



# The Effect of Participation in Adult Education on Life Satisfaction of Immigrants and Natives: A Longitudinal Analysis

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## Abstract

Beyond formal education, continuing adult learning and education (ALE) is considered as successful means for supporting immigrants' integration into the receiving society. Although recently, *subjective* parameters of immigrants' integration (e.g., life satisfaction) have received increasing academic attention, research on the impact of education on subjective integration indicators is still rare. To address this, the present study contributes to the literature by investigating the effect of ALE participation on life satisfaction in a longitudinal design. The study compares the effect for the group of immigrants with the group of natives in order to estimate whether the potential *education effect* on life satisfaction is equally strong for both groups or stronger for the group of immigrants (interaction effect). For this, the study uses seven waves of panel data from the German National Educational Panel Study (NEPS) with  $N=6386$  individuals, of which  $N=1002$  individuals have a migration background. Methodologically, a Random Intercepts Cross-Lagged Panel Model is applied. This allows distinguishing within-person fluctuations from trait-like between-person differences. On the between-person level, we find a significant link between ALE participation and life satisfaction for both immigrants and natives. However, on the within-person level, no significant cross-lagged effects are observed. Moreover, we find no support for an immigrant-native gap in life satisfaction.

**Keywords** Life satisfaction · Migration · Integration · Adult education · RI-CLPM

## 1 Introduction

Increasing population proportions of people with migration background in European societies underpin the relevance of integration as a key policy goal (Ager and Strang 2008; OECD 2019), making it important to identify the conditions of integration (Kogan et al. 2018). In this

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context, integration is understood as having equal access to institutions as well as social interactions and systems, but also includes feelings of belonging to the receiving society, independent from one's migration background or ethnic origin (e.g., Martiny et al. 2017). Although integration conditions have already been broadly researched, most studies have focused on *objective* indicators of integration, such as employment and labour market outcomes (Burkert and Seibert 2007; Drinkwater 2017; Fleischmann and Dronkers 2010) or educational and occupational accomplishments (Portes and Fernández-Kelly 2008; Volante et al. 2018). *Subjective* indicators of integration (e.g., subjective well-being, defined as the subjective feelings and thoughts on one's life, Diener 1984) have only recently gained academic attention (Koczan 2013; Kogan et al. 2018). However, the significance of these subjective, non-economic integration indicators has become increasingly evident (Amit 2010; Amit and Bar-Lev 2015). Although the level of subjective well-being (SWB) is found to be lower among immigrants compared to non-immigrants (Bartram 2010; Hendriks 2015; Safi 2010; Sand and Gruber 2018) and does not increase with the length of their stay in the receiving country (Amit 2010; Hendriks and Burger 2019), scholars argue for immigrants' SWB to be a significant indicator for integration: Immigrants who are more integrated are happier compared to less integrated immigrants (Hendriks 2015; Virta et al. 2004); higher (subjective) integration was associated with higher life satisfaction of immigrants (Angelini et al. 2015). Thus, with SWB being an indicator for individual integration (Tegegne and Glanville 2018; Paparusso 2019), examining the integration-related conditions of immigrants' SWB and the sources promoting their life satisfaction constitutes a promising way for identifying mechanisms and determinants that promote or hinder integration.

With regard to Germany as a country of immigration, politics and academia are challenged with identifying and implementing effective strategies to support integration. One strategy often targeted in policies is education. Whilst the majority of initiatives and public debate in Germany focuses on the relevance of (formal) education for integration processes, the integration of adults with migration background and the relevance of their continuing education, hereafter referred to as adult learning and education (ALE), is gaining increasing attention (Amit and Litwin 2010; Schimany et al. 2012; Steinbach 2018). In view of demographic changes and increasing proportions of adults with migration background (e.g., in 2017, over 60% of individuals arriving in Germany were over 25 years old, Federal Ministry of the Interior, Building and Community 2019), the increasing interest in adults with migration background and their integration does justice to the immigrants' age structure. Moreover, scholars argue for the potential of ALE, e.g., language courses, work-related courses or leisure courses promoting interactions between people with and without a migration background, to support integration (Ager and Strang 2008), and to impact immigrants' sense of belonging (Granderath et al. 2020) and subjective well-being (Angelini et al. 2015). However, apart from few exceptions, research on the effects of ALE participation on subjective integration indicators is only sparse. Therefore, there is a need for (1) more research on the subjective conditions of integration and (2) research on the integration-related effects of ALE participation in the receiving country. To address this research gap, the current study investigates the effect of adult learning and education on SWB as a key indicator of integration.

## 2 Subjective Well-Being and Life Satisfaction

SWB is defined as “a person’s overall evaluation of the quality of life from his or her own perspective” (Lucas 2016, p. 403). Hence, SWB refers to the subjective feelings and thoughts on one’s life (Diener 1984). SWB is regarded as a multifaceted construct consisting of three components, namely positive affect, negative affect and life satisfaction (Andrews and Withey 1976; David et al. 2012). Thus, SWB encompasses an affective dimension (positive and negative affect) and a cognitive dimension (life satisfaction, Diener et al. 1985). The current study focuses on the cognitive dimension (i.e., life satisfaction) as a proxy for SWB, since in contrast to the affective evaluation, the cognitive evaluation is more independent of a person’s current emotional state (Diener et al. 1985; Heller et al. 2004; Howell and Howell 2008). Although life satisfaction was found to be correlated with the affective components, it is a distinct dimension of SWB (Lucas et al. 1996; Pavot and Diener 2008).

Life satisfaction refers to the global judgement of a person’s quality of life, thus to one’s satisfaction with life as a whole (Diener 1994), and can be measured in a single-item measure or by using multi-item scales (Diener 1984). This judgement is based on the person’s own evaluation criteria. Hence, each individual bases the personal judgement on a self-defined benchmark (Pavot and Diener 1993). This implies that individuals from different ethnic and cultural backgrounds may have different benchmarks based on different perceptions of what constitutes a high quality of life (Sam 2001; Virta et al. 2004).

### 2.1 SWB and its Individual, Societal, and Political Associations

SWB is associated with determinants on both the individual and the societal level. Taking an individual perspective, SWB is relevant for various life domains: Higher levels of SWB profit longevity and mental and physical health (Diener and Chan 2011; Frey 2011), and reduce the risk of suicide (Koivumaa-Honkanen et al. 2001). Higher SWB may help against work disability (Koivumaa-Honkanen et al. 2004), profit economic welfare and income (de Neve and Oswald 2012), and may increase hours spent in voluntary work (Thoits and Hewitt 2001). Further, research points to an association of life satisfaction with self-esteem (Campbell 1981; Diener and Diener 1995), big five personality traits (Joshanloo and Afshari 2011; Schimmack et al. 2004), income (Cheung and Lucas 2015; Howell and Howell 2008; Luhmann et al. 2011), family status (Dolan et al. 2008; Haring-Hidore et al. 1985), and age (Angelini et al. 2012; Litwin 2005; Yang 2008).

On the societal level, SWB is related to the social cohesion of societies. However, the conceptualisations of this relationship are diverse. While some scholars (Delhey and Dragolov 2015; Schiefer and van der Noll 2017) argue that higher levels of social cohesion may contribute to the subjective well-being of society members in a “causal chain” (Schiefer and van der Noll 2017, p. 594), others conceptualise SWB as one key component of social cohesion (Council of Europe 2005).

In a political context, SWB plays an increasingly important role for informing and improving policies in general as well as integration policies in particular. Hence, in addition to economic parameters, states and international organisations are recently also considering different SWB measurements as indicators for national welfare (Easterlin 2013; Adler and Seligman 2016). In this respect, Adler and Seligman (2016) argue that SWB of all society members can be fostered by “enabling conditions for well-being through better public services” (Adler and Seligman 2016, p. 14), such as education. Taking a closer

look at integration policies, prior research points to a significant association of integration policies with self-rated health (Malmusi 2015) and also SWB (Hadjar and Backes 2013), underlining the importance of policies for immigrants' well-being.

## 2.2 SWB and Migration

Given the importance of SWB for individuals and societies on the one hand, and the increasing migration movements in Europe on the other hand, immigrants and their SWB receive increasing scholarly and political attention (Kogan et al. 2018). Numerous studies (Arpino and de Valk 2018; Bartram 2010; Hendriks 2015; Safi 2010; Sand and Gruber 2018) find a “life satisfaction gap” (Angelini et al. 2015, p. 825) between immigrants and non-immigrants, indicating that in comparison to natives, immigrants show significantly lower levels of SWB. These lower levels do not increase with the length of stay in the receiving country and may persist over generations (Amit 2010; Fugl-Meyer et al. 2002; Hendriks et al. 2018; Safi 2010; Stillman et al. 2015). Thus, although immigrants' objective living conditions (e.g., economic progress) improve over time, SWB does not (Hendriks and Burger 2019). However, Angelini et al. (2015) find that after controlling for well-documented determinants of SWB, immigrants' higher subjective assimilation (measured by the individual identification with the receiving culture and the language proficiency) is associated with higher life satisfaction. The authors argue that the life satisfaction gap between immigrants and natives “depends on the level of cultural assimilation of immigrants and reverses for those who feel completely integrated in German society” (Angelini et al. 2015, p. 825). They further report that interactions with local citizens have a significant effect on immigrants' SWB—a finding that is also supported by the longitudinal study of Tip et al. (2019). This is further in accordance with Herrero et al. (2011), who find a significant positive association between social integration (i.e., feelings of belonging to the receiving society and of mutual relations with others) into the receiving society and immigrants' SWB. In a similar vein, Tegegne and Glanville (2018) argue that social capital (i.e., social connections and networks, Coleman 1988; Putnam 2000) is an important predictor of immigrants' SWB that explains the well-documented immigrant-native gap in SWB, because immigrants “tend to have fewer family and friendship connections and may be constrained due to linguistic and cultural barriers” (Tegegne and Glanville 2018, p. 459). Thus, strengthening immigrants' social capital may be an effective strategy for increasing their SWB and for reducing the immigrant-native gap in life satisfaction. This is in accordance with the general finding that immigrants have lower social capital than natives (Amit and Bar-Lev 2015), and that traditional social capital variables (e.g., trust, social networks) are found to be positively linked with SWB (Ateca-Amestoy et al. 2014; Healy 2001; Portela et al. 2013).

## 3 SWB and Education

As pointed out, SWB is associated with a broad variety of variables. Since we are interested in the impact of ALE participation on SWB, we present theoretical considerations and the state of research on the effects of adult education on SWB in more detail.

Generally speaking, research on the relationship between education and SWB is characterised by ambiguous results (Koczan 2013): While some scholars report a negative (Amit 2010; Clark 2003) or no relationship (Kahneman et al. 2004), the majority of

studies (Easterbrook et al. 2016; Gokdemir and Dumladag 2012; Helliwell 2003; Kogan et al. 2018; Witter et al. 1984; Yakovlev and Leguizamon 2012) points to a positive relationship. However, it should be noted that most of these studies build on cross-sectional data. Therefore, scholars call for longitudinal research designs that aim at causal inferences (Bak-Klimek et al. 2015). Moreover, the studies solely measure education in terms of the individual years of education and/or educational attainments. Hence, the results are limited to formal education.

Although research on the effects of education for SWB mainly addresses the effects of primary, secondary, and higher education, few studies also focused on learning in adult life and its impact on well-being, with mixed results: While most studies (Narushima 2008; Schuller et al. 2002; Withnall 2009; NIACE 2009; Åberg 2016; Dolan et al. 2012) find a positive effect of participating in ALE on SWB, other studies (Jenkins and Wiggins 2015; Ruhose et al. 2020) report no significant effects. Further studies (Feinstein and Hammond 2004; Jenkins 2011) report mixed effects (both positive and negative), depending on the provider of the courses and the learning contents. These studies made an important contribution to the field. Nevertheless, they also show clear limitations: They either build exclusively on qualitative research methods (Narushima 2008; Schuller et al. 2002; Withnall 2009) or on cross-sectional data (NIACE 2009), solely investigate effects of work-related training (Ruhose et al. 2020) or learning that leads to a qualification (Jenkins and Wiggins 2015), could not investigate lagged effects because of small sample sizes (Dolan et al. 2012), solely focus on older adults (Jenkins 2011; Åberg 2016), or use data that is somewhat limited regarding participants' age (33–42 years) and that spans over several years with only two SWB measurement points (Feinstein and Hammond 2004). Most importantly, none of the studies addresses effects of participating in ALE for immigrants.

When investigating the effect of ALE on SWB, we build on theoretical considerations of Feinstein and Hammond (2004), who argue that participating in ALE can positively impact different social outcomes (including wellbeing). For this positive effect on SWB, the authors present six reasons: the development of specific knowledge (i.e., specific skills that extend to other areas of life), cognitive development (i.e., impact on attitudes and behaviour), peer group effects (e.g., greater social networks), personal development (e.g., promoting resilience), positional improvement (i.e., increased status) and economic factors (e.g., improved employment conditions).

Since no research on differentiated effects of ALE participation on the SWB of natives compared to immigrants exists so far, we theoretically build on two approaches for deriving a hypothesis on an interaction effect of ALE: (1) assimilation theories (Alba and Nee 1997; Gordon 1964) and (2) social capital approaches (Coleman 1988; Putnam 2000).

Assimilation theories make clear statements on the function of education for the process of integration. Assimilation theorists argue that the integration process of immigrants is characterised by several subsequent stages. The *structural* assimilation as an early stage, here understood as entering the social structure of the receiving society by having access to employment, educational institutions, and neighbourhoods (Feliciano 2009), is a “catalyst” (Alba and Nee 1997, p. 830) that depicts the most significant stage for the integration process, as it results in other forms of integration. Put differently, assimilation theories argue for integration as a straight-line process in which immigrants' life conditions and by this also their subjective well-being conditions are improved over time (Hendriks and Burger 2019). Accordingly, participating in adult learning as a form of *structural* assimilation paves the (straight-line) way for higher social integration and thus for improved well-being conditions.

In a similar vein, social capital approaches (Coleman 1988; Putnam 2000) argue that immigrants' social capital as a key predictor of SWB can be fostered by strengthening social networks as well as reducing cultural and language barriers (Tegegne and Glanville 2018). In this respect, adult education institutions can play an important role, particularly for fostering social networks, since they bridge different societal groups (Healy 2001) and therefore act as a meeting place for people. Given that immigrants are more likely to be socially isolated (Hao and Johnson 2000; Kate et al. 2020) and have smaller social networks compared to natives (Martinovic et al. 2009), they may therefore benefit to a higher extent from ALE participation.

## 4 The Present Research

Although some important studies on the effects of participating in ALE on SWB have been carried out, the existing literature has some clear limitations. The present research addresses these limitations and contributes to the literature as one of the first studies that investigates the effect of participation in ALE on life satisfaction over time for people with and without migration background. We compare the effects for the group of immigrants with the group of natives in order to estimate whether the potential education effect on SWB is equally strong for both groups or stronger for the group of immigrants (interaction effect). To meet the demand for more longitudinal research (Bak-Klimek et al. 2015; Herrero et al. 2011) which allows to distinguish between causes and outcomes of SWB, we apply a longitudinal design with a Random Intercepts Cross-Lagged Panel Model (RI-CLPM, Hamaker et al. 2015) using data from seven waves of the German National Educational Panel Study (NEPS).<sup>1</sup> We formulate three hypotheses to be tested.

There is ample evidence of an immigrant-native gap in life satisfaction that may persist over generations. Based on the literature, our first hypothesis to be tested is<sup>2</sup>:

**(H1)** Immigrants show lower levels of life satisfaction compared to natives.

Although research on the effects of adult education on SWB reveals inconsistent results, the majority of studies on the impact of education (covering all forms of education) on SWB finds positive effects (Helliwell 2003). Based on this, our Hypothesis 2 is:

**(H2)** Over time, individuals who participate in ALE show higher levels of life satisfaction compared to individuals that do not participate in ALE. The higher the change in the individual participation volume (e.g. more courses, more hours of ALE), the higher the change in life satisfaction.

<sup>1</sup> This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Adults, <https://doi.org/10.5157/NEPS:SC6:1.0.0>. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LifBi) at the University of Bamberg in cooperation with a nationwide network.

<sup>2</sup> In the preregistration, we preregistered a hypothesis on the stability of the lower life satisfaction levels of immigrants. However, with our data, we were not able to test this hypothesis in a convincing way.

According to assimilation theories (Alba and Nee 1997; Gordon 1964) and social capital approaches (Coleman 1988; Putnam 2000), immigrants may benefit from an education effect of ALE participation to a greater extent: ALE participation enables structural integration and therewith, a strengthening of social networks and a reduction of cultural and language barriers experienced in the receiving society. Hence, participating in ALE fosters integration, which is of particular benefit to people who are less integrated than others are. Based on this, we derive the following hypothesis:

**(H3)** The effect of ALE on subjective well-being is stronger for the group of people with migration background compared to the group of people without migration background (interaction effect).

## 5 Methods

### 5.1 Data

To test our hypotheses, we used data from the German National Educational Panel Study (NEPS, Blossfeld et al. 2011), an annual panel study with now ten waves that consists of six starting cohorts (new-borns, kindergartners, fifth graders, ninth graders, first-year university students, adults). The NEPS collects longitudinal data on educational processes as well as sociodemographic and psychological variables in Germany. We used seven waves (wave 4, T1—wave 10, T7) of longitudinal data (collected in 2011–2018). From 14,708 cases, we used a sample of  $N=6386$  participants: We only included participants that took part in all waves (i.e., balanced panel, details on dropouts can be found in the Online Appendix on OSF, [https://osf.io/n6s4e/?view\\_only=74519fd6fba84cd5a66dccb695462ba7](https://osf.io/n6s4e/?view_only=74519fd6fba84cd5a66dccb695462ba7)). However, to achieve robust results, we also estimated the models over all cases including missing observations with FIML (i.e., unbalanced panel). Overall, the results based on the unbalanced panel (for details see Online Appendix) confirmed the results based on the balanced panel presented here. Hypotheses were pre-registered prior to data analysis (<http://dx.doi.org/10.23668/psycharchives.2764>).

### 5.2 Participants

The sample included  $N=6386$  participants (3282 female,  $M_{\text{age at T1}}=48.82$ ,  $SD=10.45$ ), with  $N=5384$  natives (2721 female,  $M_{\text{age at T1}}=48.96$ ,  $SD=10.40$ ) and  $N=1002$  immigrants (561 female,  $M_{\text{age at T1}}=48.07$ ,  $SD=10.72$ ). The mean years of education (i.e., school, university and/or vocational training) at T1 were  $M=14.34$  ( $SD=2.33$ ) for the total sample,  $M=14.34$  ( $SD=2.31$ ) for the sample of natives and  $M=14.37$  ( $SD=2.43$ ) for the sample of immigrants. Summed up for T1–T7, 1452 participants did not participate in ALE, while 4934 participants have participated at least in one course. On average, the participants visited  $M=4.91$  ( $SD=5.59$ ) ALE courses and  $M=156.13$  ( $SD=344.89$ ) ALE hours. Descriptive statistics for the total sample and subsamples of immigrants and natives are displayed in Table 1.

405 (40%) participants were first-generation immigrants, 555 (55%) participants were second-generation immigrants and 42 (4%) participants were third-generation immigrants. First-generation immigrants' mean age at migration to Germany was  $M_{\text{age}}=22.23$  ( $SD=12.25$ ).

**Table 1** Descriptive statistics of the sample

	Total sample				Immigrants				Natives			
	M	SD	Min	Max	M	SD	Min	Max	M	SD	Min	Max
Age (at T1)	48.82	10.45	24.92	68.08	48.07	10.72	25.17	68.00	48.96	10.40	24.92	68.08
Education (in years)	14.34	2.33	9	18	14.37	2.43	9	18	14.34	2.31	9	18
Number of ALE courses (sum T1–T7)	4.91	5.59	0	45	5.08	5.95	0	45	4.88	5.53	0	41
Number of ALE hours (sum T1–T7)	156.13	344.89	0	4573	183.66	404.60	0	4091	151.00	332.41	0	4573
Age at migration					22.23	12.25	0.50	57.50				



## 5.3 Measures

### 5.3.1 Life Satisfaction

Individual *life satisfaction* was measured with the item “All in all, how satisfied are you with your life at the moment?”. The item was answered on an 11-point Likert scale ranging from 0 (“not satisfied at all”) to 10 (“completely satisfied”). It was developed based on the life satisfaction item used in SOEP (DIW Berlin 2009) and the Personal Wellbeing Index by Cummins and Lau (2005). The NEPS also asks about life satisfaction in specific areas (e.g., friends, work, health). However, given that we were interested in the global evaluation and due to the complexity of our applied model (RI-CLPM), we only used the global life satisfaction rating in the analyses.

### 5.3.2 Participation in Adult Learning and Education (ALE)

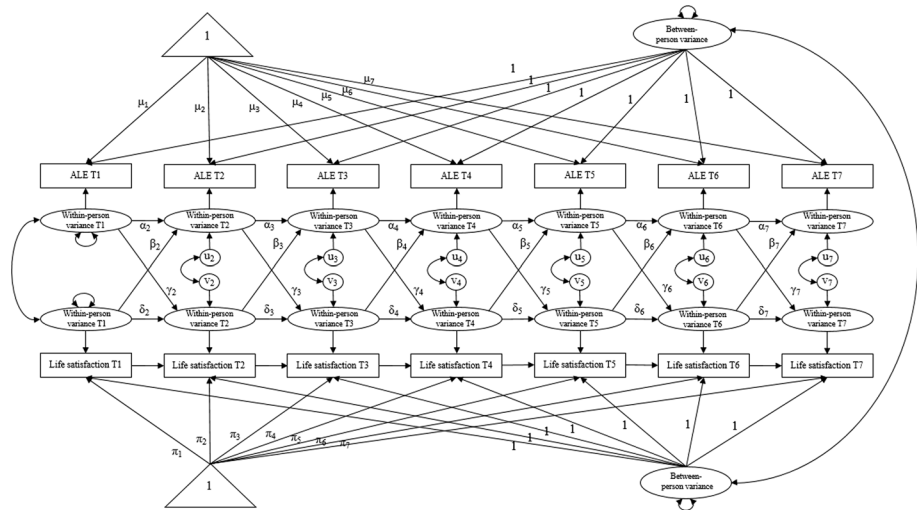
To measure the individual participation in ALE, participant’s *number of ALE courses* was assessed with “How many training programs or courses have you attended from the last interview to the present?”. *Participation in ALE in hours* was assessed with “How many hours did this course/training last in total?”.

### 5.3.3 Demographics and Further Variables

In their first panel interview, participants indicated time-invariant demographics (i.e., gender, date of birth, years of education, age at migration to Germany, and generation status).

## 5.4 Analytical Strategy

To meet the demand for longitudinal research (e.g., Bak-Klimek et al. 2015), we tested the association between ALE participation and life satisfaction by applying a Random Intercepts Cross-Lagged Panel Model (Hamaker et al. 2015). In advantage over the classical cross-lagged panel model, the RI-CLPM distinguishes between the *within*-person level and the *between*-person level. Thus, the model separates the variance of our studied variables (i.e., life satisfaction and ALE participation) into between-person variance and within-person variance (Bieda et al. 2019; Keijsers 2016). The between-person variance part accounts for stable trait-like differences between individuals via random intercepts, the within-person variance part accounts for fluctuations within individuals over time, thus variations around their expected scores at the different measurement points (Masselink et al. 2018). Therefore, the separation of within-person and between-person variance parts allows testing the association between ALE participation and life satisfaction at the between-person level, but also within an individual over time. The cross-lagged parameters (from ALE participation on life satisfaction in the subsequent wave) represent the extent to which a change in one’s ALE participation in comparison to one’s expected ALE participation is related to that person’s deviation from the expected life satisfaction score in the subsequent wave (Becht et al. 2019). Hence, the RI-CLPM allows to interpret within-person changes (Masselink et al. 2018). The autoregressive parameters, also described as stability effects, can be interpreted as the “amount of within-person carry-over effect” (Hamaker et al. 2015, p. 10). Thus, the autoregressive parameters indicate whether the deviation from one’s expected life satisfaction or ALE participation score at a measurement point can be predicted by the



**Fig. 1** Seven-wave (T1–T7) random intercepts cross-lagged panel model (Hamaker et al. 2015) of adult learning and education (ALE) participation (in courses) and life satisfaction

deviation from the expected scores at the previous measurement point (Keijsers 2016): The autoregressive effects indicate, how stable the variables of interest (ALE, life satisfaction) are, from wave to wave, at the within-person level. Our unconstrained RI-CLPM is presented in Fig. 1.

Since we were interested in the differences in the association between ALE participation and life satisfaction, we applied different group comparisons comparing immigrants and natives. We conducted all comparisons by applying  $\chi^2$ -difference tests. The data were prepared for analysis with stata. All analyses were performed with R and the package LAVAAN (Rossee 2012). Scripts and results can be found on OSF ([https://osf.io/n6s4e/?view\\_only=74519fd6fba84cd5a66dccc695462ba7](https://osf.io/n6s4e/?view_only=74519fd6fba84cd5a66dccc695462ba7)).

## 6 Results

### 6.1 Descriptive Statistics

The descriptive statistics of the sample including age, education and mean ALE participation are displayed in Table 1. Means and standard deviations of participation in ALE and life satisfaction for each measurement point (T1–T7) are reported in Table 2, the correlations between the scores at all seven measurement points are displayed in Table 3.

### 6.2 Random Intercepts Cross-Lagged Panel Model

Given that the variables entered in the RI-CLPM (i.e., ALE participation and life satisfaction) were not normally distributed, the model was estimated by robust maximum likelihood (MLR). We used full information maximum likelihood (FIML) to account for missing data (2 missing values for ALE). To test Hypothesis 1 on an immigrant-native gap in levels

**Table 2** Means and standard deviations of participation in ALE and life satisfaction

	Total sample		Immigrants		Natives	
	N=6386		N=1002		N=5384	
	M	SD	M	SD	M	SD
<i>Life satisfaction</i>						
T1	7.56	1.55	7.55	1.64	7.56	1.54
T2	7.62	1.54	7.60	1.56	7.62	1.53
T3	7.60	1.46	7.64	1.45	7.59	1.46
T4	7.64	1.51	7.59	1.60	7.65	1.49
T5	7.63	1.44	7.64	1.48	7.63	1.43
T6	7.68	1.47	7.71	1.48	7.67	1.47
T7	7.65	1.41	7.63	1.44	7.66	1.41
<i>Number of ALE courses</i>						
T1	0.91	1.40	0.94	1.48	0.91	1.38
T2	0.77	1.21	0.75	1.26	0.78	1.20
T3	0.59	1.06	0.64	1.11	0.58	1.05
T4	0.75	1.22	0.78	1.30	0.75	1.20
T5	0.61	1.11	0.65	1.18	0.60	1.09
T6	0.64	1.17	0.64	1.14	0.64	1.18
T7	0.63	1.18	0.67	1.26	0.63	1.17
<i>Number of ALE hours</i>						
T1	26.77	109.72	28.17	111.42	26.51	109.41
T2	29.73	128.82	32.69	135.86	29.17	127.47
T3	19.80	98.64	23.09	120.33	19.19	94.05
T4	23.52	102.62	31.27	143.39	22.07	93.03
T5	18.80	100.93	22.31	98.33	18.15	101.40
T6	19.81	103.90	27.06	161.81	18.46	89.02
T7	17.71	83.56	19.08	85.22	17.45	83.25

Life satisfaction was measured on an 11-point Likert scale ranging from 0 ("not satisfied at all") to 10 ("completely satisfied"). The number of ALE courses and ALE hours attended since the last interview was asked in an open-ended question

of life satisfaction, we first estimated the model constraining the intercepts of life satisfaction to be equal across groups (immigrants and natives). This constrained model had a very good data fit,  $\chi^2(121)=435.267$ ,  $p < .001$ , CFI=0.989, RMSEA=0.029 [0.026, 0.031] and SRMR=0.025. We further estimated a fully unconstrained model freeing the intercepts. This unconstrained model also fit the data very well,  $\chi^2(114)=428.328$ ,  $p < .001$ , CFI=0.989, RMSEA=0.029 [0.026, 0.032] and SRMR=0.025. The  $\chi^2$ -difference test showed that freeing the intercepts did not improve the model fit,  $\Delta\chi^2(7)=6.99$ ,  $p=.430$ . Thus, we found no evidence for Hypothesis 1.

The between-person correlation between the random intercept factors of ALE participation and life satisfaction was positive (for immigrants  $r=.121$ ,  $p < .001$ , for natives  $r=.122$ ,  $p < .001$ ), indicating that people with higher ALE participation across the seven measurement points reported significantly higher levels of life satisfaction across the seven measurement points. Thus, consistent with the first assumption of our Hypothesis 2, we found that on the between-person level, the higher the extent of ALE participation, the higher

**Table 3** Correlations between life satisfaction (LS) and ALE courses (ALE) for all measurement points

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) LS T1	-	.072***	.556***	.063***	.512***	.053***	.481***	.058***	.463***	.048***	.439***	.051***	.444***	.041***
Group 1		.084***	.564***	.092***	.505***	.050***	.439***	.048***	.488***	.056***	.452***	.051***	.458***	.040***
Group 2		.070***	.554***	.057***	.514***	.053***	.490***	.060***	.458***	.046***	.437***	.051***	.441***	.042***
(2) ALE T1		-	.050***	.400***	.058***	.345***	.045***	.328***	.058***	.322***	.072***	.291***	.062***	.314***
Group 1			.054***	.454***	.095***	.383***	.055***	.334***	.068***	.361***	.079***	.272***	.076***	.385***
Group 2			.049***	.385***	.051***	.337***	.043***	.327***	.056***	.314***	.070***	.295***	.059***	.299***
(3) LS T2			-	.067***	.576***	.054***	.516***	.061***	.487***	.055***	.452***	.058***	.462***	.033***
Group 1				.055***	.504***	.044***	.478***	.019***	.467***	.051***	.469***	.037***	.447***	.041***
Group 2				.069***	.590***	.056***	.524***	.069***	.491***	.056***	.449***	.062***	.465***	.031***
(4) ALE T2				-	.056***	.372***	.053***	.381***	.055***	.315***	.060***	.312***	.067***	.317***
Group 1					.060***	.413***	.067***	.414***	.055***	.380***	.068***	.245***	.033***	.286***
Group 2					.056***	.363***	.050***	.374***	.055***	.301***	.059***	.325***	.074***	.324***
(5) LS T3					-	.049***	.552***	.058***	.533***	.045***	.492***	.045***	.505***	.024***
Group 1					.041***	.551***	.551***	.047***	.530***	.042***	.491***	.057***	.537***	.031***
Group 2					.050***	.553***	.553***	.060***	.534***	.045***	.492***	.043***	.500***	.022***
(6) ALE T3					-	.036***	.036***	.377***	.044***	.348***	.056***	.320***	.047***	.334***
Group 1						.038***	.038***	.406***	.025*	.395***	.060***	.314***	.026*	.360***
Group 2						.036***	.036***	.370***	.048***	.338***	.055***	.321***	.052***	.328***
(7) LS T4						-	.063***	.063***	.588***	.043***	.533***	.050***	.505***	.008
Group 1						.065***	.065***	.582***	.582***	.070***	.571***	.058***	.513***	.025*
Group 2						.063***	.063***	.590***	.590***	.037***	.525***	.048***	.504***	.005
(8) ALE T4						-	.058***	.058***	.037***	.433***	.071***	.395***	.070***	.348***
Group 1						.037***	.037***	.514***	.037***	.514***	.081***	.334***	.090***	.450***
Group 2						.062***	.062***	.415***	.062***	.415***	.069***	.408***	.066***	.345***
(9) LS T5						-	.049***	.049***	.566***	.049***	.566***	.049***	.535***	.027***
Group 1						.064***	.064***	.591***	.591***	.064***	.591***	.059***	.535***	.053***
Group 2						.046***	.046***	.561***	.561***	.046***	.561***	.047***	.536***	.021***

**Table 3** (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(10) ALE T5											.059***	.420***	.053***	.417***
Group 1											.068***	.383***	.035**	.456***
Group 2											.057***	.428***	.057***	.409***
(11) LS T6											-	.072***	.585***	.032***
Group 1												.045***	.556***	.041***
Group 2												.077***	.591***	.031***
(12) ALE T6												-	.059***	.424***
Group 1													.055***	.391***
Group 2													.059***	.430***
(13) LS T7													-	.042***
Group 1														.028*
Group 2														.045***
(14) ALE T7														-
Group 1														
Group 2														

Group 1 is the group of immigrants (N=1002), group 2 is the group of natives (N=5384)

\*\*\*p<.001, \*\*p<.01, \*p<.05

**Table 4** Autoregressive and cross-lagged effects of ALE and life satisfaction (unconstrained model) for group 1 (immigrants)

	b	SE	$\beta$	95% CI
<i>Autoregressive effects</i>				
ALE T1 → ALE T2	0.182	0.052	0.214**	0.079; 0.284
ALE T2 → ALE T3	0.094	0.054	0.112	− 0.013; 0.200
ALE T3 → ALE T4	0.061	0.066	0.051	− 0.068; 0.190
ALE T4 → ALE T5	0.169	0.064	0.197**	0.044; 0.294
ALE T5 → ALE T6	0.023	0.072	0.021	− 0.118; 0.164
ALE T6 → ALE T7	0.078	0.065	0.075	− 0.049; 0.206
Life satisfaction T1 → life satisfaction T2	0.234	0.050	0.248***	0.136; 0.332
Life satisfaction T2 → life satisfaction T3	0.049	0.045	0.059	− 0.039; 0.137
Life satisfaction T3 → life satisfaction T4	0.083	0.059	0.073	− 0.032; 0.198
Life satisfaction T4 → life satisfaction T5	0.124	0.051	0.138*	0.025; 0.223
Life satisfaction T5 → life satisfaction T6	0.146	0.053	0.144**	0.042; 0.250
Life satisfaction T6 → life satisfaction T7	0.071	0.052	0.074	− 0.032; 0.173
<i>Cross-lagged effects</i>				
ALE T1 → Life satisfaction T2	− 0.015	0.029	− 0.016	− 0.071; 0.041
Life satisfaction T1 → ALE T2	0.051	0.029	0.061	− 0.006; 0.108
ALE T2 → Life satisfaction T3	0.014	0.038	0.014	− 0.060; 0.087
Life satisfaction T2 → ALE T3	0.016	0.026	0.022	− 0.034; 0.066
ALE T3 → Life satisfaction T4	− 0.003	0.044	− 0.002	− 0.090; 0.084
Life satisfaction T3 → ALE T4	− 0.029	0.038	− 0.028	− 0.104; 0.045
ALE T4 → Life satisfaction T5	− 0.045	0.036	− 0.046	− 0.116; 0.025
Life satisfaction T4 → ALE T5	0.030	0.032	0.039	− 0.033; 0.094
ALE T5 → Life satisfaction T6	0.009	0.048	0.008	− 0.084; 0.103
Life satisfaction T5 → ALE T6	0.008	0.034	0.009	− 0.057; 0.074
ALE T6 → Life satisfaction T7	0.011	0.044	0.010	− 0.076; 0.097
Life satisfaction T6 → ALE T7	− 0.019	0.036	− 0.020	− 0.089; 0.051

Coefficients ( $\beta$ ) and confident intervals are standardised

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

the life satisfaction. However, to test the effect of change in the individual ALE participation, we were interested in the within-person level (i.e., the cross-lagged effects of ALE on life satisfaction in the unconstrained model). Given that we expected period effects, the cross-lagged effects were unconstrained, hence they could vary between the waves.<sup>3</sup> Here, we found no significant cross-lagged effects; neither for immigrants nor for natives (see Tables 4 and 5). Thus, in both groups, individual deviations in life satisfaction were not linked to individual change in ALE participation over time. Besides the cross-lagged

<sup>3</sup> To check this assumption, we performed a  $\chi^2$ -difference test comparing a model that constrains the cross-lagged effects to be identical for each year (i.e., an overall-beta and overall-gamma) with an unconstrained model. This test suggested no significant difference between the constrained and the unconstrained model,  $\Delta\chi^2(10) = 3.57$ ,  $p = .965$ , which supports the idea of varying cross-lagged effects. The constrained model also revealed no significant cross-lagged effects.

**Table 5** Autoregressive and cross-lagged effects of ALE and life satisfaction (unconstrained model) for group 2 (Natives)

	b	SE	$\beta$	95% CI
<i>Autoregressive effects</i>				
ALE T1 → ALE T2	0.113	0.017	0.134***	0.080; 0.145
ALE T2 → ALE T3	0.034	0.020	0.040	− 0.006; 0.073
ALE T3 → ALE T4	− 0.003	0.027	− 0.002	− 0.056; 0.051
ALE T4 → ALE T5	0.063	0.025	0.069**	0.015; 0.111
ALE T5 → ALE T6	0.129	0.030	0.117***	0.071; 0.188
ALE T6 → ALE T7	0.138	0.026	0.140***	0.087; 0.190
Life satisfaction T1 → life satisfaction T2	0.195	0.022	0.201***	0.152; 0.238
Life satisfaction T2 → life satisfaction T3	0.180	0.023	0.201***	0.135; 0.225
Life satisfaction T3 → life satisfaction T4	0.062	0.026	0.062**	0.011; 0.113
Life satisfaction T4 → life satisfaction T5	0.126	0.024	0.131***	0.093; 0.159
Life satisfaction T5 → life satisfaction T6	0.130	0.027	0.120***	0.076; 0.183
Life satisfaction T6 → life satisfaction T7	0.197	0.025	0.207***	0.149; 0.245
<i>Cross-lagged effects</i>				
ALE T1 → life satisfaction T2	− 0.016	0.014	− 0.016	− 0.043; 0.012
Life satisfaction T1 → ALE T2	− 0.002	0.013	− 0.003	− 0.028; 0.023
ALE T2 → life satisfaction T3	0.001	0.016	0.001	− 0.029; 0.032
Life satisfaction T2 → ALE T3	0.001	0.013	0.002	− 0.024; 0.026
ALE T3 → life satisfaction T4	− 0.015	0.021	− 0.012	− 0.056; 0.026
Life satisfaction T3 → ALE T4	0.007	0.016	0.007	− 0.024; 0.037
ALE T4 → life satisfaction T5	0.003	0.016	0.003	− 0.027; 0.034
Life satisfaction T4 → ALE T5	− 0.010	0.014	− 0.012	− 0.038; 0.017
ALE T5 → life satisfaction T6	0.005	0.019	0.004	− 0.031; 0.042
Life satisfaction T5 → ALE T6	− 0.005	0.016	− 0.006	− 0.037; 0.026
ALE T6 → life satisfaction T7	− 0.002	0.015	− 0.002	− 0.032; 0.028
Life satisfaction T6 → ALE T7	− 0.011	0.015	− 0.012	− 0.041; 0.018

Coefficients ( $\beta$ ) and confident intervals are standardised

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

effects, we further estimated the within-time correlations (Table 6), which reflect the co-development of both variables, i.e., they show to what extent deviations from the person-specific mean in ALE are accompanied by deviations from the person-specific mean in life satisfaction in the same wave (Mund and Nestler 2019). Besides two small significant effects, these within-time correlations also showed no significant correlations for both groups, suggesting that we also found no effects when estimating without time lags. Therefore, Hypothesis 2 was not supported. Tables 4 and 5 also present the carry-over effects for both groups: While the autoregressive effects for ALE and life satisfaction were significant for almost all waves for natives, with two exceptions of ALE at T2 to ALE at T3 and T3 to T4, the autoregressive effects for immigrants were not. Here, only six out of 12 autoregressive effects were significant. This may indicate that for immigrants, the within-person carry-over effects of ALE and life satisfaction were not as stable as for natives, since the deviations from a person's expected scores could not be significantly predicted by the same person's deviations in the previous wave. To test this, we performed a  $\chi^2$ -difference test

**Table 6** Within-time correlations of ALE and life satisfaction in seven waves

	b	SE	$\beta$	95% CI
$r_{u1v1}$				
Group 1	0.047	0.055	0.030**	0.032; 0.154
Group 2	0.036	0.021	0.026	- 0.005; 0.078
$r_{u2v2}$				
Group 1	0.009	0.042	0.008	- 0.073; 0.091
Group 2	0.020	0.017	0.018	- 0.013; 0.053
$r_{u3v3}$				
Group 1	0.001	0.035	0.001	- 0.067; 0.069
Group 2	0.005	0.014	0.006	- 0.022; 0.033
$r_{u4v4}$				
Group 1	0.015	0.044	0.013	- 0.071; 0.102
Group 2	0.017	0.016	0.018	- 0.015; 0.050
$r_{u5v5}$				
Group 1	0.028	0.034	0.032	- 0.037; 0.094
Group 2	- 0.004	0.014	- 0.005	- 0.032; 0.024
$r_{u6v6}$				
Group 1	- 0.035	0.038	- 0.036	- 0.110; 0.040
Group 2	0.036	0.016	0.036*	0.004; 0.068
$r_{u7v7}$				
Group 1	- 0.021	0.037	- 0.021	- 0.094; 0.052
Group 2	0.019	0.014	0.020	- 0.010; 0.047

Group 1 is the group of immigrants ( $N=1002$ ), group 2 is the group of natives ( $N=5384$ )

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

comparing a model that constrains the autoregressive effects to be equal across groups with a model that freely estimates the autoregressive effects. For this, we first estimated the model that constrains the autoregressive effects to be equal across groups. This constrained model had a very good data fit,  $\chi^2(126) = 478.897$ ,  $p < .001$ , CFI = 0.988, RMSEA = 0.030 [0.027, 0.032] and SRMR = 0.026. We further estimated a model freeing the autoregressive effects (i.e., the unconstrained model). The  $\chi^2$ -difference test comparing both models showed a significant difference between the models,  $\Delta\chi^2(12) = 23.36$ ,  $p = .025$ . Given the better fit indices of the unconstrained model, this significant  $\chi^2$ -difference test revealed that freeing the autoregressive effects improved the model fit. Put differently, the results indicate that a model assuming the autoregressive effects to differ between the groups fits the data better. Hence, these results support the interpretation that for immigrants, the autoregressive effects differ from the autoregressive effects of natives in the sense that the autoregressive effects were less stable (see Tables 4 and 5).

To test Hypothesis 3 on an interaction effect, we estimated a model constraining the cross-lagged effects to be equal across groups. This constrained model had a very good model fit,  $\chi^2(120) = 430.027$ ,  $p < .001$ , CFI = 0.990, RMSEA = 0.028 [0.026, 0.031] and SRMR = 0.025. We compared this constrained model with the fully unconstrained model. The  $\chi^2$ -difference test suggested no significant difference between the constrained and the unconstrained model,  $\Delta\chi^2(6) = 1.82$ ,  $p = .936$ . Thus, we found no evidence for an interaction effect and thus no support for Hypothesis 3, since we found no improvement in model



fit when we assumed the cross-lagged effects to be different between immigrants and natives (i.e., stronger effects for immigrants).

## 7 General Discussion

While subjective indicators of immigrants' integration have received increasing attention recently, not much is known about how these subjective indicators, such as SWB, are affected by education attained in the receiving society in adulthood. Therefore, as one of the first studies in the field, we investigated the effect of participation in adult learning and education (ALE) on life satisfaction as a key indicator for integration over time. To investigate this association in a longitudinal manner, we used seven waves of German panel data and applied a RI-CLPM that compared potential effects of ALE participation for the groups of immigrants and natives. By choosing this approach, our research strategy was twofold: First, it allowed us to differentiate within-person variations from trait-like between-person differences. Second, by estimating the effects for both groups, i.e., for immigrants and natives, we were able to investigate whether this potential education effect was equally strong in both groups, or whether immigrants benefited from ALE participation to a higher extent due to its integration function.

The RI-CLPM provides support for significant between-person effects of ALE participation on life satisfaction. This is in line with previous research showing a positive association between education and life satisfaction (e.g., Easterbrook et al. 2016). With  $r = .121$ ,  $p < .001$  for immigrants and  $r = .122$ ,  $p < .001$  for natives, these weak, but significant associations were positive for both groups. One clear asset of our method is that it allows us to interpret this correlation independent from the within-person level. Thus, across all participants, we found that individuals participating in ALE have higher levels of life satisfaction, regardless of whether they have a migration background or not. To some extent, this significant link may be interpreted as evidence for our Hypothesis 2. However, it is important to note that this between-level correlation solely reveals stable trait-like differences between individuals. Moreover, it only estimates the association across all measurement points. When looking at the within-person level, i.e. the cross-lagged effects, we found no support for this linkage for either group. Thus, after controlling for the trait-like differences between individuals via the random intercepts, no effects of ALE participation on life satisfaction on the within-person level were observed. We also estimated the within-time correlations, which also revealed no significant effects (Table 6), suggesting that participating in ALE has no immediate effect. However, whether greater time lags (e.g., over several years or decades) show significant effects cannot be answered based on our data and research design.

Hence, while we find that between-person differences in ALE participation are positively associated with between-person differences in life satisfaction, we do not find that on the within-person level, fluctuations in ALE participation are linked to fluctuations in life satisfaction. Thus, it is conceivable to assume that other constructs, which are related to both ALE participation and life satisfaction, may cause this positive association, for example other variables that contribute to an individual's social capital such as social contacts. Based on our results, we can rule out a direct, causal within-person effect of ALE participation on life satisfaction. Hence, our findings are consistent with prior research in the field (e.g., Jenkins and Wiggins 2015; Ruhose et al. 2020) showing no significant effects of ALE on SWB.

While the RI-CLPM allows studying the cross-lagged effects, which are of special interest for our research question, the model also allows studying the autoregressive, 'carry-over' effects. For immigrants (Table 4), the carry-over effects for both ALE participation and life satisfaction were smaller and less significant than the carry-over effects for natives (Table 5). Conducting a  $\chi^2$ -difference test revealed that an unconstrained model fit the data better than a model constraining the autoregressive effects to be equal across groups. This suggests that within the group of immigrants, the wave-to-wave stability appears to be lower. Immigrants often face changing living conditions and challenging life situations, especially first-generation immigrants, who have arrived in a receiving country only recently. Therefore, the observed lower stability is not surprising, as it may result from higher fluctuations around one's expected scores in educational activities and life satisfaction that do not carry over to the next wave for immigrants compared to the fluctuations in the studied constructs for natives. However, it should be noted that the lower stability might also be due to the smaller sample size for the group of immigrants compared to the group of natives in the current study. Moreover, when estimating the results with all cases including missings (i.e., unbalanced panel), the better model fit of a model freeing the autoregressive effects across groups was not observed (see Online Appendix). Therefore, more research is needed before this claim can be made.

Another important result is that we did not find an immigrant-native gap in life satisfaction. Thus, when comparing the unconstrained model with the model constraining the intercepts of life satisfaction to be equal across our two groups, we found no significant differences. In view of a broad body of research that created ample evidence for a difference in life satisfaction between immigrants and natives (e.g., Arpino and de Valk 2018; Sand and Gruber 2018), we did not observe this in our data. To some extent, this surprising finding may be explained by our methodological approach, since the RI-CLPM addresses within-person processes of life satisfaction in contrast to previous research in which the between- and within-person effects could not be distinguished. Thus, it may be assumed that studies reporting an immigrant-native gap find this based on research limited to the between-person level.

Given that we found null effects, these findings have important implications for the theoretical foundations of our hypotheses. Although Feinstein and Hammond (2004) list six reasons why adult education may be beneficial for different social outcomes, within our study, we find no effects of participating in adult education on life satisfaction. Hence, our results do not support the idea that an education effect on SWB is observed for the educational sector of adult education.

Further, the findings do not support the idea of an interaction effect (i.e., stronger for the group of immigrants). Opposed to our hypothesis based on assimilation theories (Alba and Nee 1997; Gordon 1964) and social capital approaches (Coleman 1988; Putnam 2000), the results rather suggest that participating in ALE appears to have no additional benefit for immigrants' life satisfaction through social inclusion (i.e., social integration and emerging social networks) that may be associated with ALE participation. Put differently, even when participating in ALE as a form of structural integration paves the way for improved well-being conditions and fosters social capital, this may have no direct effect on life satisfaction. However, given that we have no information on individual social contacts and networks, we can make no clear statements regarding this interplay.

## 7.1 Limitations and Directions for Future Research

Although our study adds to the literature as one of the first studies that explores the effects of ALE participation for immigrants and natives longitudinally, it has clear limitations.

First, the data measurement of the NEPS, especially the survey of the adult education participation, is clearly limited. We were only able to estimate the effects for ALE participation in general, hence for all course contents, since no detailed course contents were given for all visited courses. However, it may be assumed that different course contents also have different effects on life satisfaction. Especially in view of integration courses and language courses, our data did not allow investigating the effects of participation in these courses on immigrants' life satisfaction. Therefore, future research should explore to what extent our results hold when explicitly addressing these courses, even though this approach would not allow for comparing the effects of immigrants and natives. Moreover, since the ALE courses taken by the participants were summed up for the time period since the last interview, we were not able to estimate the effect of different time intervals. We could not distinguish effects of courses that were taken recently from courses that were taken several months before the respective interview. Since it can be assumed that participating in ALE may have an immediate effect on life satisfaction, we cannot rule out that we would have observed significant cross-lagged effects when individual life satisfaction was measured more closely in time to the ALE courses. Further, the Likert-type survey of life satisfaction may be influenced by social desirability. Hence, future research should implement different life satisfaction measures and use other research approaches (e.g., qualitative approaches).

Second, due to the lack of collection of other relevant variables, we were not able to consider other variables relevant to our research question, such as the number of social contacts made through ALE courses, in our model. Especially for immigrants, building a social network in the receiving society and establishing social relations may be achieved by participating in ALE. Thus, future research should investigate other relevant variables, such as the number of social contacts, and address individual contexts (e.g., regional or national differences in openness to diversity).

Third, while the RI-CLPM has clear methodological advantages over other approaches, it has important limitations that need to be considered when interpreting its results (Maselink et al. 2018). Although the RI-CLPM allows exploring effects on the within-person level, it only estimates average within-person effects and therefore does not account for effect heterogeneity (Keijsers 2016). Moreover, this methodological approach does not account for errors in measurement, since an inclusion of measurement errors would complicate the model estimation and would only be possible with ten or more measurement points (Hamaker et al. 2015; Maselink et al. 2018).

Finally, we can only interpret our results based on the operationalisations of our constructs of interest. Thus, our interpretation is limited to the survey of satisfaction with life in general and ALE participation measured by the number of courses.

## 8 Conclusion

As one of the first studies investigating the effect of ALE participation on life satisfaction over time, we find that adult learning and education in Germany does not directly affect the individual well-being, regardless of a migration background. Specifically, while we find a

between-person association, participating in ALE has no effect at the within-person level. In regard of the societal and political aim to promote lifelong learning and to foster immigrants' integration, this finding is particularly relevant, since the current study could not show the hypothesised effects of ALE participation on life satisfaction. Hence, the often emphasised key role of education for integration may not be extendable to the sector of adult education, at least not for well-being as a subjective integration parameter. Thus, the idea of promoting SWB by "enabling conditions for wellbeing through better public services" (Adler and Seligman 2016, p. 14) may not be valid for adult education. However, the present research only takes a first step at exploring the effects of ALE participation. The findings show that more research efforts are needed to better understand the impact of ALE participation on (subjective) integration.

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## Compliance with ethical standards

**Conflict of interest** We have no conflicts of interest to declare.

**Ethical standards** We worked with panel data of the German National Educational Panel Study (NEPS, see <https://www.neps-data.de/Mainpage>). All procedures performed in the study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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

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