

Perceived Change in Life Satisfaction and Daily Negative Affect: The Moderating Role of Purpose in Life

Anthony L. Burrow · Rachel Sumner · Anthony D. Ong

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Abstract Perceiving changes in life satisfaction has been linked to diminished health and well-being. Purpose in life is theorized to promote well-being by providing a sense of personal consistency, which may buffer the negative consequences of perceived change. Using data from the Midlife in the United States study, a cluster analysis was performed to explore profiles of adults' ($N = 1,746$) ratings of life satisfaction for their past, present, and future. The analysis yielded three distinct profiles: *continuous high*, *incremental*, and *decremental*. Relative to the other profiles, *decremental* adults reported greater levels and variability of negative affect in everyday life. However, purpose moderated these effects such that no between-profile differences in negative affect level or variability were detected for adults reporting greater levels of purpose. Purpose is discussed as an asset for promoting positive adjustment in adulthood.

Keywords Purpose in life · Perceived change · Life satisfaction · Daily negative affect

1 Introduction

A substantial research literature suggests that life satisfaction (LS) figures prominently in adults' overall health and well-being. Indeed, LS is considered to be a principal component of subjective well-being (see Diener et al. 1999 for a review), and studies have demonstrated its association with multiple indicators of healthy adjustment including self-esteem (Diener and Diener 1995), positive mood and resilience (Cohn et al. 2009; Gross and John 2003), physical and cardiovascular health (Boehm et al. 2011), and even reduced mortality (Chida and Steptoe 2008). Interestingly, while mean levels of LS appear susceptible to some degree of change resulting from major life transitions, such as retirement or widowhood (Lucas et al. 2003; Mroczek and Spiro 2005), longitudinal studies generally have

A. L. Burrow (✉) · R. Sumner · A. D. Ong
Department of Human Development, Cornell University, G60D Martha Van Rensselaer Hall, Ithaca,
NY 14853-4401, USA
e-mail: alb325@cornell.edu

demonstrated its stability across adulthood (Baird et al. 2010; Diener and Suh 1998), suggesting that aging itself does not lead to reliable increases or decreases in LS.

Apart from the noted consistency in objective levels of LS, however, there is empirical evidence that adults commonly perceive changes in their LS as they reflect on their past and anticipate their future. Underscoring the importance of these self-evaluations, recent theory and research suggest that greater perceptions of change—both positive and negative—may contribute to worse psychological and physical health (Busseri et al. 2009; Röcke and Lachmann 2008). Thus, identifying factors that affect how individuals construe perceived changes in LS as they consider their own lives may deepen our understanding of adult adjustment. One such factor may be a sense of purpose in life. Purpose has been discussed as a foundation for personal consistency (Kashdan and McKnight 2009) that may help individuals incorporate perceived self-change into a coherent understanding of who they are. To date, however, the extent to which purpose in life interacts with distinct patterns of perceived change in LS to influence adjustment has not been explored. In the current report, we aimed to provide an initial test of this issue by (a) identifying unique profiles of perceived change in LS in adulthood and investigating their associations with indicators of negative emotionality and (b) examining purpose in life as a moderator of the perceived change—emotion relationship.

1.1 The Nature and Correlates of Perceived Change

Perceived change refers to a subjective sense that “one is a new or different kind of person, or that some aspect of one’s functioning has improved or declined” (Keyes 2000, p. 68). Theories of perceived change situate self-comparisons as important developmental mechanisms for evaluating and maintaining a coherent self and sense of well-being over time. According to temporal comparison theory (Albert 1977), individuals are motivated to perceive a consistent and enduring sense of self, and therefore compare themselves to past or prospective selves to make relative judgments of self-related improvement, decline, or stability. These temporal self-comparisons can, in turn, contribute to individuals’ immediate functioning and well-being. For example, studies show that adults who display greater inconsistency in self-descriptions experience more intense and variable negative affect (NA) than those who label themselves consistently over time (e.g., Charles and Pasupathi 2003). Furthermore, adults who report changes—whether positive or negative—in the quality of their own health, work, and relationships over the previous 5 years exhibit significantly greater negative emotionality than adults who perceive stability in those domains over the same period of time (e.g., Keyes 2000; Keyes and Ryff 2000). Reflecting the need for self-consistency, these findings suggest that perceiving change, regardless of its direction, may increase vulnerability to maladjustment.

More recent empirical evidence of the negative consequences of perceived change has focused on the domain of LS. Specifically, Röcke and Lachmann (2008) utilized a person-centered approach to assess adults’ ratings of their LS for the past (10 years ago), present, and future (10 years from now) and discerned three unique profiles, intuitively described as: *continuous high*, *incremental*, and *decremental*. Individuals with incremental and decremental profiles perceived change in their LS over time, but the former perceived improvement while the latter perceived decline. Those with the continuous high profile indicated a relative stability in their LS from past to present to future. Notably, significant differences in concurrent social and health functioning were found between each of these profiles, with continuous high adults demonstrating the most adaptive functioning overall, followed by incremental adults, and with adults characterized by the decremental profile

showing the worst health outcomes. Thus, while temporal stability in LS (at least at high levels) may be adaptive, perceived change may pose significant challenges to well-being; challenges that may be particularly pronounced for those whose perceptions of change are downward.

Still unknown, however, is whether perceived change in LS, in particular, is related to indicators of emotional maladjustment, such as elevated levels and discernible fluctuation of NA in everyday life. Investigating this possibility across adulthood is important given the established role that affective level and variability play in psychological health (Mroczek and Almeida 2004), and the developmental emphasis on emotional self-regulation associated with aging (e.g., Carstensen et al. 2003). However, given the well-established links between daily NA and proximal events, such as daily stressors (Mroczek and Almeida 2004), analyses would need to first account for these experiences in order to identify any unique effects of perceived LS change on outcomes occurring at the daily level.

1.2 Purpose in Life as a Moderator of the Effects of Perceived Change

Indications that perceived changes in LS can explain patterns of emotional well-being motivate identifying individual differences that may affect the magnitude of this association. Prominent among factors that may shape how perceived changes in LS relate to adjustment is purpose in life. Purpose is theorized as “a central, self-organizing life aim that organizes and stimulates goals, manages behaviors, and provides a sense of meaning” (McKnight and Kashdan 2009, p. 242). Routinely shown to be related to positive outcomes (e.g., Burrow and Hill 2011; Ryff 1989), purpose is thought to enhance well-being by promoting a sense of emotional and behavioral consistency (Kashdan and McKnight 2009). Individuals may perceive changes in their LS regardless of their level of purpose in life, but those with a greater sense of purpose may interpret such changes within the broader, and perhaps more personally meaningful, context of their life aims (Baumeister and Vohs 2002). Thus, purpose may be a higher-order source of resilience to the negative experience of perceived self-change.

As a framework for understanding one’s experiences, purpose may also inherently decouple the link between perceived change and negative mood. Like the shock absorbers on automobiles that make traveling on a bumpy feel smoother, purpose can dampen the effects of perceiving changes in the life course, thus fostering more positive emotional experiences in everyday life. Indeed, there is some empirical support for the moderating role of purpose in the relationship between LS and daily mood. Among young adults, studies reveal a weaker association between LS and daily affective balance (the relative number of positive to negative emotions experienced) for those who possess a greater sense of purpose in life (Diener et al. 2012), suggesting that purpose may attenuate the effects of frequent NA on how generally satisfied a person is with their life. Still, whether purpose in life interacts with perceived *changes* in LS to influence the experience of NA awaits empirical testing.

1.3 The Current Study

As research has begun to link perceived changes in LS with diminished well-being, factors capable of improving the adjustment of individuals who perceive such changes have not been fully explored. To address this need in the current study, we conducted a secondary analysis of data from the National Survey of Midlife Development in the United States

(MIDUS-II). We employed a person-centered approach to explore adults' ratings of their past, present, and future LS and assess how unique patterns of perceived change and stability may be differentially associated with daily affect. Specifically, we were interested in how emergent profiles may relate to daily levels and variability of NA. Given its potential to influence how perceived self-change is understood, purpose in life was tested as a moderator of profile membership on these outcomes.

Because we employed the same database as the Röcke and Lachmann (2008) study, albeit with a refined sample (i.e., using only those participants completing the daily diary phase), we anticipated replicating the three previously identified profiles of perceived change. In addition, we extend this previous study by examining two separate indicators of negative affectivity derived from daily diary reports. We hypothesized finding significant between-profile differences, with those characterized by stability across time perspectives demonstrating lower NA levels and variability than those characterized by change; the profile characterized by decline in LS was expected to show the least adaptive patterns of NA. Finally, we anticipated purpose in life would significantly moderate the effects of profile membership on affect, such that associations with daily NA level and variability should be lowest for adults endorsing high levels of purpose in life.

2 Method

2.1 Participants and Procedure

The MIDUS-II was a nationally collected follow-up study of the initial MIDUS study designed to investigate age-related differences in physical and mental health. A subsample of adults who completed the MIDUS-II survey (conducted between 2004 and 2006) also participated in an 8-day diary study designed to assess exposure and reactivity to stressors (conducted between 2004 and 2009). Administered via telephone interviews at the end of each day, these 2,022 respondents report their emotional and physical well-being as well as the content, frequency, and severity of any stressors they experienced. The daily study had high compliance with the average participant completing 7.2 of the 8 days. The current study included 1,746 participants who sufficiently completed (a) items pertaining to LS in the MIDUS-II survey and (b) daily reports of NA and stressors. Overall, the age of the sample ranged from 33–84 ($M = 56.51$, $SD = 12.08$). The majority of the sample was female (58 %), white (91 %), and married (72 %). Median household income was \$58,750.

2.2 Measures

2.2.1 Perceived Change (Life Satisfaction Clustering Variables)

Participants were asked to rate their life overall with three single items, each referring to a different time perspective: (a) "Looking back 10 years ago, how would you rate your life overall at that time?", (b) "How would you rate your life overall these days?", and (c) "Looking ahead ten years into the future, what do you expect your life overall will be like at that time?". Responses ranged from 0: "the worst possible life overall" to 10: "the best possible life overall".

2.2.2 Purpose in Life

Purpose was assessed using a seven-item subscale taken from the Ryff Scales of Psychological Well-Being (Ryff 1989). Designed to assess one's sense of directedness and intentionality in life, this purpose subscale has demonstrated to have strong reliability and predictive validity with adult samples (see Ryff and Singer 2006 for a review). Sample items included, "I have a sense of direction and purpose in life", "Some people wander aimlessly through life but I am not one of them", and "I don't have a good sense of what it is that I am trying to accomplish in my life" (reverse scored). Response formats ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*), and for the current sample Cronbach's alpha was .71.

2.2.3 Daily Negative Affect Level and Variability

Daily negative affect was assessed by having participants indicate the extent to which they felt 14 moods (e.g., nervous, irritable, alone, angry, frustrated) each day. The response formats ranged from 0 (none of the time) to 4 (all of the time). Daily NA was calculated as the average score across of the 14 moods reported by a participant. Reliabilities for the daily NA scores ranged from .83–.85 across the 8 study days. NA variability was calculated as the within-person standard deviation of NA across the 8 days.

2.2.4 Daily Stressors

The total number of stressors experienced each day was assessed with the Daily Inventory of Stressful Events (DISE; Almeida et al. 2002). This scale has been demonstrated as a valid measure of stress exposure (e.g., Mroczek and Almeida 2004). Participants indicated whether they experienced any of 7 events (e.g., had an argument, experienced a stressful event at work or school, experienced a stressful event at home, experienced discrimination) within the past day.

2.2.5 Analytic Overview

Hypotheses were tested in three steps. First, a cluster analysis was performed to identify distinct patterns of perceived change in LS based on past, present, and future time perspectives. This person-centered classification strategy is useful for grouping respondents into smaller, homogenous subsets or "types" based on specified characteristics. Second, a multilevel random coefficient modeling (MCRM) analysis was performed to examine how cluster membership predicted daily levels of negative affect. Because data were organized hierarchically, with days nested within persons, hypotheses were tested with MCRM using Hierarchical Linear Modeling (HLM) software (Raudenbush et al. 2008; version 6.34g). A major advantage of using HLM to analyze repeated measures data is that it allows for the simultaneous modeling of both within- and between-person effects. That is, daily NA could be predicted as a function of intraindividual (e.g., daily stressors) and interindividual (e.g., purpose in life, cluster membership) variation. Finally, an Ordinary Least Squares (OLS) hierarchical regression was used to predict NA variability by cluster membership, purpose, and their interaction.

3 Results

3.1 Descriptive Analyses

Descriptive statistics for all study variables are presented in Table 1. Across the sample, LS ratings for all three time perspectives were above the scale midpoints, with scores increasing systematically from past to present to future. Each of the LS ratings was also positively associated with one another, with the strongest relationship between present and future ratings and the weakest relationship between past and future ratings.

3.2 Cluster Analysis

A hierarchical cluster analysis was used to discern the inherent structure of the data (Hair and Black 2000). Ward's method with squared Euclidean distance was used to obtain discrete clusters of adults based on *z*-transformed scores for each of the three perceived change variables. The agglomeration schedule provided by this method was examined for evidence of large jumps in the fusion coefficient, which indicate distinct clusters. Based on these fusion coefficients, two-, three-, and four-cluster solutions were examined. The three cluster solution (see Table 2) emerged as optimal for several reasons: (a) each of the resulting clusters significantly differed from each other along the criterion variables, (b) the observed patterns of perceived change represented conceptually meaningful profiles, each of adequate sample size for further statistical testing, and (c) a 3-part solution is theoretically consistent with Röcke and Lachmann's (2008) formulation derived with a similar person-centered approach. To assess the convergence of cluster membership established by

Table 1 Intercorrelations, means, and standard deviations for study variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age	–										
2. Gender (% male)	.02	–									
3. Income	–.29	.09	–								
4. Race (% white)	.03	.00	.05	–							
5. Marital status (% married)	–.07	.14	.31	.08	–						
6. Avg. daily stressor total	–.23	–.09	.10	.02	.02	–					
7. Avg. daily NA level	–.15	–.06	–.04	.00	–.08	.48	–				
8. Daily NA variability	–.14	–.10	–.03	–.03	–.08	.37	.74	–			
9. Past life satisfaction	.31	.03	–.05	.00	.13	–.20	–.16	–.16	–		
10. Current life satisfaction	.18	–.01	.12	.00	.19	–.47	–.38	–.30	.37	–	
11. Future life satisfaction	–.21	.01	.19	–.02	.15	–.30	–.22	–.20	.09	.60	–
<i>M</i>	56.52	44.03	70.60	.89	72.45	.53	.21	.17	7.50	7.96	8.08
<i>SD</i>	12.24	–	.58	–	–	.48	.28	.15	1.79	1.45	1.79

Avg. average, NA negative affect

Correlations with $r \geq .04$ are significant at the $p < .01$ level. Correlations with $r \geq .06$ are significant at $p < .001$. Mean income reflects per thousand dollars

Table 2 Standardized descriptive statistics for clustering variables and demographics by hierarchical cluster membership

Variable	Continuous high (n = 439) M (SD) %	Incremental (n = 1,033) M (SD) %	Decremental (n = 274) M (SD) %	F	χ^2
Past life satisfaction	<i>.98_a</i> (.32)	<i>-.33_b</i> (.90)	<i>-.34_b</i> (1.01)	425.79***	
Current life satisfaction	<i>.89_a</i> (.44)	<i>.00_b</i> (.58)	<i>-1.42_c</i> (1.21)	939.60***	
Future life satisfaction	<i>.51_a</i> (.55)	<i>.22_b</i> (.57)	<i>-1.66_c</i> (1.15)	967.74***	
Male	42.6	44.4	42.3		.64
White	91.1	91.2	89.4		.85
Married	82.2	72.7	55.1		62.24***
Age	<i>.40_a</i> (.99)	<i>-.20_b</i> (.91)	<i>.11_c</i> (1.06)	64.41***	
Income	<i>-.06_a</i> (.94)	<i>.14_b</i> (1.04)	<i>-.39_c</i> (.73)	32.83***	
Purpose in life	<i>.34_a</i> (.87)	<i>.09_b</i> (.91)	<i>-.85_c</i> (1.04)	149.40***	
Avg LS level	<i>.80_a</i> (.33)	<i>-.04_b</i> (.42)	<i>-1.14_c</i> (.67)	1,565.69***	
Daily NA level	<i>-.35_a</i> (.54)	<i>-.08_b</i> (.80)	<i>.53_c</i> (1.36)	89.54***	
NA variability	<i>-.32_a</i> (.81)	<i>-.03_b</i> (.88)	<i>.45_c</i> (1.22)	58.87***	

Variables in italics are clustering variables. Means with different subscripts in each row are significantly different, by Scheffé tests with significance levels of 0.05

*** $p < 0.001$

the hierarchical strategy, two separate K-means cluster analyses were conducted by splitting the sample in half at random and “forcing” and three-cluster solution on the data (Aldenderfer and Blashfield 1984). Cluster centers obtained from the hierarchical solution were used as starting points for the K-means analyses. Agreement between the two clustering strategies was substantial, with kappa coefficients of .81 for the first random split and .79 for the second. Thus, the three-cluster solution based on ratings of perceived change in LS was deemed reliable.

A multivariate analysis of variance (MANOVA) using the Pillai’s Trace test criterion demonstrated significant differences on the past, present, and future LS variables by cluster membership, ($V(6, 3,484) = .91, F = 481.62, p < .001, \eta^2 = .45$). As illustrated above the bold line in Table 2, Post-hoc Scheffé tests revealed that all three clusters differed on each of the criterion variables. We labeled each cluster based the observed pattern of z-scores for past, present, and future LS ratings consistent with those used by Röcke and Lachmann (2008).

The first cluster ($n = 439, 25\%$) was characterized by the most consistent (and highest; all ratings were at least $.5 SD$ above sample means) levels of LS across the three time perspectives: past ($z = .98$), present ($z = .89$), and future ($z = .51$), and therefore was labeled “*continuous high*”. A repeated measures ANOVA indicated that satisfaction scores for this cluster changed significantly across the three time units, $F(1, 438) = 26.78, p < .001, \text{partial } \eta^2 = .06$. Specifically, future ratings of LS were lower than both past and current ratings. Upon closer inspection, however, mean levels of all three ratings were at or above 9 on a 10-point scale, suggesting an overall profile of relatively high levels of LS. The second and largest cluster ($n = 1,033, 51\%$) was labeled “*incremental*” because it was characterized by a profile of increasingly higher ratings as individuals considered their past ($z = -.33$), present ($z = .00$), and future ($z = .22$) LS. A significant repeated-

measures ANOVA test confirmed that members of this cluster perceived progressively greater LS across the three time perspectives, $F(1, 1,032) = 595.59, p < .001$, partial $\eta^2 = .34$. The third and smallest cluster ($n = 274, 16\%$) was labeled “*decremental*”. The overall profile of this cluster was characterized by a downward trend in LS over the time perspectives: past ($z = -.34$), present ($z = -1.42$), and future ($z = -1.66$). A significant repeated-measures ANOVA revealed systematically lower ratings as individuals considered their past, present, and future, $F(1, 273) = 95.43, p < .001$, partial $\eta^2 = .26$.

Analysis of Variance (ANOVA) and Chi square tests were conducted to investigate whether demographic characteristics varied by cluster membership. Degrees of freedom for some analyses differed due to missing data for the variable assessed. Results indicated significant differences by age $F(2, 1,743) = 64.41, p < .001$, partial $\eta^2 = .07$; and income, $F(2, 1,702) = 38.03, p < .001$, partial $\eta^2 = .04$. Means and standard deviations are displayed below the bold line in Table 2. Post-hoc Scheffé tests indicated that the average age of adults in the continuous high profile was significantly higher than those in the decremental profile, and both were higher than the incremental profile. Household income was highest among the incremental profile, followed by the continuous high profile, and the decremental profile reported the lowest income. Cluster membership did not vary significantly by gender or race.

Analysis of Variances were also conducted to examine whether clusters differed from each other on purpose in life, $F(2, 1,741) = 149.40, p < .001$, partial $\eta^2 = .15$, NA level, $F(2, 1,743) = 89.54, p < .001$, partial $\eta^2 = .09$, and NA variability, $F(2, 1,721) = 58.87, p < .001$, partial $\eta^2 = .06$. Cluster means and standard deviations are presented in Table 2. Post-hoc Scheffé tests indicated that the continuous high cluster reported the highest level of purpose and the lowest NA levels and variability, followed by the incremental cluster, and the decremental cluster reported the least adaptive levels of each variable. Finally, a univariate analysis revealed significant between-cluster differences in LS aggregated across the three time perspectives, $F(2, 1,743) = 1,565.69, p < .001$, partial $\eta^2 = .64$. Post-hoc tests confirmed that the continuous high cluster (standardized $M = .80$) had significantly higher LS than the incremental cluster (standardized $M = -.04$), and both were higher than the decremental cluster (standardized $M = -1.14$). Thus, we controlled for these differences in subsequent analyses in order to determine the unique effect of cluster membership (i.e., differences in perceived change in LS) beyond that which might be explained by LS level.

3.3 Multilevel Analysis

To test our hypothesis, that cluster membership and purpose in life would be associated with differential levels of daily NA, we used the following multilevel model:

$$NA_{ij} = \beta_{0j} + \beta_{1j} \times (\text{Daily Stressors}) + \epsilon_{ij} \quad (1)$$

$$\begin{aligned} \beta_{0j} = & \gamma_{00} + \gamma_{01}(\text{Age}_j) + \gamma_{02}(\text{Gender}_j) + \gamma_{03}(\text{Income}_j) + \gamma_{04}(\text{Race}_j) + \gamma_{05}(\text{Married}_j) \\ & + \gamma_{06}(\text{Life Satisfaction}_j) + \gamma_{07}(\text{Purpose}_j) + \gamma_{08}(\text{Cont. High}_j) + \gamma_{09}(\text{Incremental}_j) \\ & + \gamma_{10}(\text{Purpose} \times \text{Cont. High}_j) + \gamma_{11}(\text{Purpose} \times \text{Incremental}_j) + u_{0j} \end{aligned} \quad (2)$$

$$\beta_{1j} = \gamma_{10} + u_{1j} \quad (3)$$

As shown in Eq. 1, participants' level of NA on a given day is modeled as a function of their intercept, (β_{0j}), or mean level of NA across all study days, the person-centered number of stressors they experienced that day (β_{1j}), and a within-person error term (r_{ij}). The effects of between-person differences on daily NA are shown in Eq. 2. Here, average daily NA is predicted as a function of the grand mean of NA (γ_{00}), demographic characteristics (γ_{01} – γ_{05}), grand-mean centered levels of LS across the three temporal perspectives (γ_{06}), and grand-mean levels of purpose in life (γ_{07}). In addition, two dummy-codes were created to identify members of the continuous high (γ_{08}) and incremental clusters (γ_{09}); (participants were assigned a 0 = if they were not members and a 1 = if they were members, respectively). Thus, by entering both of these dummy-codes into the model simultaneously, the decremental cluster served as the reference group for both of these clusters. Finally, interaction terms, (γ_{10} and γ_{11}), between purpose and the dummy-coded clusters were entered as predictors, and a between-person error term was included (u_{0j}). No between-person variables were entered as predictors of how daily stressors impacted daily NA (see Eq. 3).

Results from the multilevel analyses are presented in Table 3. In support of our hypothesis, cluster membership was significantly associated with daily NA. Specifically, after accounting for demographic controls, participants in either the continuous high or incremental clusters reported significantly lower levels of daily NA than participants in the decremental cluster (reference group). It is noteworthy that these effects emerged after person-centered numbers of daily stressors and average level of LS were controlled. This suggests that associations between cluster membership and daily affect persist even on days when participants reported significantly more stressors than what was normative for them, and are not simply due to discrepant levels of LS.

In addition, and consistent with expectations, participants with a stronger sense of purpose also reported lower levels of daily NA. However, the main effects of cluster membership and purpose were qualified by their significant interaction: $b = .05$, $SE = .02$, $p < .01$ (with continuous high) and $b = .05$, $SE = .01$, $p < .01$ (with incremental). Simple slope tests revealed that at low levels of purpose, both the continuous high, $b = -.31$, $SE = .06$, $p < .01$ and incremental, $b = -.19$, $SE = .04$, $p < .001$ clusters reported greater daily NA than the decremental profile. However, at high levels of purpose, no significant differences in daily NA emerged between the decremental profile and the other two clusters: $b = -.10$, $SE = .08$, $p = .20$ for continuous; $b = -.04$, $SE = .08$, $p = .65$ for incremental. To illustrate the nature of this interaction, average levels of daily NA were plotted separately for adults endorsing high and low (± 1 *SD*) levels of purpose in life in Fig. 1 (see panel A for decremental vs. continuous high; see panel B for decremental vs. incremental).

3.4 Regression Analyses

An OLS hierarchical regression was conducted to investigate our hypothesis that cluster membership and purpose in life would be associated with NA variability, assessed as the standard deviation in daily affect scores. Predictors were entered in a step-wise fashion, with demographic control variables entered at step 1, followed by main effects for average number of daily stressors and purpose, and dummy-coded cluster variables, at step 2, and interaction terms (cluster variables \times purpose) at the final step. Predictors were grand mean centered.

Table 3 Multilevel coefficients and standard errors predicting daily negative affect

Gender: male = 1, female = 0.
 Marital Status: married = 1, not married = 0. Race: white = 1, non-white = 0. For between-cluster comparisons, Decremental was the reference group. Analyses were based on 12,667 days and 1,697 participants
 * $p < .05$; ** $p < .01$;
 *** $p < .001$

Effect	Coefficient	SE
Average negative affect, β_0		
Intercept, γ_{00}	.20***	.02
Age, γ_{01}	-.03***	.01
Gender, γ_{02}	-.02*	.01
Income, γ_{03}	.00	.01
Race, γ_{04}	.00	.02
Marital status, γ_{05}	.00	.01
Avg. LS level, γ_{06}	-.04***	.01
Purpose, γ_{07}	-.04***	.01
Continuous high, γ_{08}	-.06*	.03
Incremental, γ_{09}	-.05*	.02
Continuous high \times purpose, γ_{10}	.05**	.02
Incremental \times purpose, γ_{11}	.05**	.01
Daily stressors, β_1		
Intercept, γ_{10}	.12***	.00

As shown in Table 4, results indicated that in the final model, the combined predictors explained 21 % of the variance in NA variability, $F(9, 1,710) = 49.99$, $p < .001$. As expected, controlling for demographic variables and the average number of daily stressors reported, cluster membership and purpose in life each significantly predicted NA variability. However, significant interaction terms emerged at step 3, and the change in R^2 indicated statistical moderation. Simple slopes tests revealed that at low levels of purpose, both the continuous high, $b = -.23$, $SE = .08$, $p < .001$ and incremental, $b = -.20$, $SE = .08$, $p < .01$ clusters experienced significantly lower NA variability compared to the decremental profile. However, at high levels of purpose, magnitude of NA variability did not differ between clusters: $b = -.30$, $SE = .25$, $p = .08$ for continuous high; $b = -.12$, $SE = .24$, $p = .50$ for incremental.¹

4 Discussion

Despite the normative stability in LS typically documented by objective assessments repeated over time, the current study found considerable evidence of *perceived change* in adults' ratings of their LS across past, present, and future time perspectives. Replicating the person-centered approach employed by Röcke and Lachmann (2008), a three-part clustering solution appeared to best fit the current data, with *continuous high*, *incremental*, and *decremental* clusters emerging. Approximately three-quarters of the sample was classified as either incremental or decremental, suggesting that perceiving changes (either positive or negative) in LS is common when considering a 20-year span of one's life. Novel in the

¹ Because age and income were significantly associated with cluster membership, we also tested these demographic variables as separate moderators of the relationship between cluster membership and daily NA. However, in neither analysis did the interaction term reach statistical significance, yet main effects for cluster membership remained significant. Therefore, the differential effects noted for perceiving change in LS do not appear to be contoured by individual differences in age or level of income.

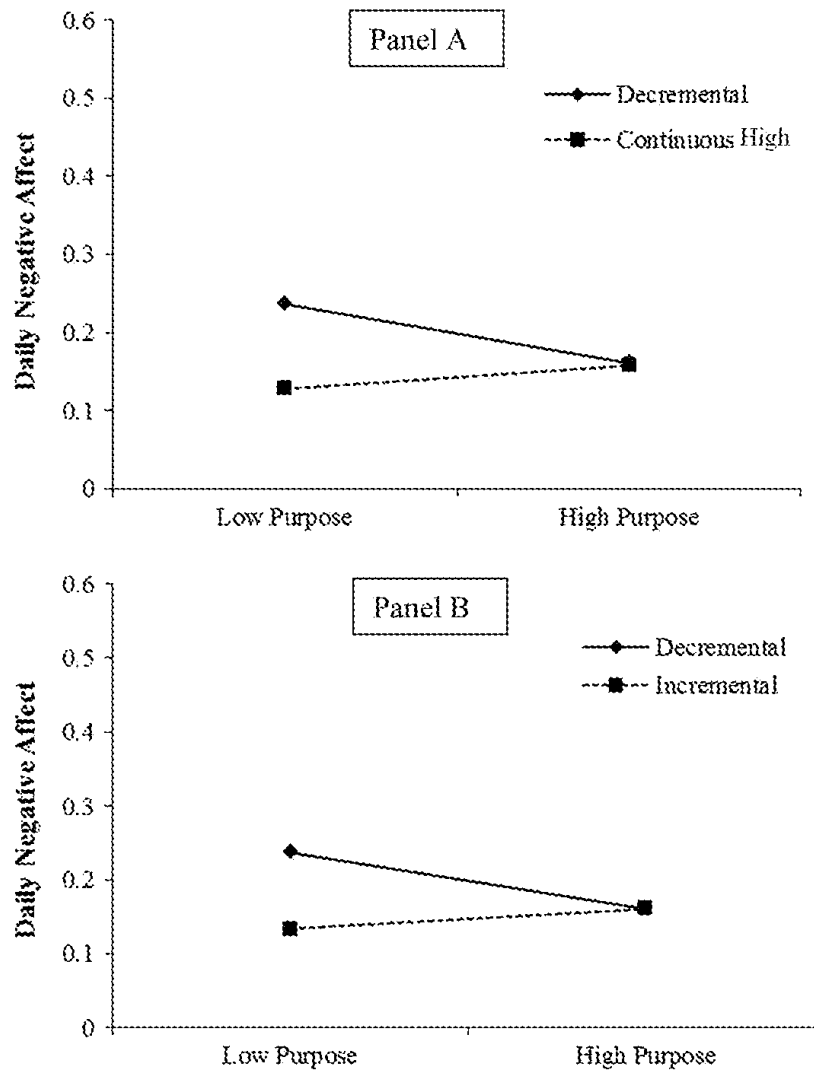


Fig. 1 Interactions between Purpose in Life and Perceived Change Profiles Predicting Daily NA

current study was evidence that cluster membership was significantly associated with subsequent indicators of daily NA and variability. As predicted, the continuous high profile reported the lowest NA levels and variability overall, and both these adults and those in the incremental profile consistently showed significantly more favorable affective adjustment than those in the decremental profile. Specifically, daily NA levels and variability were highest among the decremental profile, suggesting the negative correlates of perceived change may be most pronounced for those perceiving declines, in particular. Notably, these effects remained significant even after accounting for participants' average levels of LS and number of daily stressors, situating perceived changes in LS as a robust predictor of negative emotionality in everyday life.

Importantly, however, the deleterious nature of being characterized as decremental was not uniform across individuals. Results indicated that individual differences in purpose in life moderated how cluster membership related to daily NA. Consistent with our hypothesis, a greater sense of purpose appeared to buffer the negative effects associated with membership in the decremental cluster. Especially noteworthy was the lack of between-profile differences at high levels of purpose on measures of NA variability. This

Table 4 OLS hierarchical regression with predictors of negative affect variability

Predictors	Coefficient	SE	sr
Age	-.06**	.00	-.06
Gender	-.07**	.01	-.07
Income	-.02	.00	-.02
Marital status	.01	.01	.02
Race	-.03	.01	-.03
Step 1 change in $R^2 = .04^{***}$			
Avg. level of LS	-.16***	.05	-.10
Avg. number of daily stressors	.31***	.01	.29
Purpose	-.21***	.00	-.18
Continuous high	-.13**	.01	-.08
Incremental	-.09*	.01	-.05
Step 2 change in $R^2 = .09^{***}$			
Continuous high \times purpose	.09**	.01	.07
Incremental \times purpose	.10**	.01	.07
Step 3 change in $R^2 = .01^{**}$			

b standardized beta coefficient.
SE standard error, *sr* semi partial correlation. Gender: male = 1, female = 0. Marital Status: married = 1, not married = 0. Race: white = 1, non-white = 0. For between-cluster comparisons, Decremental was the reference group. Full Model $R^2 = .21$

* $p < .05$; ** $p < .01$;

*** $p < .001$

finding supports a growing literature suggesting that a strong sense of purpose may generate greater personal consistency (McKnight and Kashdan 2009) that promotes well-being even in the face of perceived change. Thus, purpose may serve as a psychological resource that mitigates the consequences of temporal discrepancies between individuals sense of their past and future self. As individuals dedicate more resources to effective emotional regulation as they age (Mather and Knight 2005), future studies might explore whether cultivating a purpose in life is more advantageous later in adulthood than earlier. This will be an important issue to reconcile with recent evidence suggesting that a sense of purpose may decline measurably with age (Keyes 2011).

Interestingly, relative to the other profiles, the decremental group reported significantly lower levels of purpose in life, thus raising questions about how a meaningful sense of direction might arise among these individuals in the first place. One theoretical possibility is that transformative life events, whether experienced or perceived, may actually precipitate purpose development. For example, Kashdan and McKnight (2009) argue that stressful experiences often motivate individuals to search for personal meaning in order to adapt to the experiences and persist toward self-concordant goals. Thus, a sense of purpose may be a personal asset serving as both an outgrowth from and a source of resilience to life challenges. A beneficial direction for future research would be to investigate simultaneously perceived changes in both LS and purpose, toward uncovering any developmental relationship between the two constructs. Evidence of a dynamic coupling between the two may shed light on why resilience and adaptive recovery is the most typical response to extreme stress and trauma (Bonanno et al. 2005).

4.1 Limitations and Future Directions

Some of the limitations of the current study might inform the scope and direction of future research. Namely, this report made use of a secondary analysis of a large and nationally collected data set. Assessments of perceived change in LS were derived by three single items used to assess past-10-year, present, and future-10-year time perspectives. Perhaps

more nuanced perceived change profiles would emerge if multi-item scales were used to measure LS, or if participants were asked to consider a broader range or number of time perspectives. Related to this point, personal ratings of LS using 10-year units may have obscured developmentally relevant changes in what adults cognitively and affectively rely on when rating their satisfaction. That is, how a 30-year old adult understands their LS one decade prior might differ fundamentally from how a 60-year old adult understands their LS over the same period. To more fully characterize developmental patterns that may exist, future work might examine longitudinal profiles of perceived change using person-centered approaches that can capture multivariate change (i.e., growth mixture analysis).

In addition, more studies are needed to clarify whether a sense of purpose works to buffer the effects of perceived change, or if it reduces individuals' perception of change in the first place. Resolving this issue might inform the way interventions are designed to help individuals who may be vulnerable to perceived declines in LS. For example, support for the former may lead to targeted interventions that are prescribed for individuals who are probabilistically more likely to perceive changes. In contrast, support for the latter may warrant prevention modalities wherein individuals are encouraged to consider meaningful life aims in advance of transformative developmental experiences. Ultimately, purpose in life may be a key asset in the experience of perceived change. Considering the importance of LS to well-being across adulthood, sustained inquiry into how purpose in life facilitates greater perceived stability in this domain offers another route to understanding positive adjustment and promoting happier and more satisfying lives.

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