



# Cross-Lagged Analyses Between Life Meaning, Self-Compassion, and Subjective Well-being Among Gifted Adults

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## Abstract

**Objectives** Highly intellectually gifted adults seem to be at a higher risk for existential crisis. However, not much is known about what contributes to their life meaning and/or well-being. This study examined if self-compassion may be a resource leading to a happy and/or meaningful life, or vice versa.

**Methods** Cross-lagged associations between meaningfulness, subjective well-being, and self-compassion were examined. Additionally, we tested for differences concerning these constructs between the gifted and general population. One hundred highly intellectually gifted adults (55% female; mean age  $43 \pm 9$  years) participated in a two-wave (4 years) online study with a cross-lagged design.

**Results** Gifted adults experienced significantly lower levels of meaningfulness (T1:  $d = 0.55$ , 95% CI  $[-0.76/-0.33]$ ; T2:  $d = 0.39$ , 95% CI  $[-0.60/-0.18]$ ), subjective well-being (T1:  $d = 1.11$ , 95% CI  $[-1.32/-0.90]$ ; T2:  $d = 0.82$ , 95% CI  $[-1.03/-0.61]$ ), and self-compassion (T1:  $d = 1.21$ , 95% CI  $[0.99/1.42]$ ; T2:  $d = 0.82$ , 95% CI  $[0.61/1.02]$ ) compared to the general population. Cross-sectional analyses showed positive moderate to strong associations between the constructs. Cross-lagged analysis revealed that a sense of meaningfulness was a significant predictor of subjective well-being over time ( $\beta = 0.36$ ,  $p < .05$ ), after controlling for autoregressive effects. No cross-lagged effects between self-compassion and meaningfulness or self-compassion and subjective well-being were established.

**Conclusions** Highly intellectually gifted adults might find it taxing to experience life meaning, subjective well-being, and self-compassion. Results suggested the importance of strengthening gifted adults' life meaning which in further consequence may support highly gifted individuals in living a happier life.

**Keywords** Giftedness · Meaningfulness · Subjective well-being · Self-compassion · Cross-lagged analyses

As there is no universally acknowledged definition of giftedness, one frequently used approach to distinguish highly intellectually gifted individuals from the average population is an IQ of at least 130 (e.g., Preckel and Vock 2013; Wirthwein and Rost 2011). An IQ of 130 or higher ( $M = 100$ ,  $SD = 15$ ) implies that the individual has reached or surpassed the 98<sup>th</sup> percentile in an IQ test and is therefore attributed a higher cognitive ability than 98% of the population (e.g., Bortz 2005; Rost 2013). This is following the psychometric approach that intelligence is a measurable quality (e.g.,

Spearman 1904, 1927). Regarding psychosocial and emotional characteristics of gifted individuals, two diverging assumptions have emerged, the harmony hypothesis versus disharmony hypothesis of intelligence (e.g., Neihart 1999; Preckel et al. 2015). According to the former, there is a link between high cognitive capacities and the capability of leading a good life in terms of superior socioemotional characteristics, potential, and achievement (e.g., Mönks 1963; Terman 1925). In contrast, the disharmony hypothesis suggests that highly intelligent people have an increased vulnerability with regard to socioemotional deficiencies as well as adjustment difficulties and are at a greater risk for the development of disorders compared to people with average intelligence (e.g., Becker 1978; Neihart 1999). The latter hypothesis is a revised version of the “mad genius” myth suggesting an association between creative genius and madness (e.g., Becker 1978; Lombroso 1891; Preckel et al. 2015).

Notably, there is a lack of empirical research about the lives and what constitutes the needs of gifted adults, their actual

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achievements and performance, but also their well-being (Dijkstra et al. 2012; Lubinski et al. 2006; Wirthwein and Rost 2011) and meaning in life (Pollet and Schnell 2017; Vötter and Schnell 2019). The little empirical evidence that is available concerning gifted adults' well-being suggested either no significant association or a weak positive correlation between intelligence and well-being (e.g., Dijkstra et al. 2012; Lubinski et al. 2006). However, giftedness has been linked to self-criticism, hypersensitivity, perfectionism (Brackmann 2007; Holahan and Holahan 1999; Miller et al. 2009; Silverman 1999), and a vulnerability to depression (Jackson and Peterson 2003; Wraw et al. 2016). Karprinski et al. (2018) have found evidence that individuals with a high IQ may have a greater risk for affective disorders, ADHD, and an increased incidence of diseases related to immune dysregulation. Vötter and Schnell's (2019) results suggested that intellectually gifted adults had lower meaning in life and a greater risk for the development of a crisis of meaning than a control group with an average IQ.

A meaningful life is based on an (mostly unconscious) appraisal of one's life as coherent, significant, directed, and belonging (Schnell 2009, 2010). Coherence refers to a perception of consistency and fit of various life aspects; significance denotes a perceived efficaciousness of one's actions; direction refers to an orientation guiding decisions and goal pursuit; belonging is the sense of being part of a bigger whole, e.g., family, faith, humanity, or nation (Schnell 2016). Numerous studies have linked meaning in life with psychological well-being, optimism, positive affect, self-efficacy, physical health, and life satisfaction (e.g., Czekierda et al. 2017; King et al. 2006; Park 2010; Roepke et al. 2013; Ryff 1989). It has also been found to increase with age (Schnell and Becker 2007; Steger et al. 2006). A perceived lack of meaning in life is defined as a crisis of meaning (Schnell 2009; Schnell and Becker 2007). Affected individuals judge their lives as frustratingly empty and pointless (Schnell 2009). They often experience anxiety, depression, pessimism, and negative affect; they report low degrees of positive affect, resilience, self-efficacy, and life satisfaction (Damásio and Koller 2015; Hanfstingl 2013; Schnell et al. 2018). While a meaningful life is an indicator for eudaimonic well-being, positive mood and life satisfaction are seen as indicators for hedonistic well-being - also known as subjective well-being (Steger et al. 2008). A high level of subjective well-being is linked with the presence of pleasant emotions (i.e., positive affect) and life satisfaction as well as the absence of unpleasant emotions (i.e., negative affect) (e.g., Emmons 2003; Kim-Prieto et al. 2005; Lucas et al. 1996; Ryan and Deci 2001).

Most recent cross-sectional evidence has suggested that self-compassion is associated with subjective well-being and meaningfulness in a gifted population (Pollet and Schnell 2017). Self-compassion is defined as a caring, accepting, and supportive attitude towards the self, especially in the context of (personal) suffering, failure, and shortcomings (Neff 2003a, b; Neff and Germer 2017). It is composed of three interacting

components, each of these consisting of two opposite dimensions: (1) self-kindness versus self-judgment, which means to be understanding and caring with ourselves rather than self-judgmental and critical about personal inadequacies and failures. (2) Recognizing our common humanity versus isolation, which means to view personal imperfections and challenging experiences as a part of the shared human experience and, even in hard times, to feel connected to others rather than feeling isolated. (3) Mindfulness versus over-identification, which means to have a balanced awareness of (negative) thoughts and experiences rather than to over-identify or exaggerate them (Neff 2003a, b, 2009). Research has shown that self-compassion is associated with positive psychological outcomes like well-being, meaning in life, happiness, perceived self-efficacy, self-acceptance, intrinsic motivation, optimism, wisdom, life satisfaction, and feelings of social connectedness (Hollis-Walker and Colosimo 2011; Neff 2003a; Neff et al. 2005, 2007, 2008; Phillips and Ferguson 2013; Pollet and Schnell 2017; Zessin et al. 2015). It has also been linked with less psychopathology, reduced stress, anxiety, depression as well as lower fear of failure, and emphasis on being perfect (Krieger et al. 2016; MacBeth and Gumley 2012; Neff et al. 2005, 2007). Some experimental (e.g., Arch et al. 2014; Breines and Chen 2012) and interventional studies (e.g., Neff and Germer 2013; Smeets et al. 2014) have lent credence to the assumption that self-compassion positively impacts on attitude, emotions, and behavior.

In the current study, we examined if self-compassion may be a resource leading to a happy and/or meaningful life, or vice versa, among highly intellectually gifted adults. Thus, we analyzed the cross-lagged relationships of meaningfulness, subjective well-being, and self-compassion over a time period of 4 years. We hypothesized a positive association of the three variables and expected cross-lagged effects from self-compassion at T1 to meaningfulness at T2 as well as from self-compassion at T1 to subjective well-being at T2. Moreover, we hypothesized that a sense of meaningfulness at T1 would predict subjective well-being at T2. Additionally, we tested if the highly intellectually gifted population differed from the general population concerning their experienced levels of these positive psychological constructs. We hypothesized lower levels among the highly intellectually gifted compared to the levels of the general population.

## Method

### Participants

Two-wave longitudinal data were obtained from 100 gifted adults. The sample included 55 women and 45 men. Mean age was 43 years (ranging from 24 to 63,  $SD = 9$ ). Twenty-five percent of the respondents were single, 22% were in a

relationship, 51% were married, and 2% were divorced. Two percent of the population had general education, 4% had completed an apprenticeship or vocational secondary school, 19% were high school graduates, 62% had graduated from university, and the remaining 13% were holders of a doctoral degree. A priori power analysis (G\*Power; Faul et al. 2007) revealed a required total  $n = 98$  to determine at least a medium effect ( $f^2 = 0.15$ ,  $\alpha = 0.05$ ,  $1 - \beta = 0.80$ ). Considering aforementioned findings (e.g., Pollet and Schnell 2017; Zessin et al. 2015), we expected at least medium effects in regard to the associations between the three tested constructs.

## Procedure

Our hypotheses were tested in a two-wave panel design with a time lag of 4 years. Gifted participants were recruited through the German and Austrian branches of the high IQ society Mensa. A link to the online-survey was sent out to all members. Altogether, 148 gifted individuals participated at measurement time one (T1) and completed measures which included meaning in life, self-compassion, and subjective well-being. Among those, 102 gave their approval to be contacted for the second wave study. Out of these, 100 participated 4 years later at T2. Thus, there was an attrition rate of 32% from T1 to T2. An ANOVA was utilized to test if the 48 participants who dropped out differed from the ones who participated again in the second wave. No significant differences in regard to demographic characteristics (age,  $F(1,146) = 0.218$ ,  $p = .642$ ; gender,  $F(1,146) = 3.106$ ,  $p = .080$ ), as well as in regard to the variables meaningfulness ( $F(1,146) = 1.310$ ,  $p = .254$ ), subjective well-being ( $F(1,146) = 0.587$ ,  $p = .445$ ), and self-compassion ( $F(1,146) = 0.755$ ,  $p = .386$ ) were found. Thus, no attrition bias was expected for the longitudinal analysis. All subsequent analyses (for T1 and T2) in this paper were conducted with the data of the 100 participants who participated in both times of measurement. According to Kline's (2005)  $N \geq 100$  guideline, our sample size is sufficient for SEM analyses and categorized as a medium sample size.

## Measures

**Self-Compassion Scale (SCS-D; Hupfeld and Ruffieux 2011; Neff 2003a)** Self-compassion was measured by the short German version of the Self-Compassion Scale (SCS-D; Hupfeld and Ruffieux 2011; Neff 2003a). The short version consists of 12 items and was used at both times of measurement. The instrument includes six subscales: self-kindness (e.g., "I try to be understanding and patient towards those aspects of my personality I don't like"), common humanity (e.g., "When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people"), mindfulness (e.g., "When something painful happens, I try to take a balanced view of the situation"), self-

judgment (e.g., "I am disapproving and judgmental about my own flaws and inadequacies"), isolation (e.g., "When I fail at something that is important to me, I tend to feel alone in my failure"), and over-identification (e.g., "When I fail at something important to me, I become consumed by feelings of inadequacy"). Responses are given on a 5-point Likert scale ranging from 1 ("almost never") to 5 ("almost always"), with higher scores indicating greater self-compassion. The six items describing uncompassionate behavior (self-judgment, isolation, and over-identification) are reverse-coded to indicate their relative absence. In the present study, SCS showed good internal consistency ( $\alpha_{T1/T2} = 0.83/0.87$ ) as well as good retest reliability ( $r_{tt} = 0.71$ ).

**Meaningfulness Scale (SoMe; Schnell 2009; Schnell and Becker 2007)** Meaning in life was assessed by the Meaningfulness Scale from the Sources of Meaning and Meaning in Life Questionnaire (SoMe; German edition: LeBe; Schnell 2009; Schnell and Becker 2007). The scale measures a sense of personal meaningfulness (e.g., "I have a task in my life"). Its five items are rated on a 6-point Likert scale, with 0 indicating strong disagreement and 5 indicating strong agreement. Internal consistency in the present study was good ( $\alpha_{T1/T2} = 0.78/0.78$ ). The retest reliability was good as well ( $r_{tt} = 0.83$ ).

**WHO-5 Well-being Index (WHO-5; Brähler et al. 2007)** Subjective well-being was measured by the WHO-5 Well-being Index (WHO-5; Brähler et al. 2007). The five items are rated on a 6-point Likert scale ranging from 0 ("at no time") to 5 ("all the time"). The scale measures a subjective account of well-being, based on positive mood (e.g., "I have felt cheerful and in good spirits") and vitality (e.g., "I woke up feeling fresh and rested"). In this study, the WHO-5 scale showed good internal consistency ( $\alpha_{T1/T2} = 0.84/0.82$ ) as well as good retest reliability ( $r_{tt} = 0.65$ ).

**Social Readjustment Rating Scale (SRRS; Holmes and Rahe 1967)** Stress exposure was measured by the Social Readjustment Rating Scale (SRRS; Holmes and Rahe 1967). This scale includes 43 life events (LE). Participants report if they experienced a particular LE during the previous year. Each LE is assigned a value from 0 to 100 of so called units of life change (ULC) which reflect the relative amount of stress the event has caused. The Social Readjustment Index (SRI) (i.e., Blasco-Fontecilla et al. 2010) served as our operationalization of stress exposure and was calculated by adding all ULC scores. For instance, the death of a spouse is the most severe life event and, therefore, assigned the highest score (ULC = 100), whereas a minor law violation is assigned the lowest score (ULC = 11). Marriage is situated in the middle (ULC = 50). If a participant was exposed to all three life events during the last year, he/she would obtain an SRI of 161

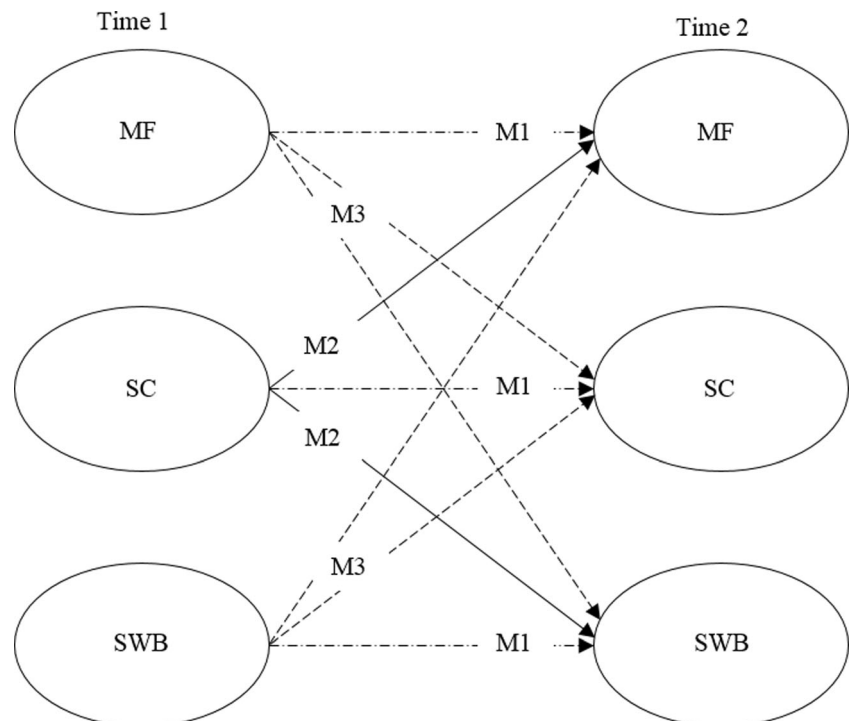
ULC. A SRI score ranging from 0 to 149 ULC is interpreted as no significant stress problem. Scores beyond 300 ULC are assumed to be associated with a high stress level.

## Data Analyses

Statistical analyses were conducted using IBM Statistical Package for the Social Science (SPSS) version 24.0 and AMOS version 23.0. Associations between the variables were tested by Pearson correlations. Mean differences across time were tested by repeated measures *t* tests and corresponding effect sizes were assessed by Cohen's *d* (Cohen 1988). To investigate the stability and cross-lagged effects, we employed structural equation modeling (SEM) techniques using AMOS (Arbuckle 2014). The utilized two-wave autoregressive cross-lagged design allows for examination of influences over time of one construct on another and vice versa, while simultaneously controlling for stability as well as for associations between the three investigated constructs over time (Kline 2005; Little et al. 2007). Four competing structural equation models were tested to examine the relationship between meaningfulness, self-compassion, and subjective well-being (see Fig. 1). Model 1 was an autoregressive model with no cross-lagged effects, also known as a baseline or stability model. This model assumed that the only predictor of the variable at T2 is the same variable at T1 and shows the temporal stability of the variable over time. Model 2 was a normal causation model extending model 1 by adding cross-lagged paths from self-compassion at T1 to meaningfulness at T2 and from self-compassion at T1 to subjective well-being at T2. Model 3 was a reversed causation model extending model 1 by adding cross-lagged paths from meaningfulness at T1 to self-compassion at T2; from meaningfulness at T1 to subjective well-being at T2; from subjective well-being at T1 to self-compassion at T2; from subjective well-being at T1 to meaningfulness at T2. Model 4 was a reciprocal causation model including all autoregressive and cross-lagged paths from model 1 to model 3.

Since the use of item parcels instead of single items as indicators of the latent constructs produces more reliable parameter estimates and, in further consequence, leads to fewer indicators per latent construct and, therefore, a reduced required sample size to obtain stable solutions (Little et al. 2002; MacCallum et al. 1999; Matsunaga 2008), we made use of this approach at both times of measurement. As parcel forming strategies, we used a combination of the content based method, whereby every parcel forms a theoretically meaningful cluster (Landis et al. 2000; Matsunaga 2008) and the factorial algorithm (Matsunaga 2008; Rogers and Schmitt 2004), whereby a factor analysis and its computed factor loadings guide the parcel building process. Hence, we assigned the five items of meaningfulness and subjective well-being to two parcels, respectively (each with one two- and one three-item parcel). Further, we assigned the 12 items of the self-compassion scale to three parcels, comprising the three opposing subscales (parcel1-SCS included the two items of self-kindness and self-judgment, resp.; parcel2-SCS included the two items of common humanity and isolation, resp.; parcel3-SCS included the two items of mindfulness and over-identification, resp.). To test if the parcel indicators measured the latent variables as intended, we

**Fig. 1** Two-wave cross-lagged model for time-lagged effects between meaningfulness (MF), self-compassion (SC), and subjective well-being (SWB). All paths are presented, whereby M1-paths (triple dashed lines) represent the baseline or stability model, M2-paths (continuous lines) represent the normal causation model, M3-paths (dashed lines) represent the reversed causation model. All paths from M1 to M3 are included in M4 which represents the reciprocal causation model





employed confirmatory factor analyses. The measurement model consisted of three latent variables at both times of measurement, whereas the three latent variables at time 1 and time 2 were allowed to covary freely. The fit statistics for both time 1,  $\chi^2(11) = 14.182, p = .223, CFI = 0.99, RMSEA = 0.05, SRMR = 0.04$ , and time 2,  $\chi^2(11) = 9.290, p = .595, CFI = 1, RMSEA = 0.00, SRMR = 0.04$ , demonstrated a good fit to the data and indicated that it was appropriate to proceed further with tests of the structural model (Byrne 2001). Based on recommended guidelines, model fit of the aforementioned four tested models was assessed by various indices. In addition to the chi-square statistics, we reported the root mean square error of approximation (RMSEA), the standardized root mean squared residual (SRMR), and the comparative fit index (CFI). A good fit is indicated by values equal or greater than 0.95 for CFI, and equal or less than 0.05 for RMSEA and SRMR (Hu and Bentler 1999). We utilized  $\chi^2$  difference tests to compare the competing models. In case of two models fitting the data equally well, selection of the preferred model was based on theoretical and statistical considerations (Kline 2005).

## Results

Pearson correlations, descriptive statistics (mean, SD), and scale reliabilities for all variables are shown in Table 1. The pattern of correlations was in the expected directions. Whereas correlations of  $r = 0.10$  to  $0.29$  were considered small,  $0.30$  to  $0.50$  were considered medium, and over  $0.50$  were considered large (Cohen 1988).

As expected, the cross-sectional correlations showed positive, medium to strong associations between meaningfulness, subjective well-being, and self-compassion at both times of measurement. Repeated measures  $t$  tests were conducted to determine if there were significant differences between means across time. Results showed that mean scores increased

**Table 1** Pearson correlations, means, standard deviations, and reliabilities

Variables	1	2	3	4	5	6
1. SC-T1	(0.83)					
2. SC-T2	0.71**	(0.87)				
3. MF-T1	0.35**	0.29*	(0.78)			
4. MF-T2	0.29*	0.40**	0.83**	(0.78)		
5. SWB-T1	0.56**	0.47**	0.49**	0.45**	(0.84)	
6. SWB-T2	0.43**	0.56**	0.45**	0.56**	0.65**	(0.82)
M	2.95	3.12	2.59	2.74	12.03	13.53
SD	0.65	0.69	1.06	1.01	5.24	4.41

Cronbach's alphas are provided in parentheses on the diagonal. *SC*, self-compassion; *MF*, meaningfulness; *SWB*, subjective well-being. Note that items in the negative subscales of self-compassion are reverse-coded. \* $p < .01$ ; \*\* $p < .001$

significantly from T1 to T2 for all three variables: meaningfulness ( $t(99) = -2.46, p = .016; d = 0.24, 95\% CI [-0.04, -0.52]$ ), subjective well-being ( $t(99) = -3.64, p < .001; d = 0.34, 95\% CI [0.06, 0.62]$ ), and self-compassion ( $t(99) = -3.30, p = .001; d = 0.35, 95\% CI [0.07, 0.62]$ ). Cohen's  $d$  for repeated measures ranged from  $0.24$  (for meaningfulness) to  $0.35$  (for self-compassion); thus, the effect sizes of the mean differences were small to moderate (Cohen 1988). Cronbach's alphas ranged from  $\alpha = 0.78$  (for meaningfulness at T1 and T2) to  $\alpha = 0.87$  (for self-compassion at T2).

The observed mean levels of meaningfulness (T1:  $d = 0.55, 95\% CI [-0.76, -0.33]$ ; T2:  $d = 0.39, 95\% CI [-0.60, -0.18]$ ), subjective well-being (T1:  $d = 1.11, 95\% CI [-1.32, -0.90]$ ; T2:  $d = 0.82, 95\% CI [-1.03, -0.61]$ ), and self-compassion (T1:  $d = 1.21, 95\% CI [0.99, 1.42]$ ; T2:  $d = 0.82, 95\% CI [0.61, 1.02]$ ) were at both times of measurement significantly lower among the gifted sample than those among the general population (Brähler et al. 2007; Körner et al. 2015; Schnell and Becker 2007). However, the observed mean levels of self-compassion at T1 and T2 were significantly higher among the gifted sample than those reported in a sample with a major depressive disorder (T1:  $d = -0.35, 95\% CI [-0.69, -0.01]$ ; T2:  $d = -0.61, 95\% CI [-0.95, -0.26]$ ; Körner et al. 2015).

In the next step, the stability and cross-lagged effects between meaningfulness, self-compassion, and subjective well-being were examined. A cross-lagged effect is the effect of one variable on another, after controlling for their stability over time (Cole and Maxwell 2003). Table 2 reports summary fit statistics ( $\chi^2$ , RMSEA, SRMR, CFI) for the tested four models (M1—M4; see Fig. 1). As can be seen, all models demonstrated a good to excellent fit to the data. Table 3 shows the corresponding standardized stability as well as cross-lagged coefficients. First, we tested the autoregressive model (M1) to ensure stable relationships within the same measure for each variable. Fit statistics for model 1 (see Table 2) demonstrated a good fit:  $\chi^2(61) = 61.365, p > .05, RMSEA = 0.008, SRMR = 0.051, CFI = 1$ . Results showed significant stability effects for all three measures, suggesting all three constructs are temporally stable. Second, we tested model 2, which added cross-lagged pathways from self-compassion at T1 to meaningfulness at T2 and subjective well-being at T2 to the autoregressive model (M1). Fit statistics for model 2 (see Table 2) demonstrated also a good fit:  $\chi^2(59) = 61.293, p > .05, RMSEA = 0.020, SRMR = 0.050, CFI = 1$ . The autoregressive paths remained significant and stable while both cross-lagged pathways were non-significant. This indicates that, contrary to our hypothesis, self-compassion did not predict meaningfulness and/or subjective well-being over time. Third, we tested model 3, which added reverse cross-lagged pathways to the autoregressive model (M1): from meaningfulness at T1 to self-compassion at T2; from meaningfulness at T1 to subjective well-being at T2; from

**Table 2** Fit indices for the models 1–4 with the following latent variables: meaningfulness, self-compassion, and subjective well-being

Model	$\chi^2$	df	<i>p</i>	RMSEA	SRMR	CFI	Comparison	$\Delta\chi^2$	$\Delta df$
Model 1	61.365	61	0.463	0.008	0.051	1			
Model 2	61.293	59	0.394	0.020	0.050	1	M1–M2	0.07	2
Model 3	54.754	57	0.560	0.000	0.048	1	M1–M3	6.61	4
Model 4	54.502	55	0.494	0.000	0.047	1	M1–M4	6.86	6

RMSEA, root mean square error of approximation; SRMR, standardized root mean squared residual; CFI, comparative fit index

subjective well-being at T1 to self-compassion at T2; from subjective well-being at T1 to meaningfulness at T2. Fit statistics for model 3 (see Table 2) demonstrated an excellent fit:  $\chi^2(57) = 54.754$ ,  $p > .05$ , RMSEA = 0.000, SRMR = 0.048, CFI = 1. The autoregressive paths in this third model remained significant and stable. Results indicated a significant cross-lagged pathway from meaningfulness at T1 to subjective well-being at T2. All other cross-lagged paths were non-significant. This indicates that higher levels of meaningfulness at T1 predicted higher levels of subjective well-being at T2 among our sample of gifted adults. Finally, model 4, which incorporated all autoregressive and cross-lagged pathways, showed analogous results to model 3. Fit statistics for model 4 (see Table 2) demonstrated an excellent fit:  $\chi^2(55) = 54.502$ ,  $p > .05$ , RMSEA = 0.000, SRMR = 0.047, CFI = 1. Contrary to our hypothesis, self-compassion at T1 did not predict subjective well-being at T2 or meaningfulness at T2. However, in line with our hypotheses, the findings showed that meaningfulness at T1 predicted subjective well-being at T2. Thus, the preferred model based on fit indices and theoretical considerations was model 3 (see Fig. 2).

Finally, we utilized process model 1 (Hayes 2013) to examine whether stress exposure according to Holmes and Rahe (1967) between T1 and T2 moderated the aforementioned longitudinal autoregressive and/or cross-lagged relationships. Nine moderation analyses were carried out. The findings that the lower and upper limits of the 95% confidence intervals (CI) for all nine interactions crossed the zero mark indicated non-significance of the tested moderation effects (see Table 4).

## Discussion

The present study aimed to provide a more fine-grained and thorough understanding of the link between meaningfulness, self-compassion, and subjective well-being among gifted adults. Thus, we utilized cross-sectional and cross-lagged analyses and determined descriptive statistics and correlations, as well as autoregressive and cross-lagged effects between these three constructs.

Our findings suggested a difference between the observed highly intellectually gifted sample and the general population across all three constructs. As expected, the gifted sample

reported lower levels of experienced life meaning, self-compassion, and subjective well-being. These results are in line with Gilbert et al.'s (2011) suggestion that especially self-critical people, like the gifted are said to be (Brackmann, 2007; Holahan and Holahan 1999; Silverman 1999), might have difficulties in having and developing self-compassion. However, the gifted sample showed higher levels of self-compassion than those reported in a sample with major depressive disorders (Körner et al. 2015). This finding was contrary to our assumption that the levels between these samples would be similar, since crises of meaning are often a part of depression (Schnell et al. 2018) and recent evidence about the greater risk to suffer from a crisis of meaning among gifted adults (Vötter and Schnell 2019).

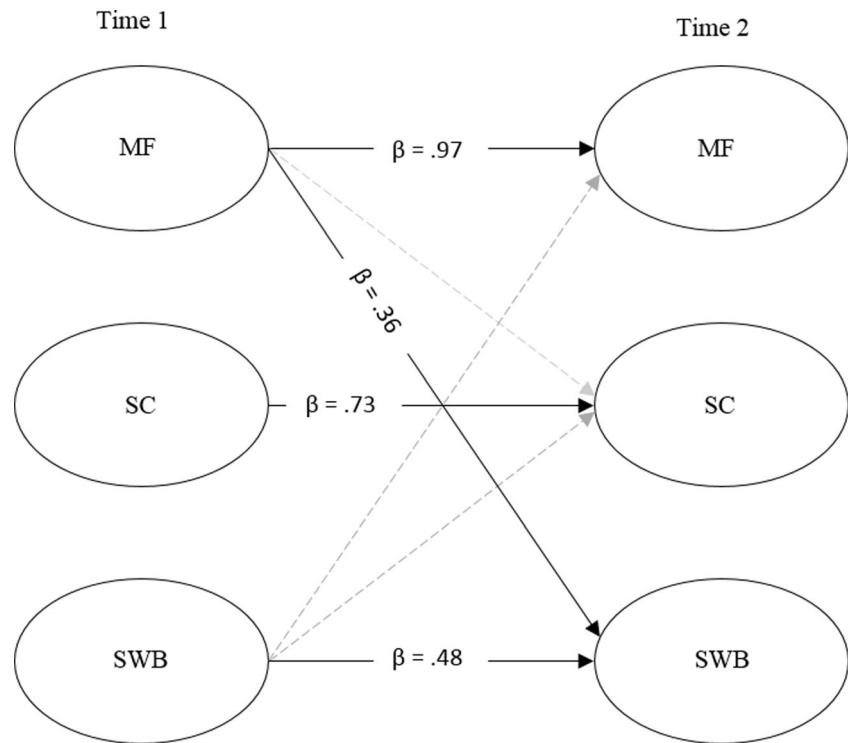
Furthermore, the findings partially support the disharmony hypothesis of intelligence which assumes, e.g., a disharmonious socioemotional development of gifted individuals (e.g., Becker 1978; Neihart 1999). All observed positive

**Table 3** Overview of the standardized stability and cross-lagged coefficients

Model	Autoregressive path	$\beta$	Cross-lagged path	$\beta$
1	MF <sub>T1</sub> --> MF <sub>T2</sub>	0.90***		
	SC <sub>T1</sub> --> SC <sub>T2</sub>	0.78***		
	SWB <sub>T1</sub> --> SWB <sub>T2</sub>	0.75***		
2	MF <sub>T1</sub> --> MF <sub>T2</sub>	0.92***	SC <sub>T1</sub> --> MF <sub>T2</sub>	-0.02
	SC <sub>T1</sub> --> SC <sub>T2</sub>	0.78***	SC <sub>T1</sub> --> SWB <sub>T2</sub>	-0.04
	SWB <sub>T1</sub> --> SWB <sub>T2</sub>	0.78***		
3	MF <sub>T1</sub> --> MF <sub>T2</sub>	0.97***	MF <sub>T1</sub> --> SC <sub>T2</sub>	0.05
	SC <sub>T1</sub> --> SC <sub>T2</sub>	0.73***	MF <sub>T1</sub> --> SWB <sub>T2</sub>	0.36*
	SWB <sub>T1</sub> --> SWB <sub>T2</sub>	0.48**	SWB <sub>T1</sub> --> SC <sub>T2</sub>	0.03
4			SWB <sub>T1</sub> --> MF <sub>T2</sub>	-0.08
	MF <sub>T1</sub> --> MF <sub>T2</sub>	0.97***	SC <sub>T1</sub> --> MF <sub>T2</sub>	-0.03
	SC <sub>T1</sub> --> SC <sub>T2</sub>	0.73***	SC <sub>T1</sub> --> SWB <sub>T2</sub>	0.05
	SWB <sub>T1</sub> --> SWB <sub>T2</sub>	0.44*	MF <sub>T1</sub> --> SC <sub>T2</sub>	0.05
			MF <sub>T1</sub> --> SWB <sub>T2</sub>	0.37*
			SWB <sub>T1</sub> --> SC <sub>T2</sub>	0.03
		SWB <sub>T1</sub> --> MF <sub>T2</sub>	-0.06	

MF, meaningfulness; SC, self-compassion; SWB, subjective well-being; T1, measurement time 1; T2, measurement time 2;  $\beta$ , standardized coefficient. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Fig. 2** Standardized coefficients ( $\beta$ ) of all significant paths of model 3 are reported (continuous lines). Gray dashed lines represent the non-significant paths of model 3. MF, meaningfulness; SC, self-compassion; SWB, subjective well-being



psychological constructs in this study were lower among the gifted sample. There is evidence for an association between these constructs and life satisfaction as well as positive affect. For these reasons, we suggest that “sad genius” in lieu of “mad genius” presents a more accurate depiction of the psychological well-being of highly intelligent individuals.

Consistent with previous cross-sectional research (Phillips and Ferguson 2013; Pollet and Schnell 2017; Wong and Yeung 2017; Zessin et al. 2015), the data revealed moderate to strong correlations between self-compassion, subjective well-being, and life meaning at both times of measurement. Furthermore, the results of the autoregressive model corroborated the assumption of construct stability. Over the given

period of 4 years, retest-reliability scores were all above 0.64. Although cross-sectional findings confirmed our hypotheses about a link between self-compassion and subjective well-being as well as between self-compassion and meaningfulness, our data showed no evidence of such a cross-lagged effect over time among the gifted sample. However, results revealed that life meaning was a significant predictor of subjective well-being over time in the gifted sample, but not vice versa. This cross-lagged effect thus lends further credence to the assumption that subjective well-being is a likely consequence of meaningful living (Schnell 2013, 2014), while undermining the position that positive moods predispose individuals to feel that life is meaningful (King et al. 2006).

This study provides a first understanding of relational aspects of life meaning, subjective well-being, and self-compassion in a cross-sectional as well as cross-lagged setting among gifted adults. The cross-sectional results suggested that experienced life meaning, self-compassion, and subjective well-being are associated with each other and, therefore, may have the potential to influence each other for the good of gifted adults. Furthermore, the cross-lagged results highlighted the predictive power of gifted adults’ life meaning on their subjective well-being later on.

### Limitations and Future Research

Several limitations of this study should be noted. First, our results do not prove causal relationships. The variables could still be (causally) unrelated, with unmeasured variables creating the reported associations. Second, one could argue that the sample size is rather small ( $N = 100$ ). However, according to Kline’s (2005)

**Table 4** Interaction effects, coefficients, and confidence intervals

DV	Interaction Effect	Coefficient	95% CI
MF <sub>T2</sub>	MF <sub>T1</sub> × SRI	0.0001	[−0.0009, 0.0010]
SC <sub>T2</sub>	SC <sub>T1</sub> × SRI	−0.0002	[−0.0014, 0.0011]
WHO <sub>T2</sub>	WHO <sub>T1</sub> × SRI	−0.0002	[−0.0013, 0.0010]
MF <sub>T2</sub>	SC <sub>T1</sub> × SRI	0.0000	[−0.0029, 0.0029]
WHO <sub>T2</sub>	SC <sub>T1</sub> × SRI	0.0003	[−0.0017, 0.0023]
SC <sub>T2</sub>	MF <sub>T1</sub> × SRI	0.0005	[−0.0008, 0.0017]
SC <sub>T2</sub>	WHO <sub>T1</sub> × SRI	−0.0006	[−0.0020, 0.0008]
WHO <sub>T2</sub>	MF <sub>T1</sub> × SRI	−0.0002	[−0.0015, 0.0012]
MF <sub>T2</sub>	WHO <sub>T2</sub> × SRI	−0.0007	[−0.0032, 0.0018]

DV, dependent variable; 95% CI, 95% confidence interval; MF, meaningfulness; SC, self-compassion; SWB, subjective well-being; SRI, social readjustment index (stress exposure between T1 and T2); T1, measurement time 1; T2, measurement time 2

$N \geq 100$  guideline, the sample size was sufficient for SEM analyses and could be categorized as a medium sample size. Furthermore, power analysis showed that the study had sufficient power to detect medium effects. However, a larger sample size would have increased power. Third, our sample covered only members of a high IQ society and, therefore, is not representative of the total gifted population. Given the diversity of giftedness, future research may benefit from replicating our findings in a population of non-pre-selected gifted adults. Fourth, a time lag of 4 years was used. This way, we aimed to investigate the long-term effects between experienced life meaning, self-compassion, and subjective well-being among gifted adults. Due to the time lag, some life events may have been missed. We tried to account for this by asking about stress exposure in form of critical life events that had occurred since the first assessment (Holmes and Rahe 1967) but no moderation effects were found. Future research could obtain further insights by analyzing shorter time intervals as well as at least three waves of measurement. This procedure would allow the utilization of, e.g., time series analyses.

Due to evidence from a longitudinal study indicating that a lack of self-compassion could serve as a vulnerability factor for depression (Krieger et al. 2016) and findings of a greater vulnerability for crisis of meaning among highly intellectually gifted adults (Vötter and Schnell 2019), further studies are needed to explore ways of preventing existential suffering in this particular minority. Several positive constructs suggest themselves for inclusion in such research, such as self-compassion, generativity, self-control, resilience, or gratitude (e.g., Bolier et al., 2013; De Ridder et al. 2012; Lee et al. 2013; Neff and Germer 2013; Schnell 2011; Seligman et al. 2005; Smeets et al. 2014). Furthermore, satisfaction of psychological needs—autonomy, competence, and relatedness—have been shown to contribute to life meaning (Demirbaş-Çelik and Keklik 2018; Martela et al. 2018). An increasing understanding of these factors and their interaction with life meaning and subjective well-being may help establishing interventions that address existential suffering and low well-being in highly intellectually gifted adults and, in further consequence, assist them in living up to their high potential.

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**Authors' Contributions** BV: designed and executed the study, conducted the data analyses, and wrote the paper. TS: advised on the design, execution, and analysis of the study, and collaborated in the writing and editing of the paper.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee of the University of Innsbruck and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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