Motiv Emot (2013) 37:444–456
DOI 10.1007/s11031-012-9328-z

ORIGINAL PAPER

Different pathways, same effects: Autonomous goal regulation is associated with subjective well-being during the post-school transition

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Published online: 16 November 2012

Abstract Using self-determination theory as a theoretical framework, this study examines the associations between autonomous goal regulation and subjective well-being (life satisfaction, positive and negative affect, self-esteem) during the post-school transition. The sample consisted of 2,284 academic track students (62 % female) in Germany who answered a questionnaire at the end of high school and again 2 years later, allowing us to differentiate three post-school trajectories (university, vocational training, not in education). Structural equation modeling showed that autonomous goal regulation measured at Time 1 positively predicted Time 2 life satisfaction, positive affect, self-esteem, and autonomous goal regulation and negatively predicted negative affect, controlling for construct stability. However, subjective well-being indicators at Time 1 did not predict autonomous goal regulation at Time 2. Multi-group analyses indicated comparable associations between goal regulation and subjective well-being across groups, highlighting the strength and generalizability of the effect of autonomous goal regulation on subjective well-being during the post-school transition.

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Keywords Self-determination theory · Personal goals · Well-being · Post-school transition

Introduction

The post-school transition is associated with many major life changes and developmental tasks, including the need to choose a career path, move away from family and friends, and establish long-term romantic relationships (Arnett 2000; Nurmi 2001; Zarrett and Eccles 2006). These challenges are likely to alter subjective well-being (SWB) as individuals experience a number of upheavals in many major life domains and adjust to new environments. Although successful transition contributes to personality development and well-being (Parker et al. 2012), this adjustment period may be a particularly stressful time for individuals who perceive these developmental changes as a threat (Fisher and Hood 1987). This life-course transition is crucial, however, as emerging adults make numerous choices and engage in behaviors that can either facilitate or thwart the passage to adulthood (Creed et al. 2003), with potential long-term implications for later life (Eccles et al. 2003).

Previous research has demonstrated the critical role of goals in shaping SWB, particularly during transition phases (e.g., Salmela-Aro and Nurmi 1997). In the post-school transition, a period of rapid development, individuals often rely on their personal goals (e.g., to graduate from university) to provide guidelines for making fundamental choices (Arnett 2000). Indeed, Nurmi (2001) views goals as "navigating tools" that facilitate a successful transition through late adolescence. However, it has been argued that not all goals are equally beneficial. According to self-determination theory (SDT; Deci and Ryan 1985, 2000;

Ryan and Deci 2000), the *regulatory processes* that drive people to attain certain goals differ: autonomous (rather than controlled) goal regulation is associated with higher SWB in the long run. Prior studies on the relationships between goal regulation and SWB suggest that SWB is influenced by goal regulation. However, few studies have investigated different developmental pathways in large student samples over the post-school transition.

Building on prior research, the present study investigates the associations between individual goal regulation and SWB. In particular, we examine the associations between goal regulation and change in subjective well-being. We also explore the associations between SWB and changes in goal regulation. Finally, we examine whether these associations are stable across three post-school pathways. Our study adds to the previous research in several ways. First, we obtained data before a major transitional phase: participants were first assessed in high school and again 2 years later. As such, our data capture a common environmental change that has significant implications for SWB (see Cooke et al. 2006; Schulenberg et al. 2005). Second, we used a large sample and a longitudinal design. Third, we differentiated between young adults' developmental pathways by exploring differences in those who left school to attend university, entered vocational training, or exited education. This allowed us to consider whether the relationship between goal regulation and SWB was generalizable to all members of a graduating class rather than to only students who went on to university (Hamilton and Hamilton 2006). Finally, we took a multidimensional approach to assess SWB, including life satisfaction, positive affect, negative affect, and self-esteem as outcome variables.

Self-determination theory

SDT postulates that different types of motivation regulate human behavior (Deci 1972; Vansteenkiste et al. 2006). Intrinsic motivation refers to undertaking an activity for its own sake, for interest and enjoyment. In contrast, extrinsic motivation refers to engaging in an activity as a means of attaining consequences that are separate from the activity itself (Deci 1972; Deci and Ryan 2008). Although this theoretical distinction is appealing, empirical research has indicated that extrinsic motivation does not inevitably lessen intrinsic motivation (Ryan et al. 1983). To better account for the motivational process, Deci and Ryan (1985; see also Ryan and Connell 1989) suggest that extrinsic motivation consists of several types of regulation reflecting different levels of perceived autonomy. From low to high autonomy, extrinsic motivation is hypothesized to include *external regulation*, *introjected regulation*, and *identified regulation* (Deci and Ryan 1985). External regulation occurs when an individual undertakes a behavior for the sake of a reward or to avoid punishment (Ryan and Deci 2002). Introjected regulation occurs when behaviors are driven by internal pressure, either to pursue self-aggrandizement and contingent self-worth or to avoid guilt and shame (e.g., when a student goes to university mainly to avoid disappointing his or her parents; Vansteenkiste et al. 2006). When behaviors are more internalized, accepted, and valued, as is the case for identified regulation, these behaviors are considered important in and of themselves. Whereas this type of regulation underlies a greater sense of autonomy, it functions as a means to an end that has little to do with the activity itself.

Current theory indicates that intrinsic motivation and external, introjected, and identified regulation can be situated on an autonomy continuum and used to compute a relative autonomy index (Ryan and Connell 1989). Intrinsic motivation and identified regulation represent higher autonomy, whereas external and introjected regulation are characterized by lower autonomy. Overall, autonomous regulation takes place when individuals perceive that their behaviors and goals result from their own volition and choice. A central hypothesis of SDT is that more autonomous regulation is associated with more positive outcomes such as SWB (Deci and Ryan 1985, 2000; Ryan and Deci 2000).

Autonomous regulation and subjective well-being

SWB is a key outcome variable in studies on goal regulation and successful transition. Diener et al. (1999) define SWB as a multidimensional construct consisting of pleasant affect, the relative absence of unpleasant affect, overall life satisfaction, and satisfaction with certain life domains (e.g., the self). According to these authors, these four major components should be assessed independently, even though they are often moderately to highly correlated. More specifically, pleasant and unpleasant affect should be assessed separately in longitudinal designs because they become increasingly distinctive over time (Diener and Emmons 1984). Using multitrait–multimethod analyses over a 2-year period, Lucas et al. (1996) also showed that affect and life satisfaction are separate constructs. Several studies have examined the link between goal regulation and SWB, focusing on either behavioral regulation or goal regulation.

Behavioral regulation

Researchers investigating behavioral regulation have shown that autonomous regulation predicts SWB and other positive outcomes in several domains, including education, close relationships, health care, religious behavior,

institutions for the aged, political attitude, and withholding emotions (Kim et al. 2002). Using the Self-Regulation Questionnaire (Ryan and Connell 1989) or similar instruments, studies have assessed specific behaviors (e.g., homework behavior) and the reasons for these behaviors and have examined their associations with outcome variables such as academic achievement and SWB.

For the present project, which focuses on the post-school transition, studies that have assessed SWB in educational settings are of central relevance. In two studies involving German and American university students, Levesque et al. (2004) found that autonomous regulation was positively associated with an aggregated indicator of SWB in both countries. In a longitudinal study spanning one term, Black and Deci (2000) showed that students attending a specific university chemistry course for autonomous reasons experienced higher interest and enjoyment and less anxiety in relation to the course. Vallerand et al. (1989) found that more autonomously motivated students reported more positive emotions in the classroom, more satisfaction at school, and greater enjoyment of academic work. Ryan and Connell found similar results in elementary school students (1989), with school enjoyment as the single indicator of SWB. These studies indicate that autonomous regulation of behaviors, such as attending school, is positively associated with SWB indicators.

Goal regulation

In the above studies, all participants answered questions about their regulation model in relation to a fixed set of behaviors. In another line of research, Sheldon and colleagues (Sheldon and Elliot 1999; Sheldon et al. 2004a, b; Sheldon and Kasser 1995, 1998) moved the focus away from behavior sets determined by the researcher to individual self-reported goals. Sheldon and colleagues argued that SWB should be higher when people pursue goals more autonomously. To explore this, they used a two-step procedure, using a combined idiographic–nomothetic approach inspired by Emmons (1986; see also Little 1983). Participants were instructed to write down the personal goals they considered to be most relevant in the coming months or years (6–10 goals were requested). Participants then rated these goals on several dimensions (e.g., regulation type). This approach ensured that the goals were relevant to the participant's own life planning (Emmons 1986). Moreover, participants' ratings of the goals in terms of regulation type can be aggregated in order to explore the general role of autonomous regulation in SWB.

Using this method in a cross-sectional study of a sample of 161 university psychology students, Sheldon and Kasser (1995) showed that students who pursued personal goals for more autonomous reasons reported higher positive affect, self-esteem, self-actualization, and vitality and lower negative affect. Using a single SWB factor aggregated from well-documented indicators (life satisfaction and positive and negative affect), Sheldon et al. (2004b) also found that autonomous goal regulation significantly predicted SWB in two cross-sectional samples and in a 1-year longitudinal sample of graduating seniors. Shorter longitudinal studies spanning one semester have also found that autonomous regulation was associated with increased SWB (Sheldon and Elliot 1999; Sheldon and Kasser 1998; 5 studies). In order to generalize these results, Sheldon et al. (2004a) conducted a cross-cultural investigation of undergraduates in four different countries and in various fields. The results showed that in all four countries, autonomous goal regulation predicted SWB.

Does well-being affect goal regulation?

Prior research suggests that autonomous goal regulation predicts SWB. To our knowledge, no studies have specifically investigated the inverse association, that SWB predicts later goal regulation. As these constructs are correlated, Sheldon (2002) suggests that "positive mood states may enhance individuals' ability to select goals that well represent their deeper values and interests, or vice versa" (p. 74). Diener and Fujita (1995) also proposed that happy people might choose their goals in accordance with their resources, and hence choose goals that are more appropriate for them. These explanations are consistent with a positive psychology approach such as the broaden-and-build theory, which postulates that positive emotions enhance an individual's personal resources and generate optimal functioning over time (Fredrickson 2001).

This potential association finds partial support in experimental studies on the effect of induced positive affect on related constructs. Investigating motivation as conceptualized by SDT, Isen and Reeve (2005) showed that giving a small gift before experimental tasks increased participants' intrinsic motivation, even when the affect was not related to the activity itself. However, it is unclear whether this pattern would be similar for general SWB and personal goal regulation across a 2-year transition phase. In a nine-week daily report study, Fredrickson et al. (2008) showed that an increase in positive emotions induced by meditation improved half of the personal resources they assessed. Nevertheless, it had no effect on participants' autonomy, which in turn positively predicted later life satisfaction. Moreover, baseline positive emotions did not significantly predict changes in resources over time.

Although there are good reasons to believe in a predictive relationship between SWB and later goal regulation, it remains uncertain whether this effect occurs for a relationship measured over longer periods of time.

The post-school transition period, subjective well-being, and goals

The post-school transition includes significant developmental changes that are likely to affect young adults' SWB. In many countries, it is possible to differentiate between normative and non-normative pathways. Although this period has become more heterogeneous over the years, it still generally implies moving on to either post-secondary education or employment (Zarrett and Eccles 2006). The psychological adjustment of young adults following different pathways might differ. Empirically, the transition to university has been associated in some studies with lower overall well-being, higher anxiety, homesickness, depression, and absent-mindedness (Beck et al. 2003; Cooke et al. 2006; Fisher and Hood 1987). Cooke et al. (2006) monitored the psychological well-being of 4,699 students before and across their first year at university. Students experienced lower SWB once the school year started and did not return to pre-university levels after that year. However, other studies have found that the post-school transition was associated with increased SWB.

Based on an American national longitudinal survey spanning 4 years ($N = 3{,}912$), Schulenberg et al. (2005) reported that overall SWB (i.e., a composite of self-esteem, self-efficacy, and social support) increased in each of nine post-school transition pathways. When comparing these pathways, they found higher well-being in unmarried and college student groups and lower well-being in the two working groups. Creed et al. (2003) reported similar findings across a nine-month period: post-school transition was associated with significantly reduced psychological distress and greater self-esteem. These changes in SWB were found in three of the four post-school transition pathways, whereas participants with full-time jobs showed no significant SWB fluctuation. Schulenberg et al. (2005) argued that this increased SWB might be due in part to greater autonomy in making choices about contexts and roles in this developmental period. Nevertheless, some individuals have limited opportunities or might feel overwhelmed by these sudden changes (Schulenberg and Zarrett 2006).

Studying personal goals during the post-school transition might shed light on how these goals affect SWB. Using the same database as Schulenberg et al. (2005), Messersmith and Schulenberg (2010) reported that the attainment of specific goals, such as graduating from a 4-year college program and getting married, was associated with higher well-being.

In sum, there are some indications that SWB is affected by the post-school transition, resulting in changes in mean SWB and decreasing rank-order stability (individual SWB ranking relative to peers across two time points). Moreover, it has been shown that the pursuit of specific goals is associated with greater well-being across the post-school transition. What has not been investigated, however, is whether goal regulation effects well-being during this critical developmental phase and whether the potentially beneficial effect of autonomous goal regulation applies to young adults following different post-school pathways. Additionally, there is no solid evidence in the literature on whether SWB can be a resource that helps people to select more autonomously regulated personal goals later in life.

Present study

The purpose of the current research was to replicate and extend previous findings on the association between autonomous goal regulation and SWB. First, in line with SDT, we expected that individuals who regulated their personal goals for autonomous reasons would experience higher SWB during the potentially stressful post-school transition. This was predicted for the four indicators of SWB assessed (life satisfaction, positive and negative affect, and self-esteem). Second, we proposed that higher SWB before the post-school transition would also be associated with the selection of more autonomously regulated personal goals 2 years later. The first two hypotheses were combined in a single reciprocal effects model. Third, we predicted that the strengths of the associations between autonomous goal regulation and SWB would be the same across three different post-school transition pathways (university, vocational training, and not in education).

Method

Participants and procedure

Data were taken from a large ongoing German study (Transformation of the Secondary School System and Academic Careers; TOSCA) initiated by the Max Planck Institute for Human Development, Berlin, and which is now conducted at the University of Tübingen (see Trautwein et al. 2010). Data were obtained from 149 randomly selected upper secondary schools in a single German state. The school participation rate was 99 % and the student participation rate was more than 80 %. At T1, the students were in their final year of upper secondary school, with a mean age of 19.51 years ($SD = 0.77$). Two trained research assistants administered the questionnaires in each school between February and May 2002. Students participated voluntarily, with no financial incentive. At T1, all students were asked to provide written consent to be

recontacted later for a second wave of data collection. At T2, 2 years after graduation from high school, participants completed an extensive questionnaire lasting about two hours in exchange for a compensation of €10.

A total of 4,709 students answered the questionnaire in the first wave. Because the focus of this investigation was the prospective association between goal regulation and SWB, we first excluded participants who reported having no goals ($N = 168$). Of this new sample ($N = 4{,}541$), we ran analyses on only the 2,284 individuals (62 % female; $M = 19.51$ years of age, SD = 0.77, 99.4 % graduated) who also participated in the second wave of data collection. To test for attrition effects, we compared gender and differences in mean T1 life satisfaction, positive affect, negative affect, self-esteem, autonomous goal regulation, parents' socioeconomic status, academic achievement, and occupational aspirations prestige between continuers (students who participated at both time points) and dropouts (students who participated in the first wave only). Continuers had higher life satisfaction ($M = 3.05$ vs. $M = 3.00$; SD = 0.61 vs. SD = 0.65; $d = 0.08$), more positive affect ($M = 3.43$ vs. $M = 3.36$; SD = 0.52 vs. SD = 0.56; $d = 0.13$), higher academic achievement ($M = 2.31$ vs. $M = 2.54$[1]; SD = 0.64 vs. SD = 0.62; $d = -0.37$), and more prestigious occupational aspirations ($M = 59.23$ vs. $M = 58.46$; SD = 9.22 vs. SD = 9.46; $d = 0.08$), and were more likely to be female, $\chi^2(1, N = 4{,}532) = 96.4$, $p < .001$. Hence, except for gender and academic achievement, selectivity effects were small.

Of those who participated at both measurement times, 42.4 % lived with their parents and 77.2 % were attending university (field of study: physical sciences, applied math, and engineering = 21.5 %, biological, life, and medical sciences = 11.2 %, business and law = 9.3 %, humanities and education = 57.9 %). Of the participants who were not at university ($N = 513$), 62.8 % were in vocational training, 15.2 % were working, 2.7 % were in the military or doing a social service year, and 19.3 % were unemployed or in an extended educational or occupation moratorium. Based on the T2 data, we differentiated three groups: university students ($N = 1{,}733$), vocational training students ($N = 322$), and individuals not in educational trajectories ($N = 191$; 38 without group identification). Differences between these groups on control variables are presented in Table 1. Overall, the university group had a more advantaged background as well as higher academic achievement and occupational aspirations.

[1] Note that a six-point grading scale (GPA) is used in Germany to assess school performance, with 1 being the highest possible grade.

Measures

Personal goal regulation

To assess personal goals and their regulation, we used a combined idiographic and nomothetic measure adapted from Emmons (1986), Little (1983), and Sheldon and Elliot (1998). At T1, participants were asked to write the six most important personal goals they intended to pursue in the coming months and years. The majority of participants rated six goals (6 goals: $N = 1{,}791$; 5: $N = 140$; 4: $N = 99$; 3: $N = 102$; 2: $N = 84$; 1: $N = 68$). Further content analyses of their personal goals (see Lüdtke 2006) revealed that almost all participants mentioned at least one vocational or academic goal ($M = 1.45$, SD = 0.93; e.g., "I would like to become a medical doctor"), with the second and third most frequent being partnership ($M = 0.69$, SD = 0.68; e.g., "meeting the perfect woman") and friendship ($M = 0.49$, SD = 0.59; e.g., "spending more time with my friends"), respectively. They then rated their self-generated goals in terms of four types of regulation: intrinsic motivation ("because of the fun and enjoyment it provides me"), identified regulation ("because I really believe that it's important for me to have this goal"), introjected regulation ("because I would feel ashamed, guilty, or anxious if I didn't"), and external regulation ("because somebody else wants it or the situation requires it"). A seven-point Likert scale was used (1 = *not at all*, 7 = *completely*).

As suggested by Ryan and Connell (1989), and following the procedures in prior research using an SDT framework (see Deci and Ryan 2000, for a review), we computed a relative autonomy index for each personal goal, aggregating the four regulation types using the following formula: (2 × intrinsic regulation + identified regulation) − (introjected regulation + 2 × external regulation). This index gives a specific weight to each regulation type, depending on its position on the motivational continuum. Cronbach's alpha for the relative autonomy index was 0.66 at T1 and 0.74 at T2.

Satisfaction with life

We used a German adaptation (Trautwein 2004) of the present life satisfaction subscale of the Temporal Satisfaction with Life Scale (Pavot et al. 1998). This German version of this scale contains four (e.g., "I am satisfied with my current life") instead of five items because the factor loadings of one of the original items ("I would change nothing about my current life") did not fully conform with the theoretical expectations (also see McIntosh 2001). Furthermore, unlike in the original publication that used a seven-point answer format, the participants rated their

Table 1 Mean differences and effect sizes between groups on control variables

Variables	Group						Group comparison		
	1. University (N = 1,733)		2. Vocational (N = 322)		3. Not in education (N = 191)		1 vs. 2	1 vs. 3	2 vs. 3
	Mean	SD	Mean	SD	Mean	SD	Cohen's d		
Age	19.47_a	0.78	19.60_b	0.72	19.67_b	0.70	0.17	0.27	0.10
Father's SES	57.52_a	16.98	52.11_b	16.74	56.39_a	18.01	0.32	0.25	0.07
Mother's SES	50.01_a	15.38	47.70_{ab}	13.86	46.59_b	13.46	0.16	0.24	0.08
Academic achievement	2.20_a	0.63	2.69_b	0.53	2.55_b	0.55	0.84	0.60	0.26
Occupational aspirations prestige	60.49_a	8.27	53.05_b	10.87	58.56_a	9.89	0.77	0.21	0.53

Group means not sharing subscripts differ significantly at the 0.01 level. Academic achievement is assessed on a six-point grading scale, with 1 being the best possible grade

SES socioeconomic status

satisfaction with life on a four-point Likert scale (1 = do not agree at all, 4 = completely agree). This decision was made because an in-depth psychometric analysis of item formats with a neutral category (e.g., middle category on a five-point scale) showed that this format sometimes has disadvantages (e.g., see the classic article by Goldberg 1963). Cronbach's alpha for the present life satisfaction scale was 0.84 at T1 and 0.87 at T2.

Positive and negative affect

We administrated the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988). This scale contains 20 emotion adjectives, 10 measuring dispositional positive affect and 10 measuring dispositional negative affect. Participants indicated the extent to which they felt these emotions on a five-point Likert scale (1 = *not at all*, 5 = *completely*). The German translation of the instrument used here has demonstrated high reliability and construct validity (Krohne et al. 1996). Cronbach's alpha was.79 and 0.80 for positive affect at T1 and T2, respectively, and 0.82 and 0.83 for negative affect at T1 and T2, respectively.

Self-esteem

A well-validated German adaptation (Schwanzer et al. 2005) of the SDQ III (Marsh and O'Neill 1984) was used to assess self-esteem via four items (e.g., "Overall, I am pretty accepting of myself") rated on a four-point Likert scale (1 = *do not agree at all*, 4 = *completely agree*). Cronbach's alpha was 0.75 at T1 and 0.81 at T2.

Statistical analyses

Given that score unreliability can distort the parameter estimates (Kaplan 2000), we used structural equation modeling to determine the reciprocal effects between autonomous goal regulation and SWB. This allows estimating structural relationships that are free of measurement error. In our case, the data were clustered (i.e., students nested within schools). This can lead to underestimation of standard errors, and thus to overly liberal tests of statistical significance (see Hox 2010, for a general introduction). One means of overcoming this is the use of multilevel modeling. However, when multilevel hypotheses are not advanced (e.g., when the effects of school-level variables on outcome variables are not considered), multilevel modeling is not required. Instead, standard analysis procedures may be used, with an adjustment for standard errors that takes into account the clustered nature of the data. Given that we did not advance any multilevel hypotheses, we used the TYPE = COMPLEX option in Mplus (Muthén and Muthén 1998–2006) to adjust the standard errors.

Three parcels of three or four items were used to measure the latent factors positive and negative affect (Kishton and Widaman 1994). When scales contain many items, item parceling reduces the number of estimated parameters and is associated with more reliable and valid indicators (Marsh and Yeung 1998). Parcels were created by averaging every third item, resulting in three item parcels (items 1, 4, 7, and 10; items 2, 5, and 8; and items 3, 6, and 9). For autonomous regulation, using the above formula, the six indicators represented a relatively autonomous score obtained for each of the six personal goals. The latent factors life satisfaction and self-esteem were obtained directly from the scale items. Factor loadings were constrained to be invariant across time in accordance with the measurement invariance assumption (Raykov 2004). As recommended by Marsh and Hau (1996; see also Jöreskog 1979), the measurement error of each T1 indicator was correlated with its corresponding T2 indicator's measurement error (correlated uniquenesses). For example, the error estimates at T1 and T2 for the first item in the life

satisfaction scale would be correlated. If these correlated uniquenesses are not taken into account, estimated correlations between latent constructs can be positively biased, and the estimates of stability may be inflated (Guay et al. 2003; Marsh and Yeung 1998).

Basing our analyses on participants who completed all measures at both T1 and T2, percentages of missing data were low, ranging from 0 % for life satisfaction and positive affect at T1 to 2.3 % for autonomous regulation at T2. To deal with these item nonresponses, we used the full information maximum likelihood (FIML) estimator implemented in Mplus (Muthén and Muthén 1998–2006), which applies a model-based approach to missing data (see Allison 2001). Instead of imputing missing values, model parameters were estimated using all the available information obtained from our model variables and a set of auxiliary variables (gender, parents' socioeconomic status, academic achievement, and occupational aspirations prestige; see Enders 2010, for a review).

Results

In studies of change, it is important to ensure that the changes observed in manifest indicators are due to real changes in the phenomena being studied, and not to changing relationships between the latent variables and their indicators (Bollen and Curran 2005; Meredith and Horn 2001). A major advantage of incorporating multiple indicators for each construct is that the invariance of the measurement model across time and study groups can be assessed. In the first step, we used confirmatory factor analyses to test for strong invariance of the measurement models across time and across study groups, including the means. Strong invariance holds when factor loadings and the intercepts of the manifest indicators are invariant across time and groups such that differences in average indicator scores across time and groups reflect differences in latent means. The model in the present study showed an acceptable fit, $\chi^2(2175) = 3473.67$, CFI = 0.96, RMSEA = 0.03, implying that strong factorial invariance held across time with respect to the measurement model of life satisfaction, positive and negative affect, self-esteem, and autonomous goal-regulation.

In the next step, we examined differences in the latent means across time and study groups. As mentioned above, there is no consensus in the literature on the effect of the post-school transition on SWB (detrimental or beneficial). Constraining the latent means of the construct to be invariant across the two measurement points, $\Delta\chi^2(15) = 337.58$, $p < .001$, or the three study groups, $\chi^2(20) = 149.14$, $p < .001$, resulted in a substantially worse fit.

Table 2 presents the latent variable means at both time measures for the three different trajectories (university, vocational training, and not in education).[2] Overall, SWB indicators and goal regulation are more favorable 2 years after the post-school transition (e.g., higher positive effects and lower negative effects), suggesting that this transition is generally positive (consistent with Creed et al. 2003; Schulenberg et al. 2005). Overall, both positive and negative affect reflect strong beneficial changes. The only notable exception is that life satisfaction for participants who were not in educational trajectories declines by almost one standard deviation, whereas it remains stable in the two other groups. This finding highlights the need to use a multidimensional perspective to examine SWB.

In the next step, an overarching confirmatory factor analysis including the five constructs of interest at both time periods was performed. Correlations between latent constructs are presented in Table 3. These correlations are moderate to high, and all in the expected direction.

Longitudinal associations between goal regulation and subjective well-being

The hypothesized model of the reciprocal association between autonomous goal regulation and SWB indicators (life satisfaction, positive affect, negative affect, and self-esteem) over a 2-year period was tested with structural equation modeling. This model retained the measurement structure of the confirmatory factor analysis, but also included structural relations between latent variables representing the hypothesized model. This model showed an excellent fit to the data, $\chi^2(687) = 1304.56$, CFI = 0.98, RMSEA = 0.02. In addition, the hypothesized paths of autonomous goal regulation predicting later SWB indicators were all statistically significant and in the expected direction (see Fig. 1). As anticipated, construct stability over time was high, with T1 counterpart factors significantly predicting T2 life satisfaction ($\beta = 0.44$, $p < .001$), positive affect ($\beta = 0.55$, $p < .001$), negative affect ($\beta = 0.60$, $p < .001$), self-esteem ($\beta = 0.64$, $p < .001$), and autonomous goal regulation ($\beta = 0.63$, $p < .001$). Despite these strong stability effects, results indicated that autonomous goal regulation at T1 positively predicted later life satisfaction ($\beta = 0.10$, $p < .01$), positive affect ($\beta = 0.15$, $p < .001$), and self-esteem ($\beta = 0.10$, $p < .01$) and negatively predicted negative affect ($\beta = -0.11$, $p < .001$).

[2] In order to facilitate interpretation of the latent means, we reparameterized the model using a nonarbitrary method to identify and set the scale of latent variables (see Little et al. 2006). This method allows estimating latent means in a nonarbitrary metric that reflects the metric of the indicators measured.

Table 2 Latent variable means at both time measures for the three groups: university students, vocational training students, and not in education

Variables	University			Vocational training			Not in education		
	Mean (T1)	Mean (T2)	Cohen's *d*	Mean (T1)	Mean (T2)	Cohen's *d*	Mean (T1)	Mean (T2)	Cohen's *d*
Life satisfaction	3.08	3.08	−0.01	2.96	2.96	0.01	2.93	2.55	−0.60
Positive affect	3.45	3.53	0.16	3.33	3.51	0.36	3.33	3.48	0.30
Negative affect	1.86	1.75	−0.22	1.96	1.80	−0.32	1.97	1.85	−0.23
Self-esteem	3.24	3.26	0.04	3.13	3.19	0.11	3.16	3.21	0.10
Autonomous regulation	9.17	9.86	0.19	9.17	10.50	0.37	9.24	10.23	0.24

Life satisfaction and self-esteem scores ranged from 1 to 4 (1 = *not agree at all*, 4 = *completely agree*). Positive and negative affect scores ranged from 1 to 5 (1 = *not at all*, 5 = *completely*). Autonomous regulation is a computed index and can range from −32 to 32. University students, $N = 1{,}733$; vocational training students, $N = 322$; not in education, $N = 191$

Table 3 Confirmatory factor analysis: correlations between all latent constructs

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1. Life satisfaction (T1)	–									
F2. Positive affect (T1)	0.51	–								
F3. Negative affect (T1)	−0.46	−0.13	–							
F4. Self-esteem (T1)	0.61	0.54	−0.46	–						
F5. Autonomous regulation (T1)	0.29	0.31	−0.34	0.28	–					
F6. Life satisfaction (T2)	0.48	0.29	−0.28	0.36	0.21	–				
F7. Positive affect (T2)	0.33	0.61	−0.17	0.41	0.31	0.47	–			
F8. Negative affect (T2)	−0.34	−0.16	0.65	−0.37	−0.30	−0.44	−0.29	–		
F9. Self-esteem (T2)	0.47	0.40	−0.38	0.69	0.26	0.56	0.55	−0.55	–	
F10. Autonomous regulation (T2)	0.18	0.16	−0.23	0.16	0.61	0.27	0.26	−0.34	0.30	–

Life satisfaction and self-esteem scores ranged from 1 to 4 (1 = *not agree at all*, 4 = *completely agree*). Positive and negative affect scores ranged from 1 to 5 (1 = *not at all*, 5 = *completely*). Autonomous regulation is a computed index and can range from −32 to 32. All correlations are significant at $p < .05$

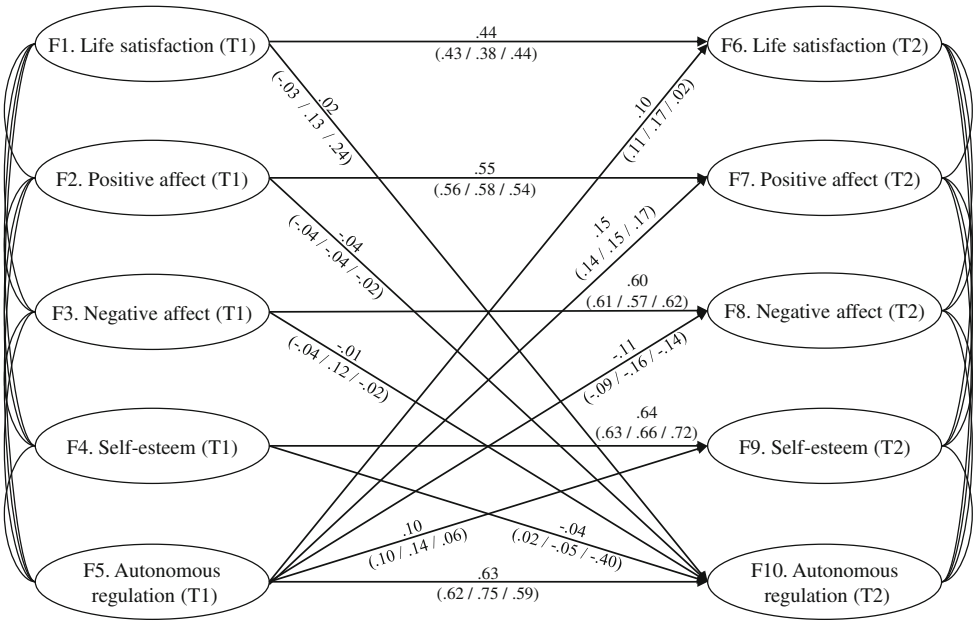

Fig. 1 Results of the structural equation model assessing prospective relationships between autonomous goal regulation and SWB indicators. Numbers in brackets refer to multigroup analyses, respectively: university, vocational training, and not in education trajectories. All path coefficients are standardized regression coefficients. F1–F10 are latent variables. *T1* = first measurement time; *T2* = second measurement time

In contrast to the consistent effect of autonomous goal regulation on SWB, no SWB indicators at T1 predicted autonomous regulation at T2 (life satisfaction: $\beta = 0.02$, positive affect: $\beta = -0.04$, negative affect: $\beta = -0.02$, self-esteem: $\beta = -0.04$, $p > .05$). In other words, participants who had more autonomous reasons to pursue their

personal goals in secondary school were more likely to report higher enjoyment of their lives and stronger self-esteem and healthier affect 2 years later.[3]

In additional exploratory analyses, we evaluated the potential effect of the autonomous goal regulation standard deviation (SD) on SWB indicators. In other words, we examined whether change in SWB would differ as a function of how consistently autonomous (or not) a student's regulation was across all personal goals. Findings indicated no consistent effects on SWB, and autonomous goal regulation SD significantly predicted only positive affect ($\beta = 0.08$, $p < .01$).

Multigroup invariance analyses

Because the participants chose various pathways (university, vocational training, or not in education), we tested for potential group differences in the association between goal regulation and SWB using multigroup structural equation modeling. To test for invariance in transition pathways, we first conducted a three-group analysis in which we constrained the structural coefficients between goal regulation and each SWB component at T2 and the measurement model (i.e., factor loadings) to be invariant across groups. The model showed a good fit, $\chi^2(2222) = 3169.63$, CFI = 0.97, RMSEA = 0.02. We then compared this model to a less restrictive model in which the structural coefficients were free to take different values for the three groups. Our results showed that the less restrictive model did not show a significantly better fit, $\Delta\chi^2(26) = 17.36$, $p = .90$, *ns*, indicating that the structural coefficients were similar across groups. For descriptive purposes, Fig. 1 also presents path coefficients for each group.

Discussion

The present study had three main results. First, we found that autonomous goal regulation, assessed before school graduation, positively predicted life satisfaction, positive affect, and self-esteem, and negatively predicted negative affect 2 years later, controlling for construct stability over time. Second, we proposed that autonomous goal regulation at T2 would be positively predicted by these SWB indicators. However, no empirical support was found for this association. Third, we expected the relationship between goal regulation and SWB to be similar regardless of the transition pathway (university, vocational school, or not in education). As expected, results of the structural equation model suggested that participants who felt that their personal goals were more autonomously regulated in secondary school were more likely to report higher SWB 2 years later, for all transition pathways. In contrast, none of the SWB indicators at the end of high school predicted autonomous regulation 2 years later.

Predicting subjective well-being with goal regulation

According to SDT, autonomous regulation is positively associated with adaptive behaviors and SWB (Deci and Ryan 2000). Empirical studies to date have supported this hypothesis (e.g., Deci and Ryan 2000; Kim et al. 2002; Sheldon and Kasser 1995). However, no prior study has focused on the developmentally critical post-school period or on whether this relationship is consistent across different transition pathways. Therefore, with its large-scale design and the differentiation of three different transition trajectories, the present study yielded substantial new evidence for the key role of autonomous goal regulation.

Extending prior studies, our results showed that students' personal goal regulation at the end of secondary school predicted SWB 2 years later. This indicates that the quality of personal goal motivation can have a meaningful impact on subsequent life satisfaction, positive affect, negative affect, and self-esteem over long periods of time and during major life transitions. Shaped by profound changes, the post-school transition period can open up new avenues and provide individuals with the potential for personal growth. However, this opening may depend in part on whether individuals systematically pursue their significant goals for autonomous reasons. In line with Creed et al. (2003) and Schulenberg et al. (2005), our findings indicate that SWB was generally higher 2 years after the post-school transition. The only exception was that life satisfaction declined for individuals who were not in an educational trajectory, whereas the other well-being indicators were less affected in this group. This supports the need to distinguish between different well-being indicators. The group that was not in education comprised mainly individuals who were either working or unemployed (with only a few in the military, for example). Given that they had graduated from a university track, it would be understandable that they were not fully satisfied with their current life conditions.

Our results are relevant in suggesting that autonomous goal regulation may be important in helping young people navigate the substantial changes that occur during the post-school transition, leading to greater well-being and

[3] In additional analyses, we explored the four types of regulation independently as predictors of SWB (instead of using the RAI score). The results suggested that intrinsic regulation was the most important factor in the association between regulation and SWB. However, the four types of regulation were highly correlated, such that multicollinearity of the predictors affected the coefficient sizes. None of the T1 SWB indicators was associated with any of the four types of regulation at T2.

happiness. According to SDT, these benefits are derived from selecting and pursuing personal goals that are more autonomously regulated, being characterized by a full sense of ownership of one's actions (Ryan 1995). The post-school transition is considered a period of numerous changes, when individuals make choices that have enduring ramifications (Arnett 2000). Individuals who feel a greater sense of ownership by having personal goals driven by autonomous regulation might be more protected from feelings of uncertainty, and therefore better able to adjust during this transition period. In line with this suggestion, Sheldon and Elliot (1998) contend that lower autonomous regulation occurs when people cannot accurately assess their deeper needs, values, and interests.

Using multiple group analyses, we found a highly similar pattern of results for the three groups of young adults studied: autonomous goal regulation similarly predicted well-being in beginning university students, individuals who started vocational training, and individuals who were not in educational trajectories. This result concurs with SDT-based predictions, showing that the beneficial effects of autonomous goal regulation are not restricted to students in normative pathways.

Our results also indicated similar effects for all four major components (see Diener et al. 1999) of well-being (i.e., pleasant affect, unpleasant affect, life satisfaction, domain satisfaction), indicating that a common process may underlie the association between autonomous goal regulation and SWB. These findings reinforced those of Sheldon et al. (2004a) on autonomous goal regulation prediction of multiple SWB indicators, including life satisfaction and positive and negative affect.

Predicting goal regulation with subjective well-being

Based on assumptions by Diener and Fujita (1995) and Sheldon (2002), and in line with the broaden-and-build hypothesis (Fredrickson 2001), we suggested that happier people might select goals that are more concordant with their resources, interests, and values. However, our results do not support this hypothesis. Indeed, none of the SWB indicators measured at the end of secondary school predicted autonomous goal regulation 2 years later. These findings also diverge from those obtained by Isen and Reeve (2005), who suggested that positive affect increases intrinsic motivation. This inconsistency might be due in part to the adopted method. Whereas Isen and Reeve (2005) used an induced positive affect situation immediately prior to free-choice experimental tasks, we assessed positive affect in a natural situation and its potential effect on autonomous personal goal regulation across a 2-year transition phase. It is plausible that the more general assessment of positive affect and the longer period of time, which was characterized by profound changes, dissolved the effect observed with more momentary good feelings. Although our results showed that SWB indicators were more favorable after the transition, there was no effect on autonomous goal regulation. These finding are similar to those observed by Fredrickson et al. (2008), that whereas increased positive emotion enhanced a wide range of personal resources, it had no effect on autonomy. Our results are also consistent with SDT. Based on this theory, there should be a relationship between the fulfillment of psychological needs and (later) goal regulation, whereas no direct relationship between well-being and later goal regulation has been postulated.

Limitations and future studies

The present study has several strengths, and it supports and extends previous findings. However, five limitations deserve attention. First, self-report scales were used, increasing the likelihood of common method variance (Podsakoff et al. 2003). It is important to note, however, that self-reports also have a number of advantages, and may be the method of choice for exploring intrapsychic factors such as personal goal regulation and SWB indicators (Crockett et al. 1987; Howard 1994). Notwithstanding, other methods such as diary studies or qualitative research could be used to further validate our findings. Second, the analyses were based on data from just two points of measurement, such that no conclusions could be drawn on the shape of the developmental trajectory for well-being or goal regulation (Duncan et al. 2006). Future studies could use growth curve models to examine interindividual differences in intraindividual developmental trajectories (for an overview, see Mroczek et al. 2006). Third, this study was restricted to German high school students who had followed an academic track (Gymnasium), which constitutes about one-third of the total German student population. However, our sample was still quite heterogeneous when compared to previous research on personal goal regulation, and it allowed us to differentiate between normative and non-normative pathways. Fourth, the magnitude of the observed effects between T1 autonomous regulation and T2 SWB indicators was fairly small (e.g., $\beta = 0.10$). However, these effects were still substantial as they were observed across a 2-year period and could be expected to accumulate over time (Neyer and Asendorpf 2001). In addition, when interpreting these effects, readers should take into account that interindividual differences in SWB are determined by multiple factors, and that only one factor was considered for autonomous goal regulation in the present study (Prentice and Miller 1992).

Despite these limitations, our findings replicate and extend previous studies. As expected, autonomous goal

regulation, assessed before school graduation, was positively related to life satisfaction, positive affect, and self-esteem and negatively to negative affect 2 years later. This type of goal regulation may help students successfully navigate the post-school transition, a time of critical changes and choices.

Acknowledgments Work on this manuscript was supported by grants from the Jacobs Foundation, the Baden-Württemberg Ministry of Science, Research and the Arts, and the Fonds de Recherche sur la Société et la Culture (FRQSC).

References

Allison, P. D. (2001). *Missing data*. Thousand Oaks, CA: Sage.

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469–480.

Beck, R., Taylor, C., & Robbins, M. (2003). Missing home: Sociotropy and autonomy and their relationship to psychological distress and homesickness in college freshmen. *Anxiety, Stress, and Coping, 16*, 155–166.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education, 84*, 740–756.

Bollen, K. A., & Curran, P. J. (2005). *Latent curve models: A structural equation perspective*. New York, NY: Wiley.

Cooke, R., Bewick, B. M., Barkham, M., Bradley, M., & Audin, K. (2006). Measuring, monitoring and managing the psychological well-being of first year university students. *British Journal of Guidance & Counselling, 34*, 505–517.

Creed, P. A., Muller, J., & Patton, W. (2003). Leaving high school: The influence and consequences for psychological well-being and career-related confidence. *Journal of Adolescence, 26*, 295–311.

Crockett, L., Schulenberg, J., & Petersen, A. (1987). Congruence between objective and self-report data in a sample of young adolescents. *Journal of Adolescent Research, 2*, 383–392.

Deci, E. L. (1972). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology, 22*, 113–120.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268.

Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology, 49*, 14–23.

Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology, 47*, 1105–1117.

Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being: A nomothetic and idiographic approach. *Journal of Personality and Social Psychology, 68*, 926–935.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*, 276–302.

Duncan, T., Duncan, S., & Strycker, L. (2006). *An introduction to latent variable growth curve modeling: Concepts, issues, and applications*. Marwah, NJ: Lawrence Erlbaum.

Eccles, J., Templeton, J., Barber, B., & Stone, M. (2003). Adolescence and emerging adulthood: The critical passage ways to adulthood. In M. H. Bornstein, L. Davidson, C. L. M. Keyes, & K. A. Moore (Eds.), *Well-being: Positive development across the life course* (pp. 383–406). Mahwah, NJ: Lawrence Erlbaum Associates.

Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology, 51*, 1058–1068.

Enders, C. K. (2010). *Applied missing data analysis*. New York, NY: Guilford Press.

Fisher, S., & Hood, B. (1987). The stress of the transition to university: A longitudinal study of psychological disturbance, absent-mindedness and vulnerability to homesickness. *British Journal of Psychology, 78*, 425–441.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226.

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology, 95*, 1045–1062.

Goldberg, L. R. (1963). A model of item ambiguity in personality assessment. *Educational and Psychological Measurement, 23*, 467–492.

Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology, 95*, 124–136.

Hamilton, S. F., & Hamilton, M. A. (2006). School, work, and emerging adulthood. In J. Arnett & J. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 257–277). Washington, DC: American Psychological Association.

Howard, G. (1994). Why do people say nasty things about self-reports? *Journal of Organizational Behavior, 15*, 399–404.

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications*. New York, NY: Routledge.

Isen, A. M., & Reeve, J. (2005). The influence of positive affect on intrinsic and extrinsic motivation: Facilitating enjoyment of play, responsible work behavior, and self-control. *Motivation and Emotion, 29*, 295–325.

Jöreskog, K. G. (1979). Statistical estimation of structural models in longitudinal developmental investigations. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 303–351). New York, NY: Academic Press.

Kaplan, D. (2000). *Structural equation modeling: Foundations and extensions*. Thousand Oaks, CA: Sage Publications.

Kim, Y., Deci, E. L., & Zuckerman, M. (2002). The development of the self-regulation of withholding negative emotions questionnaire. *Educational and Psychological Measurement, 62*, 316–336.

Kishton, J., & Widaman, K. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and Psychological Measurement, 54*, 757–765.

Krohne, H. W., Egloff, B., Kohlmann, C., & Tausch, A. (1996). Untersuchungen mit einer deutschen Version der "Positive and Negative Affect Schedule" (PANAS) [Investigations with a German version of the "Positive and Negative Affect Schedule" (PANAS)]. *Diagnostica, 42*, 139–156.

Levesque, C., Zuehlke, A. N., Stanek, L. R., & Ryan, R. M. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*, 68–84.

Little, B. R. (1983). Personal projects: A rationale and method for investigation. *Environment and Behavior, 15*, 273–309.

Little, T. D., Slegers, D. W., & Card, N. A. (2006). A non-arbitrary method of identifying and scaling latent variables in SEM and MACS models. *Structural Equation Modeling: A Multidisciplinary Journal, 13*, 59–72.

Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology, 71*, 616–628.

Lüdtke, O. (2006). *Persönliche Ziele junger Erwachsener* [Personal goals of young adults]. Münster, Germany: Waxmann.

Marsh, H. W., & Hau, K. (1996). Assessing goodness of fit: Is patrimony always desirable? *Journal of Experimental Education, 64*, 364–390.

Marsh, H. W., & O'Neill, R. (1984). Self Description Questionnaire III: The construct validity of multidimensional self-concept ratings by late adolescents. *Journal of Educational Measurement, 21*, 153–174.

Marsh, H. W., & Yeung, A. S. (1998). Top-down, bottom-up, and horizontal models: The direction of causality in multidimensional, hierarchical self-concept models. *Journal of Personality and Social Psychology, 75*, 509–527.

McIntosh, C. (2001). Report on the construct validity of the temporal satisfaction with life scale. *Social Indicators Research, 54*, 37–56.

Meredith, W., & Horn, J. (2001). The role of factorial invariance in modeling growth and change. In A. Sayer & L. Collins (Eds.), *New methods for the analysis of change* (pp. 203–240). Washington, DC: American Psychological Association.

Messersmith, E. E., & Schulenberg, J. E. (2010). Goal attainment, goal striving, and wellbeing during the transition to adulthood: A ten-year U.S. national longitudinal study. *New Directions for Child and Adolescent Development, 130*, 27–40.

Mroczek, D., Almeida, D., Spiro, A., I. I. I., & Pafford, C. (2006). Modeling intraindividual stability and change in personality. In D. K. Mroczek & T. D. Little (Eds.), *Handbook of personality development* (pp. 163–180). Mahwah, NJ: Erlbaum.

Muthén, L. K., & Muthén, B. O. (2006). *Mplus user's guide*. Los Angeles, CA: Muthén & Muthén.

Neyer, F. J., & Asendorpf, J. B. (2001). Personality-relationship transaction in young adulthood. *Journal of Personality and Social Psychology, 81*, 1190–1204.

Nurmi, J.-E. (2001). *Navigating through adolescence: European perspectives*. New York, NY: Falmer Press.

Parker, P. D., Lüdtke, O., Trautwein, U., & Roberts, B. W. (2012). Personality and relationship quality during the transition from high school to early adulthood. *Journal of Personality, 80*, 1061–1089.

Pavot, W., Diener, E., & Suh, E. (1998). The temporal satisfaction with life scale. *Journal of Personality Assessment, 70*, 340–354.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879–903.

Prentice, D. A., & Miller, D. A. (1992). When small effects are impressive. *Psychological Bulletin, 112*, 160–164.

Raykov, T. (2004). Behavioral scale reliability and measurement invariance evaluation using latent variable modeling. *Behavior Therapy, 35*, 299–331.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality, 63*, 397–427.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57*, 749–761.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory. In E. L. Deci & R. R. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). Rochester, NY: University of Rochester Press.

Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45*, 736–750.

Salmela-Aro, K., & Nurmi, J. (1997). Goal contents, well-being, and life context during transition to university: A longitudinal study. *International Journal of Behavioral Development, 20*, 471–491.

Schulenberg, J. E., O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (2005). In R. A. Settersten, F. F. Furstenberg, & R. G. Rumbaut (Eds.), *On the frontier of adulthood: Theory, research, and public policy* (pp. 417–453). Chicago, IL: University of Chicago Press.

Schulenberg, J. E., & Zarrett, N. R. (2006). Mental health during emerging adulthood: Continuity and discontinuity in courses, causes, and functions. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 135–172). Washington, DC: American Psychological Association.

Schwanzer, A., Trautwein, U., Lüdtke, O., & Sydow, H. (2005). Entwicklung eines Instruments zur Erfassung des Selbstkonzepts junger Erwachsener [Development of a questionnaire to measure young adults' self-concept]. *Diagnostica, 51*, 183–194.

Sheldon, K. M. (2002). The self-concordance model of healthy goal-striving: When personal goals correctly represent the person. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 65–86). Rochester, NY: University of Rochester Press.

Sheldon, K. M., & Elliot, A. J. (1998). Not all personal goals are personal: Comparing autonomous and controlled reasons for goals as predictors of effort and attainment. *Personality and Social Psychology Bulletin, 24*, 546–557.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*, 482–497.

Sheldon, K. M., Elliot, A. J., Ryan, R. M., Chirkov, V., Kim, Y., Wu, C., et al. (2004a). Self-concordance and subjective well-being in four cultures. *Journal of Cross-Cultural Psychology, 35*, 209–223.

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology, 68*, 531–543.

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. *Personality and Social Psychology Bulletin, 24*, 1319–1331.

Sheldon, K. M., Ryan, R. M., Deci, E. L., & Kasser, T. (2004b). The independent effects of goal contents and motives on well-being: It's both what you pursue and why you pursue it. *Personality and Social Psychology Bulletin, 30*, 475–486.

Trautwein, U. (2004). Die temporale Facetten der Lebenszufriedenheit: Eine deutsche Adaptation der Skala von Pavot, Diener und Suh (1998) [The temporal dimensions of life satisfaction: A German adaptation of the scale by Pavot, Diener and Suh (1998)]. *Diagnostica, 50,* 182–192.

Trautwein, U., Neumann, M., Nagy, G., Lüdtke, O., & Maaz, K. (Eds.). (2010). *Schulleistungen von Abiturienten [School achievement at the German gymnasium]*. Wiesbaden, Germany: VS Verlag für Sozialwissenschaften.

Vallerand, R. J., Blais, M. R., Brière, N. M., & Pelletier, L. G. (1989). Construction et validation de l'échelle de motivation en éducation (EME) [Construction and validation of the Motivation toward

Education Scale (EME)]. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 21*, 323–349.

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41*, 19–31.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.

Zarrett, N., & Eccles, J. (2006). The passage to adulthood: Challenges of late adolescence. *New Directions for Youth Development, 2006*, 13–28.