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INVESTIGATING THE INTRA-INDIVIDUAL VARIABILITY AND TRAJECTORIES OF SUBJECTIVE WELL-BEING

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ABSTRACT. The present study explored the short-term temporal characteristics of subjective well-being (SWB) and its potential correlates. Specifically, we examined the intra-individual variability and the trajectories of SWB and its components life satisfaction, positive, and negative affect. Over a two-week period, 27 participants (78% university students, 85% females, mean age of 29 years) provided SWB data every other day. Before and after this period, participants completed several questionnaires assessing personality and environmental variables, as well as several open-ended questions. The results provide evidence that participants experienced a significant amount of intra-individual variability in their SWB and its components. Furthermore, inter-individual differences in the intra-individual variability were related to several of the personality and environmental variables, as well as to participant's age. Results of multiple regression analyses indicated that deliberation (one facet of the Big Five dimension conscientiousness), social support, and age accounted for 58% of the total variance of intra-individual variability in SWB. In contrast, the slopes of the individual trajectories of SWB were on average statistically non-significantly different from zero. These results emphasize that information is gained by looking at both the patterns and the intra-individual variability over time: The individual trajectories of the participants on average appeared to be stable, but intra-individual variability of SWB was meaningfully related to several of the variables.

1. INTRODUCTION

Over the last three decades, research on subjective well-being (SWB) has made extensive advancement (Diener et al., 1999), and over the past decade and a half SWB has become the most widely used index of well-being (Ryan and Deci, 2001). SWB as a measure of well-being puts the emphasis on the subjective self-evaluation and affective experiences of people, "and does not grant complete hegemony to the external judgements of behavioural experts" (Diener et al., 1998, pp. 33–34). In this sense it is considered to be "a particularly democratic scalar" that takes into account individual values and goals (Diener and Suh, 2000, p. 4).

Most commonly, previous research utilized cross-sectional designs, focusing on the *level* of SWB and its correlates. In contrast, the investigation

of its temporal characteristics has been largely neglected (Bostic and Ptacek, 2001). Yet, the issue of the *stability* of SWB over time has received some attention, as reflected in the debate about its state and/or trait (Veenhoven, 1994, 1998; Stones et al., 1995) as well as top-down and/or bottom-up characteristics (Diener, 1984; Feist et al., 1995; Diener et al., 1999). However, the majority of such longitudinal studies investigated SWB over long time periods (and used large intervals between the points of data collection). For example, in an Australian quality of life panel study (Headey and Wearing, 1989), data were collected every second year from 1981 to 1987. In contrast, the topic of the short-term temporal characteristics of SWB (using short intervals between data collection) has received limited attention (Bostic and Ptacek, 2001). Accordingly, Diener (1996) voiced the necessity to not only focus on long-term averages of SWB, but to also emphasize the study of the short-term temporal characteristics of individual's SWB. Specifically, he suggested to further investigate the *intraindividual fluctuations or variability* of SWB.

Furthermore, Lucas et al. (2003) noted the importance of using a more individual-based approach by investigating *within-subject trends*, which provides additional information to investigating average group trends. To do so, it is necessary to consider the statistical methods utilized for the data analysis. For the investigation of longitudinal data of SWB, most previous research used correlational methods of analysis (e.g., the 26 studies that were used by Veenhoven (1994) for his analysis of happiness over time) or the repeated measures ANOVA (e.g., Virtanen and Koivisto, 2001). These statistical methods have a group-based approach and address research questions as: Are the means of the participants equal over time (using, for example, repeated measures ANOVA)? Such analyses only consider the group profile, and individual differences from this average profile are placed in the error term.

In light of this, the present study had the following objectives:

(i) to investigate the intra-individual variability of SWB with intensive data collection,
(ii) to investigate the individual trajectories or within-subject trends of SWB with intensive data collection, and
(iii) to investigate whether the intra-individual variability and the average slope of the individual trajectories are related to personality and environmental variables.

1.1. Components of Subjective Well-being

SWB is commonly considered to consist of three components: a cognitive component that refers to a person's appraisal of life satisfaction and two affective components that have been labelled positive and negative affect. Research has shown that these three components are interrelated, yet distinguishable (Lucas et al., 1996). There has been an ongoing debate with respect to the relation between positive and negative affect regarding their bipolarity versus independence/discriminant validity (cf. Diener and Emmons, 1985; Feldman Barrett and Russell, 1998; Schimmack et al., 2002). This issue is of importance for measuring SWB. Specifically, it is relevant as far as the combination of the three components into one composite score – overall subjective well-being – is concerned. Another pertinent issue is the question about what role the intensity and the frequency of positive and negative affect play in regard to subjective well-being. On the basis of several studies, Diener et al. (1991) conclude that the frequency and not the intensity of the two affective components is of primary importance. In sum, individuals are considered to have high SWB when they evaluate their life positively (indicating high life satisfaction) and frequently experience positive emotions, while rarely experiencing unpleasant ones (Diener and Lucas, 1999).

1.2. Intra-individual Variability and Trajectories of Subjective Well-being

1.2.1. Intra-individual Variability. Already in 1966, Wessman and Ricks (1966) reported that the *aggregated level* (i.e., the average over time) and the *variability* (i.e., the fluctuations over time) of hedonic affect should be considered as two separate entities. Basically, the same has been proposed by Mischel and Shoda (1995) in regard to people's behaviour. Recently, this has also been acknowledged with regard to research on SWB. That is, intra-individual variability (the fluctuations of SWB above and below the individual's average value) as a level of analysis is considered to be as important as the average level of SWB (Reis et al., 2000). The authors suggest that the daily variations in SWB might even be the more important level of analysis for the individual because these fluctuations over time and situation might be the most salient aspect of one's experience of SWB.

Eid and Diener (1999) identified three methods that are suitable to assess intra-individual variability: First, self- or other-reported intra-individual variability, second, the intra-individual standard deviation of the repeatedly measured variable, and third, spectral analysis. Of these, Eid and Diener (1999) used the intra-individual standard deviation and found that it reliably

measured intra-individual variability in affect. Regarding the topic of SWB, until recently, there was a predominant use of correlational methods of analyses or repeated measures ANOVA (in which intra-individual variability belongs to the error term) for longitudinal data. This might explain why personality has become widely acknowledged as primary determinant of SWB; personality variables are likely to have a stronger impact when intra-individual variability is disregarded. In contrast, situational factors could be more potent predictors of intra-individual variability, because it is plausible that such variability is primarily caused by current events (Diener, 1996).

Nonetheless, the dynamic aspects of SWB could also be related to personality variables. Bostic and Ptacek (2001) present results that demonstrate the usefulness of personality-based models to account for intra-individual variability in SWB. In their study, the Big Five and locus of control were used as personality variables for the prediction of intra-individual variability in SWB. SWB was assessed weekly for 10 weeks and the within-participant standard deviation was utilised as an indicator of variability in SWB. The cited authors found considerable intra-individual variability in overall SWB over the 10-week period. Their multiple regression analysis revealed that personality variables explained up to 12% of the variance in variability of SWB. In particular, individuals scoring high in conscientiousness and/or in the chance component experienced a larger intra-individual variability in their SWB.

1.2.2. Trajectories. As has been mentioned, most previous longitudinal research on SWB focused on averages or group-profiles and the study of within-subject trends has received less attention. A study by Lucas et al. (2003) supports the notion that it is of great importance to consider within-subject trends over time. With data from a 15-year longitudinal study, they explored the impacts of marital transitions on life satisfaction in order to test adaptation theory. Their findings indicate that even though participants on average adapted back toward baseline levels, there were considerable differences in this tendency and many participants did not adapt to marital transitions. This would have gone unnoticed if the authors had solely focused on the average trend. With regard to between-subjects versus within-subject effects, Lucas et al. (2003) note that psychologists' suggestions to people regarding 'what makes one happy' are generally based on between-subject findings. However, they propose that within-subject effects are, in fact, most significant to an individual's decision, and should therefore be more emphasized in research on SWB.

Similarly, Oishi et al. (1999) state that researchers have neglected to study changes of SWB within individuals. In a 23-day daily diary study they examined individual goals, values and satisfying activities to investigate whether these account for patterns of intra-individual and inter-individual variation in SWB. Their findings indicate that intra-individual changes in satisfaction are largely related to the extent of success in domains that individuals value.

1.3. Research Question

The present study was designed to investigate the intra-individual variability and the individual trajectories of SWB. We were especially interested in examining whether inter-individual differences in intra-individual variability as well as in individual trajectories exist and whether these can be meaningfully predicted by several variables. Further, we sought to build on Bostic and Ptacek's (2001) study on intra-individual variability of SWB (which they based on a composite score of SWB) by also examining the three components of SWB (life satisfaction, positive and negative affect) separately. We included personality and environmental variables in our model to investigate their potential predictive power in accounting for individual differences in intra-individual variability as well as the trajectories of SWB. Personality variables included the following: To replicate and extend the findings of Bostic and Ptacek (2001) with regard to intra-individual variability in SWB, the NEO-PI-R and the Spheres of Control Scale were administered. In contrast to their results, we expected that individuals high in conscientiousness would experience less variability in SWB**.** This makes, in our opinion, theoretically more sense: According to Costa and McCrae (1992), conscientiousness relates to self-control, insofar as conscientious individuals tend to adopt an "active process of planning, organizing, and carrying out tasks" (p. 16). These characteristics seem to be related to less rather than more variability. Individuals that are very organized and disciplined leave little to chance, and their planning might contribute to a consistent daily life. The advantage of using the NEO-PI-R is that this not only allows assessing the Big Five, but also specific facets of these dimensions, thereby providing more detailed information. Furthermore, the spheres of control provide related, though miscellaneous information regarding the control construct from locus of control that had been utilised in the study by Bostic and Ptacek. In addition, we also included variables pertaining to meaning in life, self-esteem, perceived health, as well as environmental variables such as hassles and social support.

Another topic that has been largely neglected is whether the level (as determined by a single measurement at one point in time) or the mean level (as determined by the aggregated scores over time) of SWB and the intra-individual variability in SWB are related and, if this is the case, what this relation looks like. Several studies indicate that greater variability in affect is related to negative emotional experiences. For example, Eid and Diener (1999) report that intra-individual variability in affect is primarily related to neuroticism; Hall, Sing, and Romanoski (1991) found affective variability to be elevated in depressive inpatients, and Larson et al. (1990) report that depressed youth showed greater variability in self-reports of affect. In the study by Bostic and Ptacek (2001), one table (entitled "Correlations among predictor variables and between mean levels of SWB and standard deviation in SWB..."', p. 365) actually provides the correlation between the mean level and the standard deviation (as index of variability) of SWB. It is unfortunate that the authors did not discuss this finding considering that this correlation was the second largest in the table ($r = -0.52$, $p < 0.01$). Investigating the relationship between variability in and level of SWB is important because this allows us to better understand whether variability in SWB is related to positive (high level of SWB) or negative experiences (low level of SWB) of individuals.

Furthermore, we were interested in the perceptions of the participants about how they experience intra-individual variability in their SWB, and what they consider as possible correlates/causes for such variability, and therefore several open-ended questions were administered.

2. METHOD

2.1. Participants

The final sample included 27 (4 male and 23 female) participants, the majority being students at the University of British Columbia (with the exception of two post-doctoral fellows, and four visiting scholars). Participants were recruited by distributing an email message via the Faculty of Education server and via a college for graduate students at UBC, and by posting several poster advertisements throughout the UBC campus. Participants came from a wide range of disciplines including Education, Law, English Literature, Geography, International Relations, and Psychology. The mean age was 29 years, with a range from 19 to 57 years. Prior to the study, the procedure and goals of the study were described, and participants provided informed consent. Participants received $20 for

their participation and entered a draw for two dinner tickets (each $50) after completion of the study. One male participant dropped out after the first meeting due to spontaneous travel plans, and two participants did not provide one of the seven Internet assessments. Four participants could not attend the second individual session, but answered the open-ended questions and the Survey of Recent Life Experiences (Kohn & Macdonald, 1992) by email instead.

2.2. *Measures*

2.2.1. Subjective Well-being. Life satisfaction: Global life satisfaction was assessed with the Temporal Satisfaction with Life Scale (TSWLS; Pavot et al., 1998). The TSWLS consists of 15 statements that concern the past, present, or future, which form three subscales with five items each. As reported by the scale developers, it is also possible to utilise the three subscales separately. Respondents are asked to indicate their extent of agreement on a 7-point Likert-type scale (from 1 = strongly disagree to 7 = strongly agree). The TSWLS has been reported to have good internal consistencies (Cronbach's α ranged from 0.91 to 0.93), temporal consistency (test–retest correlations ranged between 0.82 and 0.88 for differing time intervals between 4 and 9 weeks), and factorial validity and construct validity (Pavot et al., 1998; McIntosh, 2001). In the present study, Cronbach's alpha for this measure was 0.93 for the total scale, ranging between 0.85 and 0.92 for the subscales. All 15 items of the TSWLS were administered during the initial individual meeting at the beginning of the study period. Only the 5 items pertaining to present satisfaction with life were used for the every other day assessment.

Affect balance: The Daily Mood Scale (Diener, 2005) was used to measure the affective components of SWB. This instrument is comprised of nine adjectives (four adjectives indicating positive and five negative affect) that form two subscales. On a 7-point Likert-type scale, participants are asked to indicate to what extent they have felt each of these emotions during the past 2 days (this was adjusted from the original today). Response options ranged from 1 (not at all) to 7 (extremely much). One total score can be calculated by subtracting these two subscales. Cronbach's α for the Daily Mood Scale in the present study were 0.84 for the total scale, 0.93 for positive mood, and 0.85 for negative mood.

Composite score: For the purpose of providing an overall estimate of SWB a composite score was created by adding the score of the present scale of the TSWLS to the total score of the Daily Mood Scale. This composite scale showed an internal consistency estimate Cronbach's α of 0.91.

2.2.2. Personality. Five-factor model of personality: For the assessment of the personality, the Revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae, 1992) was used. The dimensions neuroticism, extraversion, openness, conscientiousness, and agreeableness are further subdivided into six facets each, which provide a comprehensive assessment of the five-factor structure of personality. 240 items have to be rated on a 5-point Likert scale format (from strongly agree to strongly disagree). The internal consistencies (Cronbach's α) of the five dimensions have been reported to range between 0.87 and 0.92, and between 0.56 and 0.81 for the facets (these consist of 8 items). Reported test-retest correlations range from 0.75 to 0.83 for the dimensions with a 3 months interval. The factor structure has been repeatedly replicated, and construct validity been indicated (cf. Costa and McCrae, 1992). In the present study the five dimensions demonstrated adequate coefficient alpha reliabilities ranging from 0.85 to 0.90, with the single facets ranging from 0.60 to 0.79.

Self-esteem: The Rosenberg Self-Esteem Scale (Rosenberg, 1989) consists of 10 items to be answered on a 4-point Likert-type scale from strongly agree to strongly disagree. The scale has been reported to have adequate internal consistency (alpha reliabilities ranged from 0.88 to 0.90 across six assessments) and construct validity (Robins et al., 2001). The analysis of the present data yielded a somewhat lower alpha coefficient of 0.69.

Meaning in life: The Meaning in Life Questionnaire (Steger et al., 2004) is composed of two 5-item subscales measuring presence of meaning and search for meaning. Each item is rated using a Likert-type response format with response options ranging from 1 (absolutely untrue) to 7 (absolutely true). The authors demonstrated the psychometric qualities of their scale in several studies that provide support for factorial, convergent and discriminant validity. In their studies, Cronbach's α coefficients for the internal consistency ranged between 0.81 and 0.86 for presence of meaning and between 0.84 and 0.92 for search for meaning. The test–retest correlation (1 month time period) was 0.70 for presence, and 0.73 for search.

Cronbach's alpha coefficients in the present study were 0.82 for the presence subscale and 0.89 for the search subscale.

Spheres of control: The Spheres of Control Scale – Version 3 (SOC-3; Paulhus and Van Selst, 1990) assesses three dimensions of control: personal control, interpersonal control and sociopolitical control. Each of these is addressed by a 10-item scale with a Likert-type response format from 1 (disagree) to 7 (agree). Paulhus and Van Selst (1990) reported an internal consistency of 0.80 for this version and Paulhus and Christie (1981) and Paulhus (1983) factorial and construct validity of the first version. These authors also report test–retest correlations to be above 0.90 for 4 weeks and above 0.70 for 6 months for the first version of this instrument. In the present study Cronbach's α were 0.83 for the total scale, 0.66 for the personal control subscale, 0.75 for the interpersonal control subscale, and 0.75 for the socio-political control subscale.

2.2.3. Perceived Social Support. The Perceived Social Support Scale (PSSS; Blumenthal et al., 1987) consists of 12 items that measure perceived social support with respect to family, friends, and significant others. The scale is answered using a 5-point Likert scale format from 1 (strongly disagree) to 5 (strongly agree). The PSSS has been shown to possess adequate internal consistency (Cronbach's α ranging between 0.85 and 0.91 for the total scale and the subscales) and adequate stability (test-retest reliabilities ranging between 0.72 and 0.85 for the total and the three subscales over a 2–3 month time period) (Blumenthal et al., 1987). In the present study Cronbach's α were 0.89 for the total scale, ranging between 0.84 and 0.90 for the subscales.

2.2.4. Hassles. The short form of the Survey of Recent Life Experiences (SRLE; Kohn and Macdonald, 1992) was used to assess hassles participants might have experienced before and during the every-other-day data collection. The SRLE consists of 41 items that break down in six subscales: Social and cultural difficulties, work area, time pressure, finances, social acceptability, and social victimisation. Participants are asked to indicate how much each of a list of experiences has been part of their life during the last month on a Likert-type response scale with response options ranging from 1 (not at all) to 4 (very much part of my life). The time frame was adapted to a 2 week interval because the relation between hassles and the 2 weeks

assessment of SWB were of interest for the purposes of our study. The authors report adequate internal consistency for the total scale (Alpha 0.92 in the item-selection sample and 0.91 in the cross-replicated sample) and criterion validity. In the present study Cronbach's α was 0.88 for the total scale, ranging between 0.62 and 0.85 for the subscales.

2.2.5. Physical Healthiness. Physical healthiness was assessed with the Physical Healthiness Rating Scale (Cassidy, 2000), a 6-item Likert-type rating scale with a reported Cronbach's α of 0.84. In the present study Cronbach's α was 0.80.

2.2.6. Qualitative Data Collection. The qualitative data collection consisted of several open-ended questions about happiness and reasons for variability in happiness. The term happiness was used instead of SWB because of its general familiarity.

2.3. Procedure

Data collection lasted 4 weeks. In week 1, all quantitative questionnaires were administered individually. In week 2 and 3, participants were asked to fill out the present satisfaction with life subscale of the TSWLS and the Daily Mood Scale every other day (on 7 occasions) after 6 p.m. via an Internet web page. This provided us with the precise information as to when the participants completed the questionnaires. Prior to participation in the study, it was assured that participants had easy access to the Internet. Participants received an email message at 4 p.m. on the days of data collection during the 2 weeks to ensure that all days of the week were covered for data collection. The text of this email was standardized and asked participants to complete the questionnaires after 6 p.m. on this day. When participants did not answer the questionnaires on the respective evenings, another email reminder was sent the following morning at 8 p.m. If the participants answered before 12 p.m., their responses were included. In week 4, there was a second individual session with the open-ended questions. Also, the SRLE was administered a second time while asking participants to focus on the past 2 weeks (covering the period of the Internet study) when answering the questions. The present study was conducted during the last week of the summer semester as well as the first week of vacation. We carefully chose this time based on the presumption that the

decrease in stressful circumstances associated with the end of the school year would be reflected in the participants' trajectories of SWB.

3. RESULTS

3.1. Descriptive Statistics

Descriptive statistics for the SWB, personality, recent life experiences, and physical healthiness measures as assessed during the first individual session are provided in Table I. None of the variables showed significant kurtosis or skewness that would necessitate transformation or exclusion.

Because of the ongoing discussion regarding the bipolarity versus independence/discriminant validity of positive and negative mood (cf. Schimmack et al., 2002; Feldman Barrett and Russell, 1998; Diener and Emmons, 1985), the composite score is supplemented by reporting the single constituents of SWB separately. Thereby, new insights into the differing relationships of the overall, cognitive and affective component of SWB to the other study variables can be provided.

TABLE I

Descriptive statistics of study variables

Variable	Mean	Standard deviation	Skewness[a]	Kurtosis[b]
SWB	31	15	−0.79	0.07
Satisfaction	25	7	−0.67	−0.03
Positive mood	19	6	−0.14	−0.19
Negative mood	13	6	0.58	−0.51
Perceived social support	70	10	−0.55	−0.73
Self-esteem	33	3	−0.55	−0.06
Presence of meaning	26	5	−0.68	0.05
Search for meaning	20	8	−0.64	−0.58
Personal control	50	6	−0.21	0.99
Interpersonal control	53	7	0.05	−0.57
Socio-political control	44	8	0.70	0.55
Hassles 1	67	13	−0.24	−0.31
Hassles 2	64	13	0.39	−1.2
Physical healthiness	17	3	0.33	0.32
Neuroticism	92	18	−0.58	−0.49
Extraversion	119	25	−0.16	0.05
Openness	138	17	−0.07	−0.63
Agreeableness	119	21	0.59	0.34
Conscientiousness	123	26	−0.22	0.78

[a]The standard error of the skewness constituted 0.45.
[b]The standard error of the kurtosis constituted 0.87.

3.2. *Initial Analyses of the Relations Between Study Variables*

Bivariate relationships among the components of SWB as assessed during the first individual session (paper and pencil), the aggregated SWB components (scores were averaged for each participant over all time-points of data collection via Internet) and the other study variables were examined. These analyses were conducted to check whether the data would replicate the main findings of the SWB literature. The alpha level was set at 0.05 for significance for all statistical calculations.

Focusing on the pattern of correlations for the single-point assessment of SWB and the five dimensions of the NEO-PI-R as provided in Table II, neuroticism had the strongest relationship to the composite score of SWB ($r = -0.47$, $p = 0.007$), to present life satisfaction ($r = -0.52$, $p = 0.006$) and to negative mood ($r = 0.63$, $p = 0.001$). Though the correlations between extraversion and the composite score of SWB, satisfaction with present life, and positive affect, were statistically insignificant, all correlations were in the expected direction. The correlations of the SWB measures to the other three dimensions of the NEO-PI-R were also statistically insignificant. The aggregated SWB scores did not show any statistically significant correlations to the NEO-PI-R dimensions, although they generally pointed in the same direction as the measure based on one time-point.

The correlations between the SWB measures and the other study variables are shown in Table III. Of the three factors of the spheres of control, only interpersonal control exhibited a statistically significant relation to the single-point assessment of the SWB composite score ($r = 0.51$, $p = 0.006$), present life satisfaction ($r = 0.42$, $p = 0.028$), and negative mood ($r = -0.48$,

TABLE II

Intercorrelations between SWB measures and NEO-PI-R dimensions

Variable	1	2	3	4	5	6	7	8	9
1. SWB	–	0.87**	0.75**	−0.74**	−0.47**	0.37	−0.03	0.27	0.13
2. Satisfaction		–	0.46*	−0.59**	−0.52**	0.36	−0.12	0.28	0.25
3. Positive mood			–	−0.24	−0.03	0.38	0.20	0.10	−0.05
4. Negative mood				–	0.63**	−0.11	0.19	−0.27	−0.11
5. Neuroticism					–	−0.27	0.02	−0.42*	−0.49**
6. Extraversion						–	0.21	0.22	0.17
7. Openness							–	0.22	−0.10
8. Agreeableness								–	0.33
9. Conscientiousness									–

*$p < 0.05$; **$p < 0.01$.

TABLE III

Intercorrelations between SWB measures and study variables

Variable	5	6	7	8	9	10	11	12	13	14
1. SWB	0.63**	0.35	0.18	−0.34	0.21	0.51**	−0.16	−0.49*	−0.41*	0.20
2. Satisfaction	0.57**	0.45*	0.35	−0.41*	0.24	0.42*	−0.20	−0.39*	−0.42*	0.34
3. Positive mood	0.52**	0.16	−0.17	−0.25	0.15	0.32	−0.14	−0.14	−0.20	−0.06
4. Negative mood	−0.38*	−0.22	−0.28	0.14	−0.09	−0.48*	0.04	0.68**	0.37	−0.21
5. Social support	–	0.55**	0.12	−0.30	0.39*	0.49*	−0.01	−0.52**	−0.37	−0.21
6. Self-esteem		–	0.37	−0.38	0.35	0.38	0.32	−0.20	−0.10	0.21
7. Presence of meaning			–	−0.20	0.47*	0.19	0.06	−0.29	−0.12	0.46*
8. Search for meaning				–	−0.18	0.01	0.23	−0.06	−0.13	−0.09
9. Personal control					–	0.49**	0.33	−0.39*	−0.08	0.59**
10. Interpersonal control						–	0.32	−0.36	−0.14	0.42*
11. Sociopolitical control							–	−0.01	0.01	0.04
12. Hassles 1								–	0.51**	−0.20
13. Hassles 2									–	−0.01
14. Physical healthiness										–

*$p < 0.05$; **$p < 0.01$.

$p = 0.012$). Self-esteem correlated positively (although statistically significantly only in the case of satisfaction with present life) with the positive aspects of SWB. Presence of meaning did not display any statistically significant correlations to SWB and its components, yet the negative correlation to positive mood was somewhat surprising. Furthermore, search for meaning exhibited a significant negative correlation to satisfaction with present life ($r = -0.41$, $p = 0.034$). Strong correlations existed between overall SWB and perceived social support, and between the three SWB components and perceived social support (in the range of $r = -0.38$, $p = 0.05$ for negative mood to $r = 0.63$, $p = 0.001$ for SWB).

The correlations between the SWB measures and hassles were higher for the first point of data collection, especially for the correlation to negative mood with $r = 0.68$, $p = 0.001$, compared to a statistically non-significant correlation between negative mood and the second time of data collection of hassles. Furthermore, the aggregated SWB measures showed statistically significant correlations to social support and recent life experiences only. None of the correlations between the SWB measures (single and aggregated time-points) and age, partner, and self-perceived physical healthiness were statistically significant.

Generally, our findings were in accordance to previous results from the SWB literature. The small sample size may explain why some of the commonly found significant correlations did not reach statistical significance in this study. Following Zumbo and Hubley's (1998) recommendations rather than conduct a post-hoc power analysis, as suggested by one reviewer, we supplement the hypothesis testing with effect sizes, which help the reader evaluate whether the sample size may have been too small to detect a real or non-trivial statistical effect. This recommendation is based on the statistical perspective that it is informative to make a statistical decision on multiple sources of information, with each source focusing on a different part of the data. Tatsuoka (1993) states that effect sizes in essence give one a sense of the magnitude of the statistical effect, which, unlike *p*-values, is hardly influenced by sample size because effect sizes factor out the effect of sample size on the statistical test of significance. In short, effect sizes are particularly useful, in addition to the *p*-value, when either the sample size is so large that even trivial effects become statistically significant or when the sample size is so small that even a large effect is declared as statistically non-significant by *p*-values alone. In our case, where the sample size is relatively small, a statistically non-significant *p*-value can correspond with a medium effect size. For example, according to Cohen's (1992) operational definitions of small ($r = 0.10$), medium ($r = 0.30$), and large ($r = 0.50$) effect sizes the

relation of extraversion to the positive components of SWB would be considered to be of medium effect size (even though it is statistically non-significant), an effect size that Cohen describes as one that "...represents an effect likely to be visible to the naked eye of a careful observer" (p. 156).

3.3. Variability of SWB and its Relation to the Other Study Variables

3.3.1. Assessing variability of SWB. As one index of variability the within-participant standard deviation of SWB was calculated over the 7 occasions of data collection via the Internet. One problem with using the standard deviation as an index of variability is that this measure is very sensitive to outliers, which is of special concern for interpreting seven data points that can be easily distorted by only one occasion. Therefore, a more robust estimate of the standard deviation, the median absolute deviation as proposed by Huber (1981) was also calculated. The median absolute deviation is the median value of the deviation of each score from the median of the sample divided by 0.6745, a constant value required to make the median absolute deviation unbiased. The precise equation taken from Zumbo and Jennings (2002, p. 425), is as follows

$$s_{\text{med}} = \frac{\text{med}|x_i - \text{med}_i x_i|}{0.6745}$$

with med_i indicating the median of a sample, and x_i indicating a score of the sample.

To ascertain whether the two variability indices differed on average from zero, a one-sample *t*-test was conducted for the standard deviation and the median absolute deviation of SWB and its components. The results indicate that the median absolute deviation and the standard deviation of SWB, temporal satisfaction with present life, positive mood, and negative mood differed statistically significantly from zero.

The descriptive statistics of the median absolute deviation and the standard deviation are shown in Table IV. With regard to distributional characteristics, we found that the standard deviation and the median absolute deviation of SWB, satisfaction with present life, and positive mood showed a significant skewness. Furthermore, the standard deviation and median absolute deviation of SWB and satisfaction with present life also showed a significant kurtosis. However, both the skewness and kurtosis were less pronounced for the median absolute deviation.

Because the median absolute deviations of the composite score of SWB and of the single components were strongly and statistically significantly

TABLE IV

Descriptive statistics of the median absolute deviation (MAD) and the standard deviation (SD) of SWB and its facets

Variable	Mean	Standard deviation	Skewness[a]	Kurtosis[b]
MAD Subjective well-being	1.37	0.79	1.08	1.45
MAD Satisfaction with present life	0.46	0.37	1.36	1.52
MAD Positive mood	0.73	0.64	0.95	0.09
MAD Negative mood	0.6	0.42	0.59	0.91
SD Subjective well-being	1.64	0.95	1.81	4.53
SD Satisfaction with present life	0.54	0.37	2.01	5.01
SD Positive mood	0.79	0.43	1.15	0.18
SD Negative mood	0.69	0.38	0.57	0.44

*$p < 0.05$; **$p < 0.01$.
[a]The standard error of the skewness constituted 0.45.
[b]The standard error of the kurtosis constituted 0.87.

correlated to the analogue standard deviations, with correlation coefficients ranging from $r = 0.85$ to $r = 0.50$, the following analysis will be restricted to the former measure of variability of SWB. On the one hand, the high correlations show the close relationship, thereby making the comparison to the study by Bostic and Ptacek (2001) possible; on the other hand, the median absolute deviation index has a preferable distribution and is more robust.

Individuals' variability of SWB and its components over time are illustrated in Figures 1 and 2. Figure 1 provides an example of a person that is highly variable in her self-reports, whereas Figure 2 provides an example of a person that is relatively consistent in her self-reports.

3.3.2. Relationship between Variability in SWB and Study Variables. To investigate whether there exists a relationship between the variability and the level of SWB, the median absolute deviation of SWB and its facets were correlated with the SWB measures derived from a single point of data collection. All correlations were statistically non-significant and small. However, the correlations between the median absolute deviations and the mean level of SWB (aggregated over the seven points of Internet data collection) were larger and three were significant. Persons, with a high amount of variability in negative mood seem to experience a lower mean level of SWB ($r = -0.45$, $p < 0.05$) and satisfaction with present life ($r = -0.47$, $p < 0.05$), whereas people with a high mean level of negative mood seem to undergo higher variability in their general SWB ($r = 0.43$, $p < 0.05$).

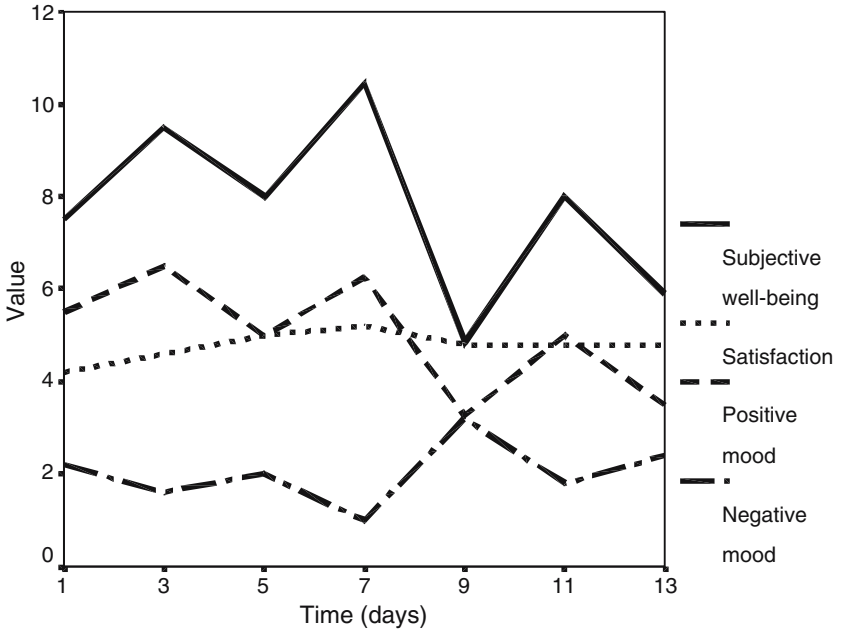

Fig. 1. Example of a person showing strong variability in SWB and its components.

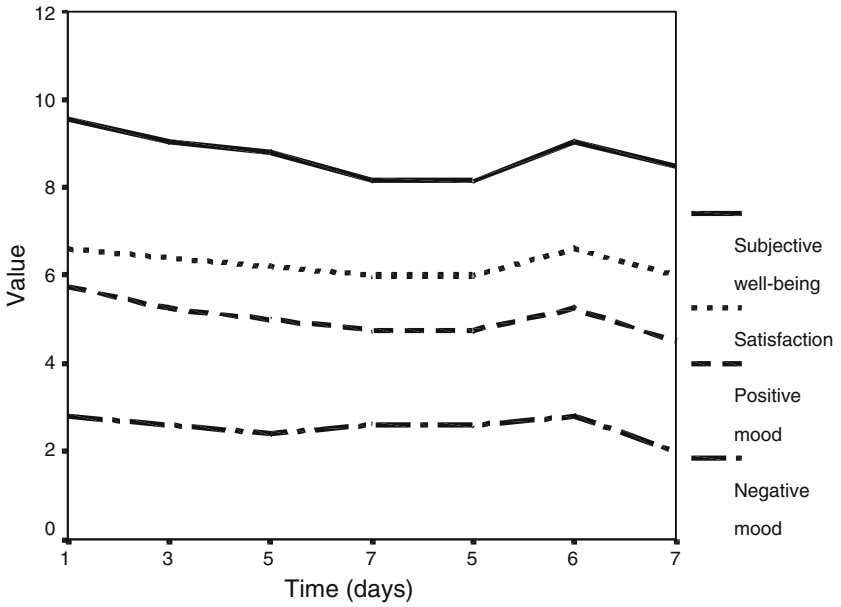

Fig. 2. Example of a person showing little variability in SWB and its components.

We also examined whether variability in SWB is related to the other study variables. Bivariate correlations were conducted between the median absolute deviations of the SWB measures and the demographic variables, hassles, social support, and self-reported physical healthiness, as shown in Table V.

The median absolute deviation of the composite score of SWB showed a statistically significant negative correlation to social support ($r = -0.40$, $p = 0.04$) and a statistically significant positive correlation to the recent life experiences assessed on time 1 ($r = 0.40$, $p = 0.04$). Of the median absolute deviations of the three components of SWB, only the median absolute deviation of negative mood showed a statistically significant correlation, namely to recent life experiences on occasion 2 ($r = 0.41$, $p = 0.032$). For a more detailed picture, we investigated the correlations between the median absolute deviations of the SWB measures and the subscales of social support and hassles. The subscale family showed the highest negative correlation to the median absolute deviation of SWB ($r = -0.41$, $p < 0.05$) indicating that people with low perceived social support, especially from their family are prone to experience a greater amount of variability in SWB. Concerning hassles on occasion 1, the subscale socio-cultural difficulties had the highest correlation to the median absolute deviation of SWB ($r = 0.44$, $p = 0.021$). Furthermore, the subscale social acceptability showed a statistically significant correlation with the median absolute deviation of negative mood ($r = 0.48$, $p = 0.012$) and the subscale social victimization with the median

TABLE V

Intercorrelations between the median absolute deviation (MAD) of SWB and its components and study variables

	5	6	7	8	9	10
1. MAD SWB	−0.41*	−0.10	−0.40*	0.40*	0.22	−0.18
2. MAD Satisfaction	−0.38	−0.19	−0.28	0.31	−0.03	−0.24
3. MAD Positive mood	−0.11	0.11	−0.32	0.10	0.11	−0.12
4. MAD Negative mood	−0.09	0.01	−0.33	0.25	0.41*	−0.07
5. Age	–	0.61**	0.14	−0.52**	−0.14	−0.34
6. Partner		–	−0.14	−0.26	0.03	−0.28
7. Social support			–	−0.52**	−0.36	0.32
8. Hassles 1				–	0.51**	−0.19
9. Hassles 2					–	0.01
10. Physical healthiness						–

*$p < 0.05$; **$p < 0.01$.

absolute deviation of positive mood ($r = 0.38$, $p = 0.048$). With regard to hassles on occasion 2, the subscale social acceptability had the highest correlation to the median absolute deviation of negative mood ($r = 0.52$, $p = 0.008$), and the subscale finances was significantly correlated to the median absolute deviation of SWB ($r = 0.42$, $p = 0.035$).

Correlations between the median absolute deviation of SWB and its constituents and the personality variables are reported in Table VI.

Self-esteem and the two scales presence of meaning and search for meaning did not show any statistically significant relations to variability in SWB and its components. Of the spheres of control, only interpersonal control had a statistically significant negative correlation to one of the variability measures, namely the median absolute deviation of negative mood, suggesting that a higher sense of interpersonal control is associated with less variability in negative mood. It has to be noted that the (statistically non-significant) correlations between the indices of variability in SWB and the spheres of control scales were all negative (with the exception of two correlations that were close to zero).

Examining the relation to the dimensions of the NEO-PI-R, the median absolute deviation of SWB only exhibited a statistically significant (negative) correlation to the dimension conscientiousness ($r = -0.41$, $p = 0.034$), indicating that higher conscientiousness is linked to less variability. Of the single facets that make up this dimension, deliberation and order had the highest correlations to the median absolute deviation of SWB ($r = -0.59$, $p < 0.01$ and $r = -0.44$, $p < 0.05$, respectively). The median absolute deviation of the cognitive component – satisfaction with present life – also showed a statistically significant negative correlation to the dimension conscientiousness ($r = -0.52$, $p = 0.005$). Again, the facet deliberation showed the strongest relation ($r = -0.51$, $p = 0.006$). Furthermore, the facets self-discipline, order, dutifulness, and competence of the dimension conscientiousness showed statistically significant negative correlations to the median absolute deviation of satisfaction with present life. Neither the median absolute deviation of positive mood nor the median absolute deviation of negative mood displayed any statistically significant correlations to the five dimensions of the NEO-PI-R, although there were several statistically significant correlations to single facets of these dimensions. All in all, the Big Five personality dimension conscientiousness was the most strongly related to variability in SWB, and the cognitive component of SWB seemed to be mainly responsible for this correlation.

A multiple regression analysis was conducted to determine the relative importance of the statistically significant zero-order predictor variables age,

TABLE VI

Intercorrelations of the median absolute deviation (MAD) of SWB and its components with personality variables

	5	6	7	8	9	10	11	12	13	14	15
1. MAD SWB	−0.08	0.03	0.20	−0.23	−0.11	0.02	0.20	0.23	0.13	−0.06	−0.41*
2. MAD Satisfaction	0.03	0.11	0.05	−0.26	0.05	−0.21	0.15	0.04	−0.07	−0.18	−0.52**
3. MAD Positive mood	−0.14	0.22	0.02	−0.36	−0.14	−0.16	−0.34	0.17	−0.04	0.36	0.09
4. MAD Negative mood	−0.16	−0.01	0.02	−0.19	−0.46*	−0.32	0.16	−0.27	0.26	0.11	−0.01
5. Self-esteem	–	0.37	−0.38	0.35	0.38	0.33	−0.52**	0.33	0.27	0.07	0.06
6. Presence of meaning		–	−0.20	0.47*	0.19	0.06	−0.61**	0.32	−0.12	0.28	0.44*
7. Search for meaning			–	−0.18	0.00	0.23	0.30	0.00	0.11	−0.17	−0.10
8. Personal control				–	0.49**	0.33	−0.27	0.32	0.12	0.04	0.57**
9. Interpersonal control					–	0.32	−0.32	0.42*	0.13	−0.12	0.03
10. Sociopolitical control						–	−0.04	0.27	0.20	−0.10	0.11
11. Neuroticism							–	−0.27	0.02	−0.42*	−0.49**
12. Extraversion								–	0.21	0.22	0.17
13. Openness									–	0.22	−0.10
14. Agreeableness										–	0.33
15. Conscientiousness											–

*$p < 0.05$; **$p < 0.01$.

social support, recent life experiences, and the facet deliberation of the NEO-PI-R dimension conscientiousness with respect to variability in SWB. Due to the small sample size, only these four variables were entered as predictors. These four variables accounted for 58% of the total variance of variability in SWB ($R^2 = 0.58$, adjusted $R^2 = 0.51$; $F(4,22) = 7.64$, $p < 0.001$). Only deliberation and perceived social support emerged as significant predictors with a standardized β of -0.55 ($p = 0.001$) and -0.37 ($p = 0.036$), respectively. Because the largest condition index of 41.6 was larger than 30 and therefore indicates multicollinearity another multiple regression was run without recent life experiences (the largest condition index was decreased and equalled 20.4), which led to a model with $R^2 = 0.58$, and adjusted $R^2 = 0.53$ ($F(3,23) = 10.62$, $p = 0.001$).[1] Hence, the model with the three predictors deliberation, age, and social support accounted for as much total variance in variability of SWB as the previous four-predictor model. Furthermore, all three predictors exhibited significant standardized regression coefficients (for deliberation $\beta = -0.54$, $p = 0.001$, for perceived social support with $\beta = -0.35$, $p = 0.018$, and for age $\beta = -0.29$, $p = 0.046$. As a measure of relative importance of the regressors, the "standardized Pratt measure" (Thomas et al., 1998, p. 259/260) was calculated according to the following equation:

$$d_j = \frac{\hat{\beta}_j \hat{\rho}_j}{R^2}, j = 1, \ldots, p$$

Thereby, the importance to a variable is assigned depending on the product of its standardized regression coefficient and the zero-order correlation with the response variable, divided by the total explained variance. This calculation resulted in a standardized Pratt measure of 0.54 for deliberation, 0.25 for social support, and 0.21 for age, which indicates that 54% of the total explained variance (i.e., the R^2) can be attributed to deliberation, 24% to social support, and 21% to age.

3.4. Individual Trajectories of SWB

An individual based approach that focuses on within-subject trends is provided by investigating the trajectories of SWB with a curve-fitting method (for each individual separately over time) and structural equation modelling. We used ordinary least squares (OLS) linear regression as a curve fitting method. The advantage of such case-by-case OLS regression approach is that it is very accessible to researchers who are familiar

with regression (cf. Carrig et al., 2004). The procedure involves two steps (cf. Singer and Willett, 2003): First, we estimated a within-person regression model for each person over the seven occasions of Internet data collection. Second, we collected the summary statistics (intercept and slope) from the within-person regression models into a separate data set. Thereby, each person gets an individual value for the slope, allowing that these slopes differ between the persons (different, for example, from the repeated measures ANOVA). Generally, one would then investigate whether any of the study variables is significantly related to these slopes. In our data, however, nearly all estimated linear individual slopes were statistically non-significant; a one-sample *t*-test exhibited that on average the slopes did not differ statistically significantly from zero. Therefore it was meaningless to predict these slopes with the other study variables. This result was replicated using latent growth curves as implemented in a structural equation-modelling framework. We used both a linear and a quadratic model with maximum likelihood as the method of estimation with the recent LISREL software. It should be noted that our sample size is typical of those reported in the methodological literature involving growth curves (Singer and Willett, 2003).

3.5. Qualitative Data

The participants gave different definitions of their concept of happiness. Many defined it as being at peace, being in balance, being fulfilled, accepting yourself, etc. Some definitions included interpersonal relationships (happiness is "... a feeling of being related, well-provided for, and well-loved") whereas others were mainly focused on work and achievement (happiness is a "feeling that you are good at your work and able to fulfill your obligations", or "being proud of yourself and your accomplishments"). Concerning the question of what makes you happy, 22 participants explicitly mentioned interpersonal relationships. On the one hand, this addressed the positive aspects of social life as "being with and talking to loved ones", "feeling loved, valued, needed, and helpful", on the other hand problematic aspects were brought up as "being free of others' needs", and "having a sense of independence of others". Other frequently noted sources of happiness were work and accomplishment (13 participants), animals and nature (10 participants), music (8 participants) sports and food (each 7 participants), and good reading (6 participants).

The majority of the participants indicated that they generally experience a medium amount of variability in their happiness (17 medium, 4 high, and 6

low). The mentioned reasons were ''external'' factors, which can broadly be subsumed under the categories support, mood, and behaviour of other people, recent events and daily activities, problems at work/workload/stress by work, home environment, and the weather. Internal factors were one's own personality and one's perceptions, hormones and menstrual cycle, health and physical condition, and peace of mind. Altogether, interpersonal relations were most emphasized as being responsible for occurring variability. Interestingly, in the opinion of several female participants having a partner extremely increases variability of happiness, because then ones happiness is not only influenced by one's own ups and downs but additionally by that of the partner. On the other hand, many female participants mentioned that not having a partner influences one's general level of SWB due to a strong societal pressure. When asked specifically about any special influencing factors during the two weeks of the online study, 17 of the participants mentioned work or work related finances, and 14 their relationships to family and friends. Furthermore, health, hormones, and housing issues were brought up.

These preliminary qualitative findings provide evidence that participants experienced some variability in their happiness. These findings are an indication that a more fully qualitative study would be fruitful following the recommendations of Shek et al. (2005).

4. DISCUSSION

Previous research in the area of SWB mainly addressed inter-individual differences in SWB and how these inter-individual differences can be predicted by variables, such as personality. In contrast, research addressing the temporal characteristics of SWB, especially with intensive data collection methods, is lacking. The main objective of the present study was to provide information that enhances our understanding of inter-individual differences in the intra-individual variability and individual trajectories of SWB using an intensive data collection design. Our findings demonstrate that important information is gained by concurrently examining the temporal processes of SWB at these two levels of analysis: the trajectories as well as the intra-individual variability. Our findings revealed that the participant's trajectories were on average flat, and that, at the same time, participants experienced a significant amount of intra-individual variability of SWB.

4.1. Individual Trajectories and Intra-individual Variability in SWB

It is interesting that no significant trend in the trajectories of participants' SWB was detectable. Though we had hypothesized that there would be a positive trend in SWB over the study time period, the results of the linear and the quadratic estimations indicate that the trajectories were on average flat. The two most evident explanations for this finding are (i) that the time period of the study was too short for detecting any general trends, and (ii) that the end of the semester/start of vacation are not considered as strong external influences.

With regard to intra-individual variability of SWB, our results showed that participants experienced a statistically significant amount of intra-individual variability in their SWB over a two-week period. (Similarly, most participants indicated in the open-ended questionnaires that they experience a medium amount of variability in their SWB.) This finding was consistent for the composite score of SWB, satisfaction with life, and positive and negative affect. Because the median absolute deviation as index for variability was strongly related to the standard deviation, it is possible to contrast the obtained results to those of Bostic and Ptacek (2001) who used the standard deviation as index of variability in SWB. The present study differs from theirs insofar as data were collected more frequently and within a shorter period of time. Their findings, however, are similar to ours, in that participants experienced variability in their SWB to a substantial degree. It is important to note that, to our knowledge, these are the only two studies in the literature on variability in SWB using this methodology for conceptualising variability as an individual difference variable.

4.2. Predicting Inter-individual differences in Intra-individual Variability of SWB

The examination of the relationships between variability in SWB and its components and the personality and environmental variables showed several statistically significant correlations. As had been hypothesized, variability in SWB was negatively related to the NEO-PI-R domain conscientiousness. The zero-order correlations imply that individuals reporting high variability in the composite score of SWB and its cognitive component tended to be less conscientious. This finding is especially notable, because it is opposed to the results of Bostic and Ptacek (2001) who reported a positive correlation. Our result can be interpreted as follows: In Costa and McCrae's conceptual definition of the conscientiousness dimension, being goal-oriented and

determined (having a "Will to Achieve") played a major part. Accordingly, high conscientiousness is associated with academic and occupational achievement, whereas low conscientiousness is associated with the tendency to neglect working towards one's goals. The framework of goal-striving theories to SWB proposes that people respond favourably when advancing toward their goals and respond negatively when they are not able to attain a goal (Diener et al., 1999). Thus, individuals that work purposefully and *consistently* toward their goals might not only be more likely to ultimately reach these goals, but also more *consistent* in their evaluation of their current goal-related status (satisfaction with present life).

When considering the single facets of the dimension conscientiousness, the facet deliberation showed the strongest relation to variability in SWB and variability in satisfaction with present life. In the multiple regression analysis involving the three variables deliberation, age, and social support as predictors of intra-individual variability in SWB, the variable deliberation emerged as regressor with the largest relative importance. The standardized Pratt measure indicated that deliberation could account for 54% of the total explained variance. This facet covers the "tendency to think carefully before acting" (p. 18, Costa and McCrae, 1992). In contrast, individuals who score low on this facet often speak and act without taking into account potential consequences. This might result in harum-scarum actions that give reason to regret, but also in actions that are seen as inherently positive because of their spontaneous nature, which again corresponds well with the notion of resulting in greater variability in SWB. As mentioned above, the present result regarding the relation of conscientiousness and variability in SWB is opposite to the one obtained by Bostic and Ptacek (2001), which is even more notable considering that the dimension conscientiousness emerged as one of the strongest predictors of variability in SWB in both studies. None of the other dimensions of the Big Five showed statistically significant correlations to variability in SWB or its components. This is interesting with regard to the dimension neuroticism, because an element of its conceptual definition is, in fact, emotional instability (Costa and McCrae, 1992). Therefore, it could be expected that neuroticism be positively related to variability in SWB and its components.

The personality variables presence of meaning and search for meaning were not related to variability in SWB or its components (with the exception of one, the correlations were close to zero). The finding that search for meaning was not related to SWB is especially remarkable, because one would expect that individuals who are in search for meaning in their lives go through several ups and downs on this path by experiencing some insights as

well as frustrating moments which, in turn, would influence variability in SWB. In our opinion, this could be an issue of the time frame. During a day-to-day life over the course of 2 weeks, individuals are not likely to encounter events, feelings, persons, etc. that would either 'help fulfilling' or 'disappointing' their search for meaning, and therefore this personality variable might only be related to variability in SWB on a longer-term basis.

Regarding the spheres of control most of the correlations of variability in SWB and its components to these were negative but only the correlation between variability in negative mood and interpersonal control was statistically significant. Individuals scoring high in interpersonal control view themselves as possessing certain social advantages and, most of all, as being successful in interactions with others (e.g., having influence on another person's behaviour). In contrast, low scorers have difficulties defending their interests, developing relationships, or getting help by others (Paulhus, 1983). The results suggest that the belief that one has little control over the interactions with others relates to larger variability in negative mood. This influence of interpersonal interactions on one's variability in negative mood relates to an interesting finding of the qualitative data collection: Several women mentioned that having a boyfriend influenced their variability in SWB. The boyfriend's variability or ''moodiness'' would, in fact, add to their own fluctuations of SWB, and make their SWB generally more variable, as compared to being single. The results of the qualitative analysis confirmed that participants experienced interpersonal relationships as the most important factor influencing variability in and level of SWB.

This leads to the relationship between variability in SWB and social support. Variability in SWB was statistically significantly negatively correlated to social support, and in the multiple regression analysis, social support emerged as the second largest relative regressor in predicting variability in SWB (with a Pratt index indicating that 24% of the explained variance of variability in SWB can be attributed to social support). The largest correlation was between family support and intra-individual variability in SWB. This suggests that individuals who perceive getting strong social support from their family experience less variability in their SWB. In the qualitative part of the study, the relation to friends was strongly emphasised. This is also reflected in the negative relationship between social support by friends and variability in negative mood: Experiencing the feeling that one does not get support from one's friends might lead to a larger variability in SWB (the causality/way of influence could, of course, also be the other way round).

Besides social support, the variable daily hassles was the other environmental variable with a strong relation to variability in SWB. Daily hassles

were assessed before and after the online data collection, each referring to the previous two weeks. For both assessments of hassles, a relationship between hassles and variability in SWB or its components was found: In regard to the first occasion, hassles were statistically significantly related to variability in the composite score of SWB, and in regard to the second occasion, hassles showed a statistically significant correlation to variability in negative mood. Due to the inconsistency of the findings, only the results from the second occasion of assessment, which in retrospect referred to the period of the online data collection, will be interpreted. Individuals experiencing many hassles or everyday stressors are prone to undergo more variability in their negative mood. This relation was especially pronounced for the area of hassles that is referred to as social acceptability, which is mostly concerned with everyday stressors that concern one's social standing in one's relevant group. Again, this highlights the influence of interpersonal relationships on variability in the SWB components, and is congruent with the participants' responses to the question whether there were any factors that might have specifically influenced their variability in SWB during the period of data collection.

The only demographic variable that was related to variability in SWB (but not to level of SWB) was age. Older individuals experienced less variability in SWB. As the multiple regression analysis indicated, 21% of the total explained variance in SWB could be attributed to age, which ranged from 19 to 57 years. Due to the design of the present study, it cannot, of course, be concluded that people experience less variability in SWB as they get older.

4.3. Relation between Intra-individual Variability in SWB and the Level of SWB

The level of SWB and its components as assessed on a single point of data collection and variability in SWB and its components did not show any statistically significant correlation. However, these relations were more distinct for the mean level (aggregated over the seven points of online data collection) of SWB: Variability in negative mood showed a statistically significant correlation to the mean level of SWB and satisfaction with present life, and variability in general SWB was statistically significantly correlated to the mean level of negative mood. Furthermore, all correlations of variability in SWB and its components to the aggregated level of SWB were in the hypothesized direction. According to Diener and Larsen (1984), the advantage of aggregated data is that they tend to be less influenced by factors such

as situations or events, because these are likely to be averaged out over the occasions. In this light, the finding can be interpreted that individuals with a low "average" level of SWB and its components tend to experience a larger amount of variability in negative affect. In addition, individuals with a high "average" level of negative mood are prone to be more variable in their general SWB. This seems to indicate that the hypothesized relation between level of SWB and its components to variability in SWB refers most strongly to variability in the component negative mood. The stated hypothesis was based on the negative correlation between mean level of and variability in SWB as reported by Bostic and Ptacek (2001), as well as on studies providing evidence that variability in affect is related to depressive symptoms (cf. Hall et al., 1991; Larson et al., 1990). Also, in the present study, variability in SWB was related to personality and environmental variables that are considered negative, such as hassles, lack of social support, or low interpersonal control. On the basis of these findings it can be cautiously argued that high variability in SWB and its components, especially high variability in negative mood, is connected to negative emotional experiences. It would be interesting to qualitatively investigate whether variability in SWB is attributed to negative rather than positive characteristics. Some people might argue that experiencing variability in SWB is something inherently necessary as illustrated by the quote of Carl Gustav Jung: "The word 'happiness' would lose its meaning if it were not balanced by sadness". By undergoing a certain amount of variability in one's SWB, one might also be exposed to different qualities of experiences, which are important for developing different perspectives towards life and the world.

5. CONCLUDING REMARKS

The present study contributes to the literature on temporal characteristics of SWB in several regards, namely (i) by separately exploring the intra-individual variability and the trajectories of the components of SWB (using an individual based approach) and their relations to several personality and environmental variables, (ii) by investigating the relation between (mean) level of and variability in SWB, and (iii) by providing a new perspective on this topic due to the integration of qualitative data. Furthermore, in terms of research design it demonstrated the appropriateness of Internet-based data collection for repeated assessment for a sample mainly consisting of students. Especially for repeated measurement designs, this administration form might be advantageous and very convenient for participants: Firstly, participants do not have to repeatedly return completed questionnaires.

Secondly, the email reminder containing the according link to the site with the questionnaires was seen as very useful and unobtrusive to keep the participants at taking part in the study, which was reflected in a very low attrition rate. From the investigators' point of view, the biggest advantage of using the Internet-based data collection is that one is able to determine at what date and time participants completed the questionnaires. However, the simple applicableness of the Internet-based data collection certainly depends on the characteristics of the sample. In this study, most participants were students, who – generally speaking – have easy access to the Internet and check their email accounts several times a day. Even though access to Internet has become more widespread, such administration might still not be feasible with several subgroups of the general population.

Two main limitations of this study need be taken into account when interpreting the results. First, the time period of data collection was relatively short and cannot provide a deeper understanding of variability in SWB on a longer-term basis. Second, the size and representativeness of the sample clearly do not warrant generalizable conclusions. Given the rather time-consuming and lengthy data collection procedure and use of the Internet, this was, however, a question of feasibility. The limited sample size results in us having possibly missed statistically significant effects due to low power. Future research may want to consider this when replicating our findings. In the present study, the matter of sample size is most important for the intra-individual variability results. We supplemented the hypothesis testing with effect sizes to help the reader evaluate whether the sample size may have been too small to detect a real or non-trivial statistical effect (Zumbo and Hubley, 1998). Furthermore, it is noteworthy that papers on SWB (as well as the social sciences more broadly defined) commonly contain many hypotheses tests that may result in a substantial likelihood of declaring a significant finding that cannot be replicated (an inflated Type I error rate).[2] Future research may want to consider methodological innovations that reduce this inflated likelihood, such as Bayesian significance testing and confidence intervals.

To conclude, when investigating the SWB of individuals it is important to investigate the temporal characteristics of SWB from an individual based approach, which is an eminent aspect for understanding individual's experiences of SWB. On this note, Zumbo (1994) advocates focusing on the individual as unit of measurement. He states that "...the 'subject' of most of the 20th century psychological and educational research has been the statistical aggregate" (pp. 263–264) and highlights the importance of "going back to our roots in the Wundtian program and leaving the aggregate

subject of the dominant (and currently envisioned as the only model in our field) Galtonian model of mental testing and the study of individual differences – where ironically the individual effectively disappeared'' (p. 264).

With the present study, we hope to raise the awareness for this issue, provide appropriate methods for the analysis, and motivate future research to investigate the temporal processes of SWB and its correlates from an individual-oriented perspective.

NOTES

[1] Considering the magnitude of the adjusted R-squared, the regression accounts for a substantial amount of the variation in the dependent variable. Using the formula from Pedhazur (1997), with k predictors, the expected R^2 equals k divided by n-1 in the sample if the population R^2 is zero. Our adjusted R^2 of 0.53 with 3 predictors and $n = 27$ is substantially larger than the expected R^2 of 0.12 if there was zero relation in the population.

[2] Thank you to an anonymous reviewer for highlighting this point.

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