

# Intraindividual Variability in Daily Experiences of Posttraumatic Growth, Affect, and HIV/AIDS Stigma among People Living with HIV: Does Resilience Matter?

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## Article

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# Abstract

This study investigated intraindividual variability in daily posttraumatic growth (PTG) versus posttraumatic depreciation (PTD), positive and negative affect (PA and NA), and HIV/AIDS stigma among people living with HIV (PLWH). Additionally, we examined whether this variability may derive from participants' resilience. The participants included 67 PLWH who after filling the baseline questionnaire on resilience for five consecutive days they completed short versions of questionnaire on (PTG/ PTD), daily declared affect, as well as daily HIV/AIDS stigma. We observed significant intraindividual variability in PTG, PTD, PA, NA, and perceived stigma. Resilience was related to PTG, PTD, PA, and NA but not stigma. Moreover, higher resilience was associated with higher, stabler PA and lower, stabler NA. Our results show the need for better PTG operationalization and measurement, particularly regarding daily manifestations in real life and intraindividual variability, as well as further studies on PLWH's daily functioning in various areas.

## Introduction

Stories of growth after trauma and adversity are prevalent across human history in various cultures and historical epochs [1]. Similarly, despite the relatively recent emergence of posttraumatic growth (PTG) as a research area [2, 3], PTG studies have proliferated quickly, creating a vast body of evidence for the meaningful, positive changes following traumatic or adverse life events that have been suggested historically [1]. Nevertheless, while great interest in PTG has contributed to this field's significant development, several questions remain unanswered concerning PTG's objective manifestations and stability, as well as the mechanisms underlying positive changes [4]. Specifically, various limitations of classic PTG study designs and their assessment have prevented a thorough explanation of these phenomena [5]. The most commonly used PTG measures, such as the Posttraumatic Growth Inventory (PTGI) [2], tend to evaluate PTG almost exclusively based on self-reports and retrospection [6]. Additionally, PTG evaluation based on participants' subjective recollection of the past is a cognitively demanding procedure prone to significant biases, especially when studied only cross-sectionally [7]. Nevertheless, the extensive critique of previous PTG research has inspired a search for methodological advancements in this field and multimethod approaches to studying and measuring PTG [5].

First, the inclusion of parallel items that reflect negative changes to standard PTG tools has been suggested as a way to overcome positivity bias in PTG measures that focus exclusively on growth [8, 9]. Thus, a new construct of posttraumatic depreciation (PTD) emerged, revealing some counteractive patterns of posttraumatic change, such as the simultaneous occurrence of PTG and PTD, as well as different predictors shared among various populations after trauma [10, 11]. Second, the further implementation of a longitudinal study design has been proposed to answer questions regarding potential PTG dynamics over time [4]. Finally, to overcome the limitations of retrospective PTG reports and related biases, authors have increasingly advised a more ecological, daily PTG assessment [6]. Particularly, an intensive longitudinal measurement [] using experience sampling methods (ESM) or electronic daily diaries has been identified as a potential way to verify whether PTG manifests in people's

everyday lives after trauma or is only a retrospective, illusory belief among trauma survivors [13, 14]. In other words, new PTG measurement can elucidate short- and long-term PTG dynamics, presenting a key finding about implementing PTG-focused clinical interventions [6, 15].

Moreover, the noted limitations in this field have also led to several ambiguities concerning how to identify necessary PTG predictors [16]. One such ambiguity concerns the relationship between PTG and resilience—that is, the these constructs' overlap, as well as the question of whether PTG is supported or inhibited by the baseline resilience levels of individuals who have experienced traumatic life events [17, 18]. Although resilience can be considered a PTG-promoting factor, it may also reinforce resistance to negative emotions and promote “bouncing back” to baseline levels of functioning after trauma, rather than growth [13, 19]. These processes have been particularly understudied in the context of resilience's daily manifestations and impact on psychological well-being during stress and adversity [20, 21]. Psychological resilience can be understood as a stable trait or an ability that supports both the maintenance and generation of positive emotions during stressful situations [19, 22]. Still, since it is a case in the PTG context, few studies have used intensive measurement methods to track daily manifestations of resilient functioning during stress or trauma [e.g., 6, 23, 24]. Similarly, no previous research has examined PTG's daily within-person variability and its association with baseline resilience levels among trauma-affected populations, though these variables may help discern the relationship between the two processes. Therefore, we investigated these issues among people living with HIV (PLWH).

PTG and resilience can be characterized by different dynamics, especially within clinical populations who are coping with the chronic stress associated with experiencing chronic somatic illness [25, 26, 27]. This had been observed especially among PLWH, whose emotional well-being may fluctuate substantially day by day, leading to various long-term trajectories of adaptation processes [28, 29] that the current study's patient group may also have experienced [30]. PLWH's daily life experiences are a very understudied research area. Meanwhile, for individuals experiencing chronic but manageable and non-acute stress conditions, such as living with HIV, monitoring daily affective states is crucial [31]. Vulnerable clinical populations are subjected to dynamic stress circumstances, such as HIV/AIDS stigma, which should be particularly monitored in these patients' daily lives [32]. A particularly interesting question is whether daily fluctuations in PLWH's positive and negative well-being are associated with their baseline levels of various stable personal characteristics [33, 34]. Therefore, in the current research, we focused on assessing the role of psychological resilience in PLWH's daily lives.

## **Current study**

This study aimed to investigate intraindividual variability in daily PTG levels versus posttraumatic depreciation (PTD), self-reported affect, and HIV/AIDS stigma among PLWH. Additionally, we sought to examine whether this variability on a state level may derive from resilience on a trait level among participants. Resilience levels were measured on the first day of the study. To the best of our knowledge, no previous studies have examined such factors among PLWH using this particular study design and

these specific variables, from which we derived our hypotheses. Thus, our study is mainly explorative. However, based on some research on daily psychosocial functioning among PLWH [e.g., 31, 32], as well as studies on the association between resilience measurements and intraindividual fluctuations of affective well-being among the general population [20, 21], we formulated the following hypotheses:

### **Hypothesis 1**

PLWH experience intra-individual variability in their daily reported levels of PTG and PTD, PA and NA, and perceived HIV/AIDS stigma.

### **Hypothesis 2**

Intra-individual variability in PLWH's daily reported levels of PTG and PTD, PA and NA, and perceived HIV/AIDS measured at the state level is related to resilience levels at the trait level.

## **Materials And Methods**

### **Participants and Procedure**

Sixty-seven patients who had been diagnosed with HIV participated in this study. Table 1 presents our study sample's demographic characteristics.

Participants were recruited from Warsaw's largest healthcare clinic for PLWH. During the initial measurement session, participants completed a paper-and-pencil version of the psychometric questionnaires (see Measures), including the sociomedical survey, and they were invited to provide their email address or telephone number so that we could contact them to complete the diary part of the study. Only participants who agreed to provide their contact information could be included in this further part of the study. Participants were informed that involvement in the study was voluntary and that no remuneration would be provided. Medical doctors also assessed patients for further eligibility criteria, such as being at least 18 years old, having a medical HIV infection diagnosis, having undergone antiretroviral treatment (ART), and having no cognitive disorders.

In the preliminary stage of this study, patients' stable characteristics—such as their socio-demographic and medical data—and resilience levels were measured at a trait level (see the following two subsections). For the electronic daily diary measurements, we prepared shortened electronic versions of the questionnaires measuring state-like variables (PTG and PTD, PA and NA, and HIV/AIDS stigma) using a special online platform. Participants were asked to complete electronic diary entries for one week within five consecutive at the end of each study day. Links to complete these diary entries were sent to participants at 6:00 PM, followed by a reminder at 9:00 PM. For each study day, these links stayed active until 1:00 AM the following day, at which point they were deactivated. Participants were invited to contact the study organizers via email or telephone throughout the whole study period if they needed any technical help accessing the diaries.

The study methodology was approved by ethical committee of the Faculty of Psychology of the University of Warsaw and the study was carried out in accordance to relevant guidelines and regulations. An informed consent was obtained from all participants.

## Trait-Level Measurements

### The Brief Resilience Scale (BRS)

The Polish adaptation of the Brief Resilience Scale (BRS) scale [19] was used in this study's initial paper-and-pencil measurement to assess initial resilience levels among participants. It is a six-item scale that uses a five-point Likert response, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha for the total resilience score was satisfactory (see Table 2).

## State-Level Measurements

### Shortened Version of the PTG and PTD Inventory (PTGDI-X)

PTG and PTD were measured with a 10-item scale in which five items measured each construct in the 50-item PTG and PTD Inventory (PTGDI-X) [35]. Responses ranged from 0 (*I did not experience this change*) to 5 (*I experienced this change to a great degree*). Higher scores indicate more intense PTG or PTD levels. We followed the global PTG and PTD scores. Participants were instructed to focus on daily positive and negative experiences in their lives after receiving their HIV diagnosis—for instance, “I felt that I have numerous opportunities,” or, “I felt that I cannot change much in my life.” We used this state-level measure of PTG and PTD per the recommendation by Blackie et al. [6]. The Cronbach's alphas for the global PTG and PTD scores were satisfactory (see Table 2).

### The Shortened Version of the PANAS-X

Participants reported the affective states they experienced during a study day using a five-point Likert scale ranging from 1 (*not at all*) to 5 (*strongly*). A list of 12 feelings and emotions was provided: six for PA (e.g., “satisfied,” “energetic”) and six for NA (e.g., “angry,” “worried”). The Cronbach's alpha coefficients obtained in this study were satisfactory (see Table 2).

### The Berger HIV Stigma Scale (HSS)

The shortened version of the Polish adaptation of HIV/AIDS stigma inventory (Berger HIV Stigma Scale [HSS]) [36] was used to measure daily experiences of stigma. This electronic inventory comprised five items, such as “I felt that others who know or may know about my HIV infection may have had a bad opinion about me.” Answers were provided using a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). In this study, the total HIV/AIDS score was used. The Cronbach's alpha for the total resilience score was satisfactory (see Table 2).

## Data Analysis

During our preliminary analysis, descriptive statistics were calculated. Next, hierarchical linear modeling (HLM) was used to assess participants' intra-individual variability in PTG and PTD, PA and NA, and stigma levels over five consecutive days, as well as its relationship to interindividual differences in resilience that were measured using the scales described in the previous subsections. HLM (known also as *multilevel modeling*) is a statistical method that uses ordinary least square (OLS) regression-based analysis to measure data's hierarchical structure [37]. Hierarchically structured results are nested data in which groups of units are clustered together in a specific pattern, which varies at more than one level. HLM may be used to predict or even draw causal inferences about the associations between study variables.

## Results

The main analysis was performed using the HLM. PTG and PTD, PA and NA, and levels of HIV/AIDS stigma over five consecutive days were analyzed as dependent variables. Each dependent variable was analyzed in a separate model. The measurements—for example, time variables in days—were analyzed as covariates and fixed effects. Random effects for intercepts and temporal effects were also included. Each model was analyzed twice: with and without resilience levels included as a covariate. This solution allowed for comparisons regarding the variance in results acquired across consecutive days when resilience was and was not considered. The models that included resilience also included also the fixed effects of resilience and resilience over time. The results of this analysis are depicted in Table 3.

Statistically significant positive relationships were found between resilience levels, average PTG levels, and PA over five consecutive days. Also, significant negative relationships were found between resilience levels, average NA levels, and PTD over five consecutive days. No statistically significant relationship was found between resilience levels and average stigma levels. The values of estimated variance fell after resilience was included in calculating PA and NA. A corresponding effect was not observed in our analysis of PTG, PTD, and stigma. Additionally, resilience levels were important in determining the dynamics of affect changes, such that higher resilience was associated with higher, stabler PA and lower, stabler NA. In contrast, resilience levels were related to PTG and PTD's daily intensity (see above), but they did not affect the stabilization of day-to-day changes. The values of estimates of variance dropped after adding resilience in case of positive affect and negative affect are presented at Fig. 1 and Fig. 2).

## Discussion

The results of our study mostly aligned with our first hypothesis, since we observed significant intraindividual variability in daily PTG and PTD, PA and NA, and perceived HIV/AIDS stigma levels among participants. Our findings can significantly contribute to the literature on PLWH's daily function, an understudied subject, without restricting our analysis to coping with HIV infection, having examined PLWH's everyday life [31]. Specifically, previous studies on this topic have focused on rather narrow aspects of PLWH's function, predominantly addressing HIV symptoms, substance abuse use, or adherence to treatment [e.g., 38, 39, 40, 41]. In other words, previous studies have been conducted under

the implicit assumption that PLWH's lives are entirely preoccupied with their HIV-positive status and its associated distress [33]. Nevertheless, great progress in treatment has changed HIV infection from a fatal to a chronic, manageable health condition [42]. Thus, health status remains important but is not necessarily the main cause of PLWH's stress and well-being [31, 43]. In other words, despite sharing a source of distress—that is, their HIV-positive status—these patients' psychological functioning may fluctuate daily, and these fluctuations may be associated with significant individual differences in their psychological functioning over time [29]. An intensive longitudinal design, assessing behaviors as they occur in real time in an individual's natural surroundings, may increase ecological validity and provide a unique chance to monitor individual differences among this patient group [12, 31].

Within the PTG literature, our study is the first to identify daily manifestations of this positive phenomenon in the clinical population. Previously in the related research, only Blackie et al. [6] showed significant within-person variability in daily state-level PTG among a sample of college students after adverse life events. Measuring PTG daily may offer an important contribution to the longstanding debate on PTG's real versus illusory nature, which has been predominantly assessed via retrospective questionnaires [4, 7, 14]. Particularly, whether any stable changes (positive or negative) really occur after trauma remains largely unknown—particularly whether these changes can occur in daily life and be revealed retrospectively in self-reports. More research assessing PTG daily is needed to prove whether PTG is just a trait-like tendency to retrospectively declare positive changes following adversity or whether it can be operationalized as a state-like term that manifests in trauma survivors' day-to-day behaviors [6, 13].

The results of the current study also aligned with our second hypothesis to an extent. On the one hand, we found respectively positive and negative relationships between resilience levels and average PTG and PTD levels among participants. A similar association was observed for affective well-being—that is, a positive relationship with PA and a negative relationship with NA. However, we noted that resilience levels were important for affect alone, such that higher resilience was linked to higher, stabler PA and lower, stabler NA. Concerning PTG and PTD, we found no such stabilization of day-to-day changes as a result of resilience. Also, no relationship between daily HIV/AIDS stigma intensity and resilience was observed. Our findings can serve as an important contribution to the long-term debate on the status of psychological resilience [e.g., 18, 19, 44]. Particularly, whether resilience should be operationalized and measured as a static trait versus a dynamic state remains unknown, as do the consequences of these operationalizations for the association between resilience and well-being across various samples after stressful and adverse life events [20]. These ambiguous findings are partially linked to the measurement limitations of resilience studies—that is, the dominance of cross-sectional design focusing on significant life challenges only and an almost total lack of research on the association between resilience and daily stressors and well-being outcomes [20]. Previously, only Ong et al. [21] had found that psychological resilience assessed on the trait level is related to intraindividual variability in daily emotional responses to stress among older adults, with higher trait resilience predicting faster recovery from daily stress due to a high level of experiencing positive emotions. Ong et al. [21] claimed that, although positive emotions are a fundamental feature of trait resilience, they cannot be reduced to a simple by-product of resilience [45].

Highly resilient individuals were found to often adopt positive emotion-eliciting coping strategies, such as benefit finding and positive reappraisal, which regulate negative affective experiences [46]. Overall, high resilience seems to enable individuals greater access to momentary positive emotional resources, which are also stabler over time, thus protecting them better from daily stress compared to less resilient people [21]. Additionally, resilience may influence levels of emotional complexity—that is, promoting greater differentiation, control, and separation between PA and NA during stress in daily life [47].

Finally, our study is the first to observe the relationship between resilience assessed on the trait level and PTG operationalized daily. It may offer an important contribution to the ongoing debate on the association between resilience and PTG, particularly among PLWH, an issue for which various authors have provided mixed views [see: 48, 49, 50]. On the other hand, the lack of a link between trait-level resilience and daily stigma may suggest that HIV/AIDS stigma is a dynamic and transient phenomenon that is not rooted in the individual, stable characteristics of PLWH but, rather, associated with external social conditions [32]. In other words, regardless of intrinsic factors, stigma among these patients is highly situational or environmental. This finding may suggest possible interventions, such as focusing less on addressing a person's individual traits and more on promoting positive social support and a patient's external environment, as well as removing the social stigma and harmful prejudice associated with living with HIV.

## **Strengths and Limitations**

This study benefitted from several strengths, including its two modes of variable measurement (trait- and state-level), intensive longitudinal design, and clinical sample of PLWH. However, a few limitations should be underscored. First, although we followed an intensive, longitudinal design, this study is correlational, so we cannot draw any cause-and-effect explanations. Second, this study's highly explanatory character complicates any discussion of its implications for the wider context of PLWH's lives. Third, we controlled for a relatively small amount of sociodemographic and HIV-related clinical variables. And based on clinical factors, we can conclude that our participants should be seen as highly functional PLWH. Future studies should focus on more heterogeneous samples of PLWH with respect to their socioeconomic variables and their progression in HIV infection.

## **Calls for Further Research**

The results of our study suggest the need for further advancements in PTG operationalization and measurement, which should particularly focus on identifying PTG's daily manifestations in real life and its intraindividual variability [5, 6]. Such research may discover whether PTG is just a trait-like tendency to retrospectively declare positive changes following adversity or can be operationalized as a state-like phenomenon that manifests in trauma survivors' day-to-day behaviors. In this study, we have already outlined some potential associations between resilience and daily PTG or PTD fluctuations; nevertheless, further scientific inquiry is necessary to differentiate between the stable and situational factors that may promote or hinder stable positive changes amid adversity.

From PLWH's perspective, our results call for further studies on the still neglected subject of PLWH's daily functioning that are not restricted to coping with HIV infection but also focus on various areas of functioning [31]. In this process, researchers should employ more of an intensive longitudinal design to better identify dynamic individual differences in these patients' well-being.

## Declarations

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## Tables

Table 1 *Participants' Demographic Characteristics* (n = 67).

		<i>n</i>	%
Gender	Women	14	20.9
	Men	53	79.1
Age		23–73	M = 40.76; SD = 11.28
Relationship	In a stable relationship	32	47.8
Education	Primary	1	1.5
	Vocational	1	1.5
	Secondary	25	37.3
	Higher	40	59.7
Employment	Regular employment	43	64.2
	Unemployed	11	16.4
	Pension	10	14.9
	Retired	3	4.5
Financial status	Very good	11	16.4
	Good	28	41.8
	Medium	20	29.9
	Bad	6	9.0
	Very bad	2	3.0
Sexual orientation	Heterosexual	15	22.4
	Homosexual	46	68.7
	Other	6	9.0
Addiction	Addict	13	19.4
AIDS	Diagnosed	9	13.4
Viral load	Detectable	5	7.5
ARV treatment	In years	0.50–30	M = 7.07; SD = 5.89

Table 2 *Descriptive Statistics of Analyzed Variables among Participants.*

Day	Variables	M	SD	min	max	S	K	a
Day 1	Resilience	21.35	5.97	9.00	30.00	-0.45	-0.76	0.92
	Positive affect	2.78	0.89	1.00	4.67	0.18	-0.20	0.88
	Negative affect	2.08	0.93	1.00	5.00	0.11	0.67	0.91
	PTG	2.98	1.07	0.00	5.00	-0.70	0.53	0.76
	PTD	1.21	1.16	0.00	4.20	0.10	0.18	0.82
	Stigma	1.78	0.77	1.00	4.00	0.16	0.67	0.91
Day 2	Positive affect	2.86	0.90	1.00	4.67	-0.23	-0.38	0.86
	Negative affect	1.94	0.90	1.00	5.00	0.59	0.53	0.89
	PTG	2.97	1.06	0.00	4.80	-0.84	0.80	0.75
	PTD	1.03	1.05	0.00	4.00	0.21	0.89	0.79
	Stigma	1.74	0.77	1.00	4.00	0.09	0.76	0.92
Day 3	Positive affect	2.82	0.82	1.00	4.67	0.08	-0.23	0.83
	Negative affect	1.97	0.84	1.00	4.83	0.52	0.13	0.87
	PTG	2.99	1.02	0.00	5.00	-0.33	0.01	0.73
	PTD	1.02	0.94	0.00	4.00	0.94	0.63	0.70
	Stigma	1.67	0.72	1.00	4.00	0.18	0.24	0.89
Day 4	Positive affect	2.97	0.80	1.00	4.83	-0.63	0.57	0.83
	Negative affect	2.02	1.05	1.00	5.00	0.24	0.61	0.93
	PTG	3.03	1.00	0.80	5.00	-0.42	-0.39	0.71
	PTD	1.17	1.15	0.00	4.00	0.01	-0.02	0.82
	Stigma	1.70	0.78	1.00	4.00	0.15	0.92	0.92
Day 5	Positive affect	2.94	0.90	1.00	4.50	-0.07	-0.67	0.87
	Negative affect	2.02	0.97	1.00	5.00	0.26	0.18	0.92
	PTG	2.99	1.02	0.00	4.40	-0.94	0.06	0.74
	PTD	1.17	1.08	0.00	5.00	0.39	0.24	0.80
	Stigma	1.66	0.76	1.00	4.00	0.14	0.87	0.92

Note: M: mean value; SD: standard deviation; min: minimum value;

max: maximum value; S: skewness; K: kurtosis;

a: Cronbach's a reliability coefficient.

*Table 3 Relationships between Resilience, Time, and Daily Levels of PTG or PTD, Positive Affect, Negative Affect, and HIV/AIDS Stigma among Participants*

Dependent variable	Resilience included		Estimate	<i>p</i>
PTG	No	Time	-0.006	0.840
		Time variance	0.017	0.063
	Yes	Time	0.007	0.949
		Resilience	0.065	0.003
		Resilience × time	-0.001	0.883
		Time variance	0.018	0.052
PTD	No	Time	0.033	0.931
		Time variance	0.020	0.040
	Yes	Time	-0.041	0.734
		Resilience	-0.059	0.009
		Resilience × time	0.002	0.710
		Time variance	0.021	0.032
Positive affect	No	Time	0.043	0.124
		Time variance	0.003	0.616
	Yes	Time	0.158	0.124
		Resilience	0.068	0.001
		Resilience × time	-0.006	0.220
		Time variance	0.002	0.650
Negative affect	No	Time	-0.006	0.839
		Time variance	0.015	0.068
	Yes	Time	-0.102	0.364
		Resilience	-0.051	0.008
		Resilience × time	0.005	0.358
		Time variance	0.011	0.093
Stigma	No	Time	-0.027	0.082
		Time variance	0.006	0.045
	Yes	Time	-0.023	0.690

Resilience	-0.015	0.339
Resilience × time	0.000	0.910
Time variance	0.006	0.045

## Figures

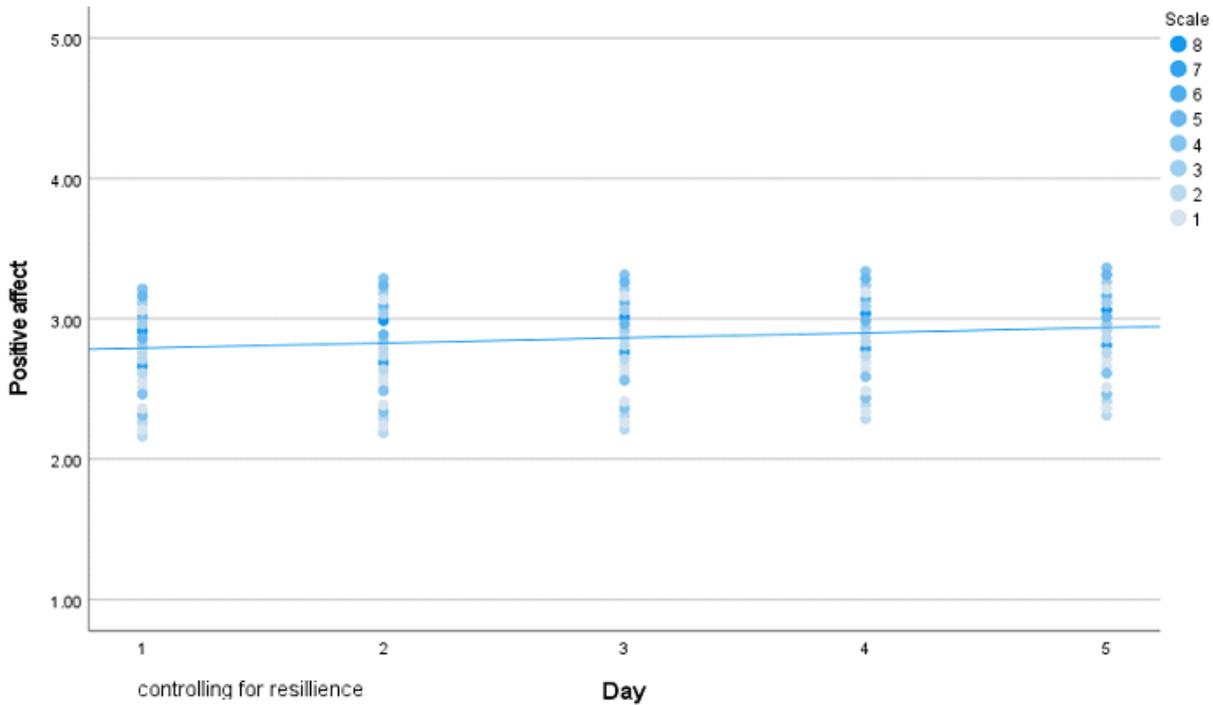
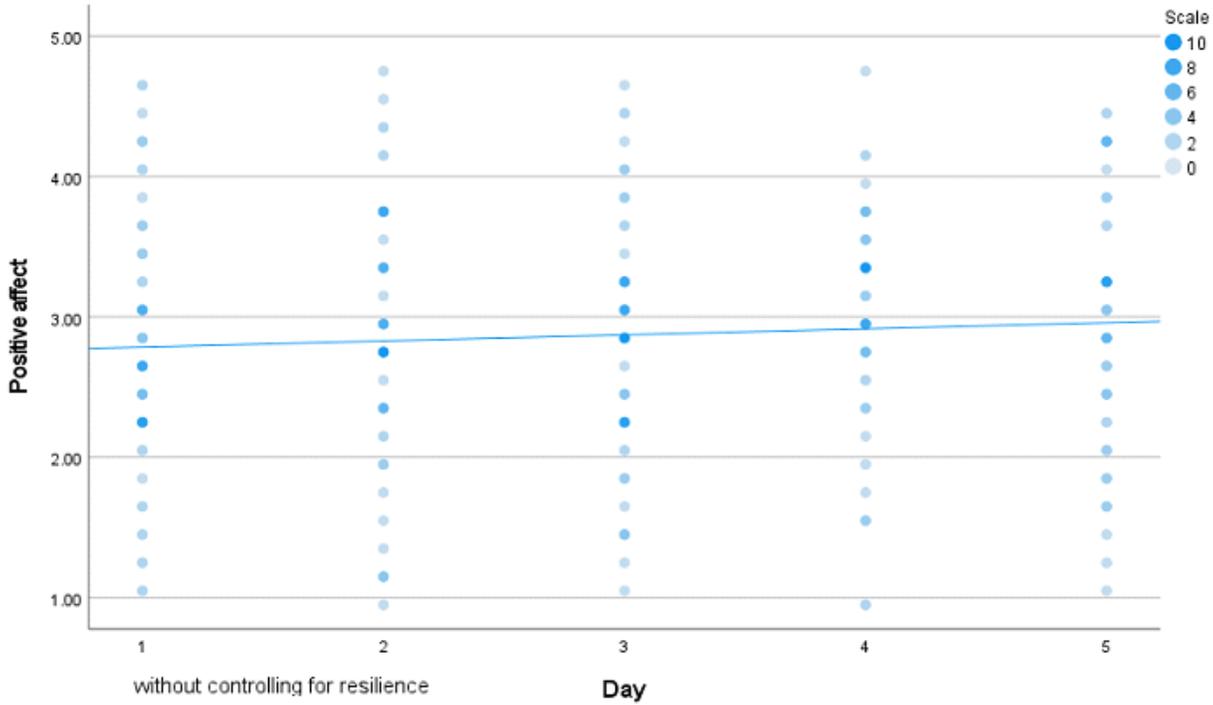


Figure 1

Variance in positive affect in five consecutive days without and with controlling for baseline resilience level.

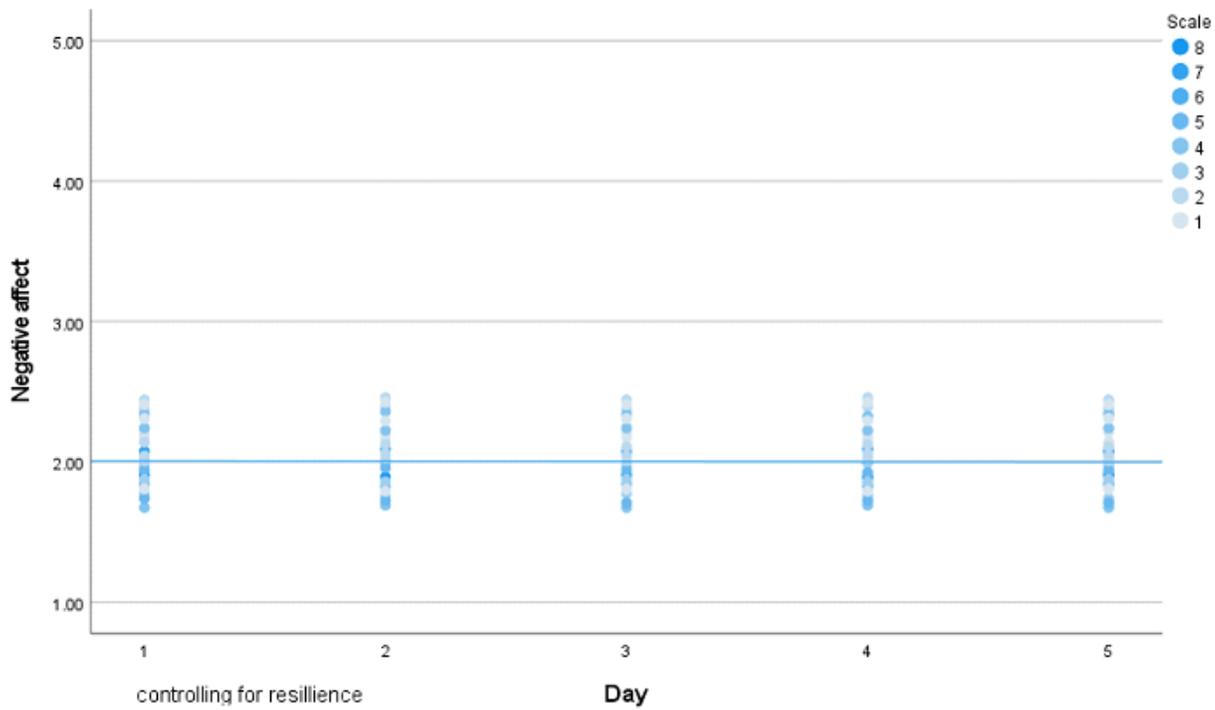
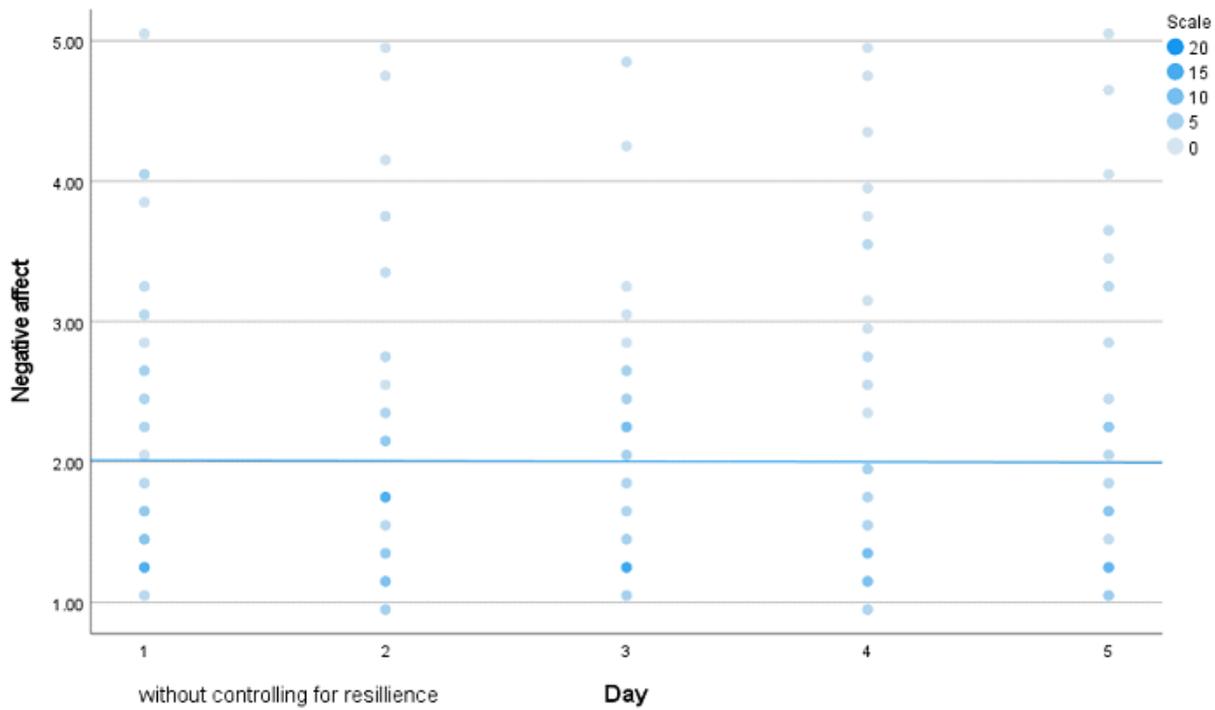


Figure 2

Variance in negative affect in five consecutive days without and with controlling for baseline resilience level.