This manuscript is currently under review—draft from 13 December 2023

Lifespan Trajectories of Negative and Positive Affect: A Coordinated Analysis of 10 Longitudinal Studies

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The current project was funded by a National Institute of Aging Grant awarded to D. K. Mroczek (R01-AG018436).

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Abstract (143/150 words)

Lifespan developmental theories suggest age-related shifts in motivation, cognition, emotion regulation, and stressor experience lead to changes in mean levels of negative and positive affect across the lifespan. The present research used coordinated data analysis to examine mean-level affective trajectories in 49,940 participants ranging from 11 to 106 years old across 10 longitudinal studies. Meta-analytic results indicated that, on average, negative affect followed a U-shaped trajectory, decreasing across most of the lifespan before reversing in late life, and positive affect followed an inverted U-shaped trajectory, peaking in late midlife. Studies with older samples showed a steeper late-life shift in their negative and positive affect trajectories relative to studies with younger samples. These findings suggest that affective well-being improves with age, but only to a certain point. In later life the pattern reverses, with the reversal occurring earlier for positive relative to negative affect.

Keywords: positive affect, negative affect, lifespan development, age trajectories, coordinated data analysis (CDA)

Statement of Relevance (129/150 words)

With a rapidly aging population, understanding how affective well-being unfolds across the lifespan is crucial. The current study highlights that common lifespan developmental models of well-being may need further refinement. First, although many lifespan models posit linear age-related changes in affect, the current findings suggest that nonlinear shifts occur in middle-to-late adulthood. Second, theoretical frameworks describing age-related changes need to account for the asymmetry in negative and positive affect given the present finding that declines in positive affect occur earlier in the aging process relative to increases in negative affect. This suggests the need for greater specificity in understanding aging processes tied to well-being. Finally, focusing

on mechanisms that promote affective well-being as people age may provide a valuable strengths-based approach to lifespan developmental perspectives on older adult transitions.

Lifespan Trajectories of Negative and Positive Affect: A Coordinated Analysis of 10 Longitudinal Studies

Introduction: 866 words

Negative and positive affect are core components of well-being and have wide-reaching implications for psychological and physical health (Boehm, 2018; Brown, Chorpita, & Barlow, 1998; Chida & Steptoe, 2008; Cross, Hofschneider, Grimm, & Pressman, 2018; Diener, Suh, Lucas, & Smith, 1999; Fredrickson, 2004). Lifespan developmental theories suggest that mean levels of negative and positive affect change as people age, though empirical evidence supporting age-based changes is mixed. Understanding general age-related changes in negative and positive affect has been of interest to researchers for decades (e.g., Charles et al., 2001; Mroczek & Kolarz, 1998), as identifying trajectories can point to when in the lifespan an individual may be most vulnerable to experiencing poor affective well-being.

Mean-level trajectories of negative and positive affect may reflect age-related shifts in motivation, cognition, emotion regulation, and stressor experience (Carstensen, 2006; Carstensen & Mikels, 2005; Graham et al., 2006; Labouvie-Vief, 2003). For example, Socioemotional Selectivity Theory (SST; Carstensen 1993, 2006; 2021; Carstensen, Isaacowitz, & Charles, 1999) posits that, as people age, they experience a motivational shift from pursuing future-oriented goals to prioritizing the present moment. In pursuit of future-oriented goals, younger and middle-aged adults may sacrifice their current affective well-being, while older adults may prioritize their current affective well-being by avoiding negative emotional experiences. Central to this theory is the belief that negative affect decreases later in the lifespan as older adults prioritize less negative emotion-inducing experiences. In addition to age-related motivational shifts, the Strength and Vulnerability Integration (SAVI) theoretical framework (Charles, 2010) argues that people accrue knowledge and experience across the lifespan that may make it easier for them to

down-regulate negative affect and up-regulate positive affect. Dynamic Integration Theory (DIT) proposes a similar lifespan trajectory of negative and positive affect as these other frameworks. The developmental tasks of younger and middle adulthood contribute to increasing levels of affective complexity. Later, older adults compensate for declining cognitive resources by avoiding cognitively demanding positive emotions and curbing the integration of cognitively-demanding negative emotions (Labouvie-Vief, 2003). Consistent with DIT, older adults attend to positive rather than negative stimuli more than younger adults (Carstensen & Mikels, 2005; Charles & Carstensen, 2008; Kennedy, Mather, & Carstensen, 2004). Lifespan theories of affective development predict age-related increases in positive affect and age-related decreases in negative affect, though this pattern may decelerate or reverse in latest life alongside cognitive and physical health decline (Baltes, 1997; Baltes & Baltes, 1990).

Empirical evidence is generally consistent with age-related decreases in *negative* affect (Charles et al., 2001; Grühn et al., 2010; Hudson et al., 2016; Jebb et al., 2020; Joiner et al., 2018; Kessler & Staudinger, 2009; Mak & Schneider, 2022; Shi et al., 2009; Stacey & Gatz, 1991; Windsor & Anstey, 2010; Windsor et al., 2013), although not all studies have observed this pattern (e.g., Kunzmann et al., 2000). Moreover, some studies have found evidence that this decline in negative affect slows or reverses in late life (Carstensen et al., 2011; Griffin et al., 2006; Lachman et al., 2015; Schilling et al., 2013). Indeed, a recent meta-analysis based on 443 unique samples with a total of 460,902 participants found that negative affect typically decreases until people's 60s, and then begins to increase (Buecker et al., 2023).

Evidence for age-related trajectories of positive affect is more mixed, with studies finding no association between positive affect and age (Carstensen et al., 2011; Grühn et al., 2010; Shi et al., 2009), positive associations between positive affect and age (Kessler & Staundinger, 2009; Windsor et al., 2013), negative associations between positive affect and age (Griffin et al., 2006;

Hudson et al., 2016; Jebb et al., 2020; Kunzmann et al., 2000; Stacey & Gatz, 1991; Schilling et al., 2013), and nonlinear relationships between positive affect and age (Charles, 2010; Gana et al., 2015; Joiner et al., 2018; Lachman et al., 2015; Mak & Schneider, 2022; Windsor et al., 2013). Some studies have found differences when comparing cross-sectional and longitudinal methods within the same sample (Charles et al., 2023; Hansen & Slagsvold, 2012; Joiner et al., 2018), and meta-analytic work has found a linear decrease in positive affect starting in childhood (Buecker et al., 2023). Thus, research is less clear regarding how experiences of positive affect shift as individuals age.

The Present Research

These conflicting empirical findings are not surprising given differences in samples, methods, and participant ages. To address inconsistent findings in previous work, the present research used 10 longitudinal datasets to examine mean-level trajectories of positive and negative affect across the adolescent and adult lifespan in a coordinated data analysis (Graham et al., 2020; Hofer & Piccinin, 2009). This approach has several strengths which will help clarify conflicting findings in the literature. First, the longitudinal designs combined with the age-heterogenous samples allowed us to test how negative and positive affect changed as people age, and whether trajectories differed as a function of baseline age. Second, our samples included participants from age 11 to age 106, allowing us to model affective trajectories across the entire adolescent and adult lifespan. Third, the conceptual harmonization of different longitudinal studies using the coordinated data analysis approach allowed 10 independent opportunities for conceptual replication, while also accounting for differences in country of data collection, measurement type, and sample characteristics.

Method

The current study used 10 longitudinal datasets, including publicly available and archived datasets as well as datasets from the Integrative Analysis of Longitudinal Studies on Aging and Dementia (IALSA) network. The main inclusion criteria were (1) at least three waves of negative and positive affect given the necessity of multiple waves to appropriately tease apart age-based changes (e.g., Galambos et al., 2021), and (2) the data were accessible to the study team. Thus, we included 10 independent longitudinal datasets with a combined sample size of 49,940 across datasets. The current study used a coordinated data analytic approach, allowing for the analysis of each dataset separately prior to meta-analyzing the effects of interest. See Table 1 for descriptive information about each dataset.

Transparency and Openness

All *R* scripts for data wrangling, analyses, meta-analysis, and creating tables and figures are available on OSF: https://osf.io/9rj82/?view_only=0f642a3ac7b341fab6d946e46d526a32. Supplemental tables with more extensive results and descriptive statistics are also available through this link. The current project was not preregistered as data collection and analysis were carried out across several years and began before preregistration was the default approach in our research group. To offset the lack of preregistration, replication across multiple large samples was built into the study design. Finally, the following datasets are publicly available: ADDH, HRS, LASA, LSOG, MIDUS, and WLS.

Samples

The National Longitudinal Study of Adolescent to Adult Health. The National Longitudinal Study of Adolescent to Adult Health (ADDH) is a nationally representative sample of United States adolescents that began in 1994-1995 (Harris, 2013). Participants completed the Center for Epidemiologic Studies Depression Scale (CES-D) every six years to gauge their

negative and positive affect over the past seven days, with a total of four measurement occasions over a 24-year period. A total of 6,491 participants (Age: *M* = 16.03, *SD* = 1.77, range = 12-21 at baseline; 53% female) completed at least one measurement of affect. There were 5,286 individuals who completed at least three measurements and 3,335 who completed at least four.

The Australian Longitudinal Study of Ageing. The Australian Longitudinal Study of Ageing (ALSA) began in 1992 out of Adelaide, South Australia with participants who were at least 65 years old. Participants completed the CES-D over varying periods of time to gauge their negative and positive affect over the past seven days, with a total of eight measurement occasions over a 22-year period. A total of 2,059 participants (Age: *M* = 75.15, *SD* = 5.60, range = 62.55-92.55 at baseline; 51% female) completed at least one measurement of affect. There were 678 individuals who completed at least three measurements and 387 who completed at least four.

The Health and Retirement Study. The Health and Retirement Study (HRS) is a nationally representative longitudinal panel study out of the United States that began in 1992 (Juster & Suzman, 1995; Sonnega et al., 2014). Half of the sample completed an affect assessment in 2008, and the other half of the sample completed it in 2010. Every four years from their personal start date, each group filled out an affect survey again, meaning the former has up to four measurement occasions while the latter has up to three. Participants completed the Positive and Negative Affect Schedule (PANAS) to report the how frequently they had experienced different negative and positive emotions over the past 30 days. A total of 15,233 (Age: *M* = 67.75, *SD* = 11.00, range = 25-101 at baseline; 60% female) completed at least one measurement of affect. There were 8,174 individuals who completed at least three measurements and 1,826 who completed at least four.

The Longitudinal Aging Study of Amsterdam. The Longitudinal Aging Study of Amsterdam (LASA) began in 1992 out of Amsterdam in the Netherlands with participants who

were 55 to 85 years old (Hoogendijk et al., 2016), sample from various geographical parts of the country and from urban and more rural areas to ensure national representativeness. Participants completed the CES-D every three years to gauge their negative and positive affect over the past seven days, with a total of seven measurement occasions over a 20-year period. A total of 4,109 participants (Age: M = 732, SD = 2.51, range = 54.78-85.64 at baseline; 55% female) completed at least one 2,131 who completed at least four.

The Longitudinal Study of Generations. The Longitudinal Study of Generations (LSOG) is an intergenerational study out of California that began in 1971 (Silverstein, Merril, & Bengston, 1971). Participants completed the CES-D every 4-5 years to gauge their negative and positive affect over the past seven days, with a total of seven measurement occasions over a 30-year period. A total of 2,931 participants (Age: M = 50.08, SD = 17.05, range = 17.52-98.66 at baseline; 58% female) completed at least one measurement of affect. There were 1,856 individuals who completed at least three measurements and 1,495 who completed at least four.

The Midlife in the United States Study. The Midlife in the United States study (MIDUS) is a nationally representative sample from the United States that began in 1995 (Brim, Ryff, Kessler, et al., 2004). Participants completed the Midlife Development Inventory (MIDI) to gauge their negative and positive affect over the past 30 days, with a total of three measurement occasions over an 18-year period. A total of 6,306 participants (Age: M = 46.38, SD = 13.00, range = 20-75 at baseline; 53% female) completed at least one measurement of affect. There were 2,481 individuals who completed three measurement occasions, and a fourth measurement occasion has not been collected.

The Veteran Affairs Normative Aging Study. The Veteran Affairs Normative Aging Study (NAS) is an all-male study through the United States Department of Veteran Affairs that began in 1963. Beginning in 1994, participants completed the PANAS every three years to gauge

their negative and positive affect over the past 30 days, with a total of six measurement occasions over an 18-year period. A total of 904 participants (Age: *M* = 66.06, *SD* = 6.61, range = 51-80 at baseline; 100% male) completed at least one measurement of affect. There were 660 individuals who completed three measurement occasions and 472 who completed at least four.

The Origins of Variance in the Oldest-Old. The Origin of Variance in the Oldest-Old: Octogenarian Twins study (OCTO) is a study of Swedish twin pairs who are at least 80 years old that began in 1991. Participants completed the CES-D every two years to gauge their negative and positive affect over the past seven days, with a total of five measurement occasions over an 11 year-period. A total of 577 participants (Age: *M* = 83.59, *SD* = 3.18, range = 79.37-97.92 at baseline; 68% female) completed at least one measurement of affect. There were 353 individuals who completed three measurement occasions and 258 who completed at least four.

The Swedish Adoption/Twin Study of Aging. The Swedish Adoption/Twin Study of Aging (SATSA) began in 1984 to study the genetic versus environmental factors associated with aging (Pedersen et al., 1991). Participants completed CES-D to gauge their negative and positive affect over the past seven days, with a total of seven measurement occasions unevenly spaced over a 30 year-period. A total of 521 participants (Age: *M* = 74.81, *SD* = 8.53, range = 59-96 at baseline; 61% female) completed at least one measurement of affect. There were 395 individuals who completed three measurement occasions and 212 who completed at least four.

Wisconsin Longitudinal Study. The Wisconsin Longitudinal Study began in 1957 to follow high school graduates into older adulthood as well as some of their family members, with the first affect assessment beginning in 1993. Participants completed the CES-D to gauge their negative and positive affect over the past seven days, with a total of three measurement occasions unevenly spaced over an 18 year-period. A total of 10,809 participants (Age: *M* = 53.24, *SD* = 4.47, range = 29-79 at baseline; 50% female) completed at least one measurement of affect.

There were 6,231 individuals who completed three measurement occasions, and a fourth measurement occasion has not been collected.

Table 1: Descriptive Information by Sample

Study	Country	Scale	Year	Follow Up	Interval	Waves	Age	N
ADDH	United States	CESD	1994-1995	24	6.00	4	15.91	6491
ALSA	Australia	CESD	1992	22	1.62	8	74.71	2059
HRS	United States	PANAS	2008-2010	12	4.00	4	64.63	15233
LASA	Netherlands	CESD	1992	20	3.00	7	66.43	4109
LSOG	United States	CESD	1971	30	4.30	7	41.62	2931
MIDUS	United States	MIDI	1995	18	9.00	3	46.24	6306
NAS	United States	PANAS	1994-1996	18	3.00	6	67.46	904
OCTO	Sweden	CESD	1991	11	2.00	5	83.31	577
SATSA	Sweden	CESD	1984	30	4.30	7	71.54	521
WLS	United States	CESD	1993	18	9.00	3	53.60	10809

Note. Year represents the first year in which data were collected. Follow Up represents the maximum amount of time between the first and final measurement occasion. Waves represents the maximum number of waves of affect. Age represents the average age of the sample at the first time point.

Measures

Positive Affect and Negative Affect. All studies assessed at least negative or positive affect. Seven studies used the CES-D to assess affect (i.e., ADDH, ALSA, LASA, LSOG, OCTO, SATSA, WLS); two studies used PANAS to assess affect (i.e., HRS, NAS); and one study used the MIDI (i.e., MIDUS). Across studies, affect was coded so higher scores represented more frequent experiences of negative affect and more frequent experiences of positive affect. Because the Likert scales differed across studies, all scales were percent of maximum possible (POMP) scored then divided by 10. The resulting scores ranged from 0 (the minimum score possible) to

10 (the maximum score possible). In other words, if a Likert scale ranged from 1 (never) to 5 (all the time), 1 would now be represented by 0 and 5 would be represented by 10. Table S1 shows the specific items used to assess affect within each study.

Age. Age was used as the time metric to model affect trajectories. Age was centered at 65 years in each study, with the exception of ADDH and OCTO. Because the maximum age in ADDH was younger than 65, age was centered at 20. Likewise, because the minimum age in OCTO was older than 65, age was centered at 90. Because of the very different age ranges and age scaling in ADDH and OCTO, these samples were not included in the meta-analytic estimates. For all samples, age was divided by 10 so 1-unit represented one decade.

Sex. All studies coded baseline sex dichotomously, wherein 0 = male and 1 = female. Because all NAS participants were men, NAS was not included in analyses where sex was a predictor.

Meta-analytic moderators. The current project evaluated four study-level moderators: the average number of measurement occasions, average baseline age, affect scale used, and country in which the study was based. On the methodological front, because these samples have differing numbers of measurement occasions and differing age ranges, we evaluated whether trajectories differed based on how many surveys people filled out on affect over time as well as the average baseline age of the sample. Additionally, regarding measurement, the current samples report on their affect through the Positive and Negative Affect Schedule (Watson et al., 1988), the Center for Epidemiological Studies - Depression scale (Lewinsohn et al., 1997), and the Midlife Development Inventory (Brim & Featherman, 1998). Given that some of these measures strictly capture positive and negative emotions, while others capture other affective experiences (e.g., MIDI and CESD also capture loneliness), exploring the extent to which these affect trajectories vary across measures will help establish how distinct versus similar these lifespan

developmental shifts in affective experiences may be. Additionally, research has highlighted that certain aspects of well-being trajectories may be in part tied to country of residence (Blanchflower, 2021), so the current study will explore whether the linear and quadratic trajectories of affect differ based on country of residence. As the current project has six samples from the United States and four from other countries (i.e., Australia, Netherlands, Sweden), this project is limited to comparing trajectories based on residency in the United States or not.

Analytic Plan

Analyses were performed in R 3.2.4 (R Core Team, 2022) using the lmer() function from the *lme4* package (Bates et al., 2015). All cleaning, analytic, and meta-analytic script can found on OSF: https://osf.io/9rj82/?view_only=0f642a3ac7b341fab6d946e46d526a32. An alpha level of .01 were used to determine significance due to the large within-study sample size.

Each dataset was arranged by nesting affect assessments within persons, thereby allowing within-person change in affect for each individual to be modeled. The multilevel models consider all datapoints, including respondents with only one measurement occasion of affect. All models were estimated using Maximum Likelihood (ML) estimation. Age was used as the time interval to estimate affect trajectories in the current study. All models were conducted for both negative and positive affect, so the term "affect" will be used in describing the following models. Level 1 will refer to time ($_j$) and Level 2 will refer to person ($_i$).

First, intercept only models were conducted to estimate the amount of variability in affect scores occurring at the within- versus between-person level.

Level 1

$$affect_{ij} = \beta_{0j} + e_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + r_{ij}$$

Second, age was included as a Level 1 predictor with random intercepts but no random slopes to estimate average affect trajectories as people age.

Level 1

$$affect_{ij} = \beta_{0j} + \beta_{1j} age_{ij} + e_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + r_{0j}$$

$$\beta_{1j} age_{ij} = \gamma_{10}$$

Third, a random slope for age was added to allow for differences between individuals in their affect trajectories as they aged.

Level 1

$$affect_{ij} = \beta_{0j} + \beta_{1j} age_{ij} + e_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + r_{0j}$$

$$\beta_{1j} age_{ij} = \gamma_{10} + r_{1j}$$

Fourth, for studies with least four waves of affect (all studies except MIDUS and WLS), a quadratic term was added to estimate non-linear affect trajectories.

Level 1

$$affect_{ij} = \beta_{0j} + \beta_{1j} age_{ij} + \beta_{1j} age_{ij}^2 + e_{ij}$$

Level 2

$$\beta_{0j} = \gamma_{00} + r_{0j}$$

$$\beta_{1j} age_{ij} = \gamma_{10} + r_{1j}$$

$$\beta_{2j} age_{ij}^2 = \gamma_{20}$$

Meta-analyses

To summarize the average effects across studies, we used random-effects models to estimate meta-analytic effect sizes for intercept-only, linear change, and quadratic change models, as well as sex by linear age interaction models. Each meta-analysis included an overall effect (weighted by total number of observations), with corresponding standard errors/confidence intervals, as well as estimates of heterogeneity ($I^{2,}$ Q) (Borenstein, Higgins, Hedges, & Rothstein, 2017). We used the significance test of the Q statistic to guide our decision to test and report the results of study-level moderation analyses. For statistically heterogeneous main effects, we tested four study-level moderators: average baseline age, country that the study was based in (1 = U.S.; 0 = non-U.S.), affect scale used (1 = CES-D; 0 = PANAS, MIDI), and the average number of measurement occasions.

ADDH and OCTO were excluded from meta-analyses because they had different age ranges that did not overlap with the age centering of the majority of studies. Additionally, if a study was not included in a specific analysis because it did not meet inclusion criteria (i.e., NAS for the sex analyses), it could not be included in the meta-analyses.

Results

Table 2 shows the meta-analytic effects across all negative affect models. Table 3 shows the individual study results for the negative affect linear change models, Tables 4 shows the individual study results for the negative affect quadratic change models, and Table 5 shows the results of the model comparison for the linear and quadratic change models. Table 6 shows the meta-analytic effects across all positive affect models. Table 7 shows the individual study results for the positive affect linear change models, and Tables 8 and 9 show the individual study results for the positive affect quadratic change models. All other results, as well as weighted and

unweighted plots, and full meta-analytic reports can be found in the supplemental materials on OSF: https://osf.io/9rj82/?view_only=0f642a3ac7b341fab6d946e46d526a32.

Negative Affect

Intercept Only Model.

The ICCs from the intercept-only model for negative affect ranged across the 10 samples from .30 to .64 (Table S2). These ICCs indicated that the amount of variability in negative affect ranged from 30% to 64% at the between-person level. Across studies, ADDH had the least amount of between-person variability while HRS and SATSA had the most between-person variability. The remainder of variability in negative affect is a combination of true within-person variability and variance due to measurement error. These intercept-only models suggest that some individuals generally experience more or less negative affect on average, but that individuals also vary in their negative affect experiences over time (in some studies more than others), setting the foundation to evaluate within-person change.

Table 2: Meta-Analytic Summary of Negative Affect Models with 95% Confidence Intervals (CI)

Model	Estimate	Lower CI	Upper CI	p	SE	Z
Intercept	1.33	1.12	1.54	<.001	0.11	12.49
Linear	0.04	-0.11	0.19	.596	0.08	0.53
Quadratic	0.09	0.05	0.13	<.001	0.02	4.63
Sex-Intercept	0.01	-0.01	0.03	.411	0.01	0.82
Sex-Slope	0.36	0.28	0.43	<.001	0.04	9.27

Note. The estimate represents the meta-analytic estimate across studies for that specific effect (e.g., Linear comes from linear model, quadratic comes from quadratic model).

Linear Growth Model.

The linear growth model tested whether there were mean-level changes in negative affect across the lifespan. In primary analyses, we report results from the models that included fixed and random slopes, to allow for individual differences in affect trajectories. See Table S3 for full model output for the random intercepts only model, Table S4 for the random intercepts and

random slope model, and Table S5 for the model comparison of with versus without random slopes.

Overall meta-analytic effect. The meta-analytic estimate for the fixed age slope for the models was not significant, suggesting there was not a consistent pattern of decline across the eight samples (B = 0.04, 95% CI [-0.11, 0.19], p = .596). There was significant heterogeneity across the samples (I^2 = 99.60, Q = 544.86, df = 7, p < .001). Table 2 reports the meta-analytic summary for the positive affect linear models. The linear negative affect trajectories for each sample are displayed in Figure 1.

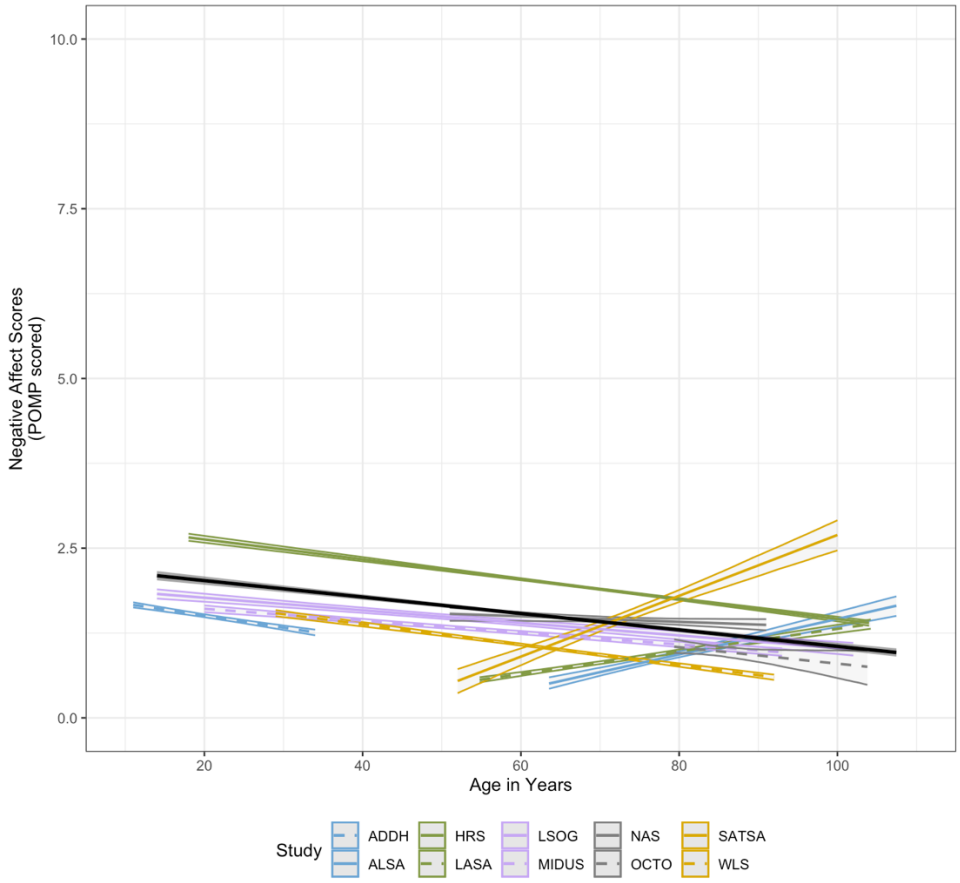

Figure 1. Linear trajectories of negative affect are shown. The bold black line depicts the meta-analytic trajectory (N-Weighted).

Between-Study Differences. When considering individual study results, we found evidence for statistically significant linear increases in negative affect in three studies, statistically significant linear decreases in negative affect in five studies, and no linear change in negative affect in two studies (see Table 3). Within each sample, the intercept represents average negative affect scores at age 65 in all samples, except for ADDH and OCTO, where the intercepts represent average negative affect scores at age 20 and 80, respectively. On a scale from 0-10, starting negative affect was lowest in ALSA (β_{0j} = 0.54) and highest in HRS (β_{0j} = 1.97). Across all studies, a one-unit change in age represented 10 years; thus, the fixed age slope represents how much negative affect changed on average negative affect as people aged 10 years. Negative affect increased in ALSA, LASA, and SATSA (β_{1j} ranged from 0.17 to 0.45; all p < .001), while negative affect decreased in ADDH, LSOG, HRS, MIDUS, and WLS (β_{1j} ranged from -0.09 to -0.19; all p < .001). Finally, negative affect did not show statistically significant mean-level change in NAS and OCTO (β_{1j} were -0.04 and -0.12, respectively, p >= .187).

Table 3: Results of Linear Negative Affect Models with 95% Confidence Intervals (CI)

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
ADDH	Intercept	1.51	1.47	1.54	<.001	0.02	84.97
	Age	-0.18	-0.22	-0.13	<.001	0.02	-7.95
ALSA	Intercept	0.54	0.42	0.67	<.001	0.06	8.65
	Age	0.26	0.19	0.34	<.001	0.04	6.98
HRS	Intercept	1.97	1.95	1.99	<.001	0.01	191.35
	Age	-0.15	-0.16	-0.13	<.001	0.01	-18.28
LASA	Intercept	0.73	0.69	0.77	<.001	0.02	38.03
	Age	0.17	0.14	0.20	<.001	0.01	11.00
LSOG	Intercept	1.35	1.29	1.42	<.001	0.03	39.90
	Age	-0.09	-0.12	-0.07	<.001	0.01	-7.31
MIDUS	Intercept	1.21	1.17	1.25	<.001	0.02	60.80
	Age	-0.09	-0.11	-0.07	<.001	0.01	-8.94
NAS	Intercept	1.48	1.40	1.55	<.001	0.04	39.69
	Age	-0.04	-0.10	0.02	.187	0.03	-1.32
OCTO	Intercept	0.92	0.78	1.06	<.001	0.07	12.53

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
	Age	-0.12	-0.32	0.08	.241	0.10	-1.18
SATSA	Intercept	1.13	0.98	1.27	<.001	0.07	15.67
	Age	0.45	0.33	0.57	<.001	0.06	7.45
WLS	Intercept	1.00	0.98	1.03	<.001	0.01	85.36
	Age	-0.15	-0.17	-0.13	<.001	0.01	-15.26

Note. All of the following models include random intercepts and random slopes for age, with the exception of MIDUS, which did not have enough variability in age trajectories to include a random slope.

Four study-level moderators were included to evaluate why findings may have differed among studies: average baseline age, country, scale, and number of measurement occasions. Higher baseline age (B = 0.01, 95% *CI* [0.00, 0.02]) and more measurement occasions (B = 0.08, 95% *CI* [0.14, 0.02]) were associated with slower decline in negative affect, while being in the United States was associated with sharper declines in negative affect (B = -0.37, 95% *CI* [-0.49, -0.26]). However, the scale used was not related to trajectories across the lifespan (B = 0.21, 95% *CI* = [-0.08, 0.50], p = .148).

Within Study Differences. The final aspect of these analyses considered individual differences in negative affect trajectories within studies. When comparing fixed slope and random slope linear models, all studies showed significant variability in random slopes (p < .001), except for OCTO. This means that there were individual differences in average negative affect and negative affect change trajectories in 9 out of 10 samples (see Table S7 for model comparison information). Moreover, higher initial negative affect was associated with more negative trajectories of negative affect in six of the studies (ADDH, ALSA, HRS, NAS, LASA, WLS). Put differently, individuals who had higher negative affect at age 65 experienced greater declines in negative affect as they aged (r ranged from -.09 to -.56). Random intercepts and slopes were not associated in LSOG, MIDUS, OCTO, and SATSA.

We evaluated sex as a person-level factor that may partially explain individual differences in negative affect trajectories. See Table S6 for full complete output for the sex moderation models. The meta-analytic summary for average sex differences suggested that women scored significantly higher on negative affect then men across samples (B = 0.36, 95% CI [0.28, 0.43], p = < .001), though there was also significant heterogeneity (I^2 = 82.49, Q = 35.29, df = 6, p = < .001). Within individual studies, women reported significantly higher negative affect than men in all samples (γ_{01} ranged from 0.25 to 0.57), with the exception of OCTO and SATSA. Finally, the meta-analytic summary also confirmed a non-significant effect of sex on linear negative affect trajectories (B= 0.01, 95% CI [-0.01, 0.03], p = .411), with no significant heterogeneity (I^2 = 0.19, Q = 5.58, df = 6, p = .472).

Quadratic Growth Model.

Next, we tested quadratic trajectories of negative affect across the lifespan. Eight studies met the inclusion criteria of at least four waves of affect reports to estimate quadratic growth models for negative affect (see Table 4). See Table S7 for the complete output for each of the quadratic growth models.

Table 4: Results of Quadratic Negative Affect Models with 95% Confidence Intervals (CI)

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
ADDH	Intercept	1.51	1.46	1.55	<.001	0.02	69.17
	Linear Age	-0.17	-0.23	-0.12	<.001	0.03	-5.82
	Quadratic Age	0.00	-0.09	0.08	.932	0.04	-0.09
ALSA	Intercept	0.65	0.46	0.84	<.001	0.10	6.62
	Linear Age	0.10	-0.14	0.34	.403	0.12	0.84
	Quadratic Age	0.05	-0.02	0.12	.161	0.04	1.40
HRS	Intercept	1.88	1.85	1.90	<.001	0.01	160.17
	Linear Age	-0.23	-0.25	-0.21	<.001	0.01	-24.27
	Quadratic Age	0.09	0.08	0.10	<.001	0.01	16.61
LASA	Intercept	0.72	0.68	0.76	<.001	0.02	37.20
	Linear Age	0.05	0.00	0.09	.041	0.02	2.05
	Quadratic Age	0.08	0.06	0.11	<.001	0.01	6.94

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
LSOG	Intercept	1.30	1.23	1.37	<.001	0.04	37.25
	Linear Age	0.01	-0.03	0.05	.641	0.02	0.47
	Quadratic Age	0.04	0.03	0.05	<.001	0.00	6.67
NAS	Intercept	1.49	1.42	1.57	<.001	0.04	39.91
	Linear Age	-0.21	-0.31	-0.12	<.001	0.05	-4.25
	Quadratic Age	0.12	0.06	0.17	<.001	0.03	4.35
OCTO	Intercept	0.92	0.78	1.06	<.001	0.07	12.53
	Linear Age	-0.10	-0.44	0.24	.570	0.17	-0.57
	Quadratic Age	0.03	-0.35	0.41	.869	0.19	0.16
SATSA	Intercept	1.12	0.98	1.25	<.001	0.07	15.99
	Linear Age	0.10	-0.10	0.29	.328	0.10	0.98
	Quadratic Age	0.21	0.12	0.30	<.001	0.05	4.40

Overall meta-analytic effect. The meta-analysis indicated a U-shaped quadratic effect (B= 0.09, 95% CI [0.05, 0.13], $p < .001$), suggesting that negative affect initially decreased as people aged before increasing later in older adulthood. There was also significant heterogeneity in estimates across the studies ($I^2 = 93.83$, $Q = 69.85$, $df = 5$, $p < .001$). See Figure 2 for visualization of the quadratic trajectories. The thick black line indicates the overall average pattern also indicated a U-shaped curve.

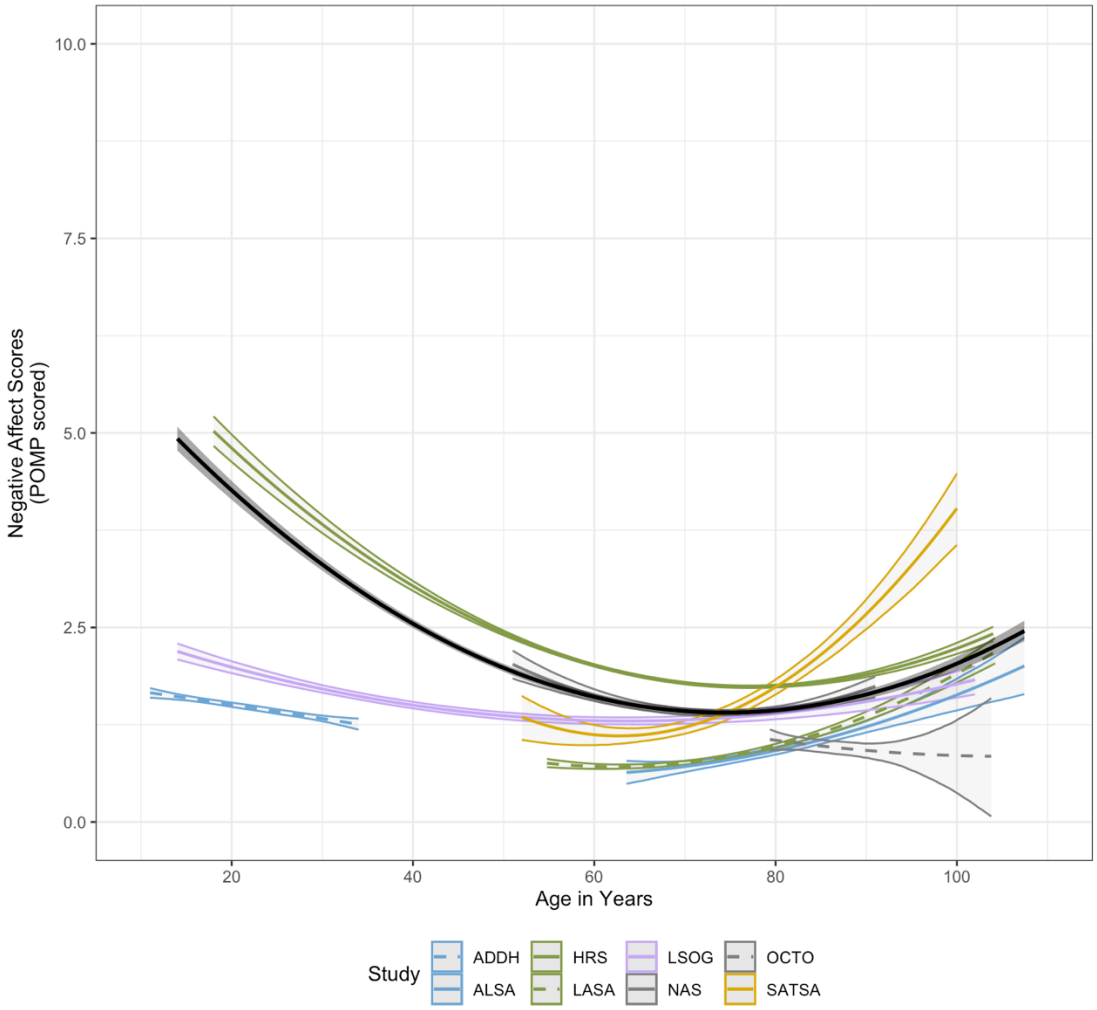

Figure 2. Quadratic Trajectories of Negative Affect. The black line is average trajectory (N-Weighted). Five studies showed evidence of a U-shaped curve, and the meta-analytic average was significant.

Between-Study Differences. Model comparisons suggested that the quadratic growth models were a better fit to the data for HRS, LASA, LSOG, NAS, and SATSA, while the linear trajectory showed better fit for ADDH, ALSA, and OCTO (See Table 5). Table 4 shows the individuals results of the quadratic models for each of the samples. Once again, four moderators were tested as potential explanation for differences in estimates across studies. Studies that had an older baseline age generally saw a steeper shift in the direction of the negative affect trajectories in older adulthood than those who had a younger baseline age (B = 0.002, 95% *CI*

[0.002, 0.003]). None of the other moderators were statistically significant predictors of between-study differences in quadratic trajectories.

Table 5: Model Comparison Results for Negative Affect Linear and Quadratic Models

Sample	Model	Parameters	AIC	BIC	Chi-Square	df	p-value
ADDH	Linear	6	86535.46	86583.26			
	Quadratic	7	86537.46	86593.23	0.01	1	.933
ALSA	Linear	6	9303.34	9339.54			
	Quadratic	7	9303.41	9345.63	1.94	1	.164
HRS	Linear	6	164222.25	164274.73			
	Quadratic	7	163949.32	164010.55	274.93	1	<.001
LASA	Linear	6	44753.21	44798.68			
	Quadratic	7	44707.19	44760.24	48.02	1	<.001
LSOG	Linear	6	39920.41	39964.14			
	Quadratic	7	39878.30	39929.32	44.11	1	<.001
NAS	Linear	6	8513.74	8550.34			
	Quadratic	7	8496.96	8539.65	18.78	1	<.001
OCTO	Linear	6	6537.12	6570.30			
	Quadratic	7	6539.09	6577.81	0.03	1	.870
SATSA	Linear	6	6915.41	6949.20			
	Quadratic	7	6898.76	6938.17	18.66	1	<.001

Note. All of the following models include random intercepts and random slopes for age, with the exception of MIDUS, which did not have enough variability in age trajectories to include a random slope.

Positive Affect

Intercept Only Model

The intraclass correlation coefficients (ICCs) from the intercept-only model for positive affect ranged across the 10 samples from .32 to .62 (see Table S8). These ICCs indicated that between 32% and 62% of the variability in positive affect occurred at the between-person level. Across studies, ALSA and ADDH had the least amount of between-person variability while HRS and NAS had the most between-person variability. The remainder of variability in positive affect is a combination of true within-person variability and variance due to measurement error. These intercept-only models suggest that some individuals generally experience more or less positive

affect on average, but that individuals also vary in their positive affect experiences over time (in some studies more than others), setting the foundation to evaluate within-person change.

Linear Growth Model

The linear growth model tested whether there were mean-level changes in positive affect across the lifespan. In primary analyses, we report results from the models that included fixed and random slopes, to allow for individual differences in affect trajectories. See Table S9 for full model output for the random intercepts only model, Table S10 for the random intercepts and random slope model, and Table S11 for the model comparison of with versus without random slopes.

Table 6: Meta-Analytic Summary of Positive Affect Models with 95% Confidence Intervals (CI)

Model	Estimate	Lower CI	Upper CI	p	SE	Z
Intercept	7.04	6.38	7.69	<.001	0.34	20.91
Linear	-0.23	-0.43	-0.03	.023	0.10	-2.27
Quadratic	-0.12	-0.16	-0.08	<.001	0.02	-5.51
Sex-Intercept	0.00	-0.02	0.03	.872	0.01	0.16
Sex-Slope	-0.15	-0.35	0.04	.123	0.10	-1.54

Note. The estimate represents the meta-analytic estimate across studies for that specific effect (e.g., Linear comes from linear model, quadratic comes from quadratic model).

Overall meta-analytic effect. The meta-analytic estimate for the fixed age slope in these models was not statistically significant at an alpha of .01 ($B = -0.23$, 95% *CI* $[-0.43, -0.03]$, $p = .023$). However, there was significant heterogeneity in this effect across studies ($I^2 = 99.61$, $Q = 751.78$, $df = 7$, $p < .001$). Table 6 reports the meta-analytic summary for the positive affect linear models. The meta-analytic linear trajectory and the linear trajectories for each sample are displayed in Figure 3.

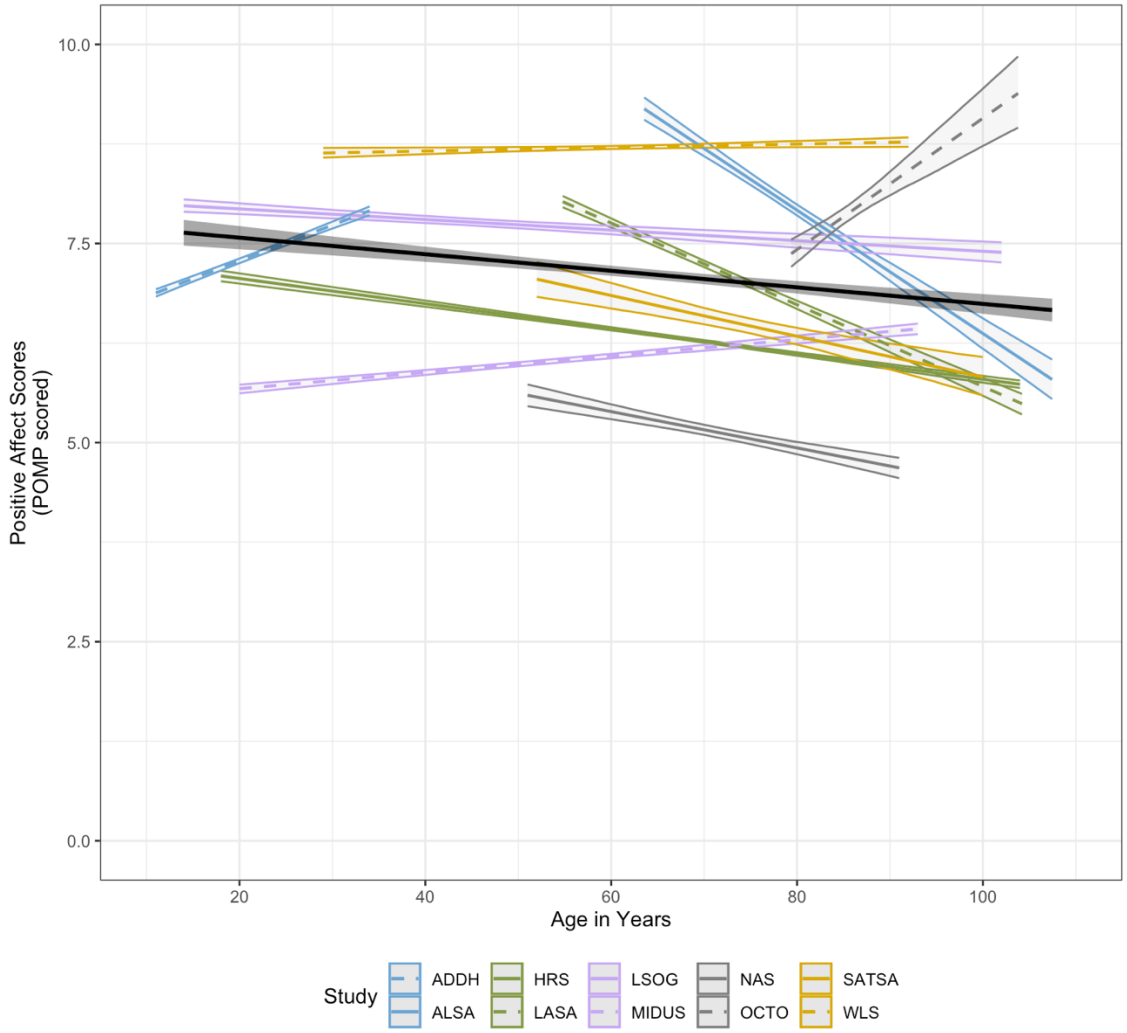

Figure 3. Linear Trajectories of Positive Affect. The black line is average trajectory (N-Weighted).

Between-Study Differences. When considering individual study results, we found evidence for statistically significant linear declines in positive affect in five studies, statistically significant linear increases in positive affect in three studies, and no linear change in positive affect in one study (see Table 7). Within each sample, the intercept represents average positive affect scores at age 65 in all samples, except for ADDH and OCTO, where the intercepts represent average positive affect scores at age 20 and 80, respectively. On a scale from 0-10, average positive affect at age 65 was lowest in NAS (β_{0j} = 5.28) and HRS (β_{0j} = 6.35), and it

was highest in WLS (β_{0j} = 8.72) and ALSA (β_{0j} = 9.08). Across all studies, a one-unit change in age represented one decade; thus, the fixed age slope represents how much positive affect changed on average as people aged 10 years. Positive affect increased in ADDH, MIDUS, and OCTO (β_{1j} ranged from 0.10 to 0.82; all $p < .001$), while positive affect decreased in ALSA, HRS, LASA, LSOG, NAS, and SATSA (β_{1j} ranged from -0.07 to -0.77; all $p < .001$). Finally, positive affect did not show statistically significant mean-level change in WLS (β_{1j} = 0.02, p = .100).

Table 7: Results of Linear Positive Affect Models with 95% Confidence Intervals (CI)

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
ADDH	Intercept	7.28	7.24	7.33	<.001	0.02	317.42
	Age	0.45	0.39	0.50	<.001	0.03	16.13
ALSA	Intercept	9.08	8.88	9.28	<.001	0.10	88.31
	Age	-0.77	-0.90	-0.65	<.001	0.06	-12.10
HRS	Intercept	6.35	6.32	6.37	<.001	0.01	489.39
	Age	-0.16	-0.18	-0.14	<.001	0.01	-15.88
LASA	Intercept	7.50	7.43	7.57	<.001	0.04	210.69
	Age	-0.51	-0.57	-0.46	<.001	0.03	-18.81
LSOG	Intercept	7.64	7.54	7.73	<.001	0.05	160.80
	Age	-0.07	-0.10	-0.03	<.001	0.02	-4.04
MIDUS	Intercept	6.14	6.09	6.19	<.001	0.03	249.95
	Age	0.10	0.08	0.12	<.001	0.01	8.87
NAS	Intercept	5.28	5.16	5.39	<.001	0.06	91.73
	Age	-0.23	-0.32	-0.14	<.001	0.05	-5.01
OCTO	Intercept	8.25	8.02	8.48	<.001	0.12	70.03
	Age	0.82	0.47	1.18	<.001	0.18	4.50
SATSA	Intercept	6.72	6.53	6.91	<.001	0.10	69.36
	Age	-0.26	-0.40	-0.12	<.001	0.07	-3.61
WLS	Intercept	8.72	8.69	8.75	<.001	0.02	560.29
	Age	0.02	0.00	0.05	.100	0.01	1.64

Note. All of the following models include random intercepts and random slopes for age, with the exception of MIDUS, which did not have enough variability in age trajectories to include a random slope.

Four study-level moderators were included to evaluate why findings may have differed among studies: average baseline age, country, scale, and number of measurement occasions. Studies with higher baseline age (B = -0.02, 95% CI = [-0.03, -0.01]) and more measurement occasions (B = -0.11, 95% CI = [-0.18, -0.04]), were associated with more negative trajectories of positive affect, while U.S. samples were associated with less negative trajectories (B = 0.45, 95% CI = [0.20, 0.71]). The scale used to assess affect did not moderate the linear trajectory of positive affect (B = -0.22, 95% CI = [-0.63, 0.19], p = .290).

Within Study Differences. The final aspect of these analyses considered individual differences in positive affect trajectories *within* studies. When comparing fixed slope and random slope linear models, all studies showed significant variability in random slopes, except for MIDUS and SATSA. This means that there were individual differences in average positive affect and positive affect change trajectories in 8 out of 10 samples (see Table S7 for model comparison information). Moreover, higher initial positive affect was associated with more negative trajectories of positive affect for three of the studies (ADDH, ALSA, HRS). Put differently, individuals who had higher positive affect at age 65 experienced greater declines in positive affect as they aged (r ranged from -.08 to -.52). In LSOG, OCTO, and WLS, this pattern was reversed, such that higher positive affect at age 65 was associated with more positive trajectories of positive affect (r ranged from .26 to .60). Finally, random intercepts and slopes were not associated in MIDUS, LASA, NAS, nor SATSA.

We evaluated sex as a person-level factor that may partially explain individual differences in positive affect trajectories. See Table S13 for full complete output for the sex moderation models. The meta-analytic summary for average sex differences was non-significant, suggesting that on average there were no sex differences in positive affect levels (B = -0.15, 95% CI[-0.35, 0.04], p = .123), though there was significant heterogeneity (I^2 = 95.45, Q = 13.67, df = 6, p = <

.001). Within individual studies, women reported lower positive affect than men in ADDH, ALSA, and LASA (γ_{01} ranged from -.49 to -.70), and men reported lower positive affect than women in HRS (γ_{01} = .06). Finally, the meta-analytic effect of sex on linear change in positive affect was also non-significant (*B* = 0.00, 95% *CI*[-0.02, 0.03), with no significant between-study heterogeneity (I^2 = 0.55, *Q* = 13.67, *df* = 6, *p* = .034).

Quadratic Growth Model.

Next, we tested quadratic trajectories of positive affect across the lifespan. Eight studies met the inclusion criteria of at least four waves of affect reports to estimate quadratic growth models for positive affect (see Table 8). See Table S13 for the complete output for each of the quadratic growth models.

Table 8: Results of Quadratic Positive Affect Models with 95% Confidence Intervals (CI)

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
ADDH	Intercept	7.46	7.40	7.51	<.001	0.03	265.50
	Linear Age	0.73	0.65	0.80	<.001	0.04	19.19
	Quadratic Age	-0.62	-0.73	-0.51	<.001	0.06	-10.87
ALSA	Intercept	8.89	8.56	9.22	<.001	0.17	52.66
	Linear Age	-0.49	-0.91	-0.07	.024	0.22	-2.27
	Quadratic Age	-0.09	-0.22	0.04	.162	0.07	-1.40
HRS	Intercept	6.50	6.47	6.53	<.001	0.01	432.39
	Linear Age	-0.05	-0.07	-0.03	<.001	0.01	-4.63
	Quadratic Age	-0.14	-0.15	-0.12	<.001	0.01	-19.94
LASA	Intercept	7.53	7.46	7.60	<.001	0.04	210.38
	Linear Age	-0.31	-0.40	-0.23	<.001	0.04	-7.37
	Quadratic Age	-0.14	-0.18	-0.09	<.001	0.02	-6.14
LSOG	Intercept	7.69	7.60	7.78	<.001	0.05	161.44
	Linear Age	-0.23	-0.28	-0.18	<.001	0.03	-8.47
	Quadratic Age	-0.05	-0.07	-0.04	<.001	0.01	-7.49
NAS	Intercept	5.26	5.14	5.37	<.001	0.06	90.13
	Linear Age	0.02	-0.12	0.16	.817	0.07	0.23
	Quadratic Age	-0.17	-0.25	-0.10	<.001	0.04	-4.37
OCTO	Intercept	8.21	7.98	8.44	<.001	0.12	69.82
	Linear Age	-0.06	-0.68	0.55	.838	0.31	-0.20

Sample	Coefficient	Estimate	Lower CI	Upper CI	p	SE	t
SATSA	Quadratic Age	-1.20	-1.87	-0.53	<.001	0.34	-3.52
	Intercept	6.72	6.53	6.90	<.001	0.10	70.17
	Linear Age	0.06	-0.20	0.31	.676	0.13	0.42
	Quadratic Age	-0.16	-0.28	-0.05	.006	0.06	-2.78

Overall meta-analytic effect. The meta-analysis indicated an inverted, U-shaped quadratic effect (B = -0.12, 95% CI = [-0.16, -0.08], p < < .001), suggesting that positive affect initially increased as people aged before decreasing later on in older adulthood. There was also significant heterogeneity in estimates across the studies (I^2 = 90.39, Q = 80.86, df = 5, p = < .001). See Figure 4 for visualization of the quadratic trajectories. The thick black line indicates the overall average pattern also indicated an inverted-U shaped curve.

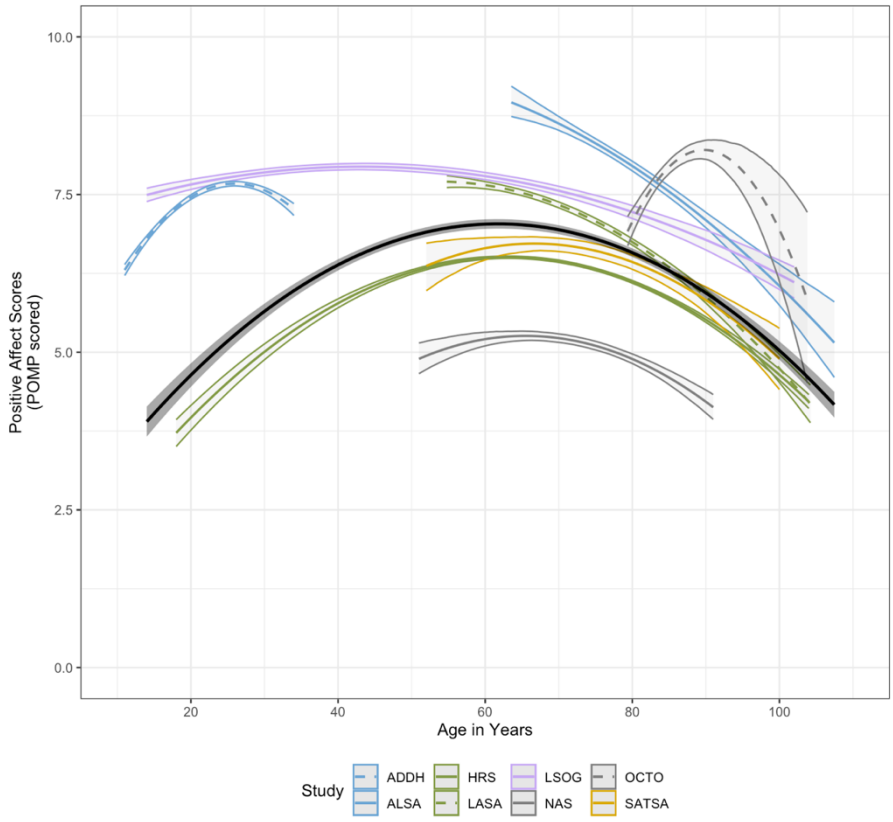

Figure 4. Quadratic Trajectories of Positive Affect. The black line is average trajectory (N-Weighted). All seven studies showed evidence of a U-shaped curve.

Between-Study Differences. Model comparisons suggested that the quadratic growth models were a better fit to the data for ADDH, HRS, LASA, LSOG, NAS, OCTO, and SATSA, while the linear trajectory showed better fit for ALSA (See Table 9). Table 8 shows the individuals results of the quadratic models for each of the samples. Once again, we tested four moderators as potential explanations for differences in quadratic effects across studies. Studies that had an older baseline age generally saw a steeper shift in the direction of the positive affect trajectories in older adulthood than those who had a younger baseline age (B = -0.004, 95% CI = [-0.004, -0.003]). None of the other moderators were statistically significant predictors of between-study differences in quadratic trajectories.

Table 9: Model Comparison Results for Positive Affect Linear and Quadratic Models

Sample	Model	Parameters	AIC	BIC	Chi-Square	df	p-value
ADDH	Linear	6	97090.90	97138.70			
	Quadratic	7	96977.68	97033.45	115.22	1	<.001
ALSA	Linear	6	12893.22	12929.41			
	Quadratic	7	12893.32	12935.54	1.9	1	0.168
HRS	Linear	6	185611.09	185663.57			
	Quadratic	7	185217.51	185278.74	395.58	1	<.001
LASA	Linear	6	63493.91	63539.38			
	Quadratic	7	63458.34	63511.39	37.57	1	<.001
LSOG	Linear	6	45726.64	45770.35			
	Quadratic	7	45673.22	45724.21	55.42	1	<.001
NAS	Linear	6	11173.15	11209.72			
	Quadratic	7	11156.54	11199.21	18.61	1	<.001
OCTO	Linear	6	8254.67	8287.84			
	Quadratic	7	8244.53	8283.23	12.13	1	<.001
SATSA	Linear	6	8466.67	8500.44			
	Quadratic	7	8461.00	8500.40	7.66	1	0.006

Note. All of the following models include random intercepts and random slopes for age, with the exception of MIDUS, which did not have enough variability in age trajectories to include a random slope.

Results Summary

Figure 5 plots the average negative and positive affect lifespan trajectories. In both cases, negative and positive affect show a quadratic relationship with age. For negative affect, the inflection point (i.e., nadir) occurs in the late 70s, where the relationship with age shifts from being negative to positive. For positive affect, the inflection point (i.e., apex) occurs around 60 years old, where the relationship with age shifts from being positive to negative.

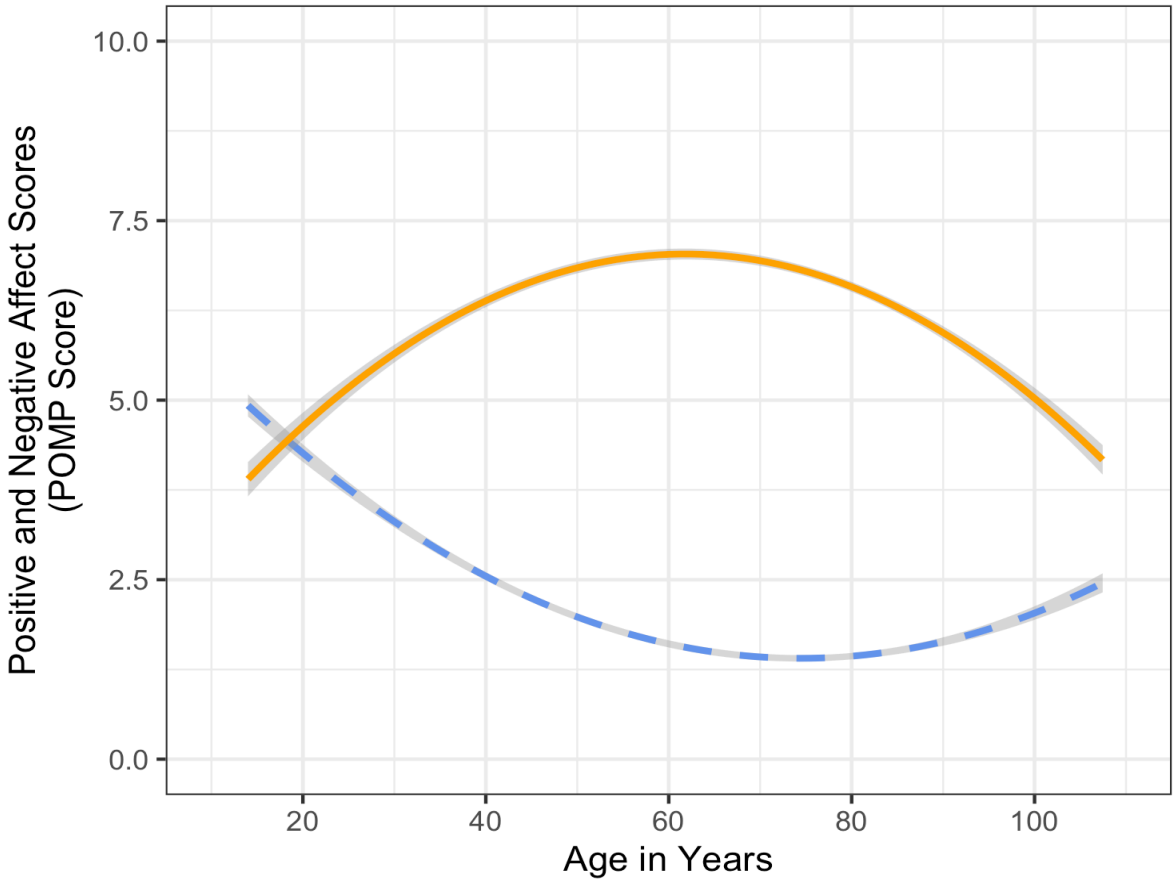

Figure 5. Quadratic Trajectories of Positive (Solid Line) and Negative Affect (Dashed Line).

Discussion

Discussion: 1,134 words

This work evaluated trajectories of negative and positive affect across the lifespan using 10 longitudinal studies with a combined sample size of ~50,000 participants. These results were

relatively consistent with past work on negative affect. On average, negative affect decreased until the late 70s, before increasing in late older adulthood. We also clarified mixed findings in the literature concerning positive affect. Specifically, positive affect increased across most of the lifespan peaking around 60, before decreasing throughout older adulthood. Notably, these age-related trajectories of negative and positive affect were not a perfect inverse of each other as the nadir of negative affect was more than a decade prior to the peak of positive affect.

We can interpret these findings within the context of several theoretical frameworks. For example, SST suggests that older adults experience less negative affect due to their choices to focus on more short-term, pro-hedonic goals (Carstensen 1993, 2006, 2021; Carstensen et al., 1999), while SAVI and DIT note that, through the accrual of life experiences, older adults are better able to attend to positive stimuli (Charles, 2010; Labouvie-Vief, 2003). The negative affect trajectories observed in the current study were more consistent with these theories of adult development and aging than the positive affect trajectories. These differences in trajectories between negative and positive affect could suggest crucial emotion regulation process differences that arise in older adulthood. Though this research suggests older adults may not be as able to up-regulate positive emotions relative to middle-aged adults, older adults still appear to be able to down-regulate their negative emotions for much of older adulthood. While research has emphasized that older adults attend to positive stimuli more than younger adults (Carstensen & Mikels, 2005; Reed & Carstensen, 2012), these findings reorient this perspective by purporting that the down-regulation or avoidance of negative emotions may be central to older adults' emotion regulatory strengths.

Other developmental theories note that, as individuals age, they experience more losses than gains, and thus must be more selective in the choices they make to compensate for these respective losses (Baltes, 1997; Baltes & Baltes, 1990). These differences in lifespan

developmental affect trajectories could be tied to the selection process older adults make amid broader aging-related declines. Older age is often associated with limitations in daily physical functioning and is sometimes associated with reliance on care partners (Marks, 1996; Vaughan et al., 2016). This loss of independence may impact the selection process of how older adults regulate their emotion. For example, there may be fewer opportunities for individuals to select into desirable situations to increase positive emotions. However, given the knowledge and experience accrued throughout the lifespan (Charles, 2010), they may still be better able to effectively reappraise life stressors to keep negative emotions at bay. Notably, these processes may not be tied solely to the experience of aging, but also the experience of feeling one's future time become more limited (e.g., Schilling et al., 2018; Gerstorf et al., 2008). This perspective could also contextualize the variability in change trajectories across samples.

The only consistent study-level moderator across both linear and quadratic approaches was average age, with the quadratic effects found for both types of affect showing steeper changes later in the lifespan amongst older samples. These findings reiterate the significance of a lifespan developmental perspective for emotion processes. With previous work emphasizing the importance of disentangling potential age-period-cohort (APC) effects (Charles et al., 2023), it is worth noting that some of these age findings could be confounded with time or cohort effects, though the current study did not meet the appropriate conditions to test potential APC effects given the lack of coverage across different ages by time periods and cohorts. Finally, contrary to previous cross-sectional work (e.g., Mrcozek & Kolarz, 1998), the current study found that there were no sex differences in how negative or positive affect changed across age.

There are of the current work that can serve as valuable next steps in the investigation of affect across the lifespan. First, while the current study benefitted from using longitudinal methodology, participants reported their emotional experiences at each measurement occasion

through retrospective questionnaires that asked about their affective experiences over the past 1-2 weeks. These types of affect questionnaires are subject to biases and may rely on different sources of information relative to in-the-moment reports of affective experiences (Robinson, 2002a; Robinson, 2002b). In-the-moment affective experiences are central to many conceptualizations of affective trajectories across the lifespan. The use of measurement burst designs to track individuals' emotions at a momentary level over many years would be able to better chart actual momentary experiences of emotions as they pertain to past theoretical mechanistic work on age-related differences in affect. Second, the current study was generally underpowered to test meta-analytic moderators (Hedges & Pigott, 2004; Hempel et al., 2013); thus, we must interpret differences among samples with more caution given the current work was underpowered at the study level (k=10). That said, the consistency of certain findings across these samples (e.g., quadratic changes of positive affect) help solidify what lifespan developmental changes in negative and positive affect likely look like as individuals age. However, while the current findings were generally consistent across these samples, these findings may not be generalizable to non-Western cultures or less educated, wealthy samples.

Finally, the current study focused on two components of well-being: negative and positive affect. Though findings were similar across measures, one limitation is that seven studies used the CES-D (Radloff,1977), while only three studies used other affect measures. Future work should continue exploring differences in affect trajectories based on assessment type. Moreover, well-being is a broad construct that includes cognitive evaluations, like life satisfaction and sense of purpose, and social experiences, such as social connectedness and loneliness (Willroth, 2022). Though there have been some theoretical and empirical endeavors into understanding how other elements of psychosocial well-being may change with age (Baird et al., 2010; Galambos et al., 2015; Mann, DeYoung, & Krueger, 2021; Pfund & Lewis, 2020), a more comprehensive

evaluation of aging-related changes across well-being components is warranted. One valuable pathway to build from the current work would be to evaluate how these age trajectories vary based on other aspects of well-being, and whether these changes co-occur within individuals.

The present research used a coordinated data analysis spanning the adolescent and adult lifespan to evaluate the generalizability of lifespan trajectories of negative and positive affect across diverse methods and samples. Our study provides strong evidence across 10 longitudinal studies to clarify the mixed findings of previous research, finding that positive affect reaches its peak in early older adulthood while negative affect reaches its nadir about a decade later. These findings suggest that older adults may experience the affective benefit of lower negative emotion for longer, on average, than the affective benefit of higher positive emotion.

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