

Positivity: The Dispositional Basis of Happiness

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Abstract The present study examined in a stringent developmental model whether positivity, conceptualized as a pervasive mode of appraising, viewing, and perceiving life from a positive stance, predicts chronic positive affectivity across time or vice versa. Participants [263 participants (47 % males)], aged 15.5 at the beginning of the study and 23.5 at the end, reported on measures of positivity and dispositional positive affect four times. Longitudinal findings corroborated the posited paths of relations, with positivity significantly predicting positive affectivity across time rather than vice versa.

Keywords Positivity · Positive affect · Longitudinal models · Happiness · Well-being

1 Introduction

Current views of happiness highlight states of well-being in which the individual realizes his or her own potential and is able to engage in rewarding relationships with others, value life and experience, turn challenges into opportunities for growth, work productively, and actively promote his or her own health (Ryan and Deci 2001; World Health Organization 2004). Indeed, even severe conditions of illness can be better addressed by acknowledging the individuals' characteristics that predispose them to adaptive functioning and enable them to cope with adversities by capitalizing upon their own strengths (Scheier and Carver 2001).

Among the individual characteristics that have been previously associated with a variety of positive outcomes, self-esteem (Baumeister et al. 2003), optimism (Carver et al. 2010), and life satisfaction (Pavot and Diener 2008) have been recently traced to a common

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disposition named positivity (POS) (Caprara et al. 2009). Similarly, chronic positive affect has been previously associated with subjective well-being and individual differences in chronic positive affectivity has been viewed as an enduring disposition associated with a variety of positive outcomes and wellbeing (Lyubomirsky et al. 2005; Pressman and Cohen 2005). The extent to which POS and chronic positive affectivity relate to each other is unknown and is the target of the present article.

1.1 Positivity

A large set of studies corroborates the idea that POS represents a common latent factor underlying self-esteem, life satisfaction, and dispositional optimism in diverse samples and cultures (Caprara et al. 2012a, b). Twin studies show that heritability accounts for about the 50 % of the variance of this latent dimension, whereas unshared environment accounts for the remaining (Fagnani et al. 2014). Further studies have provided evidence of the stability of POS over the course of development and to its potential positive effect on people's lives across diverse domains of functioning including health, work performance, psychological well-being, and social adjustment (Alessandri et al. 2012a, b; Fagnani et al. 2014). Of interest, little residual variance was explained in the above outcomes by self-esteem, life satisfaction, and optimism once their common component was taken into account (Alessandri et al. 2012b, c, 2015).

Summarizing, these results support the argument that POS is a stable evaluative disposition, which is primarily cognitive in nature. Self-esteem, life satisfaction, and optimism represent its major phenomenological expressions. The basic tenet of the developing theory regarding POS is that viewing oneself, life, and the future from a positive outlook reflects a basic trait that has an important biological function of making people prone to cope with life despite adversities, failures, and loss (Caprara et al. 2009). Such an approach to life is believed to be necessary for sustaining people's growth, flourishing, and their willingness to continue to care about living, despite the decline of aging and the idea of death (Caprara et al. 2010a, b).

1.2 Theory Regarding POS

The reasoning underlying POS is built upon the earlier intuitions of Beck (1967), who posited that a negative view of oneself, the world, and the future at the core of social cognitive processing of depressed versus non-depressed persons. In particular, Caprara et al. (2009, 2010a, b) posited the existence of an analogous positive cognitive triad that leads people to hold a positive view of themselves, their life, and the future, and is reflected in observed levels of self-esteem, life satisfaction, and optimism (see Alessandri et al. 2012a).

The idea of a general propensity to evaluate life from a positive outlook is not new. Likewise, the name given to that dimension (i.e., POS) is not completely new. Indeed, many authors have pointed to individual differences that, to varying degrees, can be traced to a general tendency to approach one's experience with a positive outlook. Scheier and Carver (1993) suggested that positive thinking is at the core of individuals' confidence in their future. Kozma et al. (2000) described POS as a general dispositional determinant of subjective well being (SWB), which operates much like a trait, and may account for individual variation and stability in happiness despite environmental change. Diener et al. (2000) referred to POS as a propensity to evaluate aspects of life in general as good. In the view of Diener et al. (2000) view, global satisfaction was more than just the sum of specific

domains satisfaction (like recreation, education and oneself) but rather the expression of a trait that colors the way people perceive the world. Finally, the label of POS has been used to refer to cluster of positive emotions that color “peoples’ day to day lives” (Frederickson 2009, p. 39) and to the latent construct of behavioral and evaluative tendencies, including sense of mastery, self-esteem, life satisfaction, and coping (see Neppel et al. 2015).

Caprara and his colleagues’ theorizing about POS shares with previous perspectives the idea of the existence of a pervasive human tendency to construe the subjective individual experiences from a positive outlook. This tendency is believed to be based on the functioning of self-referent evaluative processes, which operate when individuals assess themselves as living beings, by reflecting on their past life conditions, by making reference to their present, their past, and what they expect from the future. The primacy assigned to self-referential thoughts, and to the proclivity to positively interpret external stimuli regarding the self, is what, in our opinion, distinguishes POS, from the above perspectives, and from other constructs like core self-evaluations (CSE) that share some of its components (Judge and Bono 2001).

The association of POS with self-referential information processing has recently been confirmed by a electroencephalographic study reporting an association between POS and electric activity in two areas brain areas (i.e., BA23 and BA31), member of the posterior cingulate (Alessandri et al. 2015). These areas are part of a complex default-mode neural network (DMN). The activity in the DMN appears to play a predominant role in identifying self-relevant stimuli by integrating cognitive and emotional processing, and in introspective self-referential processing, such as the appraisal and evaluation of the self-relevant stimuli (Gallagher and Frith 2003; Gusnard et al. 2001).

Moreover, POS has accounted for a significant portion of variance in studies examining people’s tendencies to overestimate their performance and attributes. In particular, POS correlated with individuals’ tendency to perceive their academic performance better than the average independently of their previous objective academic achievements (Caprara et al. 2012a, b). Thus, there is reason to believe that POS may account (at least in part) for many phenomena that have been previously regarded as positive illusions, self-serving comparisons and distortions, egocentric bias, and self-enhancement manoeuvres (Cummins and Nistico 2002; Taylor and Brown 1988).

However, there is reason to doubt that these phenomena always reflect flawed judgments. Indeed, they may also represent assets that help to make life worth living, despite the limitations of the human condition. Self-serving evaluations and comparisons, in particular, may have beneficial effects because they increase positive affect that, in turn, fosters affect regulation and appears to affect health and wellbeing (Lyubomirsky et al. 2005; Taylor et al. 2003). Positive affect helps to preserve a state of optimal vigilance toward threats, compensate for the effects of negative affect, and help to cope effectively with uncertainties and setbacks (Roese and Olson 2007).

Yet, to our knowledge, researchers have not systematically investigated whether the habitual level of individuals’ positive affect is partly dependent on the functioning of a more general cognitive predisposition to approach reality. The idea is that POS might be part of humans’ biological equipment that predisposes them to benefit from positive events. In this regard, Cacioppo and Berntson (1999) described a ‘POS offset’ as a general tendency of humans to be positively predisposed towards neutral stimuli. This tendency may counter balance the natural reactivity of humans to negative stimuli (Baumeister et al. 2001). In brief, POS represents the cognitive evaluative structure at the core of self-esteem, life satisfaction, and optimism, as the expression of a more general tendency to positively evaluate external reality. Moreover, we predicted that POS, in general, provides the

motivational force to construe experience in a way that fosters positive affectivity. More specifically, individual differences in POS were hypothesized to predict dispositional differences in positive affectivity.

1.3 Positive Affect

The frequency of positive affect (PA), namely feelings and emotions that reflect a pleasurable engagement with the environment such as joy, excitement, contentment, interest and enthusiasm (Watson et al. 1988), has been viewed as a key indicator of well-being. PA has been associated with many positive healthy outcomes through its apparent effects on social relationships (Neyer and Asendorpf 2001), cognition (Bolte et al. 2003; Fredrickson and Branigan 2005; Rowe et al. 2007; Isen et al. 1987), coping (McCrae and Costa 1986), resiliency (Fredrickson et al. 2003). This is not surprising given the well known association of PA with various physiological functions (e.g., cardiovascular, endocrine, and immune systems) (see Pressman and Cohen 2005). Despite the correlational nature of most findings, chronic PA has been assigned a primary causal role in promoting the sense of personal satisfaction and achievement that one can call happiness (Fredrickson and Joiner 2002), in fostering individuals' success in various contexts (Lyubomirsky et al. 2005; Mastekaasa 1994), and in sustaining health (Mroczek and Spiro 2005).

Developmentally, PA appears to be an element of early temperament (Rothbart and Bates 2006). However, viewing children (after infancy) and adults as agents potentially endowed with the properties of self-awareness, self-reflection, and self-regulation (Bandura 1997) leads one to connect emotions, including PA, with cognitions, and in particular with the set of self-referent evaluations captured by POS. Because feelings and emotions largely derive from the meanings people assign to the events, it is unlikely that the frequency of positive feelings and emotions reflects only their actual experience and an individual's life conditions.

1.4 Positivity and Positive Affect

Whereas individual differences in PA reflect individuals' sensitivity and responsivity to environmental demands that is mostly temperamental, individual differences in POS reflect a pervasive evaluative disposition that mostly rests upon individuals' levels of self-awareness and self-reflection. Although positive feelings open people's hearts to experience and supply the vital energy that is needed to grow and flourish (Fredrickson 2009), people's views of themselves and life might be more important in dictating the direction of their endeavors and consequently the benefits they can draw from pleasant feelings. It is likely that in earlier stages of life, positive feelings mostly reflect individuals' natural sensitivity and responsivity to pleasure. However, once people are aware of themselves and reflect upon their experience, what they think of themselves, of their life, and of their future would be expected to increasingly dictate the extent to which their attainments accord with their goals and ultimately the satisfaction and pleasure they enjoy.

1.5 The Present Study

The present prospective study was designed to examine the relations between POS and positive affect over time from middle adolescence to early adulthood. In accordance with the theoretical arguments exposed above, we expected that, over time, POS would

significantly predict PA rather than vice versa when controlling for the stability of the two constructs and for their prior associations. In all analyses, we controlled for two potentially relevant confounds, gender and socio-economical status. Previous studies investigating gender differences in POS have found inconsistent results because both a slightly higher score on POS for men than women (Caprara et al. 2003) and no sex difference (Alessandri et al. 2012b; Caprara et al. 2012b) have been reported. However, in a meta-analysis, Else-Quest et al. (2006) found gender differences in absolute levels of PA. Finally, weak associations between SES and several indicators of well-being and well being have been found (see Argyle 1999, for a review).

2 Methods

2.1 Participants

Two hundred and sixty-three adolescents (47 % males) took part at this study. Participants attended the 10th grade at Time 1 (T1, mean age 15.5; $SD = .50$) and most of them attended the 12th grade at Time 2 (T2, mean age 17.5; $SD = .55$). At Time 3 (T3, mean age 19.5; $SD = .51$), the majority (52.2 %) were college students. At Time 4 (T4, 23.5; $SD = .50$), about half (46.6 %) were college students. Of the remaining participants (at T4), 70 % had stable work, 9 % worked occasionally, 13 % were unemployed, and 7 % were searching for a job. At T4, 94 % of participants were unmarried and only 1 participant was divorced.

At T1, all participants were drawn from two schools located in Genzano, a residential community near Rome, and they were from families involved in an ongoing longitudinal study in that community. The families of this community represent a socioeconomic microcosm of the larger Italian society (ISTAT 2002): at T1, 14 % of the parents of the children were in professional or managerial ranks, 25 % were merchants or operators of other businesses, 31 % were skilled workers, 29 % were unskilled workers, and 1 % were retired.

The participation rate was fairly high during the present longitudinal data collection; the 92.2, 92.1, and the 71.8 % of the sample returned the questionnaire from T1 to T2, from T2 to T3, and from T3 to T4 respectively. Attrition was mainly due to relocation from the area, absence from school at the time of assessment, or to the impossibility of contacting the participants (especially at T3 and T4).

Analyses of variance suggested that the participants included at T4 did not significantly differ from the participants who were not available at T4 on any of the variables in the initial assessment; nor did the groups differ in the covariance matrices as tested by the *Box-M* test for homogeneity of covariance matrices. Furthermore, we examined the tenability of the assumption that data were “missing at random” (MAR) (i.e., missingness is related to the observed values for the variables in the data set, but unrelated to unobserved missing values) using the MCAR test (Little and Rubin 2002) in SPSS 14. This test resulted in a nonsignificant value (i.e., $\chi^2 = 25.67$, $df = 37$, $p = .92$), indicating the tenability of MAR assumption.

2.2 Procedures

At T1 and T2, two female researchers collected the questionnaires with measures of interest for this study (as well as other measures) during specially scheduled sessions at school. Parents' and youths' consents, as well as approvals from school councils, were

obtained. Experimenters informed participants that their responses would be confidential and offered clarification regarding the variables measured. Participants were asked to complete the scales independently of others. At T3 and T4, when the majority of participants were in college, they were contacted by phone and invited to participate in the study, for which they received a small payment. Participants received all measures by mail and returned them after completion.

2.2.1 Positive Orientation (POS)

For the aim of this study, items to measure POS were extracted from four existing instruments. Specifically, (1) two items (i.e., “I feel I do not have much to be proud of,” “At times I think I am no good at all”) were drawn from the Rosenberg self-esteem scale (Rosenberg 1965); (2) three items (i.e., “Overall, I expect more good things to happen to me than bad,” “I’m always optimistic about my future,” and “I hardly ever expect things to go my way”) were drawn from the Life Orientation Test (Scheier et al. 1994); (3) an item (i.e., “I am satisfied with my life”) was drawn from the Satisfaction with Life Scale (Diener et al. 1985); and one item (i.e., “I feel that people dislike me”) was drawn from the CESD-D scale (Radloff 1977). Despite slight differences in wording, these items are fully overlapped in form and content with those from the recently introduced P-Scale (see Caprara et al. 2012a, b). All items were standardized and then averaged before analyses. At T4 only, all individuals were administered the full P-Scale; the correlation between the summative score on the P-Scale and on the measure used in this study was .95. Cronbach’s alphas at T1, T2, T3, and T4 were .74, .75, .79, and .80.

2.2.2 Positive Affect

Participants’ positive affectivity was assessed using ten items from the PANAS (Watson et al. 1988). The “positive affect” section of the PANAS includes terms such as “active,” “cheerful,” “enthusiastic,” and “happy.” Individuals reported the frequency that they generally experienced each term (1 = never/almost never to 5 = always/almost always; alphas at T1, T2, T3, and T4 = .76, .82, .78, and .83).

2.2.3 Socioeconomic Status (SES)

Familial SES was based on the occupation and education of both mothers and fathers (Sirin 2005). To derive a SES index, we performed a confirmatory factor model, using the WLSMV as the method of estimation (see Muthén and Muthén 2006, for details), where SES was defined as a latent factor loaded by parents’ education and occupation. After establishing the unidimensionality of this set of indicators (54 % of variance was explained by the first factor alone), we estimated the factor score of SES by using a regression method.

2.2.4 Preliminary Analysis

In order to investigate the dimensionality of the measure items and to avoid any overlapping among the two measures, a principal factor analysis with Promax rotation was performed at each assessment times. According to the scree-plots, the four analyses yielded a two-factor structure corresponding to the hypothesized two constructs of POS and

positive affect at each assessment time. The actual item loadings on the intended factors ranged from .34 to .92 ($M = .50$; $SD = .18$) across the four assessment times, whereas the secondary loading varied from .101 to .185 ($M = .11$; $SD = .06$) across the two assessment times. Factor correlations ranged from .33 to .45 across the two assessments. These analyses supported (1) the factorial validity of the two measures, (2) to the empirical separateness of POS and PA, and (3) the lack of empirical overlapping among items measuring POS and PA, as indicated by the low secondary loadings.

2.3 Data Analytic Strategy

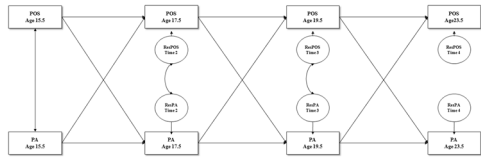
To investigate our research question, we employed an integrative autoregressive-latent-trajectory (ALT) model. The ALT model has been recently introduced by Bollen and Curran (2004, 2006) as a way to combine two otherwise exclusive statistical models: autoregressive cross-lagged models (Cole and Maxwell 2003) and latent growth models (LGMs) (Meredith and Tisak 1990). Both models have advantages and disadvantages because each approach considers the analysis of repeated measures from a different perspective. Autoregressive cross-lagged models (AR) (Fig. 1, Model 1) use cross-lagged regression paths to unravel the likely direction of influence among processes occurring at the same time (Cole and Maxwell 2003). Autoregressive paths link the same variable assessed at each successive time point. Latent growth models (Fig. 1, Model 2) have been introduced as an extension of structural equation models to explain intra-individual changes observed at the mean level. As such, LGMs include an intercept (i.e., the initial level) and a slope (i.e., the change over time). The comprehensive ALT model (Fig. 1, Model 3) combines the advantages of AR and LGM (Bollen and Curran 2006) and allows one to simultaneously examine overall trajectories of the constructs and their inter-relationship. Whereas the interpretation of the LGM is straightforward, as noticed by Morin et al. (2011), “the AR structures take another meaning in ALTs, being based on the state-like residuals of the LGM part, and thus do not directly reflect inter-individual rank order stability” (p. 9). Instead, the AR structure (i.e., cross lagged and autoregressive longitudinal paths) should be interpreted as “reflecting the impact of individual state-like deviations from the overall trajectories on the remaining time points” (p. 9).

Usually the ALT model is identified by assuming (similar to a conventional AR model) that the variable at the first measurement point is an exogenous variable not influenced by the estimated trajectory factors or the other measurement points. However, this variable can be correlated with the latent intercept and slope parameters. Practical rules of implementation require several steps (Bollen and Curran 2006). In short, we started with first fitting multivariate autoregressive models (M1) and then LGMs (M2). Then, we proceeded with implementing the ALT model sequentially, starting from the ARC model (see Bollen and Curran 2006). Thus, we first specified an “intercept only ALT model” for PA (M3) and then for POS (M4). Finally, we expanded this model by including two correlated linear slopes, one for POS and one for PA (M5).

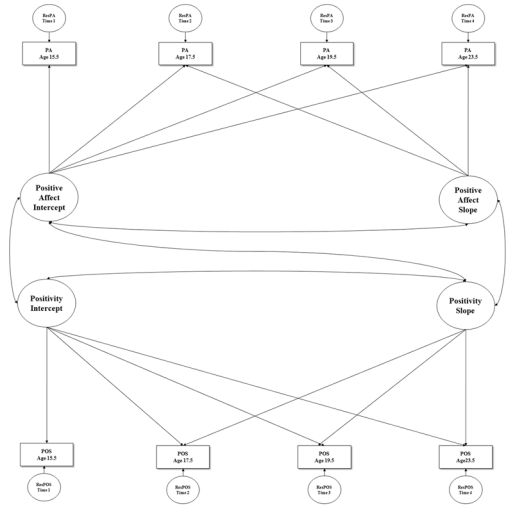
Although AR, LGM and ALT model were not nested, we compared the best-fitting version of the above presented ALT models with that of a more parsimonious model in which the autoregressive and cross-lagged parameters were fixed to zero (M7; see Morin et al. 2011). This model allowed us to test the plausibility for the autoregressive and cross-lagged structure of the state-like deviations of both constructs (Bollen and Curran 2004). Once done, we proceeded with the other tests recommended by Bollen and Curran (2004). These tests (implemented in models M8–16) are necessary to investigate the relevance of specific parts of the model, and thus the worthiness to include them in the model, along

Fig. 1 The alternative models tested. *Note.* PA positive affect, POS positivity. The coefficient for the slope have been chosen by taking into account the distance between times of assessment

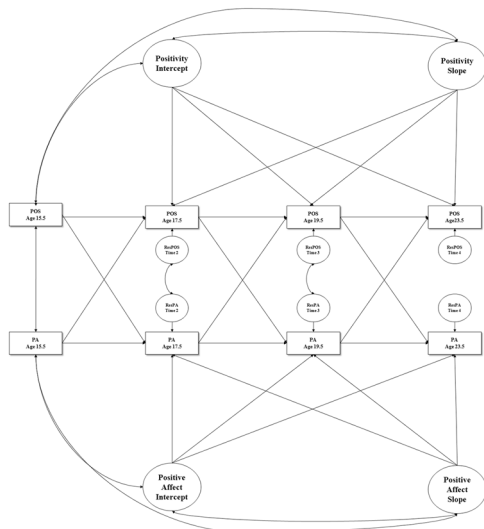
Model 1. The Autoregressive Cross-Lagged Model



Model 2. The Multivariate Latent Growth Model



Model 3. The Autoregressive Latent Trajectories Model



with the stability of the observed coefficients over time. In detail, we proceeded to test the various possible alterations to the model; specifically, these were to exclude the correlated within-time residuals (M8), constrain within-time residuals to equality (M9), exclude autoregressive paths for PA (M10), constrain autoregressive paths to equality for PA (M11), exclude autoregressive path for POS (M12), constrain autoregressive paths to equality for POS (M13), to exclude lagged paths from PA to POS (M14), constrain cross-lagged paths from PA to POS to equality (M15), exclude lagged paths from POS to PA (M15), and constrain cross-lagged paths from POS to PA to equality (M16).

To investigate the fit of different alternative models, structural equation modeling (SEM) was used as the general modeling framework. Parameters were estimated by Maximum Likelihood using *Mplus* 5.1 (Muthén and Muthén 2006). Missing data were handled using Full Information Maximum Likelihood, which draws on all available data to estimate model parameters without imputing missing values (Arbuckle 1996). The following criteria were used to evaluate the goodness of fit: χ^2 likelihood ratio statistic, Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) with associated confidence intervals, and the Root Mean Square Residuals Standardized (SRMR). We accepted CFI values $>.95$, RMSEA values $<.08$, and SRMR $<.08$ (Kline 2016). Nested models were compared using the difference Chi-square test. Given the large number of models compared, to control for alpha inflation we fixed the alpha level for this test at $.01$ (Vandenberg and Lance 2000). The Akaike Information Criterion (AIC, Burnham and Anderson 2004) was used to compare non-nested models proposed. The lower the AIC, the better the fit of the model.

3 Results

3.1 Measurement Invariance

Measurement invariance is a basic requirement for longitudinal modeling, which tests if individuals' scores at different waves are directly comparable (Vandenberg and Lance 2000). In this study, we were interested in comparing individuals' scores across time and across males and females. This requires the assumption of metric invariance (i.e., the same measurement model and relations between each indicator and the latent factor must hold across time and gender). We tested these assumptions by comparing the fit of sequentially restrictive models (Table 1). To reduce the number of indicators, items were combined randomly into four parcel for POS (composed by 2 items each), and into five parcels for PA (composed by four items each) at each time point. Item parcels are likely to *increase* the stability of the parameter estimates, to improve the variable to sample size ratio, and to reduce the effects of nonnormality (e.g., Little et al. 2002). All parcels were highly reliable (mean alpha = $.88$, $SD = .07$).

Separately for both PA scale and the P-Scale, we first tested a baseline model with parameters freely estimated over time (Model 1). In this model, the correlations between the four latent traits (i.e., POS or, alternatively, PA, from time 1 to time 4) were estimated, as were the correlations between the parcel-specific residuals across time. This model fit the data well (in Table 1). We then assessed measurement invariance by first testing whether the model was equivalent across time (Model 2). Specifically, in Model 2, metric invariance was tested by constraining loadings for a given construct to equality across the four time points. For both PA scale and the P-Scale, this model fit the data well, and,

Table 1 Fit indices for measurement invariance models

	χ^2	<i>Df</i>	CFI	TLI	RMSEA	95 % CI	$\Delta\chi^2$	Δdf
PANAS								
Model 1	230.34	134	.980	.972	.052	.043–.060	–	–
Model 2	249.59	146	.980	.974	.053	.043–.061	19.25	12
Model 3	274.12	156	.979	.974	.052	.043–.061	18.11	12
POS								
Model 1	116.78*	74	.990	.984	.037	.024–.049	–	–
Model 2	126.51*	83	.990	.985	.035	.022–.047	9.73	9
Model 3	139.60*	92	.998	.985	.035	.022–.046	13.09	9

Model 1 = Longitudinal configural invariance; Model 2 = Longitudinal metric invariance; Model 3 = Longitudinal scalar invariance

* $p < .05$

according to the Chi-square difference tests, was not significantly different from Model 1 (Table 1). Constraining intercepts to be equal over time did not worsen the fit of the model for either POS or PA (Table 1). Thus, the hypothesis of scalar invariance cannot be rejected for the present data.

3.2 Longitudinal Modelling

Correlations, means, and standard deviation for all variables are presented in Table 2. Overall, POS and PA showed substantial stability over the 8 years of study. The ALT model provided an adequate fit to the data and was preferable to the ARC and LGM models (see Table 3). The final best-fitting model depicted in Fig. 2 (i.e., M13 in Table 3),

Table 2 Means and standard deviations, and correlations of positivity (POS), and positive affectivity (PA), at T1, T2, T3, and T4

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) POS1 (15.5 years)	3.64	.52	1							
(2) PA1 (15.5 years)	3.53	.53	.45*	1						
(3) PO2 (17.5 years)	3.67	.50	.55*	.27*	1					
(4) PA2 (17.5 years)	3.74	.55	.49*	.49*	.44*	1				
(5) PO3 (19.5 years)	3.72	.52	.43*	.30*	.59*	.31*	1			
(6) PA3 (19.5 years)	3.58	.53	.39*	.34*	.47*	.50*	.48*	1		
(7) PO4 (23.5 years)	3.82	.51	.41*	.29*	.41*	.38*	.58*	.34*	1	
(8) PA4 (23.5 years)	3.77	.53	.35*	.35*	.40*	.37*	.49*	.49*	.50*	1
(9) Gender	–	–	–.03	–.10	–.03	.03	–.03	–.04	–.07	–.08
(10) SES	.00	1.00	.01	.02	–.03	.02	.03	–.03	–.05	–.01

SD standard deviation, POS positivity, PA positive affectivity, NA negative affectivity, SES socio-economic status

* $p < .01$

Table 3 Model fitting results

	χ^2	<i>df</i>	CFI	RMSEA	95 % CI	CM	$\Delta\chi^2$	Δdf	<i>p</i>	AIC
M1-Autoregressive. full model	46.41*	12	.960	.104	.074, .137	–	–	–	–	2862.97
M2-LGM. full model	98.22*	22	.918	.115	.092, .138	–	–	–	–	2894.78
M3-ALT. Intercept on PA	43.99*	11	.962	.107	.075, .141	–	–	–	–	2862.55
M4-ALT. M3 + Intercept on POS	9.78	9	.999	.018	.00, .073	–	–	–	–	2832.34
M5-ALT. M4 + slope on PA ^a	6.62 ^a	4	.997	.050	.00, .115	–	–	–	–	2839.18
M6-ALT. M4 + slope on POS	2.67	5	1.00	.00	.00, .100	–	–	–	–	2837.22
M7-ALT. Nested LCM model	191.93*	25	.806	.159	.139, .181	–	–	–	–	2982.49
M8-ALT-M4 + no time-specific uniquenesses correlations	92.28*	13	.908	.152	.124, .182	4	82.5**	4	>.01	2906.84
M9-ALT-M4 + fixed time-specific uniquenesses correlations	12.82	11	.998	.025	.00, .072	4	1.20	2	.55	2831.38
M10-ALT-M9 + no autoregressions for PA	29.61	14	.982	.065	.032, .098	9	16.79**	3	>.01	2842.16
M11-ALT-M9 + fixed autoregressions for PA	12.88	12	.999	.017	.00, .066	9	.06	1	.81	2829.43
M12-ALT-M11 + no autoregressions for POS	29.55	15	.983	.061	.027, .093	11	16.67**	3	>.01	2840.10
M13-ALT-M11 + fixed autoregressions for POS	14.02	13	.999	.017	.00, .065	11	1.14	1	.29	2828.58
M14-ALT-M11 + no "PA → POS" predictions	17.20	16	.999	.17	.00, .061	13	3.18	3	.36	2825.76
M15- ALT-12 + no "PA → POS" predictions ^b	–	–	–	–	–	–	–	–	–	–
M16- ALT-13 + no POS → PA predictions	62.75*	19	.949	.094	.068, .120	13	45.55**	3	<.01	2865.31
M17-ALT-13 + fixed POS → PA predictions	22.75	17	.993	.036	.00, .071	13	5.55	1	.02	2829.31

The best fitting models is highlighted

* $p < .05$

** means a significant Chi-square difference test, according t the preselected alpha level (i.e., .01)

C.I. 95 % confidence interval, *CM* compared to model, $\Delta\chi^2$ difference Chi-square test, Δdf difference in degrees of freedom between the two models

^a To fit this model the variance of PA at Time 2 was fixed to zero

^b Model 15 was not tested because the cross-lagged coefficients predicting POS from PA over time resulted not statistically significant, and thus were not considered further for inclusion in the final model

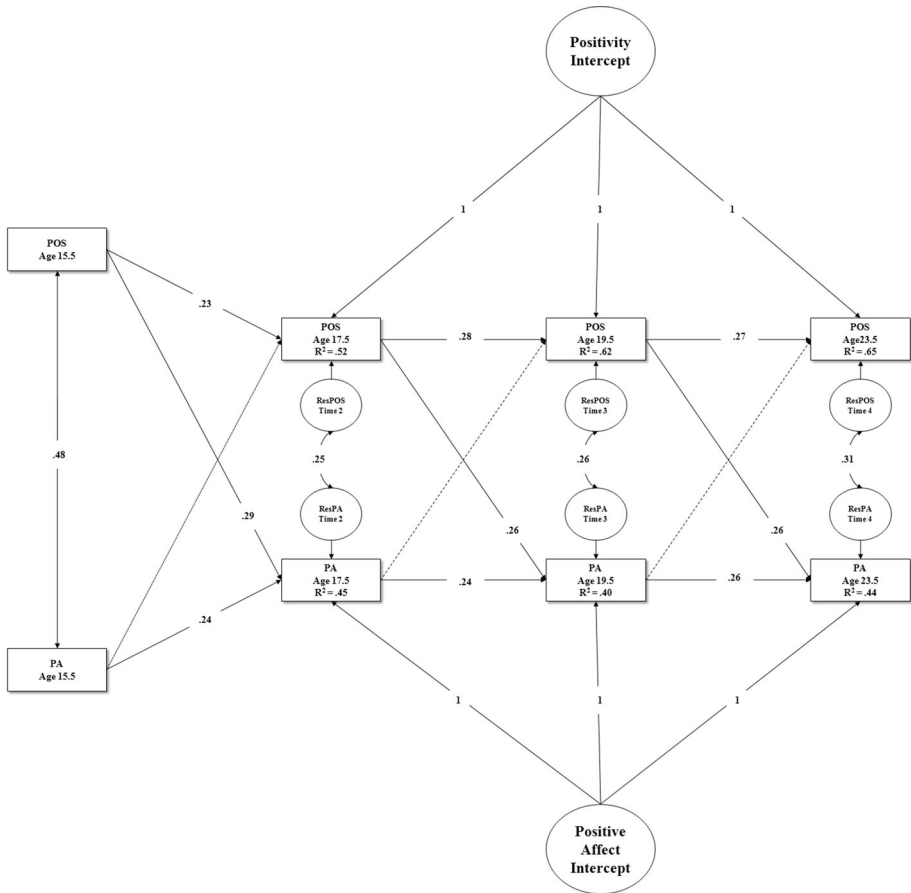


Fig. 2 The best fitting model. *Note.* Significant parameters are bolded and on solid lines. Dashed lines represent paths fixed to zero after model testing. The figure does not show the correlations of positive affect at 15.5 and of positivity at the same age with the latent intercepts, nor the correlation between the latent intercept. These correlations are reported in the main text. *PA* positive affect, *POS* positivity

consisted of only two latent factors—the intercepts factors explaining the observed covariation among the four indicators of POS and the four indicators of PA. Thus, individuals’ scores on PO and PA were highly stable across the study period. The latent intercepts represent the individual average levels of POS or PA as observed across the study period. This model included all autoregressive parameters (i.e., the parameter predicting a variable from its previous level), but only the cross-lagged prediction of PA from POS. Furthermore, all autoregressive and cross-lagged parameters, as well as within-time correlations among residual terms, were constrained to equality over time.

Intercepts for both PA and POS were moderately and significantly correlated ($\varphi = .34$, $t = 1.96$), suggesting an association between the stability in PA and POS across time. PA at T1 was significantly correlated to PA intercept ($\varphi = .49$, $t = 4.35$) and POS intercept ($\varphi = .43$, $t = 6.90$). Likewise, POS at T1 was significantly correlated to POS intercept

($\varphi = .61$, $t = 11.83$) and PA intercept ($\varphi = .35$, $t = 2.56$).¹ Furthermore, time-specific covariances between the uniquenesses of both constructs, which represent the individual specific state of POS or PA that specific year, were significant and moderate in size. All in all, these results indicate a moderate level of covariation between the experience of PA and POS states within each assessment period that remained substantially stable over the study period.

The analysis of autoregressive indicated that the association of state-like deviations in PA levels with later levels of PA, and state-like deviations in POS with later levels of POS, were moderate and significant, about .24 and about .23 for mean PA and POS, respectively. Importantly, at all time points, state-like deviations in PA levels did not significantly predict later levels of POS. In contrast, there were moderate and significant paths from state-like deviations in POS to later levels of PA over time. These findings suggest that the presence of unidirectional relations between POS and PA from a previous time point to the next.

3.3 Covarying Gender and SES

To investigate the role of gender and SES as potential confounds, we estimated two additional models. The first model was identical to the previous best fitting ALT model but included gender and SES specified as time invariant predictors of observed scores on POS and PA across the four waves. The second model was identical to the previous best fitting ALT model but included gender and SES specified as time invariant predictors of the latent intercept of POS and PA. Both models fit the data very well (first model: $\chi^2(21) = 33.45$, CFI = .989, RMSEA = .051(.041, .062); second model: $\chi^2(33) = 47.89$, CFI = .991, RMSEA = .041 (.033, -.049). Gender and SES were unrelated to both observed scores or latent intercepts. Moreover, the inclusion of the two covariates did not change the size of the estimated parameters.

4 Discussion

The identification of positive traits, behaviours, emotions, and cognitions that tend to promote well-being and flourishing has become a major goal of recent psychological research (Judge and Bono 2001). Self-esteem, life satisfaction, and optimism correspond to pervasive views of experience, highly correlated to each other and commonly associated with positive outcomes across domains of functioning and over the life-span. Although most of the literature has focused primarily on the unique role of self-esteem, life satisfaction, and optimism with respect to specific life contexts and outcomes, the three constructs have been traced to a common latent factor—a finding supporting a basic disposition characterized by a positive orientation towards self, life, and the future (i.e., positivity, Caprara et al. 2010a, b).

Previous findings have supported the conclusion that POS predicts the likelihood of an array of positive outcomes and appears to have a protective function in regard to adverse outcomes such as severe illness (Alessandri et al. 2012a, b; Caprara et al. 2010a, b, 2012a). The findings in the present study suggest that POS fosters positive affect over a prolonged time through an important life transition. Chronic positive affect (Lyubomirsky et al. 2005;

¹ We use the Greek letter of φ to refer to covariances. These parameters are represented by double headed arrows in Fig. 1.

Watson et al. 1988) reflects the enduring tendency to be in a positive mood (i.e., the frequency and the intensity of positive feelings). POS, in contrast, is crucial in setting the conditions to face, frame, and construe experiences in ways that activate and promote positive affect.

Our findings are particularly noteworthy because positive affect has been associated with many health outcomes through its apparent effects on cognition and social relationships (Bolte et al. 2003; Fredrickson and Branigan 2005; Fredrickson and Joiner 2002; Rowe et al. 2007; Lyubomirsky et al. 2005), as well as on various physiological functions (e.g., cardiovascular, endocrinal and immunological) (Pressman and Cohen 2005). Thus, one can argue that POS likely contributes to individuals' mood by predisposing them to positive emotional experiences and by enhancing positive feelings.

Our empirical model, although longitudinal, does not permit strong inferences about causal effects. Certainly, it does not exclude the possibility that positive affect also contributes to POS, sometimes or under certain circumstances. The tendency to be in positive mood, in fact, may foster rewarding experiences that further reinforce individuals' positive stance towards themselves, life, and the future. Likely relations between POS further evolve and become reciprocal other than unidirectional, varying over the course of development. However, in the present data, and for the observed time span, the strong and consistent directional pattern of associations we found supports the primacy of POS with respect to positive affect in the population and over the interval of time examined. In this regard, further research is needed to clarify the path of influence between POS and PA across longer (and earlier) time periods, as well as to clarify the influences of culture and life experiences on these constructs.

Moreover, as stated above, heredity accounts for a large portion of both POS and PA. Thus, further investigation is necessary to clarify the extent to which PA and POS can be traced to a common genetic endowment and to unravel their overlapping versus unique developmental pathways. Probably maturation and life events exert crucial influences in shaping both PA and POS and their reciprocal relation. The more children are sensitive and positively responsive to others, the more they attract others' support and sympathy. The more children are provided with rewarding experiences, the more their positive feelings contribute to building positive relations. The more children enjoy love and care, the more they are encouraged to view themselves as worthy of regard and life as worth living. The more children tend to view at life and experience from a positive stance, the more likely they are to benefit from any good events that happen to them.

Further research is also needed to clarify when self-esteem, life satisfaction, and optimism appear during development and when POS emerges as a pervasive mode of appraising, viewing, and construing, able to affect how individuals act and approach experiences. We speculate that the sense of the self remains at the core of POS because people are unlikely to be satisfied with their lives and to be confident about the future unless they believe themselves to be of value. Likewise, we conjecture that self-regard emerges in concomitance with self-awareness whereas life satisfaction and dispositional optimism build upon the cognitive capacities to remind, compare, and anticipate events and experiences.

In the future, it would be useful to further clarify how and when different feelings about the self, life, and the future ultimately coalesce under a unique pervasive disposition. Viewing POS as a disposition opens new avenues to both research and practice relevant to the promotion of human potential and strengths. Whereas recent findings suggest that POS, although stable, is malleable to change (Caprara et al. 2010b), both whether and how POS has a beneficial function, and whether and why a lack or excess of POS may carry negative consequences, deserve further investigation. Such knowledge is crucial to design

interventions structured on practices that promote and sustain individuals' POS. Likewise, a better understanding of the biological correlates of POS and of the ways POS may moderate stress, illness, and pain is crucial to promote positive affect and, as a consequence, health and wellbeing.

One may wonder what distinguishes POS from other general constructs, such as CSE (Judge et al. 1998), that have received considerable attention in the Industrial and Organizational psychology during the last years (Johnson et al. 2006). Empirically, when submitted to a simultaneous confirmatory factor analyses, measures of POS and CSE are highly correlated (in the range of .66), but not perfectly correlated (see Alessandri et al. 2012c). Moreover, POS shows incremental validity over and above CSE in predicting important organizational outcomes such as job performance (Alessandri 2012c). Theoretically, there are important differences separating the two constructs. The construct of core self-evaluations (i.e., CSE) has been defined as the "fundamental premises that individuals hold about themselves and their functioning in the world" (Judge et al. 1998, p. 161). In contrast, POS is instead intended as a higher order dimension explaining the communality among individual judgments about oneself, one's life, and one's future. Moreover, a goal of CSE theory is to explain why certain traits (e.g., self-esteem, general self-efficacy, internal locus of control, and positive affectivity) successfully predict job satisfaction, whereas POS theory points to the dispositional components of individual's well being in the everyday life. Likewise, whereas the four basic components of CSE were individuated using three criteria: *evaluation-focus*, *fundamentality*, and *scope*, self-esteem, life satisfaction and optimism were selected as empirical manifestations of abroad orientation and as crucial determinants of a syndrome of well being with the self playing a crucial role as an anchor (Caprara et al. 2010a, b). Finally, whereas POS can be represented as a Multifaceted "reflective" construct (i.e., a latent factor which directly influences its observed indicators, as in the standard factor model, see Bollen and Lennox 1991), recent findings have shown that CSE should be best represented as an aggregate construct (i.e., a latent factor which is, instead, influenced by its observed indicators, see Bollen and Lennox 1991, for details and also Johnson et al. 2006), resulting from basic behavioral tendencies (emotional stability), attributional style (locus of control), self-esteem and self-related knowledge structures (general self-efficacy). In contrast, POS reflects the common core of optimism and life satisfaction, as well as self-esteem.

4.1 Limitations

Finally, we acknowledge a few limitations of the present contribution. Although POS and PA rest on a set of subjective evaluations that are not easily accessible other than through self-reports, other methods such as implicit measures, clinical interviews, and reports from other informants would be useful complements to the use of self-report data. Moreover, well-educated participants were over-represented in our sample and it is not clear if the findings can be generalized to less advantaged groups. Moreover, the unique prediction of PA by POS found in this study need to be replicated and extended to other (larger or smaller) temporal interval (such as days, or hours), or during a major life transition (i.e., entering to the college, facing with a major life events). Most important of all, more theoretical work is necessary to further develop a full theoretical account of the possibly intricate relations between POS and PA, and of the mechanisms that connect or have the power to change (i.e., strengthen or reduce) the relation between the two constructs. Because the advancement of research on POS has mostly relied on the accumulation of empirical proofs sustaining their utility, the need of further theoretical development should

be, in some respects, not surprising. However, further development of the theory is likely to expand or change our current understanding of the construct.

5 Conclusion

The human condition is fraught with frailty and limitations. Yet, as we progress in our understanding of the basic mechanisms governing the expression of endowed potentialities, the better we understand the critical role of psychological structures in ensuring individuals a good life. POS theory emphasizes the role of positive self-beliefs in sustaining positive affect during the course of development. In turn, it suggests the idea that positive affect can be the key psychological mechanism mediating the behavioral expression of POS. While this latter point is in need of evaluation in future research, present study offers a novel contribution to the understanding of the critical role of POS in human development. Moreover, given that PA been posited among the key determinants not only of psychological adjustment (Davis et al. 2004; Reich and Zautra 2002), but also of a variety of psychological problems (see Koenigsberg et al. 2002; Litz et al. 2000), uncovering the basis of stable PA has the potential to inform applied interventions designed to bolster and maintain positive youth growth and flourishing.

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