

Master Thesis

**The Role of Social Support in the Experience of Personal Growth following Daily
Stressors:
An Experience Sampling Study**

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Abstract

Background: A lot of research has been done on positive psychological changes and personal growth experienced in the period following traumatic events and major life crises. In contrast, not so much is known about personal growth in response to stressors that we experience on a daily basis. Yet, daily stressors occur more frequently and affect a larger proportion of individuals. Moreover, previous research indicates that social support may exert an influence on this association. Different types of social support are expected to show a different influence on personal growth. Here, a distinction can be made between perceived social support (PSS) and received social support (RSS).

Objective: This study investigates the association between personal growth and daily stressors on a within-person level. Moreover, social support, specifically the feeling of being supported (PSS) is expected to positively moderate this association, while actual supportive acts by others (RSS) are expected to be a negative moderator.

Method: The Experience Sampling Method (ESM) was applied for 10 consecutive days. Twenty-two participants filled in the daily assessments five times per day measuring the variables personal growth, daily stressors, PSS, and RSS. Linear Mixed Modelling (LMM) was used to analyse the within-person data. Visual representations were created to depict individual cases.

Results: A significant positive association was found between personal growth and daily stressors ($b = 0.48$, $CI [0.40, 0.57]$, $p < .001$). Besides, no significant moderation effect was found for neither PSS ($b = -0.03$, $CI [-0.07, 0.02]$, $p = .27$) nor RSS ($b = 0.01$, $CI [-0.03, 0.06]$, $p = .63$).

Conclusion: To the researcher's knowledge, this was the first study aiming to assess personal growth on a within-person level in the context of daily stressors while taking different types of social support into consideration. The insights highlight the importance of further research to enhance interventions for stress management in daily life.

Keywords: Experience Sampling Method (ESM), Personal growth, Daily stressors, Perceived social support, Received social support.

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Introduction

Many people experience a traumatic event or a major life crisis at some point in their lives. In the Netherlands, the lifetime prevalence of traumatic experiences lies above 80 % (De Vries & Olf, 2009). Following a traumatic or highly stressful event, many individuals experience positive psychological changes including personal growth (Tedeschi & Calhoun, 2004). These changes are known as ‘posttraumatic growth’ (PTG) (Tedeschi & Calhoun, 1996). As a result, people report a greater appreciation of life, improved relationships with others, new possibilities, personal strengths, and spiritual change (Tedeschi & Calhoun, 1996). To find positive meaning in a seemingly negative event, individuals must engage in mental processing, including the questioning of fundamental beliefs and personal values, as well as a repeated evaluation of the event (Schroevers et al., 2010).

To date, much research has been done on the process of PTG (Jing et al., 2023; Tedeschi & Calhoun, 2004). The focus here has mostly been on major life crisis and trauma. Although such life events can have major adverse effects on an individual’s functioning and well-being, they do usually not occur on a regular basis (Almeida, 2005). In contrast, people are more frequently exposed to smaller routine stressors. Yet, it is not clear whether similar growth processes as with PTG can arise after daily stressors. This implies an important gap in research, as daily stressors differ from major life events in that they occur more often and are time-limited in their appearance and consequences (Diehl et al., 2012). Common examples of daily stressors include interpersonal events such as an argument with a friend or family member, as well as achievement-related events such as a poor performance at work, or running late for a meeting (Almeida, 2005). Investigating the process of personal growth in the context of daily stressors could give valuable insights and contribute to novel interventions for stress management in daily life.

Daily Stressors and Personal Growth

Daily stressors may be perceived as less dramatic in the first place compared to major life events and trauma (Diehl et al., 2012). Yet, previous research shows that the effects of daily stressors may accumulate across days due to their regularity and thus, also have a direct effect on a person’s functioning and well-being (Almeida, 2005). This research mostly focused on the adverse effects following daily stressors (Almeida, 2005; Diehl et al., 2012). Positive psychological changes, including personal growth, remain largely unexplored (Losavio et al., 2011). Ryff and Keyes (1995) have defined personal growth as the experience of a continuous development, including the realization of one’s potential, the openness for new experiences, an improvement in self and behaviour, and an increase in self-knowledge and personal reflection.

Concludingly, it could be hypothesized that the process of personal growth may not necessarily require the experience of a major adverse life event but as well evolve following the daily stress that affects everyone (Kaurin et al., 2021; Losavio et al., 2011; Ruini et al., 2015).

There are several findings in favour of this hypothesis on personal growth in the context of daily stressors. Calhoun and Tedeschi (1998) claim that it is not the threat associated with a traumatic event that ultimately leads to personal growth. Rather, the irreversibility and uncontrollability that come along with the threat predict personal growth in the following period. Irreversibility and uncontrollability are two characteristics that may equally apply to daily stressors (Calhoun & Tedeschi, 1998). To further support the possibility of personal growth after daily stressors, a study by Ruini et al. (2015) compared breast cancer patients with aged-matched, healthy, yet strained women in terms of their psychological adaptation to stressful situations. Here, the focus was put on PTG following major life events and ongoing chronic stress. What they found is that both groups showed at least some amount of PTG, regardless of the cancer diagnosis. Moreover, only 16.7 % of the healthy women reported the event as severely stressful, while 60 % described its impact as mild to moderate. Therefore, they concluded that PTG may be more likely experienced when the stress levels are perceived as low in combination with high levels of well-being. Individuals may then have more cognitive capacities for mental processing which facilitates positive psychological changes (Ruini et al., 2015).

Although the study of Ruini et al. (2015) was conducted in the context of major life events, the findings may also apply to the context of minor daily stressors. Growth may not necessarily depend on the type or severity of the event, but rather on the subjective perception thereof, as all women regardless of the severity of the event showed some amount of PTG (Losavio et al., 2011; Ruini et al., 2015). Besides, Ruini et al. (2015) hypothesized that personal growth may be facilitated if the impact of the stressor is perceived as manageable by the individual. Yet, these suggestions need further exploration, as the research on personal growth in the context of daily stressors is scarce. Hence, the first aim of this research is to assess whether individuals may experience personal growth resulting from daily stressors.

Social Support

The literature on PTG following major life events and trauma suggests that social support facilitates the experience of personal growth in times of major stress (Jing et al., 2023; Ruini et al., 2015). Social support is defined as the belief of being “cared for and loved, esteemed, and a member of a network of mutual obligations” (Cobb, 1976, p. 300). Research shows that sharing experiences with others may foster an alteration of the subjective experience

and result in personal growth (Wagner et al., 2015). To the best of our knowledge, there are no available data on the role of social support in the context of personal growth following daily stressors. There are, however, some findings in the literature on social support in the context of major life events and its effects on stress responses that lead to the assumption that social support may also play an important role in the context of daily stressors (Jing et al., 2023; Schmiedl et al., 2022).

For example, a meta-analysis on the relationship between social support and PTG by Jing et al. (2023) has found a modest, positive relationship. It was hypothesized that social support stimulates cognitive processing by providing an opportunity for self-disclosure and creating new perspectives for a positive meaning of the event. Thus, social support was found to buffer the effect of perceived stress on various health outcomes (Jing et al., 2023). However, a drawback of the available studies on PTG following major life events is the publication of contradictory findings by different researchers. To substantiate this, other studies found adverse effects of social support during stressful situations if the support does not adequately match with the demands brought about by the stressor (Guilaran et al., 2018). A possible reason for the inconsistent findings in the literature on social support is the fact that previous research has often failed to differentiate between different types of social support (Schmiedl et al., 2022). Social support is a heterogeneous construct and can be broken down into different forms of support (Kaurin et al., 2021). A distinction can be made between perceived social support (PSS) and received social support (RSS). PSS refers to the belief that social support is available when help is needed, whereas RSS, on the contrary, describes actual supportive acts by others that an individual receives (Kaurin et al., 2021).

A lot of previous research has only taken PSS into account, leaving the effects of RSS underexplored (Schmiedl et al., 2022). In the study of Schmiedl et al. (2022), PSS was found to be more beneficial when perceived stress levels of university students are on a low to medium level. It was hypothesized that especially in times of low stress levels, an overload of support may lower self-efficacy beliefs and lead to maladaptive coping responses. However, PSS may become insufficient when stress levels are high which raises the need for actually receiving the social support of others. When the person does not feel able to cope with a stressor alone, detrimental effects on mental health outcomes can be observed (Schmiedl et al., 2022). Transferring these findings to the context of personal growth and daily stressors, different expectations arise when a distinction is made between PSS and RSS. For the current study, the average stress levels arising from minor daily stressors are likely to be on a low to medium level and thus, heightening the importance of PSS. Specifically, PSS is hypothesized to

positively moderate the relationship between daily stressors and personal growth, meaning that the relationship becomes stronger when PSS increases. Contrary, RSS is hypothesized to negatively moderate the relationship between daily stressors and personal growth, as an overload on social support was found to lower self-efficacy beliefs which in turn may hamper the experience of personal growth (Schmiedl et al., 2022). Thus, the relationship between daily stressors and personal growth becomes weaker when RSS increases.

The Current Study

To the researcher's knowledge, this is the first study examining how daily stressors and social support are associated with daily personal growth. Previous work often used data from retrospective survey measures, which were found to be affected by positive recall bias and thus, miscalculate levels of daily personal growth (Frazier et al., 2009; Jing et al., 2023). A promising methodology that may contribute to overcoming the present shortcomings is the 'Experience Sampling Method' (ESM). ESM is a unique method to collect data of participants' behaviour, thoughts, and feelings during their everyday experiences. Participants are asked to report about their day-to-day experiences in response to a signal on their mobile device on several occasions throughout the day (Van Berkel et al., 2017).

Thus, the current study made use of the ESM methodology to investigate (1) the association between daily stressors and daily personal growths on a within-person level, (2) PSS as a positive moderator, and (3) RSS as a negative moderator in the relationship between personal growth and daily stressors. Overall, it was expected that higher levels of daily stressors lead to higher levels of personal growth, with PSS strengthening the aforementioned relationship, and RSS weakening it.

Subsequently, the following three hypotheses emerged:

- (1) *Levels of daily stressors are positively associated with levels of personal growths on a within-person level.*
- (2) *PSS positively moderates the association between daily stressors and personal growth on a within-person level.*
- (3) *RSS negatively moderates the association between daily stressors and personal growth on a within-person level.*

Method

Design

The current study was conducted using an intensive longitudinal design. Specifically, the ESM method was applied for 10 consecutive days. The data was collected by means of self-reported questionnaires consisting of a baseline questionnaire and daily momentary

assessments (Appendix A). This study was part of a larger study conducted in collaboration with four other researchers from the University of Twente.

Experience Sampling Method

ESM was the chosen method for the current study as it comes with numerous benefits. First, the responses are less prone to recall biases as participants are asked to report their experiences in real-time (Schneider, 2006). This will, in turn, increase the reliability and validity of this research. Moreover, the repeated measures provide the opportunity to analyse the variations of the experiences and feelings over the day and the week. It allows researchers to not only examine between-person effects, but also within-person effects which are often ignored in psychology as they are unattainable from traditional cross-sectional study designs (Conner et al., 2009). Specifically, within-person effects give rise to the varying amount of growth within an individual throughout the day. To generate novel insights and expand the current literature on personal growth following daily stressors, the current study will be examining all effects on a within-person level.

Participants

To participate in the study, the inclusion criteria were: (1) being at least 18 years old, (2) possessing a sufficient knowledge of English, and (3) owning a smartphone. Overall, $N = 49$ participants were recruited using convenience sampling. On the one hand, individuals from the researcher's social network were asked to participate in the study. On the other hand, students from the University of Twente were recruited via the online application SONA systems. Here, the students received one credit point in return.

Of the 49 participants, a total of 27 participants had to be removed due to a response rate of $< 30\%$, leaving 22 participants for the final analyses. According to Van Berkel et al. (2017), at least 19 participants should be included in an ESM study to reach a reliable sample size. The participants' mean age was 24.91 ($SD = 9.91$). A majority of the participants were German (81.8 %) and female (77.3 %). Besides, most participants have at least obtained a bachelor's degree (68.2 %). A complete list of the demographic characteristics can be found in Table 1.

Material

The participants used their own smartphones to download the data gathering application 'Ethica'. Using the own smartphone was found to be most convenient, as it is typically carried around in daily life and thus, the questionnaire could be filled in immediately after receiving the notification. This also increases the ecological validity of the current study (Van Berkel et al., 2017).

Table 1*Overview of the Demographic Characteristics (N = 22)*

Characteristics	Frequency (<i>f</i>)	%
Gender		
Female	17	77.3
Male	5	22.7
Other	0	0
Nationality		
German	18	81.8
Dutch	1	4.5
Other	3	13.6
Level of education		
High School	3	13.6
Bachelor's Degree	15	68.2
Master's Degree	3	13.6
Doctor's Degree or higher	0	0
Other	1	4.5

Baseline Questionnaire

Demographics. To get an insight into the population characteristics, four demographic questions were asked at the beginning of the study. These included the participants' gender, age, nationality, and degree of education.

Momentary Daily Assessments

Daily Stressors. One item was administered to account for the experience of daily stressors. The item was taken from the 'ESM item repository' which is a database with a collection of different ESM items (Kirtley et al., 2023). The repository helps researchers to identify relevant items and improves the method reproducibility and validity of the current ESM research. The item stated: 'Think of the most striking event in the last hour. How stressful was this event?' and was rated from - 3 ('*not at all*') to + 3 ('*very much*').

Personal Growth. One item of the posttraumatic growth inventory-short form (PTGI-SF) was adapted to fit the set-up of an ESM study and a second one was created based on the definition of personal growth in this study. Specifically, the researchers chose the first item based on a relatively high factor loading. The item stated: 'In the last hour I felt capable of handling difficulties'. The second item stated: 'In the last hour, I felt that life is a continuous

process of learning, changing, and growth'. Both items were assessed on a 7-point Likert scale from 1 (*totally disagree*) to 7 (*totally agree*). The current sample showed a poor reliability ($\alpha = .54$).

Social Support. To differentiate between PSS and RSS, two items were created by the researchers. Both items were asked in relation to the most striking event during the last hour. The first item measured PSS and stated: 'To what extent did you feel supported by others regarding the event?'. The second item, in contrast, assessed RSS and stated: 'To what extent did you actually make use of the support from others?'. The answers were given on a 7-point Likert scale from 1 (*not at all*) to 7 (*very much*).

Procedure

Before the start of the study, the researchers obtained ethical approval by the Ethics committee of the University of Twente (Approval code: 230092). The participants received an invitation email with a download link for Ethica prior to the starting date. When entering the app, the participants were first given some information about the upcoming process and the informed consent (Appendix B). The baseline questionnaire was available from the day of signing up. The data collection period started on March 20th 2023. All participants were able to join until April 17th 2023.

Following the baseline questionnaire, the participants filled in the daily momentary questionnaires five times a day for 10 consecutive days. Filling in the questionnaire was expected to take about five minutes. Generally, it is recommended to have around 4-10 measurement points per day over a time period between three days to three weeks (Conner & Lehman, 2012). Thus, having five measurement points per day for a period of 10 days seemed like a suitable median to minimize the participant burden as much as possible while obtaining enough measurement points in total.

Additionally, a fixed signal-contingent sampling strategy was chosen. Specifically, the questionnaire in Ethica was triggered at 10 AM, 1 PM, 4 PM, 7 PM, and 10 PM. This sampling strategy was chosen to capture the important variations within the participants' experiences. In total, three reminders were sent via an in-app notification whenever the questionnaires had not been filled in yet. The questionnaire expired after one hour of non-response to make sure that the time frame between the stressful event and the momentary assessments was relatively short.

Data Analysis

To analyse the data, IBM SPSS Statistics version 28 was used. To start with, the data was exported into the programme and the data sets of the baseline questionnaire and the momentary daily assessments were merged and arranged into long format. Afterwards, the data

was prepared. This included the exclusion of participants who did not reach the response rate. For each remaining participant, a continuous time variable was added. The item assessing the daily stressor was recoded from - 3 to + 3 into a scale from 1 to 7, to match the other item's scales and allow proper comparison. In particular, - 3 was recoded into 1, indicating low levels of stress, and 3 was recoded into 7, indicating high levels of stress. The two personal growth items were added up into one construct. Thus, the total score of personal growth could range from 2 to 14.

Besides, total scores and person-mean centred (PMC) scores were computed for each variable. The PMC score is calculated by subtracting the person-mean score (PM) from each participant's time-specific score, thus allowing for the analysis of within-person effects (Wang et al., 2019). To check whether the data is missing at random, the Little's Missing Completely at Random (MCAR) test was conducted. If the null hypothesis, implying that the pattern of missing data is completely at random, is confirmed, no further analyses are required. Otherwise, the data has to be further analysed for the reasons of missing data (Li, 2013). Descriptive statistics were assessed to get an insight into the sample's characteristics by calculating means and standard deviations of the total scores. For a visual representation of the variability within the participants' state scores of personal growth, daily stressors, PSS, and RSS, boxplots were created.

To answer the hypotheses, linear mixed modelling (LMM) was applied. In ESM research, LMM is commonly used as it accounts for both, the random and fixed effects, that belong to the multilevel data of repeated measures (Myin-Germeys & Kuppens, 2021). Additionally, a first-order autoregressive covariance structure (AR1) was applied for the analyses which assumes that measures closer in time are more correlated (Barnett et al., 2010). For the first hypothesis, investigating the association between daily stressors and personal growth, a LMM was run with the PMC score of personal growth as dependent variable and the PMC score of daily stressors as fixed factor. For the second and third hypothesis, concerning the moderation of PSS and RSS in the association between daily stressors and personal growth, two LMMs were run. The PMC score of personal growth was again treated as the dependent variable and the PMC score of daily stressors as the fixed factor. In the first model, the PMC score of PSS was added as another fixed covariate to test for moderation, whereas the same was done with RSS as another fixed covariate in the second model. To illustrate the findings, individual participant data was displayed in line plots.

Results

Preliminary Analyses and Descriptive Statistics

Little's MCAR test revealed that the data are missing completely at random ($\chi^2(6) = 5.82, p = .44$). Thus, no further actions were taken. A list of the means and standard deviations for daily stressor, personal growth, PSS, and RSS for each participant can be found in Table 2. For the participants printed in bold, individual line plots depicting different PMC scores per time point can be found below.

Table 2

Means and standard deviations of total scores per participant

Participant	Daily Stressor	Personal Growth	PSS	RSS
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
1	1.78(1.63)	9.07(1.54)	4.85(0.91)	5.07(0.83)
2	3.11(1.75)	9.44(1.54)	4.61(1.24)	4.06(1.35)
3	3.94(1.71)	6.76(1.98)	2.30(1.51)	2.09(1.79)
4	2.17(1.80)	9.41(1.76)	2.07(1.54)	1.78(1.44)
5	2.41(1.72)	10.41(0.84)	3.82(1.17)	2.27(1.56)
6	4.15(1.89)	9.29(1.43)	4.85(1.35)	4.32(1.53)
7	3.74(1.66)	10.84(1.83)	5.05(1.22)	4.00(1.20)
8	3.03(2.21)	8.26(2.08)	4.36(2.07)	3.00(2.41)
9	2.50(1.91)	9.35(2.88)	3.95(1.80)	2.65(1.96)
10	4.13(1.58)	8.26(2.54)	4.43(1.53)	4.83(1.27)
11	3.48(1.64)	9.80(1.64)	4.52(1.53)	4.07(1.59)
12	1.58(1.31)	8.79(1.47)	4.32(1.16)	2.68(1.83)
13	2.64(1.82)	9.69(1.39)	4.42(1.63)	4.08(1.93)
14	3.00(1.69)	7.59(3.37)	1.70(1.41)	1.48(1.09)
15	2.38(1.44)	9.04(1.18)	4.35(1.50)	3.81(1.52)
16	3.17(1.79)	8.28(1.71)	2.78(1.70)	2.89(2.03)
17	2.58(1.82)	10.58(1.93)	4.37(2.08)	3.17(2.10)
18	3.17(1.43)	7.72(1.50)	4.32(1.12)	4.53(0.91)
19	2.68(1.41)	10.25(2.51)	3.82(1.47)	3.34(1.58)
20	3.58(1.41)	8.68(1.35)	3.97(1.28)	3.35(1.33)
21	2.56(1.63)	9.31(2.57)	3.13(1.26)	3.19(1.68)
22	3.38(1.88)	10.21(2.50)	3.69(2.24)	3.48(2.54)

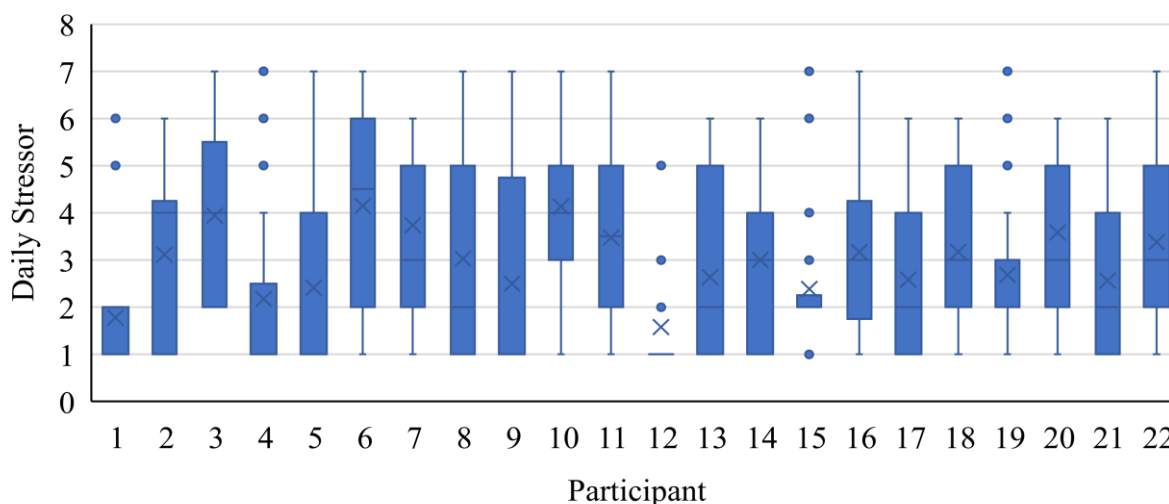
Note. *M* = Mean; *SD* = Standard Deviation.

Individual Variations

The boxplots below represent the variability within the participants' state scores. The variation of scores within a participant is represented by the boxes' length, with a longer box representing higher variation. Overall, the participants indicated a medium level of daily stressors, with a group mean of 4.47 ($SD = 1.62$). Within the participants, a rather high variability in their scores of daily stressors can be observed (Figure 1). Only a few participants experienced less variation in their scores such as participant 1, 4, 12, 15, and 19 indicated by shorter boxes. To illustrate, participant 12 reported the same score for daily stress at almost every measurement point and thus, no box is visible. Only a few outliers are indicated as individual dots.

Figure 1

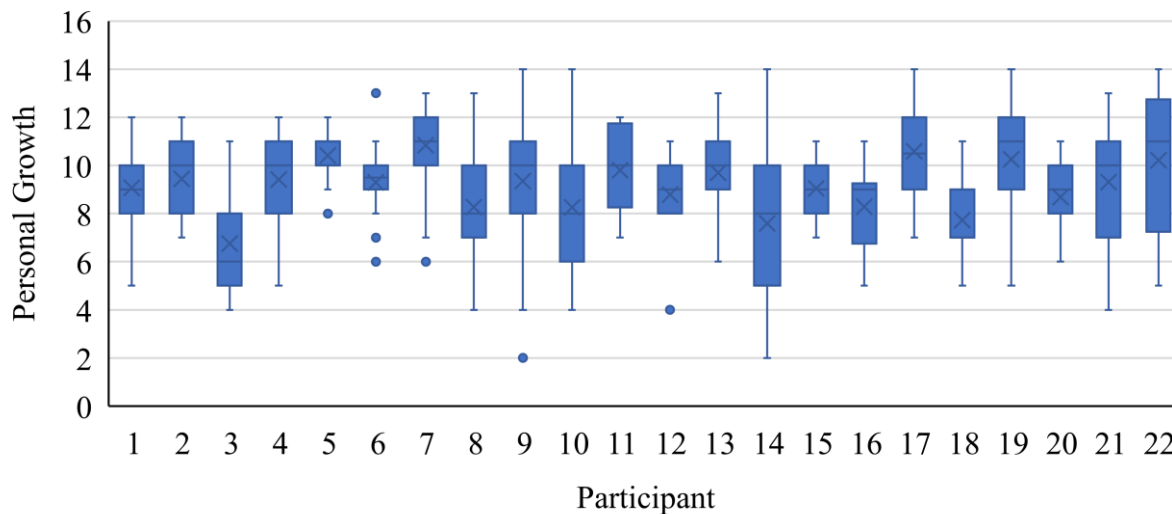
Boxplot depicting the variation in state daily stressor for each participant



For personal growth, the participants reported on average a rather high level of scores, with a group mean of 9.15 ($SD = 2.19$). The variation between, as well as within participants, is rather low. To illustrate, participants 14 and 22 showed the highest variation with scores ranging from around five to ten (Figure 2).

Figure 2

Boxplot depicting the variation in state personal growth for each participant



Compared to the other measures, the variability for PSS (Figure 3) and RSS (Figure 4) between participants is higher. To illustrate, participants 3, 4, and 14 show low scores, while the others reported moderate levels of support. Moreover, the response patterns in the scores of PSS and RSS show some similarities. Again, participants 3, 4, and 14 experienced rather low levels of both, PSS and RSS, whereas participants 17 and 22 for example showed more variation. The similar response patterns are also reflected in the group means. For both measures, the participants experienced medium levels of support, with a mean of 3.88 ($SD = 1.75$) for PSS and 3.34 ($SD = 1.90$) for RSS.

Figure 3

Boxplot depicting the variation in state PSS for each participant

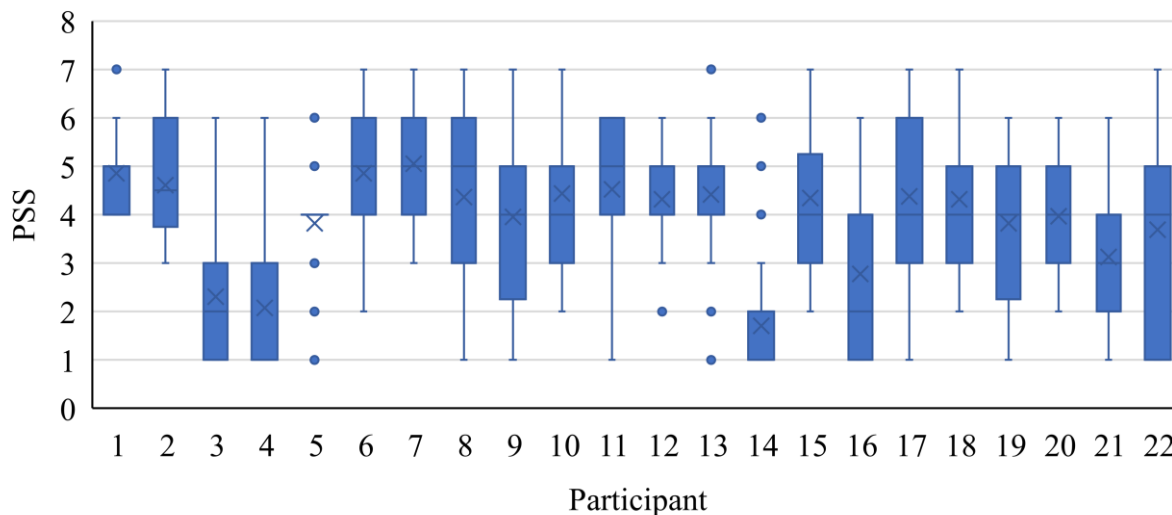
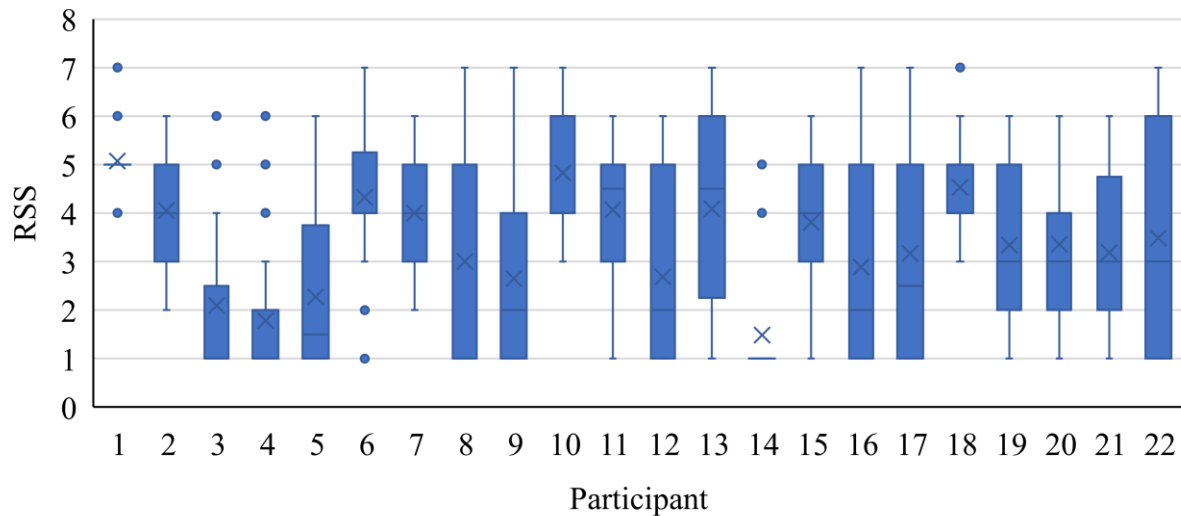


Figure 4

Boxplot depicting the variation in state RSS for each participant



Hypothesis Testing

Association between Daily Stressors and Personal Growth

The outcome of the first LMM showed a significant positive association between personal growth and daily stressors on a within-person level ($b = 0.48$, $CI [0.40, 0.57]$, $p < .001$). This indicates that the momentary experience of daily stressors is associated with higher levels of personal growth at that moment. Thus, hypothesis one was accepted. All relevant estimates of this association can be found in Table 3.

Table 3

Estimates of Fixed Effects with Daily Stressors as Independent Variable and Personal Growth as Dependent Variable

Parameter	b	SE	df	t	Sig	95% CI	
						Lower Bound	Upper Bound
Daily Stressor	0.48	.04	666.72	11.22	< .001	0.40	0.57

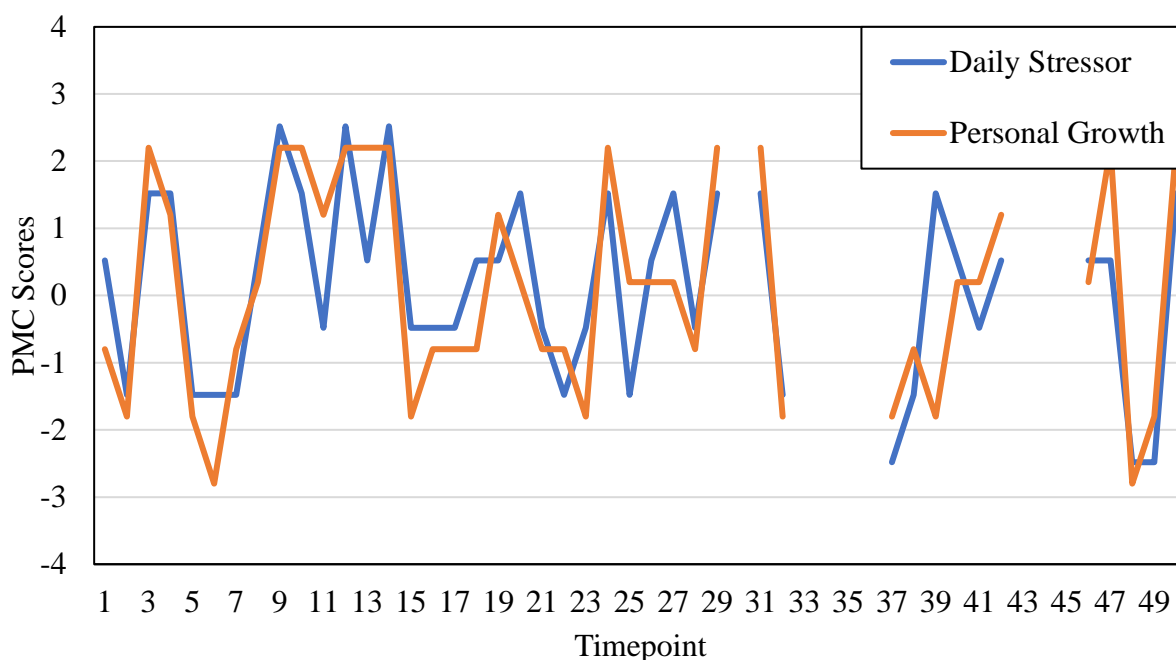
Note. df = Degrees of freedom; CI = Confidence interval of unstandardized estimates.

Figure 5 highlights this finding. The line plot shows the PMC scores of daily stressors and personal growth for participant 11 per timepoint. It can be seen that this participant scores high on personal growth when experiencing higher levels of stress. Contrary, when

experiencing lower levels of stress, the participant reported lower levels of personal growth. Despite some fluctuations, the overall association between the two constructs over time becomes visible (Figure 5). The gaps between the lines indicate missing data for these timepoints.

Figure 5

Line Plot depicting the PMC Scores for Daily Stressors and Personal Growth for Participant 11



Moderation Effect of PSS

The results of the second LMM revealed a significant main effect between personal growth and daily stressor ($b = 0.40$, $CI [0.31, 0.48]$, $p < .001$), and a significant main effect between PSS and personal growth ($b = 0.35$, $CI [0.26, 0.43]$, $p < .001$) was found. The moderation effect by PSS on daily stressors and personal growth was found to be non-significant ($b = -0.03$, $CI [-0.07, 0.02]$, $p = .27$). Therefore, hypothesis two was rejected. All relevant estimates of this analysis can be found in Table 4.

Table 4

Estimates of Fixed Effects with Daily Stressors and PSS as Independent Variable and Personal Growth as Dependent Variable testing for Moderation

Parameter	<i>b</i>	SE	<i>df</i>	<i>t</i>	Sig	95% CI	
						Lower Bound	Upper Bound
Daily Stressor	0.40	.04	666.12	9.18	< .001	0.31	0.48
PSS	0.35	.05	667.41	7.61	< .001	0.26	0.43
Daily Stressor*PSS	-0.03	.02	661.25	-1.10	.27	-0.07	0.02

Note. *df* = Degrees of freedom; *CI* = Confidence interval of unstandardized estimates.

Moderation Effect of RSS

In the last LMM, a significant main effect was found between personal growth and daily stressor ($b = 0.44$, $CI [0.36, 0.53]$, $p < .001$), and a significant main effect was found between RSS and personal growth ($b = 0.25$, $CI [0.17, 0.33]$, $p < .001$). The moderation effect by RSS on daily stressors and personal growth was again found to be non-significant ($b = 0.01$, $CI [-0.03, 0.06]$, $p = .63$). Concludingly, hypothesis three was also refuted. Table 5 shows a summary of all relevant estimates from the analysis.

Table 5

Estimates of Fixed Effects with Daily Stressors and RSS as Independent Variable and Personal Growth as Dependent Variable testing for Moderation

Parameter	<i>b</i>	SE	<i>df</i>	<i>t</i>	Sig	95% CI	
						Lower Bound	Upper Bound
Daily Stressor	0.44	.04	662.21	10.44	< .001	0.36	0.53
RSS	0.25	.04	667.08	6.11	< .001	0.17	0.33
Daily Stressor*RSS	0.01	.02	659.91	0.49	.63	-0.03	0.06

Note. *df* = Degrees of freedom; *CI* = Confidence interval of unstandardized estimates.

Figures 6 and 7 display the PMC scores of participant 18 per timepoint, with daily stressors, personal growth, and PSS irrespective of RSS. PSS and RSS fluctuate in a very similar manner, indicating that the influence of social support on personal growth does not necessarily depend on the type of social support. In addition, no association between the variables can be observed.

Figure 6

Line Plot depicting the PMC Scores for Daily Stressors, Personal Growth, and PSS for Participant 18

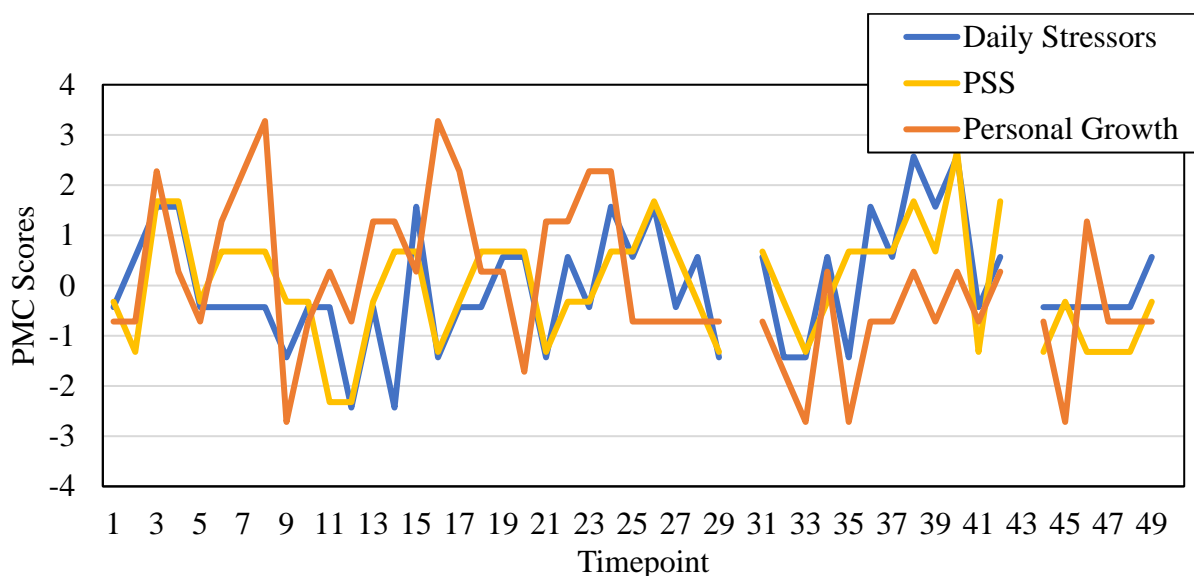
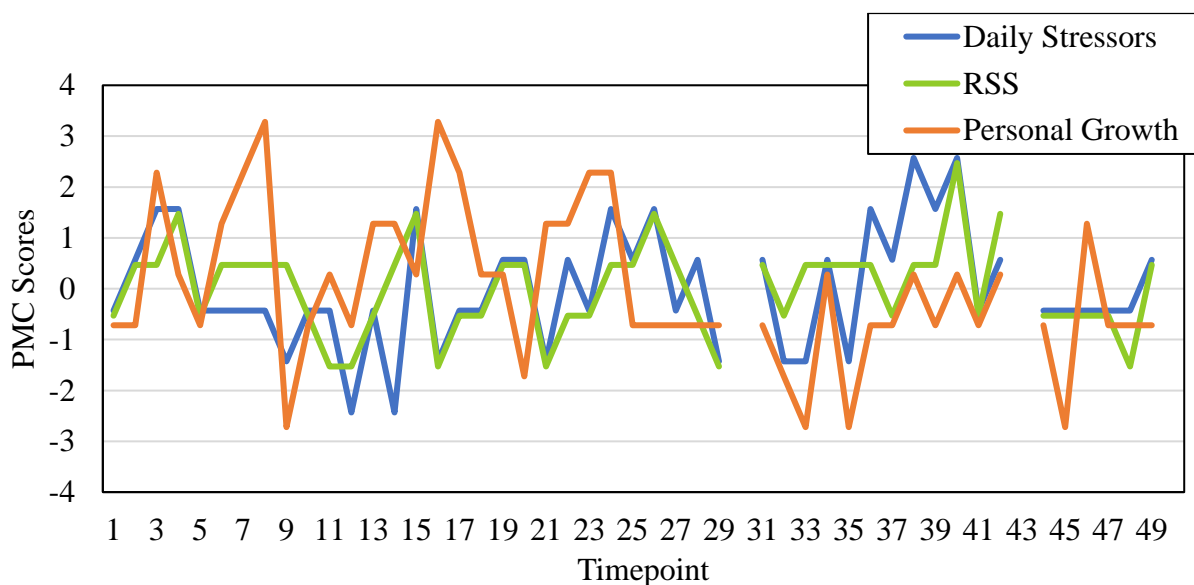


Figure 7

Line Plot depicting the PMC Scores for Daily Stressors, Personal Growth, and RSS for Participant 18



Discussion

The current study assessed the association between the experience of daily stressors and personal growth. In addition, social support was investigated as a possible moderating variable in this relationship. Specifically, it was tested whether differences in the feeling of being supported (PSS) and the actual reception of support (RSS) can be observed. Thereby, this study addressed a gap in the current research field in that the momentary daily experiences of personal growths in response to daily stressors and social support were assessed by applying the ESM method.

Findings

This study advances the current literature on positive psychological changes following stress in that the results suggest a positive relationship between daily stressors and personal growth. It confirms the hypothesis that personal growth does not necessarily require the experience of a major life event but can also evolve on a daily basis. Overall, this finding is in line with previous research on stress-related growth (Losavio et al., 2011; Park & Fenster, 2004). For example, Tedeschi and Calhoun (2004) suggest that it is not the severity of the stressor that predicts personal growth, but it rather depends on cognitive processes, such as a reflection of the event, in the following period. Relatedly, Park and Fenster (2004) have investigated the processes through which stress-related growth may arise and found that personal growth was influenced by coping strategies. Specifically, adaptive coping strategies, such as positive reappraisal, venting of emotions, and acceptance facilitated stress-related growth (Park & Fenster, 2004). This implies that it is not only the objective severity of the stressor that determines personal growth, but rather how an individual responds to the stressor.

The argument that personal growth is facilitated by adaptive coping can be supported with the self-determination theory (SDT) by Deci and Ryan (2000). According to the SDT, the needs for autonomy, competence, and relatedness depict the driving forces of an individual's actions and must be met in order to ensure psychological well-being (Deci & Ryan, 2000). Supposedly, an individual who feels autonomous, competent, and related to others, is more likely to view a stressful situation as manageable and positive (Kostromina et al., 2022). Kostromina et al. (2022) have investigated the relationship between adaptive coping styles and the needs for self-determination in the context of the COVID-19 pandemic. They hypothesized that during the period of the pandemic and prolonged social restrictions, these basic needs have been frustrated for an ongoing time frame. In turn, individuals started to look for strategies to satisfy the needs again, such as helping those in need (Kostromina et al., 2022). Relating this to the context of the current study, it could be hypothesized that the impact of daily stressors

may affect the needs for self-determination and induce a desire for action. A dispute with a friend, for instance, could violate the need for relatedness and thus, contribute to a motivation for successful dispute resolution. In turn, this requires an active engagement with what has happened and may facilitate processes of personal growth.

The second aim of the current study was to examine the role of social support in the relationship between personal growth and daily stressors. The two hypotheses stating that PSS would positively moderate the relationship, while RSS would be a negative moderator, were not supported. This led to two different implications. First, on a more general level, the social support of others does not seem to facilitate personal growth. A large extent of the current literature yielded similar findings, showing no buffering effect of social support in the context of daily stressors. For instance, researchers have found a lagged effect of social support, indicating that social support does not have an immediate effect on an individual's stress response (Caspi et al., 1987; Kaurin et al., 2021). In the present study, the items assessing the daily stressors and social support were asked simultaneously within a timeframe of one hour following the stressor. Hence, no insights into possible long-term consequences are available. Oftentimes, social support is not available immediately after the stressor occurred (Caspi et al., 1987). It may take some time for the individuals to receive support and thus, social support may possibly show positive effects only in the long run.

Besides, it was found that the benefits of social support in the context of stress recovery are largest when the support is provided invisibly, thus, outside of the recipient's awareness (Howland & Simpson, 2010; Rini & Schetter, 2010). To strengthen this argument, a daily diary study by Bolger and Amarel (2007) has found that partners in intimate relationships reported increased levels of depressed mood, when the support recipient explicitly indicated to have received support, whereas the support provider did not indicate to have provided any support. Contrary, the best mood was reported when the support provider indicated to have provided support and the recipient did not notice to have received any support from the partner (Bolger & Amarel, 2007). In the current study, the participants were explicitly asked for the levels of perceived and received social support. Invisible social support was therefore not taken into account.

The second observation concerns the different expectations in relation to PSS and RSS. Specifically, PSS and RSS were expected to have a different influence on personal growth and thus, representing two distinct constructs. Many participants reported low levels of received social support whenever the perception thereof was also on a lower level. This contradicts the expectations, as it was hypothesized that PSS is more important in times of low levels of stress,

whereas RSS become increasingly important when stress levels are on a higher level (Schmiedl et al., 2022). This finding emerged when plotting the individual variations of the two items. To account for this, Melrose et al. (2015) call for further differentiation of social support. Particularly, they argue that it is not necessarily the amount of support, irrespective of PSS or RSS, that predicts positive mental health outcomes. Rather, the effectiveness of social support depends on whether the support was needed (Melrose et al., 2015). Similarly, Park et al. (1996) have found that an individual's satisfaction with their social support positively correlates with stress-related growth. Thus, a novel conceptualisation of social support may provide different insights.

Strengths and Limitations

For the interpretation of results, the set-up of the study should be considered. Here, the current study shows some strengths and limitations. As a strength, the use of the ESM method should be noted. This method allowed the collection of real-time data and momentary experiences of personal growth, daily stressors, and social support. Subsequently, the collected data is less prone to be affected by recall biases. This seems to be especially important in the context of negative daily stressors, as they tend to be perceived as less negative in the long run (Schneider, 2006). In addition, the repeated measures allowed for new insights into the fluctuations of the constructs throughout the day and within individuals (Conner et al., 2009). Next to that, this study attempted to differentiate between different types of social support, as the current literature indicated that PSS and RSS may have a different influence on personal growth (Kaurin et al., 2021; Schmiedl et al., 2022).

Despite these strengths, some limitations should be noted as well. First, more than half of the participants ($N = 27$) had to be excluded, leaving a sample of 22 participants. This may be an indication that filling in the questionnaire five times a day was too much, making the participation burden of this study too high. In turn, the low response rate reduces the reliability of the data (Van Berkel et al., 2019). Second, all constructs were measured by asking only one or two questions. This was a conscious decision to keep the questionnaire short and minimize response fatigue (Reynolds et al., 2015; Van Berkel et al., 2019). In turn, the items may not reflect a true estimation of the constructs. To illustrate, the item for daily stressors was formulated in very general terms. However, daily stressors can mean different things to different individuals. Relatedly, it is also conceivable that the number of questions was not sufficient to accurately differentiate between PSS and RSS. Thus, more questions would be needed to receive an adequate representation of the constructs.

As a third limitation, the poor reliability ($\alpha = .54$) for the items of personal growth should be mentioned, indicating a low internal consistency. This provides an indication that the items in fact do not measure the same construct (Connelly, 2011). Despite the low alpha, it was decided to combine the two items as to date there is no consensus definition for the concept of personal growth (Vittersø, 2014). Yet, the work by different researchers indicates that personal growth can be seen as a multidimensional construct with more than two dimensions (Ryff & Keyes, 1995; Staudinger & Kunzmann, 2005; Vittersø, 2014). Thus, one item was perceived as insufficient for covering personal growth. Nevertheless, the interpretation of results should be made with caution. Lastly, the demographics of the current sample should be considered with the majority of participants being female, German, and graduates of a bachelor's degree. By using convenience sampling, the generalizability of the study to other populations has been limited.

Implications and Future Research

The findings suggest that daily stressors have the potential to evoke positive psychological changes and personal growth. This is an important insight as daily stressors are experienced by a much larger proportion of the population as opposed to traumatic events (Almeida, 2005). By helping individuals to effectively cope with these stressors, professionals may foster the opportunity to grow. To put this into practice, more insights are needed. Future studies could investigate not just whether a stressor was recently experienced, but also how the stressor was perceived by the individual. Moreover, the current study only induced a low to moderate level of daily stressors. To also capture daily stressors that evoke higher stress levels, future studies might benefit from applying event-contingent sampling. Here, participants fill in the questionnaire whenever a specific, more stress-evoking event occurs (Myin-Germeys & Kuppens, 2021).

Next to the assessment of daily stressors, the conceptualization of personal growth and social support could be improved. This study was part of a collaboration between different researchers and thus, many different constructs were investigated. Future ESM studies could better focus on a limited number of constructs in order to ask multiple questions per construct. This would allow researchers to better cover the different aspects of social support and personal growth. Lastly, it might be interesting for future studies to recruit a more diverse sample. Among others, 77 % of the current sample were females. Yet, previous research indicated that women tend to report higher levels of stress-related growth as opposed to men (Park, 2010). Therefore, individual differences are expected to play a role as well and therefore, deserve further exploration.

Conclusion

The current study contributed to the research concerning personal growth, daily stressors, and social support in daily life by applying the ESM method. This is to our knowledge the first study that measured personal growth on a within-person level in the context of daily stressors while taking different types of social support into consideration. The results show that the experience of daily stressors is associated with higher levels of personal growth. Moreover, it was found that this relationship is neither moderated by PSS nor RSS. The findings indicate that even minor daily stressors offer the opportunity to grow which highlights the importance of further research in this area. More insights into possible determinants are needed to enhance future interventions for stress management in daily life.

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Appendices

Appendix A: Questionnaires

Baseline Measurement

1 What's your gender?

Female

Male

Non-binary/Third gender

Prefer not to say

3 What's your age?

4 What's your nationality?

Dutch

German

Other

5 What is the highest degree or level of school you have completed? If currently enrolled, mark the highest degree already received.

High school graduate

Bachelor's degree

Master's degree

Doctorate degree or higher

Other

6 What is your Sona ID? Fill in your personal number.

Daily Momentary Assessment

Hello,

It's time again for your daily questions.

Let's begin and tell us how you feel at the moment.

Think of the most striking event in the last hour. How stressful was this event?

Think of the most striking event in the last hour. To what extent did you feel supported by others regarding the event?

Think of the most striking event in the last hour. To what extent did you actually make use of the support from others?

In the last hour, I felt capable of handling difficulties.

In the last hour, I felt that life is a continuous process of learning, changing and growth.

Good job!

Thank you for your response, we appreciate it.

See you soon.

Appendix B: Informed Consent

This study focuses on responses to daily stressors and consists of two parts. In the first part, you have to fill out some general questionnaires. You only need to do this once and it takes about 20 minutes. The second part of the study lasts for 10 days. Per day, you will get 5 notifications to complete a short questionnaire. Completing this short questionnaire will take about 5 minutes.

Your participation in this study is completely voluntary and all your responses are treated anonymously. None of the responses will be connected to identifying information and wouldn't be shared with third parties. Data will only be used for statistical analyses. However, you can withdraw from the study at any time! By simply stopping answering the daily questions without the need to give any reasons.

If you would like to have further information about the research, now or in the future, feel free to contact *Mirjam Radstaak* at:

m.radstaak@utwente.nl.

If you have any complaints about this research, please direct them to Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente, email: **ethicscommittee-bms@utwente.nl**.