini (2011) "meeting friends at least twice a week raises the probability of reporting good health by 4.4%" (p. 1647). This suggests that the amount of social interaction leads to better health outcomes and increased well-being which is in line with the reported results.

The second main finding of the present study is that the perceived quality of a social

interaction is significantly associated with well-being. The better a social interaction was perceived, the higher the positive affect and the lower the negative affect. It can be concluded that the results are consistent with those of other studies and that the quality of the interaction does have an impact on our well-being (Kuczynski et al. 2022; Sandstrom & Dunn, 2014). There are many studies that point out that intimate friendships and close contacts contribute to an increased well-being (Tay et al., 2013; Wheeler et al., 1983; Clark et al., 2018). Especially perceived meaningful social contacts are beneficial (Wheeler, et al., 1983; Clark et al., 2018; Reis et al., 2000). Thus, the results of this study further support the notion of previous studies that a high-quality contact leads to an increased positive affect.

Moreover, this study also confirmed that interactions perceived low in positivity are associated with a lower mood level. This finding is in line with the explanation of Reis & Gable (2003) who pointed out that social interactions can be associated with both increased and decreased well-being. Thus, they wrote that "Relationships are an important, and perhaps the most important, source of life satisfaction and emotional well-being" (Reis & Gable, p. 129) as well as "On the distress side of the spectrum, relationships are well-established as one of the most potent causes of human misery" (Reis & Gable, p. 130). Comparing the results of the first with the second research question, it becomes apparent that the perceived quality of social interactions is more strongly associated with well-being than the quantity of social interactions. According to Gibson et al. (1987) "it is the respondents' perception of the adequacy of interaction, rather than the amount of interaction, which counts" (p. 36). Various scholars concluded that the amount of social interaction and its association on well-being is dependent on the quality of these interactions (Gibson et al., 1987; Wheeler et al., 1983; Van den Berg et al., 2017). Therefore, it can be concluded based on the results of the present and on other scientific studies that the quality of a social interaction matters and seems to be more important than the pure presence of an interaction.

Lastly, the third main finding is that depression has a significant association with the relation between perceived social interaction and well-being. The higher the level of depressive symptoms the higher the level of well-being after a perceived positive or neutral contact. The findings also indicate that a higher depression level leads to a decreased well-being which is consistent with other scientific research (Kube et al., 2020). It can be said that positive interactions as well as neutral interactions have a positive association on well-being for people with depression. This is confirmed, for example, in a study conducted by Revenson et al. (1991), showing that a high-quality social contact in the form of social support from close friends and family leads to lower depressive symptoms. To interpret the result of the

interaction and to place it in the scientific context several possible explanations are provided.

First, people with depression have a lower overall well-being in general. This study confirmed that positive affect was lower in people with higher depression. However, because affect is in general at a lower level, the possibility of an increase in positive affectivity is also higher. There is, so to speak, more room for improvement, whereas people who already have a high positive affect level cannot increase in affectivity so much. This phenomenon can be also described as the ceiling effect (Kleefstra et al., 2015).

Secondly, there are on average fewer positive experiences during a day because of the reduced activity in comparison to people living without depressive symptoms (Kube et al., 2020). Suggesting that a positive experience seems to have more weight as fewer of these experiences are made during the day (Kube et al., 2020). As depression is characterised from expecting, perceiving, and evaluating events more negatively (Kube et al., 2020) a perceived positive experience could be more meaningful.

Thirdly, in this study not overall well-being was assessed but positive and negative affect using the ESM method. Analysing the relation between a social interaction and well-being in a relatively short time period leads to a decrease in recall bias. In this context, it is important to mention that people who suffer from depression or are prone to depressive tendencies show an increased level of rumination (Nolen-Hoeksema et al., 2008). Rumination can be defined as “a mode of responding to distress that involves repetitively and passively focusing on symptoms of distress and on the possible causes and consequences of these symptoms” (Nolen-Hoeksema et al., 2008, p. 400). People with increased depressive symptoms tend to classify an event as increasingly worse and more negative over time which is also called negativity bias. The experienced event is distorted in a negative, and self-destructive direction (Kube et al., 2020; Berman et al., 2011; Urban et al., 2018). However, the influence of rumination is strongly limited by the approach of the ESM method in which the time lag between the moment of the social interaction and the question of how the social interaction was perceived is strongly decreased. The application of the ESM method could therefore play an important role for the current findings. It can be assumed that a positively perceived social interaction does not lead to such a strong increase in well-being if there is a certain period of time between the social interaction and the measurement of well-being, as people suffering from a major depressive episode tend to have an increased negativity bias (Kube et al., 2020).

Strengths and Limitations

A strength of this study is the experience sampling method used. Multiple measurements per day reduces recall bias and increases ecological validity (Scollon et al., 2009). In particular, the reduction of recall or memory bias is an aspect that needs to be considered in the context of depression. Memory bias, together with negativity bias, is a fundamental component of depression. Thus, this study could provide further and potentially important new insights to explain the interaction of everyday experiences and depression more precisely by capturing the current state of well-being rather than analysing an overall stable well-being.

Another strength is the focus on perceived positive and pleasant social interactions. The main focus especially in psychology was often only on the negative emotions, which led to the neglect of positive ones (Algoe, 2019). Therefore, a strength in this study is to take a closer look at perceived positive interactions especially for people with depressive symptoms. To explore the role of positive relations could be “[...] “the next exciting frontier in research linking social life with health outcomes”, according to Algoe (2019, p. 186). Moreover, working from a positive psychological perspective leaves room to adapt not only problem solution focused interest but simultaneously looking for positive things in people’s life to promote and influence the mental health which is in line with the two-continuum model of mental health (Keyes, 2007).

However, this study also comes with certain limitations. First, it needs to be questioned whether an interaction rated as low in positivity is really negative. It can be assumed that the interactions rates as low have a high correlation also on perceived negative interactions. However, asking participants only how positive and pleasant a contact was perceived does not automatically mean that the contact was negative. Thus, the present study does not capture the variable of perceived negative events in particular.

Secondly, in addition to the advantages already mentioned, the ESM method also has its pitfalls. It should be noted that the effort of the study for the participants due to daily questioning can have an influence on the measured variables (Scollon et al., 2009).

Lastly, the mean depression scores are higher compared to other studies (Hayat et al., 2021; Leung et al., 2020). However, even if the mean scores are higher none of the participants can be labelled as having a severe depression, according to categorization of Hayat et al. (2021). Only three people have moderate severe depression. The comparison between individuals with low, moderate and high symptoms is skewed to the right, meaning that most participants have low or moderate depression scores. However, the study aimed to

capture the full range of low to high depressive symptoms. The results should therefore be treated with caution and not over-interpreted.

Implications and Future Research

The current study shows that social interactions are associated with well-being both quantitatively and qualitatively. This correlation is a confirmation of previous studies and indicates that especially the quality of perceived interactions is an important factor for well-being. In the presence of increased feelings of loneliness, it is important to create and develop interventions that make it easier for people to find together.

In this study, the sample consists mostly of students. Acknowledging the relevance of having social interactions especially among students is of high importance. Starting to study at a university often means a huge change of environment marked by new experiences and challenges which increases the risk of suffering from loneliness (Diehl et al., 2018; Hysing et al., 2020). Students are suffering especially from emotional loneliness which is characterised by a low quality of social interactions (Diehl et al., 2018). Therefore, having a high number of interactions does not automatically mean that a person does not feel lonely (Stoliker & Lafreniere, 2015). Student unions or so-called student mentors can play an important role in providing increased social support for students (Richardson et al., 2017). Moreover, offering a broad variety of sport courses decreases the chance that students suffer from social loneliness (Diehl et al., 2018). The results of this study further support the notion that universities not only have the important task of providing education but also of offering opportunities to connect with other students with the aim to establish meaningful relationships (Diehl et al., 2018).

Furthermore, a unique finding of the present study is the relation between perceived positive interactions on well-being using depression as the moderator. The higher the level of depression the higher the interaction association as the Johnson-Neyman plot shows. This suggests that having positive social interactions is important for people with depression. As this study only entails a small number of people with severe depression it is advised to analyse the relation again with a sample of more people suffering from a severe depression to see whether the relation remains. Nevertheless, the finding already shows a tendency of how important a treatment of increasing positive contacts could be for people with depressive symptoms.

In this context, it might be interesting to test the effects of positive psychological interventions (PPI) as well. A common well-established exercise for example is the “three good things exercise” in which people write three good things daily which happened during

the day (Schueller & Parks, 2012). These interventions are putting the focus on positive memories to counteract negative thoughts and rumination. Future studies could therefore analyse and compare groups of people with depression that do or do not use positive psychological interventions after a perceived positive interaction. Based on research, it can be assumed that the effects of positive social interactions on well-being can be enhanced by the use of PPI interventions. There are already studies showing that brief positive interventions can reduce levels of depression by focusing on positive experiences and increase life satisfaction and general well-being (Pietrowsky & Mikutta, 2012; Chaves et al., 2019). Moreover, interventions aimed at focusing on positive feelings could be an important addition for future professionals when treating patients with depression (Chaves et al., 2019).

Conclusion

The present study shows that social interactions are important for momentary well-being. In particular, the perceived quality of social interactions is strongly linked to well-being. Depression acts as a moderator, meaning that with higher levels of depression, the importance of good quality social interactions for well-being increases. Thus, positively perceived interactions can be an important factor in improving the current well-being, especially of depressed people. Given the increasing feeling of loneliness in Western societies and its far-reaching health consequences, this study draws attention to the importance of positive social contacts.

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Appendix A

Informed Consent

English

Dear participant, Thank you for your participation in this study. Before you participate, it is important that you understand the goal of this research and what the study will ask from you. The purpose of this study is to find out how well being is related to several positive psychology constructs. To explore this relationship, we want to measure fluctuations in mental health in daily life to gather a more detailed picture of the dynamics of mental health.

For this study, we will ask you to fill in several questionnaires on your mobile phone. All questionnaires will be completed in the Ethica app. The study will start with a questionnaire concerning your demographics and general mental health. This initial questionnaire will take about 10 minutes to complete. Afterwards, you will receive three daily questionnaires per day for a period of two weeks. Notifications will remind you about the next questionnaire. The questionnaires will be provided in the morning, afternoon and evening. One daily questionnaire takes approximately 3 minutes to complete. It is important that you answer the questionnaires as soon as possible. Please make sure that you turn on the notifications for the Ethica app on your mobile device.

The information that we collect from this research project will be kept confidential. This means that only the researchers have insight into your answers. All personal data (such as age, gender etc.) will be anonymized and will not be published and/or given to a third party. Your participation in this study is voluntary. You are free to withdraw from this study at any time and without giving a reason.

Contact information

If you have any questions regarding this study, you can contact the researchers of this project Amelie Schleich (a.c.schleich@student.utwente.nl) and Allegra Passmann (a.v.passmann@student.utwente.nl)

Consent

I have read and understood the information provided and had the opportunity to ask questions. I understand that my participation is voluntary and that I am able to withdraw at any time, without a reason or cost. I hereby voluntarily agree to take part in this study.

German

Liebe Teilnehmer*innen, wir danken Ihnen für Ihre Teilnahme an dieser Studie. Bevor Sie teilnehmen, ist es wichtig, dass Sie sowohl das Ziel als auch die Anforderungen, die diese Studie an Sie stellt, verstehen. Ziel dieser Studie ist es, herauszufinden, wie die mentale Gesundheit mit verschiedenen Konstrukten der positiven Psychologie zusammenhängt. Um diesen Zusammenhang zu 51 erforschen, wollen wir die Schwankungen der psychischen Gesundheit im Alltag messen, um ein detaillierteres Bild von der Dynamik der psychischen Gesundheit zu erhalten.

Für diese Studie werden wir Sie bitten, mehrere Fragebögen auf Ihrem Mobiltelefon auszufüllen. Alle Fragebögen werden über die Ethica-App ausgefüllt. Die Studie beginnt mit einem Fragebogen zu Ihren demografischen Daten und Ihrer allgemeinen psychischen Gesundheit. Das Ausfüllen dieses ersten Fragebogens wird etwa 10 Minuten dauern. Danach erhalten Sie über einen Zeitraum von zwei Wochen täglich drei Fragebögen. Diese werden Sie gefragt morgens, nachmittags, und abends auszufüllen. Dabei werden Benachrichtigungen Sie an den nächsten Fragebogen erinnern. Das Ausfüllen eines täglichen Fragebogens dauert etwa 3 Minuten. Es ist wichtig, dass Sie die Fragebögen so schnell wie möglich beantworten. Bitte stellen Sie sicher, dass Sie die Benachrichtigungen für die EthicaApp auf Ihrem Mobilgerät einschalten.

Die Informationen, die wir im Rahmen dieses Forschungsprojekts sammeln, werden vertraulich behandelt. Dies bedeutet, dass nur die Forscher Einblick in Ihre Antworten haben. Alle persönlichen Daten (wie Alter, Geschlecht usw.) werden anonymisiert und werden nicht veröffentlicht und/oder an Dritte weitergegeben. Ihre Teilnahme an dieser Studie ist freiwillig. Es steht Ihnen frei, jederzeit und ohne Angabe von Gründen von dieser Studie zurückzutreten.

Kontaktinformationen

Wenn Sie Fragen zu dieser Studie haben, können Sie sich an die Forscherinnen dieses Projekts Amelie Schleich (a.c.schleich@student.utwente.nl) und Allegra Passmann (a.v.passmann@student.utwente.nl) wenden.

Einverständniserklärung

Ich habe die bereitgestellten Informationen gelesen und verstanden und hatte die Möglichkeit, Fragen zu stellen. Ich weiß, dass meine Teilnahme freiwillig ist und dass ich jederzeit ohne Angabe von Gründen und ohne Kosten von der Teilnahme zurücktreten kann.

Appendix B

Baseline questionnaire

English

Demographics

- Age: How old are you?
- Gender: What gender do you identify as? Male, female, other
- Nationality: What is your nationality? Dutch German Other
- Occupation: What is your current occupation? Student, Working, Self-employed, studying and working, not working, other
- Highest degree obtained: Middle school (such as MBO, MTS, MEAO or Haupt- oder Realschule), High school (such as HAVO, VWO, HBS or Gymnasium/ Berufsschule/ Berufskolleg), High school, Bachelor, Master, PhD, Other
- SONA- ID

Mental Health Continuum Short Form:

During the past month, how often did you feel...

1. Happy
2. Interested in life
3. Satisfied with life
4. That you had something important to contribute to society
5. That you belonged to a community
6. That our society is a good place or is becoming a better place, for all people
7. That people are basically good
8. That the way our society works makes sense to you
9. That you liked most parts of your personality
10. Good at managing the responsibilities of your daily life
11. That you had warm and trusting relationships with others
12. That you had experiences that challenged you to grow and become a better person
13. Confident to think or express your own ideas and opinions
14. That your life has a sense of direction or meaning to it
 - a. Never
 - b. Once or twice
 - c. About once a week
 - d. About 2 or 3 times a week
 - e. Almost every day
 - f. Every day

GAD-7 for anxiety

Over the last two weeks, how often have you been bothered by the following problems?

1. Feeling nervous, anxious, or on edge
2. Not being able to stop or control worrying
3. Worrying too much about different things
4. Trouble relaxing
5. Being so restless that it is hard to sit still
6. Becoming easily annoyed or irritable
7. Feeling afraid, as if something awful might happen
 - a. Not at all
 - b. Several days
 - c. More than half the days
 - d. Nearly every day

PHQ-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying asleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety or restless that you have been moving around a lot more than usual
9. Thoughts that you would be better off dead, or of hurting yourself
 - a. Not at all
 - b. Several days
 - c. More than half the days
 - d. Nearly every day

Psychological Well-being scale items from the positive relations with others subscale

Below are three statements that may apply to you to varying degrees. For each statement, please indicate how much it applies to you. Please answer openly and honestly.

1. “Maintaining close relationships has been difficult and frustrating for me.”

2. "People would describe me as a giving person, willing to share my time with others."
3. "I have not experienced many warm and trusting relationships with others."
 - Strongly disagree
 - Disagree
 - Somewhat disagree
 - neutral
 - Somewhat agree
 - Agree
 - Strongly agree

Trait gratitude GQ-6 (McCullough et al., 2002)

Below are six statements that may apply to you to varying degrees. For each statement, please indicate how much it applies to you. Please answer openly and honestly.

- 1. I have so much in life to be thankful for.
- 2. If I had to list everything that I felt grateful for, it would be a very long list.
- 3. When I look at the world, I don't see much to be grateful for.*
- 4. I am grateful to a wide variety of people.
- 5. As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.
- 6. Long amounts of time can go by before I feel grateful to something or someone.*
 - 1 = strongly disagree 2 = Disagree 3 = Somewhat disagree 4 = neutral 5 = Somewhat agree 6 = Agree 7 = Strongly agree
 - *Item 3 and 6 are reversed

Self-compassion

Please read each statement carefully before answering. Indicate how often you behave in the stated manner.

1. When I fail at something important to me I become consumed by feelings of inadequacy.
2. I try to be understanding and patient towards those aspects of my personality I don't like.
3. When something painful happens I try to take a balanced view of the situation.
4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.
5. I try to see my failings as part of the human condition.

6. When I'm going through a very hard time, I give myself the caring and tenderness I need.
7. When something upsets me I try to keep my emotions in balance.
8. When I fail at something that's important to me, I tend to feel alone in my failure
9. When I'm feeling down I tend to obsess and fixate on everything that's wrong
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm disapproving and judgmental about my own flaws and inadequacies
12. I'm intolerant and impatient towards those aspects of my personality I don't like.
 - a. Almost never
 - b. Rarely
 - c. Sometimes
 - d. Often
 - e. Almost always

German (Baseline questionnaire)

Demographics:

Alter: Wie alt sind Sie?

Nationalität: Welcher Nationalität gehören Sie an? Niederländisch, Deutsch, sonstiges

Geschlecht: Mit welchem Geschlecht identifizieren Sie sich? Männlich, weiblich, divers

Tätigkeit: Welcher Tätigkeit gehen Sie nach? Studieren, Angestellt, Selbstständig, Studieren und Arbeiten, Nicht arbeitend, Sonstiges

Welches ist der höchste Abschluss, den Sie erworben haben? *Falls Sie derzeit immatrikuliert sind, kreuzen Sie den höchsten bereits erworbenen Abschluss an.* Weiterführende Schule (z.B. Haupt- oder Realschule), Weiterführende Schule (z.B. Gymnasium, Berufsschule/Berufskolleg), Bachelor, Master oder Diplom, Promotion, Sonstiges
SONA

MHC-SF:

Im letzten Monat, wie oft hatten Sie das Gefühl,

1. dass Sie glücklich waren?
2. dass Sie Interesse am Leben hatten?
3. dass Sie zufrieden waren?
4. dass Sie einen wichtigen gesellschaftlichen Beitrag geleistet haben?
5. dass Sie zu einer Gemeinschaft gehörten (z.B. einer sozialen Gruppe, Ihrer Nachbarschaft oder Ihrer Stadt)?
6. dass unsere Gesellschaft besser für Ihre Bürger wird?
7. dass Menschen von Natur aus gut sind?
8. dass Sie verstehen, wie unsere Gesellschaft funktioniert?

9. dass Sie die meisten Aspekte Ihrer Persönlichkeit wertschätzen?
10. dass Sie Ihre täglichen Aufgaben und Verpflichtungen gut erfüllen konnten?
11. dass Sie warme und vertraute Beziehungen zu anderen haben?
12. dass Sie sich entwickeln oder ein besserer Mensch werden?
13. dass Sie selbstbewusst Ihre eigenen Ideen und Gedanken gedacht und geäußert haben?
14. dass Ihr Leben Richtung und Sinn hat.
 - a. Nie
 - b. 1-2 mal im Monat
 - c. 1 mal in der Woche
 - d. 2-3 in der Woche
 - e. Fast täglich
 - f. täglich

GAD-7

Wie oft fühlten Sie sich im Verlauf der letzten 2 Wochen durch die folgenden Beschwerden beeinträchtigt?

1. Nervosität, Ängstlichkeit oder Anspannung
2. Nicht in der Lage sein, Sorgen zu stoppen oder zu kontrollieren
3. Übermäßige Sorgen bezüglich verschiedener Angelegenheiten
4. Schwierigkeiten zu entspannen
5. Rastlosigkeit, so dass Stillsitzen schwer fällt
6. Schnelle Verärgerung oder Gereiztheit
7. Gefühl der Angst, so als würde etwas Schlimmes passieren
 - Überhaupt nicht
 - An einzelnen Tagen
 - An mehr als der Hälfte der Tage
 - Beinahe jeden Tag

PHQ-9

Wie oft fühlten Sie sich im Verlauf der letzten 2 Wochen durch die folgenden Beschwerden beeinträchtigt?

1. Wenig Interesse oder Freude an Ihren Tätigkeiten
2. Niedergeschlagenheit, Schwermut oder Hoffnungslosigkeit.
3. Schwierigkeiten ein- oder durchzuschlafen oder vermehrter Schlaf
4. Müdigkeit oder Gefühl, keine Energie zu haben
5. Verminderter Appetit oder übermäßiges Bedürfnis zu essen
6. Schlechte Meinung von sich selbst; Gefühl, ein Versager zu sein oder die Familie enttäuscht zu haben
7. Schwierigkeiten, sich auf etwas zu konzentrieren, z.B. beim Zeitunglesen oder Fernsehen
8. Waren Ihre Bewegungen oder Ihre Sprache so verlangsamt, dass es auch anderen auffallen würde? Oder waren Sie im Gegenteil „zappelig“ oder ruhelos und hatten dadurch einen stärkeren Bewegungsdrang als sonst?

9. Gedanken, dass Sie lieber tot wären oder sich Leid zufügen möchten
 - Überhaupt nicht
 - An einzelnen Tagen
 - An mehr als der Hälfte der Tage
 - Beinahe jeden Tag

Positive Beziehungen:

1. Es war für mich immer schwierig und frustrierend enge Beziehungen aufrechtzuerhalten.
2. Meine Bekannten würden mich als entgegenkommende Person bezeichnen, und meinen, dass ich meine Zeit gerne mit anderen verbringe.
3. Ich habe nicht viele warmherzige, vertrauensvolle Beziehungen mit anderen Menschen erlebt.
 - a. 1 Stimme überhaupt nicht zu
 - b. 2 stimme nicht zu
 - c. 3 stimme eher nicht zu
 - d. 4 Neutral
 - e. 5 stimme eher zu
 - f. 6 stimme zu
 - g. 7 stimme stark zu

Trait gratitude

Im Folgenden finden Sie sechs Aussagen, die auf Sie in verschiedenem Ausmaß zutreffen können. Geben Sie bitte für jede Aussage an, wie sehr diese auf Sie zutrifft. Bitte antworten Sie offen und ehrlich

- 1. Ich habe so vieles im Leben, wofür ich dankbar sein kann.
- 2. Müsste ich alles aufschreiben, wofür ich je dankbar war, dann würde das eine sehr lange Liste ergeben
- 3. Wenn ich mir die Welt ansehe, dann kann ich nicht viel erkennen, wofür ich dankbar sein könnte.
- 4. Ich empfinde vielen verschiedenen Menschen gegenüber Dankbarkeit.
- 5. Mit zunehmendem Alter kann ich Menschen, Erlebnisse oder Augenblicke besser wertschätzen, die Teil meiner Lebensgeschichte waren.
- 6. Es kann sehr viel Zeit vergehen, bis ich jemandem oder für etwas dankbar bin.
 - 1 Stimme überhaupt nicht zu
 - 2 stimme nicht zu
 - 3 stimme eher nicht zu
 - 4 Neutral
 - 5 stimme eher zu
 - 6 stimme zu

- 7 stimme stark zu

Self compassion

Bitte lesen Sie jede Aussage sorgfältig durch, bevor Sie antworten. Kreuzen Sie bei jeder Aussage an, wie oft Sie sich in der beschriebenen Art und Weise verhalten:

1. Wenn ich bei etwas versage, was mir wichtig ist, werde ich von Gefühlen der Unzulänglichkeit aufgezehrt.
2. Ich versuche verständnisvoll und geduldig gegenüber jenen Zügen meiner Persönlichkeit zu sein, die ich nicht mag.
3. Wenn etwas Unangenehmes passiert, versuche ich einen ausgewogenen Überblick über die Situation zu erlangen.
4. Wenn es mir schlecht geht, neige ich dazu zu glauben, dass die meisten anderen Menschen wahrscheinlich glücklicher sind als ich.
5. Ich versuche, meine Fehler als Teil der menschlichen Natur zu sehen.
6. Wenn ich eine sehr schwere Zeit durchmache, schenke ich mir selbst die Zuwendung und Einfühlsamkeit, die ich brauche.
7. Wenn mich etwas aufregt, versuche ich meine Gefühle im Gleichgewicht zu halten.
8. Wenn mir etwas für mich Wichtiges misslingt, glaube ich oft, dass nur ich allein versage.
9. Wenn ich mich niedergeschlagen fühle, neige ich dazu nur noch auf das zu achten, was nicht in Ordnung ist.
10. Wenn ich mich auf irgendeine Art unzulänglich fühle, versuche ich mich daran zu erinnern, dass die meisten Leute solche Gefühle der Unzulänglichkeit haben.
11. Ich missbillige und verurteile meine eigenen Fehler und Schwächen.
12. Ich bin intolerant und unduldsam gegenüber denjenigen Seiten meiner Persönlichkeit, die ich nicht mag.
 - a. Sehr selten
 - b. Selten
 - c. Gelegentlich
 - d. Oft
 - e. Sehr oft

Appendix C

Daily questionnaires

English

Below you can find several questions about your current feelings. Please try to indicate how you felt right before you started to answer the questionnaire!

Positive and negative affect

- How *cheerful* do you feel right now?
- How *enthusiastic* do you feel right now?
- How *satisfied* do you feel right now?
- How *relaxed* do you feel right now?
- How *anxious* do you feel right now?
- How *insecure* do you feel right now?
- How *down* do you feel right now?
- How *guilty* do you feel right now?
 - 1 (not at all) to 7 (very much)

Gratitude

- How *grateful* do you feel right now?
 - 1 (not at all) to 7 (very much)

Positive relations

- Who did you spend time with since the last time you answered a questionnaire for this study? (online or offline) If more answers apply, only choose the longest contact.
 - Family Member
 - Friend
 - Romantic Partner
 - Co-Worker/Fellow Student
 - Other
 - I did not spend time with anyone

Unless the last answer was given:

- How pleasant did you experience the contact you had?
 - 1 (not at all) to 7 (very much)
- How positive did you experience the contact you had?
 - 1 (not at all) to 7 (very much)

Stressful event

Think of the most striking event or activity since the last questionnaire. How (un)pleasant was this event or activity?

- -3 (very unpleasant) to +3 (very pleasant)

Self-compassion

1. I currently feel self-critical
2. I feel kind towards myself

- 1 (not at all) to 7 (very much)

German

Im Folgenden finden Sie einige Fragen zu Ihren derzeitigen Gefühlen. Bitte versuchen Sie anzugeben, wie Sie sich gefühlt haben, kurz bevor Sie mit der Beantwortung des Fragebogens begonnen haben!

Positiver und negativer Affekt

- Wie fröhlich fühlen Sie sich im Augenblick?
- Wie begeistert fühlen Sie sich im Augenblick?
- Wie zufrieden fühlen Sie sich im Augenblick?
- Wie entspannt fühlen Sie sich im Augenblick?
- Wie ängstlich fühlen Sie sich im Augenblick?
- Wie unsicher fühlen Sie sich im Augenblick?
- Wie niedergeschlagen fühlen Sie sich im Augenblick?
- Wie schuldig fühlen Sie sich im Augenblick?
 - 1(gar nicht) bis 7 (sehr stark)

State gratitude

- Wie dankbar fühlen Sie sich im Augenblick?
 - 1(gar nicht) bis 7 (sehr stark)
 -

Positive relations

- Mit wem haben Sie seit dem letzten Fragebogen Zeit verbracht? (Online und Offline)
Wenn mehrere Antworten zutreffen, wählen Sie nur den längsten Kontakt aus.
 - Familienmitglied
 - Freund*in
 - Romantische Partner*in
 - Kolleg*innen/ Komoliton*innen

- Sonstige
- Ich habe mit niemandem Zeit verbracht

Unless the last answer was given:

- Wie angenehm haben Sie den Kontakt empfunden?
 - 1(gar nicht) bis 7 (sehr stark)
- Wie positiv haben Sie den Kontakt empfunden?
 - 1(gar nicht) bis 7 (sehr stark)

Stressful events

Denken Sie an das auffälligste Ereignis oder die auffälligste Aktivität seit dem letzten Fragebogen. Wie (un)angenehm war dieses Ereignis oder diese Aktivität?

- -3(sehr unangenehm) bis +3 (sehr angenehm)

Self-compassion

1. Ich fühle mich selbstkritisch
2. Ich bin freundlich zu mir selbst
 - a. 1(gar nicht) bis 7 (sehr stark)