



# Measuring Adolescents' Well-Being in Schools: The Adaptation and Translation of the EPOCH Measure of Adolescent Well-Being—A Validation Study

Sarah Buerger<sup>1</sup> · Julia Holzer<sup>1</sup> · Takuya Yanagida<sup>1</sup> · Barbara Schober<sup>1</sup> · Christiane Spiel<sup>1</sup>

Accepted: 11 February 2023 / Published online: 25 February 2023  
© The Author(s) 2023

## Abstract

This paper addresses a validation study focusing on the process of adapting the EPOCH measure of adolescent well-being (Kern et al. in *Psychol Assess* 28(5):586–597. <https://doi.org/10.1037/pas0000201>, 2016) to the school context and translating it into German—resulting in the EPOCH-School model (EPOCH-S) with the corresponding measure EPOCH-G-S (EPOCH-German-School). As schools represent an important context for promoting well-being, while at the same time, favorable effects of school-related well-being for adolescent development can be expected, research on school-related well-being is of utmost interest. To provide schools with the information they actually need to promote their students' well-being, integrative measurements of school-related well-being are important. The EPOCH-G-S is a multidimensional approach to measuring students' well-being in schools with five factors: *Engagement, Perseverance, Optimism, Connectedness, and Happiness*. Construct validity and convergent validity of the EPOCH-G-S measure were validated in this study with an Austrian student sample (grade 5 to 12) of N = 1651 students (52.03% males, 47.43% females, 0.55% others, mean age 13.13 years/SD = 1.89). Validation results are in favor of the EPOCH-G-S as an instrument to assess students' well-being in school. A second-order model was applied with well-being as a second-order factor and the five specific EPOCH first-order factors. This allows for detecting strengths and weaknesses in students' well-being profiles and derive needs for intervention. Additional measurement invariance analyses regarding gender and age were conducted.

**Keywords** School-related well-being · School satisfaction · Student questionnaire · Multidimensional approach · Educational psychology · School psychology

## Why It is Important to Measure School-Related Well-Being

Well-being is a widely used term to describe optimal psychological experience and functioning (Deci & Ryan, 2008). There are several approaches to define or conceptualize well-being, differing depending on the (research) context. In the field of educational psychology, research on well-being has become an increasingly studied research topic with respect to students' optimal psychological experience and functioning in school. As the call for “twenty-first-century schooling”

(Waters, 2011) has become unmistakable, it is widely agreed that the purpose of schools should not be limited to academic learning but should also focus on students' well-being (Kern et al., 2015; Peterson et al., 2005; Seligman et al., 2009). This can be seen as a great resource for their learning behavior, developing abilities as well as for facing challenges in life as experiences at school will influence their development not only in the sense of academic achievement but also impact their lifelong development (e.g., Eccles & Roeser, 2011; Park, 2004). In PISA 2018, one of the main aspects named by students that influence their life and how they feel was life at school (OECD, 2019). There is also strong evidence that supporting students' well-being has an impact on their success in school (Adler, 2016; Durlak et al., 2011; Hascher & Hagenauer, 2010; Karvonen et al., 2018; Yang et al., 2018). It is associated with higher self-control regarding academic-related tasks as well as school grades (Howell, 2009). Students with higher well-being are less often

✉ Sarah Buerger  
sarah.buerger@univie.ac.at

<sup>1</sup> Department for Psychology of Development and Education, Faculty of Psychology, University of Vienna, Universitaetsstrasse 7, 1010 Vienna, Austria

absent from school (Suldo et al., 2011), feel more capable of coping with academic challenges and value school more highly in general (Hascher, 2010). Moreover, components of well-being, such as connectedness (Turner et al., 2014) and optimism (Låftman et al., 2018), are associated with lower levels of bullying in school. Furthermore, well-being in school can be seen as a potential coping mechanism for dealing with stress and upcoming challenges in schools (Ruus et al., 2007).

Concluding, in view of the literature on the important role of well-being, it is a central ambition to effectively target adolescent well-being. In this respect, schools represent an important context for promoting well-being, while at the same time, favorable effects of school-related well-being for adolescent development can be expected (Eccles & Roeser, 2011; Park, 2004). Therefore, research on school-related well-being, especially the use of scientifically developed measurement instruments, can provide schools with the necessary information they need to promote the well-being of their students. Multidimensional measures on the status quo concerning the well-being of students in a school raise the opportunity to obtain a nuanced overview of students' needs and to develop interventions that specifically address them. In this respect, we argue that consideration of the particular setting is highly relevant to gaining an understanding of predictors, effects, and how to promote well-being. For that purpose and in order to strengthen students' well-being in all its facets, it is best to have a detailed view of school-related well-being what makes multidimensional instruments essential. Accordingly, specific models and measures that take specificities of the educational setting into account, are required.

## Conceptualization of Well-Being

There is great inconsistency in operationalizations of students' well-being, ranging from global life satisfaction to measures of positive or negative affect (Bücker et al., 2018; Fanchini et al., 2019), and a lack of appropriate measures for specifically targeting students' context-related well-being in schools (Renshaw et al., 2015). From the numerous definitions of well-being (e.g., Hefferon & Boniwell, 2011; Seligman, 2018; Vernon, 2008), only a few explicitly address students' well-being (e.g., Tobia et al., 2019; Van Petegem et al., 2008). Especially in studies using German-speaking samples, the understanding of school-related well-being is very heterogeneous as well as the use of instruments is (e.g., Kroeske, 2020; Rathmann et al., 2016; Schnick-Vollmer et al., 2020). In these studies, students' well-being is assessed using different measures supporting the respective understanding of well-being (e.g., school experience and engagement, negative and positive affect, school

connectedness). Likewise, instruments are sometimes used that were not originally designed to measure students' well-being. For example, although it was validated on a clinical sample, the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a frequently used questionnaire for assessing students' well-being in German-speaking samples (e.g., Marckhoff et al., 2022; Schneider et al., 2022; Schwab et al., 2015). According to the meta-analysis by Bücker et al. (2018), students' global life satisfaction and positive affect are the two most common used constructs to operationalize adolescent well-being in German-speaking samples. This shows the need for a single instrument assessing multiple facets of students' well-being, parsimoniously combined within a comprehensive framework.

## Hedonic and Eudaemonic Well-Being

In recent literature, well-being is more often defined as feeling good and functioning well (Huppert, 2014), rather than the mere absence of ill-being, as it had been defined over many decades before. This conceptualization integrates both: hedonic well-being (feeling good; Diener, 1984) and eudaemonic well-being (the feeling of functioning well; Ryff, 1989). While hedonic aspects of well-being refer to experienced positive affect, eudaemonic aspects refer to well-being as a process of self-actualization and the pursuit of intrinsic values (Deci & Ryan, 2008). From this perspective, factors that were originally seen as either antecedents or outcomes of well-being are referred to as integral part of the construct. Nevertheless, many studies (e.g., Proyer & Tandler, 2020; Steinmayr et al., 2018; Urhahne & Zhu, 2015) based their operationalization of well-being on a conceptualization of global life satisfaction (e.g., the *Habitual Subjective Well-Being Scale* [HSWBS]; Dalbert, 2003, or the *Students' Life Satisfaction Scale* [SLSS]; Weber et al., 2013). However, there is growing consensus that it is important to have an integrative view of well-being that focuses not only on hedonic but also on eudaemonic well-being as a process in order to be able to promote single facets of the construct (e.g., Deci & Ryan, 2008). Accordingly, an integrative approach of conceptualization is needed, that goes beyond the concept of life satisfaction and describes different facets through which well-being can be expressed. Addressing different facets of well-being makes it possible to address individual strengths and weaknesses especially important in the field of educational practice. In line with this theoretical point of view, and in light of the complexity of the well-being construct, it should be measured using a multidimensional approach (Forgeard et al., 2011; Ryff & Keyes, 1995) also accounting for context-specificity (Huebner et al., 2014). Multidimensional measures of well-being show only moderate correlations with life satisfaction measures (Huppert & So, 2013), underlining the

more comprehensive character of the well-being construct. There are some integrative approaches focusing more on youth development, like the *Five Cs Model of Positive Youth Development* (Lerner et al., 2005) and the model of *Covitality* (Furlong et al., 2014), both not directly addressing adolescents' well-being in the narrower sense. Although they contain some school-specific items, most of the items are not context specific. Renshaw et al. (2015) developed the *Student Subjective Wellbeing Questionnaire* which explicitly focuses on students' well-being in schools. However, it mostly addresses the hedonic part of well-being and only sparsely the process-related aspects of functioning well.

### The EPOCH Model

The EPOCH model (Kern et al., 2015) is an integrative conceptualization focusing on adolescents' well-being that explicitly integrates a eudaemonic and hedonic perspective. Well-being in the sense of the EPOCH is more than just feeling good or being satisfied. As it integrates a eudaemonic perspective of well-being, it also refers to the feeling of functioning well and being optimistic about one's future and thus feeling self-efficient. The EPOCH model (Kern et al., 2015) is based on Seligman's (2011) conceptualization of well-being as a multidimensional construct, consisting of *Positive Emotions, Engagement, Relationships, Meaning, and Accomplishment* (PERMA). Applying the PERMA model to adolescents revealed a different factor structure for that target group, e.g., in that items reflecting *Meaning* loaded on the *Relationships* factor (Kern et al., 2015). The EPOCH model consists of the five factors *Engagement, Perseverance, Optimism, Connectedness, and Happiness* and addresses the well-being of adolescents aged 10–18. *Engagement* refers to being absorbed by an activity, forgetting everything else. Very high levels of engagement are referred to as "flow" (Csikszentmihalyi, 1997). *Perseverance* refers to sticking with tasks and pursuing one's goals even when encountering obstacles. Subjective achievement seems to consist of perseverance (Kern et al., 2015). *Optimism* refers to one's feelings toward the future, hopefulness, and confidence. *Connectedness* is understood as having friends and being cared for. *Happiness* refers to steady states of positive mood and a general feeling of happiness (Kern et al., 2016). The five factors of the EPOCH model are argued to support well-being in the sense of PERMA in adulthood. Hence, well-being is defined by EPOCH using a multidimensional approach, offering the chance to measure well-being comprehensively and thus to better understand and promote well-being by deriving specific intervention needs. This makes it very useful for schools and education.

For measuring well-being in sense of the EPOCH model, a corresponding questionnaire, the *EPOCH Measure of Adolescent Well-Being* (Kern et al., 2016), consists of 20 items on a five-point response scale. There are four items for each EPOCH domain. Validation study results (Kern et al., 2015, 2016) favored a five-factor structure with the EPOCH domains described above over a higher-order structure. The factors were moderately inter-correlated. Nevertheless, in addition to the five-factor scores, the authors suggest calculating an overall psychological function score as the average of all five-factor scores. Exploring the nomological network, well-being was only weakly to moderately correlated with additionally measured ill-being factors, supporting the assumption that well-being refers to more than the mere absence of ill-being (Kern et al., 2016). Moreover, based on a qualitative study on students' and teachers' conceptualizations of school-related well-being (Holzer et al., 2021), the multidimensional EPOCH model, adapted to the school context, represents an appropriate framework to map the components of school-related well-being as reported by students and teachers. In this exploratory study, students and teachers were asked to give statements about students' school-related well-being via questionnaire. Statements of students and teachers were then categorized within the EPOCH framework. Most frequently addressed categories were *Connectedness, Happiness, and Engagement*, while *Perseverance* and *Optimism* were less often addressed. This could be attributed to the questionnaire itself relating the questions directly to observable behavior that is more difficult to answer in terms of *Perseverance* and *Optimism*.

However, the EPOCH addresses adolescents' general well-being, neglecting context-specificity. Thus, it allows to derive conclusions about adolescents' overall well-being, but limits the possibility to locate concrete resources as well as specific needs for intervention within significant settings, such as the school environment.

As there is a lack of German-speaking instruments comprehensively targeting students' well-being in school, we aimed at using the advantages of the EPOCH model and simultaneously overcoming the neglected context-specificity. Thus, we wanted to provide a useful multidimensional German-speaking measurement for assessing students' well-being that integrates hedonic and eudaemonic indicators of well-being. For that purpose, we translated the EPOCH measurement into German and adapted the EPOCH model to the school context.

## The Present Study

Given the relevance of the respective context for understanding well-being (Bradshaw et al., 2011) and the call for context-specific measures of school-related well-being (e.g., Huebner et al., 2014), the present study sought to provide an instrument for explicitly measuring the well-being of students in school, which, in contrast to previous operationalizations, integrates hedonic and eudaemonic aspects and takes into account the specificity of the school context. The instrument intends to unite facets that have so far, in different constellations been put together under the umbrella-term well-being, and to integrate them within a consistent framework. This multidimensional approach enables to determine differentiated well-being profiles of students in schools and to derive specific needs for the promotion of their school-related well-being by using a single and consistent instrument.

We chose to base the development of the instrument on EPOCH, as it comprehensively covers hedonic as well as eudaemonic aspects of well-being and at the same time offers the possibility of assessing well-being in a parsimonious way. Therefore, the *EPOCH Measure of Adolescent Well-Being* was translated into German using the translation–backtranslation strategy (Brislin, 1986). In a further step, the German version of the EPOCH was adapted to the school context. This resulted in a general conceptualization of well-being in schools (the EPOCH-School model) with the corresponding German-language measurement, the EPOCH-German-School (EPOCH-G-S).

## Research Questions and Hypotheses

The main goal was to investigate the construct validity of the EPOCH-G-S measurement. We hypothesized that the five-factor structure of the EPOCH would also yield acceptable model fit for the EPOCH-G-S (Hypothesis 1). Although validation results of Kern et al. (2016) were favoring the five-factor model over a higher-order model, we assumed a higher-order well-being factor accounting for the relationship between the five dimensions making up the EPOCH in our data (Hypothesis 2). From a theoretical point of view, this assumption would lead to a better use of interpretation of students' well-being in school (e.g., Chen et al., 2005) by allowing interpretation of a general school-related well-being factor as well as of its subscales. Regarding validity in terms of test score interpretations (AERA et al., 2022), we collected evidence for convergent validity using additional questionnaires. The respective measures were, on the one hand, chosen based on the theoretical conceptualization of the EPOCH-G-S dimensions and, on the other hand, selected to assess convergent validity of the assumed second-order

well-being-factor. We implemented scales that were available in German and, optimally, validated among a sample of German-speaking adolescents. Depending on availability of convergent measures, we chose scales that either referred to the dimensions of the EPOCH framework or the EPOCH-G-S dimensions, accounting for the EPOCH dimensions adapted to the school context.

To assess convergent validity of the assumed second-order well-being factor, our strategy was to select constructs that, in previous studies, have predominantly been applied to target adolescents' general well-being, as well as to account for students' optimal experience and functioning in school. As students' global life satisfaction and positive affect are the two most common used constructs to operationalize adolescent well-being (Bücker et al., 2018), we accordingly used the *Students' Life Satisfaction Scale* (SLSS; Weber et al., 2013) and the positive scale of the *Scale of Positive and Negative Experience* (SPANE; Rahm et al., 2017). We hypothesized positive associations between well-being as a higher-order factor with both scales (Hypotheses 3a and 3b) and negative associations between general student well-being and the negative scale of the SPANE (Hypothesis 3c). We expected these associations to be only moderately high because none of these measures focus on the school context. To account for students' optimal experience in school, we used a single item measuring *General Satisfaction with School* (see Beierlein et al., 2014). According to Deci and Ryan (2008), optimal functioning (i.e., eudaemonic well-being) refers to the pursuit of intrinsic values. From this perspective, experience of optimal functioning in school is supposed to relate to motivation for school, as students feel to pursue what is intrinsically important to them. We therefore applied the *Motivation for School* scale (MIS MX; Stöber, 2002) to address convergent validity of the second-order well-being factor with respect to the aspect of optimal functioning. We hypothesized strong positive correlations between the EPOCH-G-S as a general well-being measure and the MIS MX scale (Stöber, 2002) as well as the single item (Beierlein et al., 2014) (Hypotheses 3d and 3e).

For each of the five EPOCH dimensions, at least one scale was chosen that referred to the same underlying theory or matched the construct to be measured as close as possible.

For *Engagement*, we used the *Engagement* subscale from the *Orientation to Happiness* scale (OTH; Ruch et al., 2014, adapted from Peterson et al., 2005), because in the EPOCH framework and the OTH, engagement is referred to the same underlying theory with regard to the conceptualization of engagement by Csikszentmihalyi (1997). We assumed a positive relationship between the scales (Hypothesis 4a), although we expected this correlation to be only moderately high because the school context was not explicitly addressed in the OTH.



For *Perseverance*, we chose the *BISS-8* (Schmidt et al., 2019) scale measuring GRIT as Kern et al. (2016) in the EPOCH framework referring to the concept of GRIT as encompassing perseverance. We assumed a highly positive association between *Perseverance* and the *BISS-8* (Schmidt et al., 2019) subscales *Perseverance of Effort* and *Consistency of Interest* (Hypotheses 4b1 and 4b2).

*Optimism*, as conceptualized according to Kern et al. (2016), refers to one's feelings toward the future, hopefulness, and confidence. Adapted to the school context, *Optimism* in the EPOCH-G-S refers to an optimistic attitude toward one's future in school and confidence with respect to school-related challenges. Because of its conceptual similarity, we chose the school-related self-efficacy expectation scale *WIRKSCHUL* (Jerusalem & Satow, 1999) for convergent validity and hypothesized a highly positive relation between *Optimism* and the *WIRKSCHUL* scale (Hypothesis 4c).

*Connectedness*, i.e., having friends and being cared for (Kern et al., 2016), in the EPOCH-G-S intends to target satisfying relationships in school. Connectedness in school is often measured using single items assessing the relationships in classes or based on class climate measures (e.g., Bond et al., 2007; Eder & Haider, 2012). Thus, we decided to base the convergent validity testing on measures of school and class climate, namely the *Linzer Questionnaire* measuring school and class climate (LFSK; Eder & Mayr, 2000) and the *Positive Class Climate* scale (KLAKL; Stöber, 2002). As for the LFSK, we used the subscale *School Community*, accounting for cohesion in school among students, and the subscale *Teacher Involvement*, targeting the teachers' social and emotional support. As teacher involvement cannot be seen as a characteristic expressive for student well-being, but as indicative of teachers' attitudes, the measure was used to account for an antecedent of *Connectedness*, rather than a convergent measure of the actual construct. We assumed positive correlations with the two subscales of the LFSK (Eder & Mayr, 2000) (Hypotheses 4d1 and 4d2) as well as with the KLAKL scale (Stöber, 2002) (Hypothesis 4e). We expect both correlations to be only moderately high because the *Connectedness* dimension focuses not only on class climate but also on social relationships in class and school.

*Happiness* demonstrated the strongest (negative) correlations with negative affect in the original EPOCH validation study. For validation purposes of the EPOCH-G-S, we accordingly tested validity measuring test anxiety as one of the most common causes for negative affect at school (OECD, 2017). We used the two subscales *Worry* and *Lack of Confidence* of the *Test Anxiety Questionnaire* (PAF; Hodapp et al., 2011) to test convergent validity and assumed a positive association because high scores on the two scales indicate no worry and no lack of confidence, respectively, regarding tests in school (Hypotheses 4f1 and 4f2).

We assumed moderate to high latent correlations between those measures and the specific EPOCH dimensions, and the second-order well-being factor, respectively. Due to the lack of German-speaking instruments assessing school-related dimensions of well-being, not all of the questionnaires used for validity purposes were specifically developed for the school context, namely the *Students' Life Satisfaction Scale*, the *Scale of Positive and Negative Experience*, the *BISS-8 Grit*, and the *Orientations to Happiness Questionnaire*, respective correlations were expected to be only moderate. Figure 1 shows the hypothesized relations for the convergent measures (for detailed descriptions of the instruments, see Instrument section).

Moreover, we assumed scalar invariance of the EPOCH-G-S regarding gender (Hypothesis 5a) and age (Hypothesis 5b), meaning that factor means can be compared across groups.

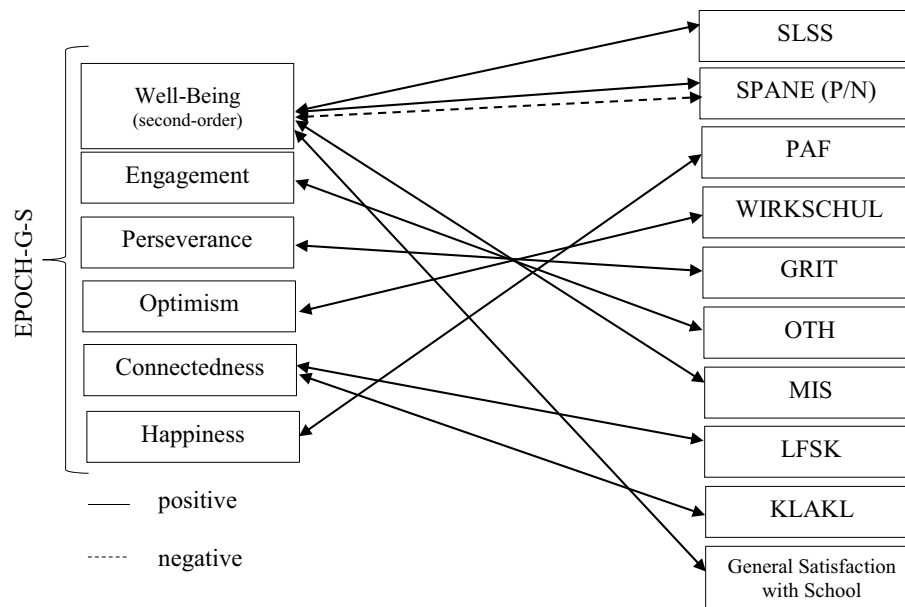
## Method

### Sample and Procedure

The sample consisted of  $N = 1651$  students (52.03% males, 47.43% females, 0.55% others) with a mean age of 13.13 years ( $SD_{\text{age}} = 1.89$ , range = 10–18). 67.96% were native German speakers, 9.09% were Serbian, 9.09% were Turkish, and 7.33% were English native speakers, while 6.53% reported other native languages.

Data collection took place in spring 2019 in 91 classes (from fifth to twelfth grade) in six schools in Vienna, Austria. All schools were secondary schools. In total, eight schools were invited to participate in this study. Information material and personal presentations of the study purpose were provided, and each school was offered to get their own feedback on their students' well-being. After that, six schools gave consent to participate. In all six schools, students from all classes were assessed. The schools were located in five different districts in Vienna with different compositions of the population in terms of financial, educational, and migration backgrounds. The sample included middle schools and academic-track schools to cover the most relevant characteristics of secondary schools in the German-speaking area. Apart from the fact that the participating schools were located in an urban, densely populated area, our sample can be assumed characteristic for the student population in Austria.

All students participated voluntarily and only those whose parents provided permission filled out the questionnaire. In addition to parental agreement, each student's active consent was obtained at the beginning of the assessment. Data were collected using a computer-based questionnaire supervised by trained test supervisors. Students filled



**Fig. 1** Hypothesized relations for convergent measures. SLSS=Students' Life Satisfaction Scale; SPANE-P=Scale of Positive And Negative Experience—positive; SPANE-N=Scale of Positive And Negative Experience—negative; PAF=Worry and Lack of Confidence scales of the Test Anxiety Questionnaire; WIRKSCHUL=School-related Self-Efficacy Expectation scale; GRIT=Perseverance of

Effort and Consistency of Interest dimensions of BISS-8 scale; OTH=Orientations to Happiness Questionnaire; MIS=Motivation for School scale; LFSK=School Community and Teacher Involvement dimensions of the Linzer Questionnaire measuring school and class climate; KLAKL=Positive Class Climate scale; single item=General Satisfaction with School

out the questionnaire during class time using their school's computer lab.

To avoid cognitive overload for students, the instruments were divided over three booklets, and each student was randomly assigned to work on one booklet. For allocating the items across booklets, a balanced assignment within a three-form design was used (Jorgensen et al., 2014; Lang et al., 2020). Therefore, the items were divided into four sets. The first set (set X) contained items that every student filled in: the EPOCH-G-S, the single item *General Satisfaction with School* as well as additional questions regarding demographic characteristics, such as age, gender, school grades, and native language. The other three sets A, B, C contained a proportionate number of items from every instrument while each instrument was completely included in one of the three sets once. Each booklet consists of 40 to 44 items. The students were randomly assigned to one of the three booklets XA, XB, XC. For the "missings by design" the full information maximum likelihood (FIML) estimator was used.

Data from students who did not provide active consent were excluded from the dataset ( $N=18$ ), as were data from students over 18 years old and those who filled out an invalid class code ( $N=16$ ); this resulted in a final sample of  $N=1651$  for further analyses. The participation rate of students with parent permission and students' active consent to take part in relation to students invited was 72.57%.

## EPOCH Adaptation and Translation Process

Following international guidelines on translating and adapting tests (Hambleton & Kanjee, 1995; International Test Commission, 2017), we first translated the *EPOCH Measure of Adolescent Well-Being* (Kern et al., 2016) into German using the translation-backtranslation strategy (Brislin, 1986). The first and second author of this paper, both German native speakers with very good knowledge of English, translated the items into German independently. They also ensured that there were no cultural discrepancies in the meaning of the items or the measured construct in general between the original and translated versions. These translations resulted in an initial version of the EPOCH-German. In a next step, the items were back-translated into English by an English native speaker with very good knowledge of the German language. In nine cases, there were very small and negligible discrepancies that were ignored for further process. For one item, no adequate translation into German as well as adaptation to the school context could be found, so we decided to exclude this item (*Optimism*: "I think that good things are going to happen to me") from the questionnaire. The remaining items were then adapted to the school context. More concretely, we made the items specific to the school context (e.g., "friends in school," "fun in school," "people in school who really care about me"), or referred

to the context of completing tasks for school, such as studying for class tests (“doing something for school,” “working hard for school,” “learning something new in school”). This resulted in the final version of the EPOCH-G-S, consisting of 19 items measuring students’ well-being in school.<sup>1</sup>

## Instruments

In this section, we present the measures used in this study. All statistical measures, such as CFA model fit indices and Cronbach’s  $\alpha$ , were estimated based on the collected data.

### EPOCH-G-S Measure of School-Related Adolescent Well-Being

The *EPOCH-G-S Measure of school-related Adolescent Well-Being* is a 19-item measure of school-related well-being, developed for students aged 10 to 18 years, addressing the previously described dimensions *Engagement* (sample item: “When I do an activity for school, I enjoy it so much that I lose track of time”), *Perseverance* (sample item: “When I have started a school task, I finish it”), *Optimism* (sample item: “I am optimistic about my future at school”), *Connectedness* (sample item: “When something good happens to me, I have people at school who I like to share the good news with”), and *Happiness* (sample item: “I feel happy at school”). The measure uses a five-point response format (1 = *not true at all*; 5 = *completely true*). The internal reliability (Cronbach’s  $\alpha$ ) of the EPOCH-G-S was  $\alpha = 0.88$ . Reliability for the EPOCH-G-S subscales was  $\alpha = 0.64$  for *Connectedness*,  $\alpha = 0.70$  for *Optimism*,  $\alpha = 0.72$  for *Engagement*,  $\alpha = 0.80$  for *Perseverance*, and  $\alpha = 0.85$  for *Happiness*. Confirmatory factor analysis showed good model fit for the five-factor structure ( $\chi^2 (139) = 503.171$ ; RMSEA = 0.040, SRMR = 0.042, CFI = 0.960, TLI = 0.950).

### Students’ Life Satisfaction Scale

The German *SLSS* (Weber et al., 2013) measures students’ general life satisfaction with seven items utilizing a six-point response scale (from 1 = *strongly disagree* to 6 = *strongly agree*; sample item: “I would like to change many things in my life”), with Cronbach’s  $\alpha = 0.85$ . Confirmatory factor analysis showed acceptable model fit ( $\chi^2 (11) = 42.568$ ; RMSEA = 0.073, SRMR = 0.031, CFI = 0.970, TLI = 0.942).

### Scale of Positive and Negative Experience

The German *SPANE* scale (Rahm et al., 2017; English original by Diener et al., 2010) measures positive (SPANE-P) and negative (SPANE-N) emotions. Each subscale consists of six items on a five-point response scale (1 = *very rarely/never* to 5 = *very often/always*; sample item: “For the past four weeks, ... I’ve felt happy”), with Cronbach’s  $\alpha = 0.85$  for SPANE-N and  $\alpha = 0.89$  for SPANE-P. Confirmatory factor analysis showed that the two-factor structure had a good model fit ( $\chi^2 (53) = 122.326$ ; RMSEA = 0.048, SRMR = 0.032, CFI = 0.972, TLI = 0.965).

### Test Anxiety Questionnaire

The *Worry* and *Lack of Confidence* subscales of the *PAF* (Hodapp et al., 2011) consisted of five items each, with a four-point response scale (1 = *almost never* to 5 = *almost always*; sample item subscale *Worry*: “I think about what my school report will look like”; sample item subscale *Lack of Confidence*: “I am confident about my performance.”). Internal consistency was  $\alpha = 0.76$ . Confirmatory factor analysis showed acceptable model fit for the second-order model ( $\chi^2 (33) = 146.594$ ; RMSEA = 0.078, SRMR = 0.076, CFI = 0.939, TLI = 0.916).

### BISS-8 Grit

The dimensions *perseverance of effort* and *consistency of interest of the* German *BISS-8 Grit* scale (Schmidt et al., 2019; English version in Duckworth & Quinn, 2009) was included to measure grit. It consisted of eight items. Responses were given on a five-point response scale (1 = *not at all like me* to 5 = *very much like me*; sample item: “If something doesn’t work out, I won’t be discouraged”), with Cronbach’s  $\alpha = 0.70$ . Confirmatory factor analysis showed acceptable model fit for the second-order model ( $\chi^2 (17) = 31.203$ ; RMSEA = 0.040, SRMR = 0.041, CFI = 0.978, TLI = 0.963).

### Linzer Questionnaire for School and Class Climate

The *LFSK* for 4th to 8th grade (Eder & Mayr, 2000) measures classroom climate on a five-point response format (1 = *not true at all*; 5 = *completely true*). We only used the *school community* and *teacher involvement* subscales (six items; sample item subscale *school community*: “If someone says something against our class, we all stick together”; sample item subscale *teacher involvement*: “The teachers are also interested in our personal problems and experiences”), with Cronbach’s  $\alpha = 0.78$ . Confirmatory factor analysis showed that the two-factor model had good model fit ( $\chi^2$

<sup>1</sup> See supplementary material A) for the German and B) for an English version of the EPOCH-G-S.

(8) = 10.597; RMSEA = 0.024, SRMR = 0.019, CFI = 0.997, TLI = 0.994).

### Motivation for School

The *MIS MX* scale (Stöber, 2002) is a nine-item measure (six-point response scale; 1 = *disagree completely* to 6 = *agree completely*; sample item: “I like to take on voluntarily additional tasks at school”) of motivation in school, with an internal consistency of Cronbach’s  $\alpha = 0.74$ . Confirmatory factor analysis showed acceptable model fit ( $\chi^2(24) = 66.588$ ; RMSEA = 0.058, SRMR = 0.040, CFI = 0.962, TLI = 0.943).

### School-related Self-efficacy Expectation

The *WIRKSCHUL* scale (Jerusalem & Satow, 1999) assesses students’ self-efficacy beliefs in relation to school demands with seven items, using a six-point response scale (1 = *disagree completely* to 6 = *agree completely*; sample item: “I am sure that I can still achieve the desired performance even if I get a bad grade”), with Cronbach’s  $\alpha = 0.78$ . Confirmatory factor analysis showed good model fit ( $\chi^2(13) = 33.340$ ; RMSEA = 0.054, SRMR = 0.030, CFI = 0.972, TLI = 0.955).

### Positive Class Climate

The *KLAKL* scale (Stöber, 2002) measures how students perceive their social climate in class with ten items, using a six-point response scale (1 = *disagree completely* to 6 = *agree completely*; sample item: “In our class, ... there is a trusting atmosphere among the students”), with an internal consistency of Cronbach’s  $\alpha = 0.76$ . Confirmatory factor analysis showed good model fit ( $\chi^2(34) = 85.020$ ; RMSEA = 0.053, SRMR = 0.050, CFI = 0.939, TLI = 0.920).

### Orientations to Happiness Questionnaire

The short version of the *OTH* Questionnaire (Ruch et al., 2014) measures paths to happiness with nine items on a five-point response scale (1 = *not true at all*; 5 = *completely true*). We only used the three-item<sup>2</sup> *Engagement* subscale (sample item: “Whether at work or when playing, I forget everything around me”), with Cronbach’s  $\alpha = 0.64$ .

<sup>2</sup> The model fit for the measurement model for the *Orientations to Happiness Questionnaire (OTH)* could not be tested because this factor contains only three items and a scale with three items can only be identified.

### General Satisfaction with School

Lastly, we included an adaptation of the single-item *General Satisfaction with Life* scale (Beierlein et al., 2014). The question (“How satisfied are you currently, all in all, with your life?”) has been validated in several contexts (see Beierlein et al., 2014), both with other well-being questionnaires and external factors, with a test–retest reliability of  $r = 0.67$  over a 6-week interval. We adapted the item slightly to school context, resulting in *General Satisfaction with School* (“How satisfied are you currently, all in all, in school?”). We also converted the answer format to a five-point response scale (1 = *not satisfied at all* to 5 = *completely satisfied*) to resemble the EPOCH-G-S measure.

### Data Analysis

Data were analyzed using R (R Core Team, 2018) and Mplus version 8.1 (Muthén & Muthén, 1998). First, confirmatory factor analyses using robust maximum likelihood estimation (MLR) based on factor models with continuous indicators were conducted to analyze the five-factor structure of the EPOCH-G-S measurement as well as a measurement model for each of the five factors. The hierarchical structure of students clustered within school classes was controlled for using cluster-robust standard errors. Additionally, a second-order model was estimated to test the hypothesis of a higher-order well-being factor. Model fit was evaluated using the fit indices RMSEA, SRMR, CFI, and TLI and based on common cut-off criteria (see Kline, 2015). The validity of the EPOCH-G-S was evaluated through its association with other measures. A full information maximum likelihood (FIML) estimator was used to deal with items missing completely at random (MCAR) due to the booklet design. We tested for measurement invariance of the EPOCH-G-S in the second-order model regarding gender and age, as suggested by Chen et al. (2005). In accordance with Cheung and Rensvold (2002), the CFI and RMSEA were examined to evaluate the equality of factor loadings, with a change of more than 0.01 in CFI and more than 0.015 in RMSEA indicating a meaningful decrease in model fit.

## Results

### Construct Validity

For the EPOCH-G-S, the confirmatory factor analysis revealed good model fit for the five-factor measurement model ( $\chi^2(139) = 503.171$ ; RMSEA = 0.040, SRMR = 0.042, CFI = 0.960, TLI = 0.950) (Hypothesis 1). As the five factors are moderately inter-correlated (see Table 2), we additionally evaluated a second-order model with a second-order



**Table 1** Results of the confirmatory factor analysis for the five-factor measurement model and the second-order model

Model	$\chi^2$	df	CFI	TLI	RMSEA	SRMR
Five-Factor Model	503.171	139	.960	.950	.040	.042
Second-Order Model	539.713	143	.956	.947	.041	.048
Model: <i>Engagement</i>	0.048	1	1.00	1.01	.000	.001
Model: <i>Perseverance</i>	0.034	1	1.00	1.00	.000	.001
Model: <i>Connectedness</i>	0.516	2	1.00	1.01	.000	.004
Model: <i>Happiness</i>	3.529	2	.999	.998	.022	.007

*N* = 1651. The model fit for the measurement model for *Optimism* could not be tested because this factor contains only three items

**Table 2** Standardized factor loadings for the EPOCH items and subscales

(Sub-) Scale	EPOCH-G-S	E	P	O	C	H
Engagement	.552					
Perseverance	.564					
Optimism	1.003					
Connectedness	.660					
Happiness	.932					
Item 5		.495				
Item 7		.741				
Item 11		.669				
Item 12		.545				
Item 2			.639			
Item 9			.736			
Item 16			.725			
Item 18			.648			
Item 3				.758		
Item 13				.543		
Item 17				.480		
Item 1					.442	
Item 10					.638	
Item 14					.622	
Item 15					.542	
Item 4						.765
Item 6						.800
Item 8						.742
Item 19						.753

EPOCH-G-S = second-order well-being factor for the EPOCH-German-School; E = Engagement; P = Perseverance; O = Optimism; C = Connectedness; H = Happiness

well-being factor. This model showed good model fit ( $\chi^2$  (143) = 539.713; RMSEA = 0.041, SRMR = 0.048, CFI = 0.956, TLI = 0.947) (Hypothesis 2). See Table 1 for all measurement models and fit indices. The second-order model accounts for the relationship between the five factors and fits the data as well as the five-factor model. The second-order model can be seen as a way of simplifying the interpretation of the measurement (Chen et al., 2005), because it allows a general well-being factor to be interpreted. This was also our intention in interpreting the EPOCH-G-S: interpreting the five factors independently as well as in terms of

components of a general school-related well-being factor in a more parsimonious way. Thus, we decided to use the second-order model for further analysis.

For standardized factor loadings of the EPOCH items and second-order factors, see Table 2.

### Convergent Validity

For validity purposes, latent correlations were investigated between the EPOCH-G-S, as general school-related well-being, and global life satisfaction scales, as well as between

**Table 3** Latent correlations between the second-order factor EPOCH-G-S and between the five factors Engagement, Perseverance, Optimism, Connectedness, and Happiness with other measures

(Sub-) Scale	EPOCH-G-S	E	P	O	C	H
SLSS	<b>.341**</b>	.221**	.297**	.342**	.188**	.589**
SPANE-P	<b>.745**</b>	.202**	.237**	.583**	.281**	.530**
SPANE-N	<b>-.508**</b>	-.131**	-.186**	-.413**	-.100**	-.377**
MIS	<b>.795**</b>	.483**	.481**	.594**	.182**	.615**
Single item: How satisfied are you currently, all in all, in school?	<b>.819**</b>	.199**	.222**	.562**	.192**	.770**
OTH	.265**	<b>.455**</b>	.278**	.222**	.072*	.180**
GRIT—Perseverance of Effort	.596**	.462**	<b>.628**</b>	.453**	.122**	.372**
GRIT—Consistency of Interest	.324**	.116	<b>.296**</b>	.257**	.003	.212**
WIRKSCHUL	.682**	.328**	.397**	<b>.578**</b>	.171**	.387**
LFSK—School Community	.697**	.300**	.302**	.486**	<b>.299**</b>	.503**
LFSK—Teacher Involvement	.704**	.403**	.349**	.521**	<b>.199**</b>	.508**
KLAKL	.582**	.139*	.205**	.426**	<b>.237**</b>	.434**
PAF—Worry	.255**	.257*	.341**	.102*	.121**	<b>.153**</b>
PAF—Lack of Confidence	.687**	.248**	.331**	.599**	.160**	<b>.417**</b>
E			.310**	.281**	.069**	.247**
P				.312**	.071**	.257**
O					.218**	.554**
C						.221**

\*\* $p < .001$ ; \* $p < .01$ .  $N = 1651$ . The second-order model was used as the measurement model. Hypothesized convergent correlations are highlighted in bold. EPOCH-G-S = second-order well-being factor for the EPOCH-German-School; E = Engagement; P = Perseverance; O = Optimism; C = Connectedness; H = Happiness; SLSS = Students' Life Satisfaction Scale; SPANE-P = Scale of Positive And Negative Experience—positive; SPANE-N = Scale of Positive And Negative Experience—negative; PAF = Worry and Lack of Confidence scales of the Test Anxiety Questionnaire; WIRKSCHUL = school-related self-efficacy expectation scale; GRIT = Perseverance of Effort and Consistency of Interest dimensions of BISS-8 scale; OTH = Orientations to Happiness Questionnaire; MIS = Motivation for School scale; LFSK = School Community and Teacher Involvement dimensions of the Linzer Questionnaire measuring school and class climate; KLAKL = Positive Class Climate scale; single item = General Satisfaction with School

the five factors *Engagement*, *Perseverance*, *Optimism*, *Connectedness*, and *Happiness* and other measures. See Table 3 for results. In line with Hypothesis 3a, there was a moderate positive latent correlation between SLSS (Weber et al., 2013) and the EPOCH-G-S ( $r = 0.341$ ,  $p < 0.001$ ). Another global measure of life satisfaction focusing on positive and negative affect, SPANE (Rahm et al., 2017), was also correlated with EPOCH-G-S: a high positive correlation between the EPOCH-G-S and the positive affect scale ( $r = 0.745$ ,  $p < 0.001$ ) (Hypothesis 3b) and a negative correlation with the negative affect scale ( $r = -0.508$ ,  $p < 0.001$ ) were revealed (Hypothesis 3c). The correlation between the EPOCH-G-S and the *Motivation for School scale* (Stöber, 2002) was  $r = 0.795$  ( $p < 0.001$ ) (Hypothesis 3d). Likewise, the correlation with the single item for satisfaction in school was  $r = 0.819$  ( $p < 0.001$ ) (Hypothesis 3e). Afterward, one specific latent correlation was investigated for each of the five factors. As expected, there was a high positive correlation between *Engagement* and OTH (Ruch et al., 2014), ( $r = 0.455$ ,  $p < 0.001$ ) (Hypothesis 4a). Between *Perseverance* and the dimension *Perseverance of Effort* and *Consistency of Interest* of the BISS-8 GRIT scale (Schmidt et al.,

2019), there were moderate to high correlations ( $r = 0.628$ ,  $p < 0.001$ ;  $r = 0.296$ ,  $p < 0.001$ ) (Hypotheses 4b1 and 4b2). The *Perseverance of Effort* subscale also showed high correlations with *Engagement* and *Optimism* ( $r = 0.462$ ,  $p < 0.001$ ;  $r = 0.628$ ,  $p < 0.001$ ). The correlation between *Optimism* and the *School-related Self-Efficacy Expectation* scale (Stöber, 2002) was highly positive ( $r = 0.578$ ,  $p < 0.001$ ) (Hypothesis 4c), while there was a relatively low correlation between *Connectedness* and the dimensions *School Community* and *Teacher Involvement* of the LFSK (Eder & Mayr, 2000) ( $r = 0.299$ ,  $p < 0.001$ ;  $r = 0.199$ ,  $p < 0.001$ ) (Hypotheses 4d1 and 4d2), but high correlations to *Optimism* ( $r = 0.486$ ,  $p < 0.001$ ;  $r = 0.521$ ,  $p < 0.001$ ) and *Happiness* ( $r = 0.503$ ,  $p < 0.001$ ;  $r = 0.508$ ,  $p < 0.001$ ). Between *Connectedness* and *Positive Class Climate* scale (Stöber, 2002), there was a low to moderate correlation ( $r = 0.237$ ,  $p < 0.001$ ) (Hypothesis 4e), while correlation with *Optimism* ( $r = 0.426$ ,  $p < 0.001$ ) and *Happiness* ( $r = 0.434$ ,  $p < 0.001$ ) was relatively high. The correlation between *Happiness* and the two dimensions of the *Test Anxiety* scale (Hodapp et al., 2011) was low for the *Worry* subscale ( $r = 0.153$ ,  $p < 0.001$ ) and moderate to high for the *Lack of Confidence* subscale ( $r = 0.417$ ,  $p < 0.001$ )

(Hypotheses 4f1 and 4f2). This subscale also showed a high correlation with *Optimism* ( $r=0.599$ ,  $p<0.001$ ).

## Measurement Invariance

Confirmatory factor analysis for measurement invariance regarding gender ( $N_{\text{Boys}}=859$ ,  $N_{\text{Girls}}=783$ )<sup>3</sup> showed good model fit for the configural invariance model ( $\chi^2(287)=708.465$ ; RMSEA = 0.042, SRMR = 0.052, CFI=0.953, TLI=0.944) as well as for the metric invariance model for the first-order factor loadings ( $\chi^2(301)=722.773$ ; RMSEA=0.041, SRMR=0.053, CFI=0.953, TLI=0.947) and the second-order factor loadings ( $\chi^2(305)=727.474$ ; RMSEA=0.041, SRMR=0.055, CFI=0.953, TLI=0.947). In line with Cheung and Rensvold (2002), there was no substantial difference in model fit regarding CFI and RMSEA between those models. Thus, equal factor loadings for boys and girls can be assumed for the first- and second-order factors. Testing for scalar invariance, equal intercepts of the measured variables ( $\chi^2(319)=767.758$ ; RMSEA=0.041, SRMR=0.055, CFI=0.950, TLI=0.946) as well as for the first-order factors ( $\chi^2(323)=801.906$ ; RMSEA=0.042, SRMR=0.057, CFI=0.947, TLI=0.944) were assumed (see Chen et al., 2005). As can be seen, there was no meaningful decrease between both models (CFI=0.950 vs. CFI=0.947) and thus we assumed no appreciable difference in the intercepts of the first-order factors. According to Chen et al. (2005) second-order factor means can be compared across groups.

To test measurement invariance among different age groups, we grouped the students into three groups according to their class level: 10–12-year-olds (lower level;  $N=697$ ), 13–15-year-olds (middle level;  $N=703$ ), and 16–18-year-olds (upper level;  $N=241$ ). Confirmatory factor analysis revealed good model fit for the configural ( $\chi^2(432)=877.717$ ; RMSEA = 0.043, SRMR = 0.054, CFI=0.948, TLI=0.938) as well as for the metric invariance model for the first-order factor loadings ( $\chi^2(460)=936.573$ ; RMSEA=0.044, SRMR=0.059, CFI=0.944, TLI=0.937) and the second-order factor loadings ( $\chi^2(468)=967.086$ ; RMSEA=0.044, SRMR=0.069, CFI=0.941, TLI=0.936). In line with Cheung and Rensvold (2002), there was no meaningful decrease in the model fit, indicating that the factor loadings were invariant across age groups. According to Chen et al. (2005), scalar invariance was tested assuming equal intercepts of the measured variables ( $\chi^2(496)=1046.991$ ; RMSEA = 0.045, SRMR = 0.070, CFI=0.935, TLI=0.933) as well as for the first-order factors ( $\chi^2(504)=1116.924$ ; RMSEA = 0.047, SRMR = 0.074,

CFI=0.928, TLI=0.927). As can be seen, there was no substantial difference between both models (CFI=0.935 vs. CFI=0.928, RMSEA = 0.045 vs. RMSEA = 0.047), indicating invariant intercepts across age groups.

## Discussion

Well-being can be seen as an important resource for students when it comes to learning, developing abilities as well as facing challenges in life (e.g., Durlak et al., 2011; Hascher & Hagenauer, 2010; Howell, 2009; Ruus et al., 2007; Suldo et al., 2011). Because schools have an important value in the students' daily life, students' context-specific school-related well-being is of great interest for building this resource (Durlak et al., 2011; Waters, 2011). However, there is a lack of conceptualizations integrating different facets of school-related well-being within a consistent framework. Thus, the present study aimed at providing an instrument to comprehensively cover hedonic, as well as eudaemonic facets of school-related well-being within a consistent multidimensional framework. The development of the intended instrument was based on the *EPOCH Measure of Adolescent Well-Being* (Kern et al., 2016). The EPOCH-G-S is the German version of the EPOCH measure within the adapted framework of well-being in school context (EPOCH-School). For validation purposes, a series of confirmatory factor analyses as well as analyses for convergent validity and measurement invariance regarding gender and age were conducted.

The original EPOCH was validated based on a five-factor structure with the following factors: *Engagement*, *Perseverance*, *Optimism*, *Connectedness*, and *Happiness*. Based on a qualitative study, assessing the conceptualizations of school-related well-being of students and teachers (Holzer et al., 2021), we interpret the adapted EPOCH-School model as a framework capturing adolescents' well-being in school along these five dimensions.

The CFA for the EPOCH-G-S measure showed good model fit for the five-factor structure, with small to medium correlations between the factors. Although the original validation study results favored a five-factor structure above a higher-order structure (Kern et al., 2015, 2016), we additionally conducted a second-order CFA, assuming a higher-order well-being factor accounting for the relationship between the five EPOCH-G-S dimensions. The model fit for the second-order CFA was as good as for the five-factor structure but additionally included a second-order well-being factor that explained the relationship between the first-order factors. Thus, this further supports the approach to conceptualize well-being in terms of hedonic as well as eudaemonic aspects (Deci & Ryan, 2008), as they load on a common factor. The advantage of this second-order model is that it allows for global statements about adolescents' well-being in

<sup>3</sup> For simplification, we only used data from boys and girls for this analysis and left out the third category "others" (0.55%).

school, as well as interpreting the single dimensions (Chen et al., 2005). Gaining information on students' well-being on a global level to get an overview of school-related well-being in general might be of interest for school principals and teachers. Additionally, the second-order model offers the possibility of clearly detecting strengths and weakness in students' well-being profiles by interpreting the five first-order factors, thus enabling schools to promote their students' well-being exactly in the areas where it is necessary. In this sense, schools may specifically respond, for instance, to students' increased needs in learning-related dimensions such as engagement and perseverance by adapting learning arrangements accordingly. Low Connectedness scores may indicate the need to explicitly encourage the establishment of social relationships among students (for example by implementing peer tutoring), whereas low scores in Optimism and Happiness may require interventions that relate to the academic self-concept or emotion regulation. Whether the desired improvements could be achieved can then be evaluated by means of the EPOCH-G-S.

Alongside construct validity, we also analyzed convergent validity using measures that are very similar to the five EPOCH-G-S factors or the general well-being factor. Most of the correlations were found to be medium to large and in line with our validity hypotheses. The largest correlation was found for the single item on school satisfaction and the second-order well-being factor. We used this item to test whether the adaptation to the school context was successful, which was confirmed. The medium correlation with a measure of global life satisfaction (SLSS) showed that well-being goes beyond global life satisfaction and so does the EPOCH-G-S. While life satisfaction refers to the cognitive evaluation of life overall (i.e., cognitive well-being; e.g., Diener et al., 1985), the EPOCH-S represents a more comprehensive concept, covering different aspects of feeling and functioning well, with the EPOCH-G-S measure adequately assessing those. However, some correlations were higher than expected. For instance, well-being was very highly correlated with motivation for school (MIS) even though the two constructs are conceptually different, with the measures targeting different latent constructs. While the EPOCH-G-S measures school-related well-being, the MIS integrates the components achievement motivation, school identification, and school reluctance. However, some items in the MIS are very similar to the EPOCH-G-S, such as "School is a place where I like to stay," and thus also focused on students' feelings about going to school alongside motivational aspects.

For *Engagement*, adequate measures to test convergent validity were scarce. We used the three-item *Engagement* subscale from the *Orientation to Happiness* scale (OTH; Ruch et al., 2014). Our data revealed a rather weak internal consistency for those three items, and the measurement model could not be tested for methodological reasons, because a

scale with three items can only be identified. The correlation between the *Engagement* subscale from the OTH and the *Engagement* scale of the EPOCH-G-S was as expected high, but for the aforementioned reasons of limited informative value. The correlation between *Perseverance* and the subscale *Perseverance of Effort* was high but only moderate with the *Consistency of Interest* subscale of the GRIT scale (Schmidt et al., 2019). This is in line with the meaning of perseverance in the conceptualization of well-being that refers rather to persevere in a task than being consistently interested in something. This result also showed that perseverance in the sense of the well-being framework should not be used interchangeably with GRIT. The *Perseverance of Effort* subscale also showed high correlations with *Engagement and Optimism* which is expectable in a way that *Perseverance* is also correlated with *Engagement and Optimism*. The correlation between *Optimism* and the school-related self-efficacy subscales (*WIRKSCHUL*, Jerusalem & Satow, 1999) was as high as expected, while the correlations between *Connectedness* and the subscales measuring school and class climate (LFSK, Eder & Mayr, 2000 & KLAKL, Stöber, 2002) were lower than expected. This shows that class climate and particularly teacher involvement cannot be seen as a characteristic expression for student well-being, but as indication of teachers' attitudes and quality of relationships in the classroom as a whole and in a broader sense and thus accounting for an antecedent of *Connectedness*, rather than a convergent measure of the actual construct. Surprisingly, relatively high correlations emerged for the school and class climate subscales with *Optimism and Happiness*, as well as with the second-order well-being factor. This might be explained by the fact that both instruments (LFSK & KLAKL) account for relationship quality in school or in the classroom as a whole and that positive school and classroom climate, in turn, have in earlier studies been found to positively relate to students' positive emotions, optimism, and general well-being in school (Kutsyuruba et al., 2015; Ruus et al., 2007).

Additionally, we analyzed measurement invariance regarding gender and age. In line with our hypotheses, the results showed scalar invariance, indicating that factor means can be compared between boys and girls as well as between different age groups. This implicates that the items are equally understood in their meaning and thus latent means assessed from the EPOCH-G-S can be interpreted meaningfully across those groups such as differences between latent means from boys and girls or students of different age can be interpreted equally.

Through the validation of the EPOCH-G-S, we provide a model of school-related well-being, consisting of five factors (EPOCH-School). Fostering these five dimensions—*Engagement, Perseverance, Optimism, Connectedness, and Happiness*—therefore contributes to fostering school-related well-being as whole. The EPOCH-S model contributes to clarifying



the well-being construct and making it less abstract and thus more useful for schools and education. Thus, the EPOCH-G-S measure opens up a broad range of opportunities to set support according to the test results. It can help to further establish well-being in schools, as the need for further development and interventions can be directly shown and improvements can be measured. In order to meet the challenges of everyday school life in the best possible way, fostering well-being in school should be part of any educational concept regardless of the educators' conceptual orientation. Students' well-being should be acknowledged as sustainable coping mechanism and driving force for progress. This is particularly highly relevant nowadays, as schools face challenges related to distance learning, heterogeneity, inclusion, and migration, to name just a few.

For future research, we recommend studies addressing the stability of the EPOCH-G-S as well as its relationship with other achievement-related variables to be conducted to show the importance of promoting students' well-being in schools. Furthermore, as all scales and data stem from student ratings, a comparison with the perspective of teachers and parents in the sense of a multi-informant approach would be interesting.

## Limitations

The study is limited inasmuch as the sample only included students from schools based in Vienna. For future research, we recommend to focus on validating the EPOCH-G-S with other samples, especially from other regions in the German-speaking area and with further appropriate measures.

The selection of measures for testing convergent validity is another limitation of this study. Because of limited availability of German-speaking school-related instruments, we could not use a convergent measure for each of the EPOCH-G-S dimensions that perfectly fitted the construct to be validated. Thus, some correlations were only low to moderate.

Regarding the reported characteristics of the sample, this study is limited insofar as additional demographic variables could have been collected, for example, the socioeconomic status (SES) or a disability category, that would have described the sample more extensively. Those variables should be used in subsequent studies for testing measurement invariance between different groups (e.g., different SES groups).

## Conclusion

This study reports the validation of the *EPOCH-G-S measure of adolescents' well-being in schools*. The results obtained from a sample of German-speaking students in Austrian schools speak in favor to recommend the EPOCH-G-S for use in schools to measure students' well-being.

The main advantage is that strengths and weaknesses in students' well-being profiles can be directly assessed along the five factors while simultaneously, school-related well-being can be measured on a general level; the results of the EPOCH-G-S measure can be further used to derive specific needs for intervention according to strengths and weaknesses in the well-being profiles of the student body.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s12310-023-09574-1>.

**Funding** Open access funding provided by University of Vienna.

## Declarations

**Conflict of interest** We have no known conflict of interest to disclose.

**Consent Informed** Participants' active consent was obtained.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Adler, A. (2016). *Teaching well-being increases academic performance: Evidence from Bhutan, Mexico, and Peru* [Unpublished doctoral dissertation]. University of Pennsylvania.
- AERA, APA, & NCME (2022). Standards for educational and psychological testing (2014 Edition). AERA. <https://www.aera.net/Publications/Books/Standards-for-Educational-Psychological-Testing-2014-Edition>
- Beierlein, C., Kovaleva, A., László, Z., Kemper, C. J., & Rammstedt, B. (2014). Eine Single-Item-Skala zur Erfassung der Allgemeinen Lebenszufriedenheit: Die Kurzskala Lebenszufriedenheit-1 (L-1). [A single-item scale for the assessment of general satisfaction with life: Short scale satisfaction with life (L-1)]. Working Papers. GESIS - Leibniz-Institut für Sozialwissenschaften.
- Bond, L., Butler, H., Thomas, L., Carlin, J., Glover, S., Bowes, G., & Patton, G. (2007). Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health, 40*(4), 357.e9-357.e3.57E18. <https://doi.org/10.1016/j.jadohealth.2006.10.013>
- Bradshaw, J., Keung, A., Rees, G., & Goswami, H. (2011). Children's subjective well-being: International comparative perspectives. *Children and Youth Services Review, 33*(4), 548–556. <https://doi.org/10.1016/j.childyouth.2010.05.010>
- Brislin, R. W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural psychology* (pp. 137–164). Sage Publishers.

- Bücker, S., Nuraydin, S., Simonsmeier, B. A., Schneider, M., & Luhmann, M. (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in Personality, 74*, 83–94. <https://doi.org/10.1016/j.jrp.2018.02.007>
- Chen, F. F., Sousa, K. H., & West, S. (2005). Testing measurement invariance of second-order factor models. *Structural Equation Modeling, 12*(3), 471–492. [https://doi.org/10.1207/s15328007sem1203\\_7](https://doi.org/10.1207/s15328007sem1203_7)
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233–255. [https://doi.org/10.1207/S15328007SEM0902\\_5](https://doi.org/10.1207/S15328007SEM0902_5)
- Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. Basic Books.
- Dalbert, C. (2003). Habituelle Subjektive Wohlbefindensskala (HSWB) [Trait well-being inventory]. In J. Schumacher, A. Klaiberg, & E. Brähler (Eds.), *Diagnostische Verfahren zu Lebensqualität und Wohlbefinden* (pp. 170–175). Hogrefe.
- Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies, 9*(1), 1–11. <https://doi.org/10.1007/s10902-006-9018-1>
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542–575. <https://doi.org/10.1037/0033-2909.95.3.542>
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75.
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143–156. <https://doi.org/10.1007/s11205-009-9493-y>
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment, 91*(2), 166–174. <https://doi.org/10.1080/00223890802634290>
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*(1), 405–432. <https://doi.org/10.1111/j.1467-8624.2010.01564.x>
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence: Schools as developmental contexts. *Journal of Research on Adolescence, 21*, 225–241. <https://doi.org/10.1111/j.1532-7795.2010.00725.x>
- Eder, F., & Mayr, J. (2000). Linzer Fragebogen zum Schul- und Klassenklima für die 8.-13. Klasse (LFSK 8-13) [Linzer questionnaire measuring school- and class climate]. Hogrefe.
- Eder, F., & Haider, G. (2012). Schulqualität und Befinden im Kontext des familiären Hintergrunds der Schülerinnen und Schüler [School quality and well-being in the context of students' family background]. In F. Eder (Ed.), *Pisa 2009. Nationale Zusatzanalysen für Österreich* (pp. 99–130). Waxmann.
- Fanchini, A., Jongbloed, J., & Dirani, A. (2019). Examining the well-being and creativity of schoolchildren in France. *Cambridge Journal of Education, 49*(4), 391–416. <https://doi.org/10.1080/0305764X.2018.1536197>
- Forgeard, M., Jayawickreme, E., Kern, M., & Seligman, M. (2011). Doing the right thing: Measuring well-being for public policy. *International Journal of Wellbeing, 1*(1), 79–106. <https://doi.org/10.5502/ijw.v1i1.15>
- Furlong, M., Dowdy, E., Carnazzo, K., Boverly, B. L., & Kim, E. (2014). Covitality: Fostering the building blocks of complete mental health. *Communiqué, 42*(8), 1–28.
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*(5), 581–586. <https://doi.org/10.1111/j.1469-7610.1997.tb01545.x>
- Hambleton, R. K., & Kanjee, A. (1995). Increasing the validity of cross-cultural assessments: Use of improved methods for test adaptations. *European Journal of Psychological Assessment, 11*(3), 147–157. <https://doi.org/10.1027/1015-5759.11.3.147>
- Hascher, T. (2010). Learning and emotion: Perspectives for theory and research. *European Educational Research Journal, 9*(1), 13–28. <https://doi.org/10.2304/eeerj.2010.9.1.13>
- Hascher, T., & Hagenauer, G. (2010). Alienation from school. *International Journal of Educational Research, 49*(6), 220–232. <https://doi.org/10.1016/j.ijer.2011.03.002>
- Hefferon, K., & Boniwell, I. (2011). *Positive psychology: Theory, research and applications*. McGraw-Hill Education.
- Hodapp, V., Rohrmann, S., & Ringeisen, T. (2011). *Prüfungsfragebogen PAF-S [Test anxiety questionnaire PAF-S]*. Hogrefe.
- Holzer, J., Buerger, S., Samek-Krenkel, S., Spiel, C., & Schober, B. (2021). Conceptualisation of students' school-related wellbeing: Students' and teachers' perspectives. *Educational Research, 63*(4), 474–496. <https://doi.org/10.1080/00131881.2021.1987152>
- Howell, A. J. (2009). Flourishing: Achievement-related correlates of students' well-being. *The Journal of Positive Psychology, 4*(1), 1–13. <https://doi.org/10.1080/17439760802043459>
- Huebner, E. S., Hills, K. J., Jiang, X., Long, R. F., Kelly, R., & Lyons, M. D. (2014). Schooling and children's subjective well-being. In A. Ben-Arieh, F. Casas, I. Frønes, & J. Korbin (Eds.), *Handbook of child well-being* (pp. 797–819). Springer. [https://doi.org/10.1007/978-90-481-9063-8\\_26](https://doi.org/10.1007/978-90-481-9063-8_26)
- Huppert, F. A. (2014). The state of wellbeing science: Concepts, measures, interventions, and policies. In C. L. Cooper & F. A. Huppert (Eds.), *Wellbeing: A complete reference guide* (Vol. 6, pp. 1–49). Wiley. <https://doi.org/10.1002/9781118539415.wbwell036>
- Huppert, F. A., & So, T. T. C. (2013). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research, 110*(3), 837–861. <https://doi.org/10.1007/s11205-011-9966-7>
- International Test Commission. (2017). *The ITC guidelines for translating and adapting tests* (2nd edn).
- Jerusalem, J., & Satow, L. (1999). Schulbezogene Selbstwirksamkeitserwartung (WIRKSCHUL) [School-related self-efficacy expectation scale]. In R. Schwarzer & M. Jerusalem (Eds.), *Skalen zur Erfassung von Lehrer- und Schülermerkmalen: Dokumentation der psychometrischen Verfahren im Rahmen der Wissenschaftlichen Begleitung des Modellversuchs Selbstwirksame Schulen* (pp. 15–16). Freie Universität Berlin und Humboldt-Universität zu Berlin.
- Jorgensen, T. D., Rhemtulla, M., Schoemann, A., McPherson, B., Wu, W., & Little, T. D. (2014). Optimal assignment methods in three-form planned missing data designs for longitudinal panel studies. *International Journal of Behavioral Development, 38*(5), 397–410. <https://doi.org/10.1177/01650254145310>
- Karvonen, S., Tokola, K., & Rimpelä, A. (2018). Well-being and academic achievement: Differences between schools from 2002 to 2010 in the Helsinki metropolitan area. *Journal of School Health, 88*(11), 821–829. <https://doi.org/10.1111/josh.12691>
- Kern, M. L., Benson, L., Steinberg, E. A., & Steinberg, L. (2016). The EPOCH measure of adolescent well-being. *Psychological Assessment, 28*(5), 586–597. <https://doi.org/10.1037/pas0000201>
- Kern, M. L., Waters, L. E., Adler, A., & White, M. A. (2015). A multidimensional approach to measuring well-being in students: Application of the PERMA framework. *The Journal of Positive Psychology, 10*(3), 262–271. <https://doi.org/10.1080/17439760.2014.936962>
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.
- Kroeske, B. (2020). Schulisches Wohlbefinden, Zugehörigkeit und Unterstützung bei Schülerinnen und Schülern im gemeinsamen Unterricht der Sekundarstufe I [School well-being, social

- affiliation and perceived support for students in inclusive secondary education]. *Unterrichtswissenschaften*, 48, 243–272. <https://doi.org/10.1007/s42010-020-00067-7>
- Kutsyruba, B., Klinger, D. A., & Hussain, A. (2015). Relationships among school climate, school safety, and student achievement and well-being: A review of the literature. *Review of Education*, 3(2), 103–135. <https://doi.org/10.1002/rev3.3043>
- Läftman, S. B., Alm, S., Sandahl, J., & Modin, B. (2018). Future orientation among students Exposed to school bullying and cyberbullying victimization. *International Journal of Environmental Research and Public Health*, 15(4), 605. <https://doi.org/10.3390/ijerph15040605>
- Lang, K. M., Moore, E. W. G., & Grandfield, E. M. (2020). A novel item-allocation procedure for the three-form planned missing data design. *MethodsX*, 7, 100941. <https://doi.org/10.1016/j.mex.2020.100941>
- Lerner, R. M., Lerner, J. V., Almerigi, J., Theokas, C., Phelps, E., Gestsdottir, S., Naudeau, S., Jelicic, H., Alberts, A., Ma, L., Smith, L. M., Bobek, D. L., Richman-Raphael, D., Simpson, I., Christiansen, E. D., & Von Eye, A. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth grade adolescents: Findings from the first wave of the 4-H Study of Positive Youth Development. *Journal of Early Adolescence*, 25(1), 17–71. <https://doi.org/10.1177/027243160427246>
- Marckhoff, M., Siebald, M., Timmesfeld, N., Janßen, M., Romer, G., & Föcker, M. (2022). COVID-19: Effects of pandemic related restrictions on physical activity, screen time, and mental well-being in German adolescents. *Zeitschrift Für Kinder- Und Jugendpsychiatrie Und Psychotherapie*, 1, 14. <https://doi.org/10.1024/1422-4917/a000867>
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus user's guide: Statistical analysis with latent variables* (7th ed.). Muthén & Muthén.
- OECD. (2017). Schoolwork-related anxiety. In *PISA 2015 results (volume III): Students' well-being* (pp. 83–92). OECD Publishing. <https://doi.org/10.1787/9789264273856-8-en>
- OECD. (2019). PISA 2018 results (volume III): What school life means for students' lives. *OECD Publishing*. <https://doi.org/10.1787/acd78851-en>
- Park, N. (2004). The role of subjective well-being in positive youth development. *The ANNALS of the American Academy of Political and Social Science*, 591, 25–39. <https://doi.org/10.1177/000216203260078>
- Peterson, C., Park, N., & Seligman, M. E. P. (2005). Orientations to happiness and life satisfaction: The full life versus the empty life. *Journal of Happiness Studies*, 6(1), 25–41. <https://doi.org/10.1007/s10902-004-1278-z>
- Proyer, R. T., & Tandler, N. (2020). An update on the study of playfulness in adolescents: Its relationship with academic performance, well-being, anxiety, and roles in bullying-type-situations. *Social Psychology of Education*, 23(1), 73–99. <https://doi.org/10.1007/s11218-019-09526-1>
- R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. <http://www.R-project.org/>
- Rahm, T., Heise, E., & Schuldt, M. (2017). Measuring the frequency of emotions: Validation of the scale of positive and negative experience (SPAN) in Germany. *PLoS ONE*, 12(2), e0171288. <https://doi.org/10.1371/journal.pone.0171288>
- Rathmann, K., Heilmann, K., & Moor, I. (2016). Schulisches Wohlbefinden, Schulformen und Tabakkonsum von Jugendlichen: Ergebnisse der SILNE-Studie [School wellbeing, school type and tobacco use among adolescents: Results of the SILNE-Survey]. *Sucht*, 62(6), 383–395. <https://doi.org/10.1024/0939-5911/a000458>
- Renshaw, T. L., Long, A. C. J., & Cook, C. R. (2015). Assessing adolescents' positive psychological functioning at school: Development and validation of the Student Subjective Wellbeing Questionnaire. *School Psychology Quarterly*, 30, 534–552. <https://doi.org/10.1037/spq0000088>
- Ruch, W., Martínez-Martí, M. L., Heintz, S., & Brouwers, S. A. (2014). Short form of the Orientations to Happiness Questionnaire for the German-speaking countries: Development and analysis of the psychometric properties. *Swiss Journal of Psychology*, 73(4), 225–234. <https://doi.org/10.1024/1421-0185/a000141>
- Ruus, V.-R., Veisson, M., Leino, M., Ots, L., Pallas, L., Sarv, E.-S., & Veisson, A. (2007). Students' well-being, coping, academic success, and school climate. *Social Behavior and Personality: An International Journal*, 35(7), 919–936. <https://doi.org/10.2224/sbp.2007.35.7.919>
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069–1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69(4), 719–727. <https://doi.org/10.1037/0022-3514.69.4.719>
- Schmidt, F. T. C., Fleckenstein, J., Retelsdorf, J., Eskreis-Winkler, L., & Möller, J. (2019). Measuring grit: A German validation and a domain-specific approach to grit. *European Journal of Psychological Assessment*, 35(3), 436–447. <https://doi.org/10.1027/1015-5759/a000407>
- Schneider, S., Lösch, T., Schneider, D., & Schütz, A. (2022). How self-concept, competence, and their fit or misfit predict educational achievement, well-being, and social relationships in the school context. *Collabra: Psychology*, 8(1), 37154. <https://doi.org/10.1525/collabra.37154>
- Schnick-Vollmer, K., Diefenbach, C., Gräf, C., Hoffmann, D., Hoffmann, I., Imhof, M., Kiefer, T., König, J., Schlecht, J., Schmidt, M. F., & Urschitz, M. S. (2020). Indikatoren schulischen Wohlbefindens bei gesunden und chronisch kranken Kindern: Psychometrische Prüfung und Validierung adaptierter FEES-Skalen. [Indicators of school-related well-being of healthy and chronically ill children: Psychometric examination and validation of adapted FEES-scales]. *Zeitschrift Für Pädagogische Psychologie*, 34(3–4), 201–219. <https://doi.org/10.1024/1010-0652/a000259>
- Schwab, S., Rossmann, P., Tanzer, N., Hagn, J., Oitzinger, S., Thurner, V., & Wimberger, T. (2015). Schulisches Wohlbefinden von SchülerInnen mit und ohne sonderpädagogischen Förderbedarf: Integrations- und Regelklassen im Vergleich [School well-being of students with and without special educational needs—A comparison of students in inclusive and regular classes]. *Zeitschrift Für Kinder- Und Jugendpsychiatrie Und Psychotherapie*, 43(4), 265–274. <https://doi.org/10.1024/1422-4917/a000363>
- Seligman, M. E. (2011). Building resilience. *Harvard Business Review*, 89(4), 100–106.
- Seligman, M. E. (2018). PERMA and the building blocks of well-being. *The Journal of Positive Psychology*, 13(4), 333–335. <https://doi.org/10.1080/17439760.2018.1437466>
- Seligman, M. E., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009). Positive education: Positive psychology and classroom interventions. *Oxford Review of Education*, 35(3), 293–311. <https://doi.org/10.1080/03054980902934563>
- Steinmayr, R., Heyder, A., Naumburg, C., Michels, J., & Wirthwein, L. (2018). School-related and individual predictors of subjective well-being and academic achievement. *Frontiers in Psychology*, 9, 2631. <https://doi.org/10.3389/fpsyg.2018.02631>
- Stöber, J. (2002). Skaldokumentation „Persönliche Ziele von SchülerInnen“ [Scale documentation “Students' personal goals“]. In C. Dalbert (Ed.), *Hallesche Berichte zur Pädagogischen Psychologie* (3). Martin-Luther-Universität Halle-Wittenberg.

- Suldo, S., Thalji, A., & Ferron, J. (2011). Longitudinal academic outcomes predicted by early adolescents' subjective well-being, psychopathology, and mental health status yielded from a dual factor model. *The Journal of Positive Psychology*, 6(1), 17–30. <https://doi.org/10.1080/17439760.2010.536774>
- Tobia, V., Greco, A., Steca, P., & Marzocchi, G. M. (2019). Children's wellbeing at school: A multi-dimensional and multi-informant approach. *Journal of Happiness Studies*, 20(3), 841–861. <https://doi.org/10.1007/s10902-018-9974-2>
- Turner, I., Reynolds, K. J., Lee, E., Subasic, E., & Bromhead, D. (2014). Well-being, school climate, and the social identity process: A latent growth model study of bullying perpetration and peer victimization. *School Psychology Quarterly*, 29(3), 320–335. <https://doi.org/10.1037/spq0000074>
- Urhahne, D., & Zhu, M. (2015). Accuracy of teachers' judgments of students' subjective well-being. *Learning and Individual Differences*, 43, 226–232. <https://doi.org/10.1016/j.lindif.2015.08.007>
- Van Petegem, K., Aelterman, A., Van Keer, H., & Rosseel, Y. (2008). The influence of student characteristics and interpersonal teacher behaviour in the classroom on student's wellbeing. *Social Indicators Research*, 85(2), 279–291. <https://doi.org/10.1007/s11205-007-9093-7>
- Vernon, M. (2008). *Wellbeing*. Routledge. <https://doi.org/10.4324/9781315710334>
- Waters, L. (2011). A review of school-based positive psychology interventions. *The Australian Educational and Developmental Psychologist*, 28(2), 75–90. <https://doi.org/10.1375/aedp.28.2.75>
- Weber, M., Ruch, W., & Huebner, E. S. (2013). Adaptation and initial validation of the German version of the students' life satisfaction scale (German SLSS). *European Journal of Psychological Assessment*, 29(2), 105–112. <https://doi.org/10.1027/1015-5759/a000133>
- Yang, Q., Tian, L., Huebner, E. S., & Zhu, X. (2018). Relations among academic achievement, self-esteem, and subjective well-being in school among elementary school students: A longitudinal mediation model. *School Psychology Quarterly*. <https://doi.org/10.1037/spq0000292>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.