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Psychometric properties of the Resilience Scale for Adults (RSA): a cross-cultural validation in a Chinese and a German-speaking Swiss sample

Clarissa Janousch[1,2,3] · Carmen Nadja Hirt[4] · Shu Da[5] · Frederick Anyan[6] · Roxanna Morote[6,7] · Odin Hjemdal[6,8] · Roger Keller[9] · Ulrike Graf[10] · Xichao Zhang[11] · Yves Karlen[4] · Wassilis Kassis[12]

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Abstract

Resilience refers to the ability to adapt and recover from adversity, influenced by intrapersonal and social factors. Given the prevalence of mental health problems, understanding and accurately measuring resilience in diverse populations has become a pressing priority in health and clinical psychology. The Resilience Scale for Adults (RSA) is widely used to assess protective factors. Although several cross-cultural studies have supported the RSA's construct validity, evidence from Mainland China using confirmatory approaches and from the revised German version in Switzerland remains limited. This study therefore examined the RSA's psychometric properties in these two culturally distinct samples/contexts (China and Switzerland) by focusing on factor structure and construct validity. An online survey collected data from 798 Chinese workers and 1,114 Swiss university students. The psychometric properties of the RSA were evaluated through confirmatory factor analysis (CFA), measurement invariance testing, and validity analyses. Convergent and incremental validity were examined using correlations, regressions, and structural equation modeling (SEM). CFA supported a six-factor solution in both samples. Convergent validity was confirmed through significant correlations with self-esteem, self-efficacy, satisfaction with life, depressive symptoms, stress, and burnout. After controlling for life satisfaction, RSA scores predicted additional variance in depressive symptoms (21% in China, 4% in Switzerland). In the Swiss sample, social competence, family cohesion, and social resources did not significantly predict depressive symptoms. The RSA is a valuable measure of protective resilience factors. However, generalizability is limited due to sample differences, which should be considered when interpreting the findings.

Keywords Cross-cultural validation · Measurement invariance · Protective factors · Resilience · Confirmatory factor analysis

✉ Clarissa Janousch
clarissa.janousch@ki.se.ch

1 University Hospital of Psychiatry, University of Zurich, Zurich, Switzerland

2 Jacobs Center for Productive Youth Development, University of Zurich, Zurich, Switzerland

3 Department of Global Public Health, Karolinska Institutet, Stockholm, Sweden

4 Institute of Education, University of Zurich, Zurich, Switzerland

5 School of Psychology, Nanjing Normal University, Nanjing, China

6 Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway

7 Department of Psychology, Catholic University of Peru, Lima, Peru

8 Diakonhjemmet Hospital, Oslo, Norway

9 Centre for Inclusion and Health in Schools, Zurich University of Teacher Education, Zurich, Switzerland

10 Faculty of Educational and Social Sciences, University of Education Heidelberg, Heidelberg, Germany

11 Beijing Key Laboratory of Applied Experimental Psychology, National Demonstration Center for Experimental Psychology Education (Beijing Normal University), Faculty of Psychology, Beijing Normal University, Beijing, China

12 School of Education, University of Applied Sciences and Arts Northwestern Switzerland, Brugg-Windisch, Switzerland

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Background

Developing and maintaining a healthy mental state is crucial when systems and individuals face challenges, particularly considering rising global stressors such as economic instability, public health crises, and increasing mental health disorders (Masten, 2014). According to the World Health Organization (WHO), mental health conditions are among the leading causes of disability worldwide, with depression affecting over 280 million people. COVID-19 significantly exacerbated global health disparities by reversing over a decade of gains in life and healthy life expectancy, bringing them back to 2012 levels (WHO, 2024). Following the pandemic, approximately one in seven people globally (i.e., 13.9% of the world's population) were affected by some form of mental health disorder, making mental illness one of the most significant contributors to the global health burden (McGorry et al., 2025). Consequently, reliable and culturally valid resilience measures are essential for identifying at-risk populations, tailoring mental health interventions, and informing policy decisions aimed at reducing the global mental health burden. This study contributes to these efforts by investigating and understanding the psychometric properties of the Resilience Scale for Adults (RSA) in two culturally distinct populations, facilitating cross-cultural comparisons to advance the development of more universally applicable resilience measures.

Given the worsening trajectory of mental health outcomes worldwide, the capacity to react and respond successfully to risk factors (Masten, 2014), understood as the concept of resilience, is paramount. Resilience is shaped by protective factors, which scholars classify into three overarching categories: personal dispositions (e.g., biological aspects, knowledge, life skills), social resources, namely a supportive family, and access to social support outside the family (Masten et al., 2021). These protective factors buffer individuals from psychological distress and help mitigate the adverse effects of risk factors, such as loss of a loved one, trauma, or natural disasters (Masten, 2014). By strengthening these protective factors, individuals are enabled to cope more effectively in times of adversity and maintain functioning in times of crisis, thus developing greater resilience. Beyond its importance at the individual level, resilience is a key factor in broader public health and societal well-being. It contributes to community adaptability, economic stability, and overall social cohesion.

The concept of resilience has been widely considered crucial across all areas of psychology for its functioning in individuals, teams, and organizations. However, there needs to be more clarity regarding the conceptualization and the distinctions between the assessment and the antecedents of resilience for adults (Britt et al., 2016). In this context, antecedents refer to the factors or conditions that precede and potentially contribute to the development of resilience (e.g., intrapersonal dispositions and social resources).

Consequently, researchers have used different definitions of resilience for decades, resulting in several scales, measuring varying aspects of resilience (Windle et al., 2011). While existing scales provide valuable insights, many were developed in Western contexts, often without considering cross-cultural differences in resilience processes (Ungar, 2008). Thus, the cultural sensitivity of the construct needs to be fully considered in theoretical frameworks and measurement scales. Critical research priorities remain to assess the concept and possible resources contributing to successful resilience development in Western and non–Western cultures. According to a systematic review, 19 scales are available that measure resilience as a process or outcome variable (Windle et al., 2011, 2022). Among the most widely used instruments is the Connor-Davidson Resilience Scale (Connor & Davidson, 2003), which measures stress resistance through five factors; however, its structure varies across cultures. The Brief Resilience Scale is a unidimensional tool assessing recovery speed from stress, but it lacks a multidimensional perspective. The Resilience Scale defines resilience as intrapersonal competence and life acceptance, omitting external protective factors.

In contrast, the Resilience Scale for Adults (RSA; Friborg et al., 2003) captures both factors on intrapersonal and social levels, making it more suitable for cross-cultural research. It also received the highest psychometric ratings based on its internal consistency, construct validity, and measurement reliability (Windle et al., 2011) and has been tested in several Western and non-Western populations, as well as in general and specific samples (see Table S1 in the Supplementary Material, providing an overview of previous studies investigating the psychometric properties of the RSA). Given its comprehensive framework, it was selected for this study.

Several studies have validated the RSA in diverse cultural settings. However, evidence from Mainland China using confirmatory approaches and from the updated German version in Switzerland remains limited. Existing validations of the Chinese translation have relied exclusively on exploratory approaches, such as exploratory factor analyses (EFA), rather than confirmatory approaches, which limits their ability to test the scale's theoretical structure. Due to variations between samples, two different samples will yield a unique factor structure when using an EFA, so a more appropriate way of examining the factor structure of a scale is to use a CFA in order to assess if the original factor structure is supported with acceptable fit indices. Furthermore, prior Chinese validations were conducted in three specific samples according to a systematic review of Chinese

resilience scales, such as nurses, army members, and urban pregnant women (Ma et al., 2019; Peng et al., 2011; Yao et al., 2013), rather than in a more general adult sample. Whereas no Chinese validation has been conducted so far using a confirmatory approach, the validity of the RSA has been examined in a German sample (Kaiser et al., 2019). However, no studies have tested the updated German version, particularly not in a Swiss German-speaking sample. A new psychometric evaluation is required since linguistic adaptations have been made to enhance grammatical and cultural alignment.

To address these gaps, this study aims to conduct a thorough psychometric evaluation of the RSA in a working adult Chinese sample and a German-speaking Swiss sample of university students, by employing confirmatory factor analyses (CFA) to examine the original factor structure of the RSA and provide a more robust evaluation of its psychometric properties in both cultural settings.

Description and previous validations of the RSA

The current RSA measures six dimensions of protective factors in 33 items, which include four intrapersonal-oriented subscales (perception of self, planned future, social competence, structured style) and two interpersonal subscales (family cohesion, social resources), drawing from theoretical models emphasizing both individual and environmental influences on adaptive functioning (Friborg et al., 2003). The six dimensions reflect key components of the resilience theory. Perception of self and planned future capture intrapersonal dispositional factors, such as self-efficacy and goal-setting, which are understood to be central to theories of psychological resilience and self-determination (Masten, 2014). Similarly, social competence reflects interpersonal skills, which are crucial in stress adaptation. Structured style, representing organization and self-discipline, has been linked to resilience, which emphasizes adaptive coping and flexibility. Finally, family cohesion and social resources reflect external resources of support, aligning with family resilience theory and social support theory (Li et al., 2021), highlighting the importance of interpersonal relationships in mitigating adversity and productive development, as also proposed in Bronfenbrenner's ecological model of human development (Bronfenbrenner & Morris, 2007).

To ensure linguistic and conceptual equivalence across cultures, the translation of the RSA used in this study followed a standardized procedure. Two persons with excellent knowledge of resilience research and English, as well as the new language (in this case, Chinese or German), independently translated from English to the new language (in this case, Chinese or German). Then, two new persons with the same qualifications performed a back-translation from the new language to English. The four translations were then sent to the copyright holders for review to ensure the preservation of the intention in the content. If inconsistencies were found, all parties were invited to participate in a comprehensive process to identify optimal solutions to conserve the original intent of the items (Peña, 2007).

Given that individual and cultural aspects shape resilience factors, the importance of the structure of factors in the RSA may vary, as may the structure across different cultural contexts. To better understand these differences in more depth, it is essential to consider both cultural values and psychological self-construals. Hofstede's (2011) cultural dimensions framework shows that China is a collectivist society, while Switzerland is an individualist one. Markus and Kitayama (2010) complement this view by distinguishing between interdependent and independent self-construals. In collectivist cultures, individuals tend to emphasize social harmony, relational responsibilities, and group unity. On the other hand, individualist cultures promote independent self-views, emphasizing autonomy, self-expression, and personal achievement. These cultural and psychological perspectives suggest that Chinese individuals may emphasize the importance of relationships in building resilience, such as family support and social networks. In contrast, Swiss individuals might concentrate more on personal skills and planning for the future. Bringing these viewpoints together helps explain the differences in RSA scores and how items are perceived across cultures. This reinforces the need to examine validity with a confirmatory cross-cultural perspective to assess structural consistency and measurement invariance across diverse subpopulations.

With over two decades of development, the psychometric properties of the RSA have been tested in several samples across Western and non-Western cultures, supporting the final six-factor structure of the scale (Anyan et al., 2019; Hjemdal et al., 2011, 2015). However, the sub-dimension structured style in these studies often resulted in relatively low Cronbach alphas. Similarly, other studies investigating one specific sample, rather than two culturally distinct samples, supported these findings (Bonfiglio et al., 2016; Morote et al., 2017). Also, a more recent study from Denmark, using a student sample (Jakobsen et al., 2020), confirmed the six-factor structure. Nevertheless, they relocated one item, based on fit indices below recommendations (item 23: *becoming informed if a family member experiences a crisis*) from the social resources factor to the family cohesion factor due to strong cross-loadings.

One validation study of the German version and three exploratory studies of the Chinese version of the RSA have already been conducted. The study in a German sample (Kaiser et al., 2019) supported the initial six-factor structure; however, a validation has yet to be conducted with a

Swiss sample, and some items' wording was changed in the meantime. To enhance grammatical accuracy and ensure better linguistic alignment with native German speakers, certain modifications were implemented in the scale. For example, rather than inquiring about the strength of participants' bonds with their friends (item 17) using the terms "*stark*" (strong) and "*schwach*" (weak), the responses were revised to employ "*gut*" (good) and "*schlecht*" (bad).

Additionally, the Chinese studies were conducted in specific groups such as army members (Peng et al., 2011), nurses (Yao et al., 2013), and urban pregnant women (Ma et al., 2019). Confirmatory factor analysis is preferred over exploratory factor analysis (EFA) if there is an established factor structure or a clear theoretical rationale. Despite this, these studies based on EFA resulted in a five- or four-factor solution due to weak fit indices of the initial model. In all three publications, personal competence, family cohesion, social resources, and social competence were replicated, explaining between 52 and 59% variance. Consequently, adaptations were made in all three studies, resulting in a substantial decrease in items and deletion of factors. The final number of items in the studies ranged from 19 to 25, and the factors of planned future and/or structured style were excluded. Although the authors argued that adapting resilience measures to non-Western societies is complex, and resilience might be construed differently in other countries, with choices of culturally and contextually more or less sensitive items, the results ultimately distorted the original instrument using exploratory techniques.

Also, the convergent and incremental validity of the RSA has been established in diverse social and cultural contexts. Strong positive relations were found between RSA and sense of coherence (Anyan et al., 2019; Hjemdal et al., 2011, 2015; Jakobsen et al., 2020), satisfaction with life (Capanna et al., 2015), and perceived social support (Kaiser et al., 2019). Strong negative associations were reported between RSA and depressive symptoms (Morote et al., 2017), stress (Anyan et al., 2017), and burnout. Additionally, the RSA significantly predicts psychiatric symptoms, such as depressive and anxiety symptoms (Hjemdal et al., 2006), and can mediate pain and stress (Friborg et al., 2006). Another study has supported these findings by investigating the relationship between anxiety and depression levels and the indirect relation between stressful life events and depressive symptoms (Anyan et al., 2017). The incremental validity of the RSA above hope in anxiety and depression was demonstrated in a South American adult sample (Morote et al., 2017).

To summarize, the convergent and incremental validity of the RSA has been well-established across different cultural contexts. The RSA correlates positively with protective factors such as satisfaction with life, self-efficacy, and self-esteem, while showing negative associations with psychological distress indicators such as depressive and anxiety symptoms, stress, and burnout. Furthermore, the scale predicted psychiatric symptoms in previous research and mediated stress-related outcomes, reinforcing its utility as a meaningful resilience measure.

In light of the prior validation study conducted in a German sample (Kaiser et al., 2019), which supported the initial six-factor structure but did not account for subsequent wording modifications, and the Chinese studies conducted using exploratory methods with specific samples, resulting in substantial adaptations and the omission of factors, the necessity for an in-depth cross-cultural investigation of the RSA's reliability and validity becomes evident. This study addresses these limitations by examining the psychometric properties of the RSA in German-speaking Swiss and Chinese working adults samples using CFAs. This analysis will examine whether the original six-factor structure remains consistent across these cultural groups, thereby ensuring structural validity. Additionally, the CFA results will inform whether sum scores provide a meaningful representation of resilience or if subscale-specific scoring is more appropriate, thus impacting its application in both research and clinical settings. By evaluating measurement invariance, this study will further determine whether resilience is conceptualized similarly across these cultures or if cultural adaptations are needed for meaningful comparisons. This endeavor is crucial for ensuring the linguistic and cultural alignment of the scale and preserving its integrity in diverse contexts.

Present study

Despite the various validations worldwide, to our knowledge, the RSA has yet to be validated in a more general population of adults in mainland China, nor in a (German-speaking) Swiss sample. Furthermore, a cross-cultural validation study has yet to be tested in either language version, and adaptations have been made in the meantime in the German version of the scale. Therefore, we aim to examine the evidence of validity and cross-cultural comparability of the RSA by analyzing its psychometric properties of the original factor structure in a working adult Chinese sample and a German-speaking Swiss sample of university students.

Even though the previous Chinese studies have failed to support the original six-factor structure of the RSA, using exploratory approaches, we still expected to replicate the original structure in both samples, as seen in previous cross-cultural studies (Anyan et al., 2019; Hjemdal et al., 2011, 2015) and the German study (Kaiser et al., 2019), demonstrating configural invariance (hypothesis 1). We further hypothesized that form and metric invariance would be expected similarly to previous cross-cultural studies investigating

different cultures and language versions (hypothesis 2). We did not expect full scalar invariance, as seen, for example, in the study investigating a Brazilian and Norwegian sample (Hjemdal et al., 2015), where scalar invariance was only discovered partially (hypothesis 3). As shown in previous studies and mentioned in the introduction, individual protective factors such as satisfaction with life, self-efficacy, self-esteem, risk factors as depressive symptoms, stress, and burnout are strongly connected to resilience (Anyan et al., 2017; Capanna et al., 2015; Friborg et al., 2006; Morote et al., 2017). Thus, we expected convergent validity (hypothesis 4) using all these constructs. Finally, incremental validity was tested. We expected that satisfaction with life and the RSA would explain levels of depressive symptoms (hypothesis 5). Specifically, we aimed to ascertain whether the RSA would make a unique and statistically significant contribution to the prediction of depressive symptoms, over and above any shared variance with other predictors that are theoretically strongly linked to each other.

Method

Participants and procedure

For the Chinese study, workers were invited to participate in an online survey throughout August 2021 through an online data collection platform called Credamo. The study aimed to investigate resilience in occupational settings as a highly relevant topic in China. Participants had to be full-time employees 18 years or older to participate. Participants who finished the questionnaire and successfully answered the attention detection questions would get an 8-RMB (approximately $1.20) reward through the platform. In the valid sample, 798 Chinese-speaking people were randomly selected with a mean age of $M = 32.86$ ($SD = 6.38$) years, and 388 (48.6%) participants were female.

In the Swiss study, students enrolled at one university of applied sciences and arts in the German-speaking part of Switzerland were invited via email to participate in an online questionnaire between the beginning of November and the end of December 2021. University students frequently encounter significant academic and life stressors, rendering them a particularly vulnerable subgroup. About one-third of all students, 1,114, completed the online questionnaire. The mean age was $M = 27.97$ ($SD = 7.92$), and 722 (75.2%) were female. While these two samples differ in age and life circumstances, the study focused on resilience as a psychological construct rather than specific occupational or educational influences.

Both studies were performed in accordance with the Declaration of Helsinki, the Institutional Review Board of the Faculty of Psychology, Beijing Normal University (reference #202106070034), and the Research Ethics Committee of the University for Applied Sciences and Arts Northwestern Switzerland. Participation was voluntary, anonymous, and confidential, and participants were free to withdraw at any time.

Instruments

Because the studies were conducted separately, some of the constructs were measured using different scales covering the same constructs. In the following section, we describe all measures and indicate whether they have been applied in both studies or only in one.

Gender and *age* were collected as single items in both samples (0 = females; 1 = males).

The *Resilience Scale for Adults* (RSA; Friborg et al., 2003; Hjemdal et al., 2001) is a 33-item self-report scale assessing six dimensions of protective factors (i.e., perception of self, planned future, social competence, family cohesion, social resources, and structured style). Participants rated each item on a 7-point semantic differential scale format (e.g., *My plans for the future are…* (1) *difficult to accomplish*, (7) *possible to accomplish*). The scale has received broad support for cross-cultural validation and was used in both samples with reliability values for the total score and the subdimensions ranging between $\alpha = .64$ -.96 in the Chinese sample and $\alpha = .63$ -.90 in the Swiss sample.

The *Satisfaction with Life Scale* (SWLS; Pavot & Diener, 2009) was implemented in both samples. It includes five positively phrased items (e.g., *I am satisfied with my life*), and participants rated the items on a seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). According to the developers, the scale has high internal consistency and test–retest correlations of.84 and.80 over a monthly interval. In the present study, Cronbach's alpha in the Chinese sample was $\alpha = .89$, and $\alpha = .87$ in the Swiss sample.

Self-efficacy was measured using the *General Self-Efficacy Scale* by Schwarzer and Jerusalem (1995) in the Chinese sample. It is a well-established, highly reliable, and valid scale with ten positively phrased items (e.g., *I can usually handle whatever comes my way*) and a Cronbach's alpha of $\alpha = .83$. It assesses optimistic self-beliefs using a four-point Likert scale, ranging from (1) not at all true to (4) exactly true.

In the Swiss sample, the general self-efficacy was measured through the *Self-Efficacy Scale – Short Form* (Beierlein et al., 2012), which includes three positively phrased items (e.g., *I am able to solve most problems on my own*). The short version has high correlations ($r = .75$) with the general self-efficacy scale by Schwarzer and Jerusalem

(1995) and shows high reliability and validity (Beierlein et al., 2012) with a Cronbach's alpha of α=.83. The short version uses a five-point Likert scale, ranging from (1) does not apply at all to (5) applies completely.

Self-esteem was only implemented in the Swiss sample. It was measured through the *Rosenberg Self-Esteem Scale* (RSES; Rosenberg, 1965), including ten positively and negatively phrased items (e.g., *I feel that I have a number of good qualities; reversed*) on a four-point Likert scale, ranging from (1) strongly disagree to (4) strongly agree. Cronbach's alpha was α=.83.

Depressive symptoms have been measured in the Chinese sample using the highly reliable and valid subscale of the *SCL-90* (Derogatis, 1994). On a five-point Likert scale, 13 items regarding depressive symptoms (e.g., *feeling blue*) were rated. The response scale ranges from (0) not at all to (4) extremely, and Cronbach's alpha was α=.89.

In the Swiss sample, the *HSCL-5* (Derogatis et al., 1974; Schmalbach et al., 2021), which is based on the *SCL-90* (Derogatis, 1994), has been implemented in the questionnaire. The short version demonstrated excellent internal consistency for the depressive symptoms subscale (Schmalbach et al., 2021). Cronbach's alpha was α=.75. The short version only uses a four-point Likert scale ranging from (1) not at all to (4) extremely.

Data on *burnout* was only collected in the Chinese sample. We used the *Maslach Burnout Inventory-General Survey* (MBI-GS) developed by Maslach et al. (1996), which includes three dimensions: exhaustion (five items), cynicism (four items), and professional efficacy (six items). Items such as *Working all day is really a strain for me*, were rated on a seven-point Likert scale, ranging from (0) never to (6) every day, resulting in a Cronbach's alpha of α=.92.

Stress was only collected in the Swiss sample. We used the *Perceived Stress Scale* (PSS-4; Cohen et al., 1983), including four items being rated on a four-point Likert scale, ranging from (1) never to (4) very often (e.g., *In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?*). The PSS-4 has shown adequate internal consistency and reliability, resulting in a Cronbach's alpha of α=.77.

Statistical analyses

Descriptive statistics, Cronbach's alpha and McDonald's omega, convergent validity analyses (zero-order correlations), and linear regression analyses were conducted in SPSS 24.0. Mplus 8.6 was used for confirmatory factor analysis (CFA), measurement invariance, and incremental validity tests.

To account for potential non-normality in the distribution of RSA items across samples, the Maximum Likelihood Estimation with Robust Standard Error (MLR) and Full-Information-Maximum-Likelihood (FIML) were used in the factor analyses. Factors were allowed to correlate. Model fit was assessed by Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) between 0.06 and 0.08 (upper 90% CI close to or < 0.08), respectively. Comparative Fit Index (CFI) and Tucker–Lewis index (TLI) values greater than 0.95 have often been considered indicative of good fit (Hu & Bentler, 1999). CFI and TLI values between 0.90 and 0.95 and RMSEA between 0.08 and 0.06 are traditionally taken to indicate acceptable fits (Hu & Bentler, 1999). Furthermore, modification indices were used to identify localized areas of misfit (MI > 10). However, these changes were only made if the fit indices mentioned above were not met and if changes were theoretically justified, ensuring psychological coherence rather than model fit improvement alone.

After establishing a well-fitting model for each sample, a multigroup CFA (MG-CFA) approach was used to determine measurement invariance (Byrne, 2011). First, the factor structure of RSA was tested to determine whether the same number of factors and pattern of factor-item relations were equivalent across Chinese and Swiss samples. Second, metric (weak) invariance was investigated. By constraining factor loadings equal across both samples, we tested whether we could find equal factor loadings across the samples. Finally, scalar (strong) invariance was tested by constraining intercepts equal across both samples, indicating whether values on the RSA are directly comparable. However, scalar invariance is rarely supported (Marsh et al., 2018).

According to Chen (2007), a ΔRMSEA of $\leq$.015, a ΔCFI of $\leq$.01, and a ΔSRMR of $\leq$.03 have traditionally been considered indicative of invariance when testing metric invariance. When testing scalar invariance, the same changes in CFI and RMSEA apply, supplemented by a ΔSRMR of $\leq$.01, though these thresholds should be interpreted as general guidelines rather than strict cutoffs. Following established practices, we gradually released constraints on the non-invariant items one at a time, prioritizing modification indices indicating substantial misfit and theoretical justification.

Convergent validity was investigated by zero-order correlations of the RSA total score and the subscales with additional psychological variables. The correlations were run separately for each sample because, as already mentioned, not all instruments were included in both studies (burnout and stress), and some instruments covered the same construct but were not identical (e.g., depressive symptoms). Therefore, direct comparisons should be made cautiously. However, a Welch *t*-test was conducted to compare the means of the RSA and its subscales of the two samples.

Similarly to previous studies (Morote et al., 2017), the incremental validity of the RSA was investigated using two

different approaches. First, the popular regression approach was chosen. We used the RSA total score and the subscales over and above levels of life satisfaction (which have been measured with the same scale) as separate predictors of depressive symptoms. The regressions were bootstrapped using 1000 re-samplings, giving less biased confidence intervals and significance tests because of the non-normality of the data. Second, Structural Equation Models (SEM) were used. Unlike zero-order correlations, they account for possible measurement errors and are less likely to produce misleading results as in the regression approach (Wang & Eastwick, 2020).

Results

Confirmatory factor analysis

As part of the model evaluation, we first tested an unifactorial model. This model demonstrated poor fit in both samples, particularly for Switzerland (Switzerland: $\chi^2(495)=5104.229$, $p<.001$; RMSEA=.093 [90% CI=.091 –.096]; SRMR=.092 CFI=.566; TLI=.538; China: $\chi^2(495)=1770.363$, $p<.001$; RMSEA=.057 [90% CI=.054 –.060]; SRMR=0.049 CFI=.870; TLI=.861), confirming that resilience is not a unidimensional construct. When examining the original structure, including 33 items and six factors across the Chinese and Swiss samples, results showed acceptable fits. Standardized factor loadings are presented in Table 1 and Figs. 1 and 2, fit values for both models are shown in Table 2 (M1a and M1b). Modification indices also suggested that specific item pairs exhibited correlated residuals, which were incorporated into the model when theoretically justifiable. Specifically, residual correlations were added between items 15 (*content related to establishing friendships*) and 21 (*content related to meeting new people*) and between items 12 (*content related to planning*) and 24 (*content related to rules and routines*) in both models. These correlations primarily arose between items with similar wording or conceptual overlap within the same subscale, possibly reflecting redundancy rather than a substantive additional factor in the current samples. In the Swiss model, the residual correlation between items 15 and 21 was.609, and between 12 and 24 was.025 (non-significant). In the Chinese model, both correlations were non-significant with.102 and -.024, respectively; however, modification indices still supported their inclusion. These correlations were applied consistently across both samples to improve model fit while maintaining theoretical coherence.

Most items demonstrate high factor loadings except for item 3 (*content related to being socially oriented*) and item 9 (*content related to flexibility in social settings*) in the social competence factor of the Swiss model (Table 1, Fig. 2). Nevertheless, the model fits in both models were good, as well as reliabilities for all factors (including the social competence factor with the two items having lower factor loadings). Therefore, we decided to keep these models and continued the analysis.

Measurement invariance

The MG-CFA demonstrated good fits for the configural invariance model (Table 2; M2). Furthermore, the model with constrained factor loadings was compared to the configural invariance model, indicating that metric invariance held, too (Table 2, M3). Scalar invariance was not supported because of low CFI and TLI values and a high SRMR value (Table 2, M4a). Therefore, we examined partial scalar invariance, following established best practices, by gradually freeing single items based on high modification indices and theoretical considerations. After freeing six items in total, we found a model demonstrating acceptable model fits (Table 2, M4b). The five items freely estimated in chronological order were item 1, 13 and 25 (perception of self), followed by item 23 (social resources), item 26 and finally item 21 (both social competence).

Descriptive statistics and reliabilities

Table 3 presents descriptive statistics, and reliability estimates of the RSA, its subscales and other instruments used, and results of the means difference tests. As shown, mean values differed significantly for the RSA total score and its subscales, ranging from small to large effects. Striking differences were observed in the perception of self and structure style subscales, with Chinese participants scoring higher on average than Swiss participants. The mean values of the RSA and its subscales were generally higher in the Chinese sample than in the Swiss, except for the social resource's subscale. However, these Welch *t*-test comparisons should be interpreted cautiously because only partial scalar invariance was established. Accordingly, absolute mean differences, particularly for subscales that include non-invariant items (items 1, 13, and 25 [perception of self], items 21 and 26 [social competence], and item 23 [social resources]), should be viewed as descriptive rather than as definitive inferential evidence of cross-cultural differences in the underlying constructs. Furthermore, no significant difference between the mean values of the SWLS was found. Direct comparisons were not made because the other constructs were measured through different instruments.

In the Swiss sample, age correlated significantly and positively with the RSA total score, perception of self, family

Table 1 Standardized factor loadings of the country samples in the original structure

Item	China (n = 798)						Switzerland (n = 1,114)					
	ps	pf	sc	fc	sr	ss	ps	pf	sc	fc	sr	ss
RSA1	.67						.57					
RSA7	.75						.64					
RSA13	.75						.64					
RSA19	.79						.66					
RSA25	.75						.72					
RSA29	.72						.46					
RSA2		.72						.69				
RSA8		.81						.80				
RSA14		.84						.72				
RSA20		.77						.72				
RSA3			.67						.30			
RSA9			.47						.19			
RSA15			.75						.89			
RSA21			.73						.89			
RSA26			.67						.43			
RSA30			.78						.55			
RSA4				.58						.63		
RSA10				.57						.82		
RSA16				.76						.88		
RSA22				.76						.68		
RSA27				.69						.65		
RSA31				.46						.73		
RSA5					.62						.74	
RSA11					.65						.77	
RSA17					.70						.54	
RSA23					.53						.54	
RSA28					.62						.81	
RSA32					.77						.69	
RSA33					.70						.66	
RSA6						.37						.39
RSA12						.57						.40
RSA18						.77						.78
RSA24						.64						.63

ps perception of self, *pf* planned future, *sc* social competence, *fc* family cohesion, *sr* social resources, *ss* structured style

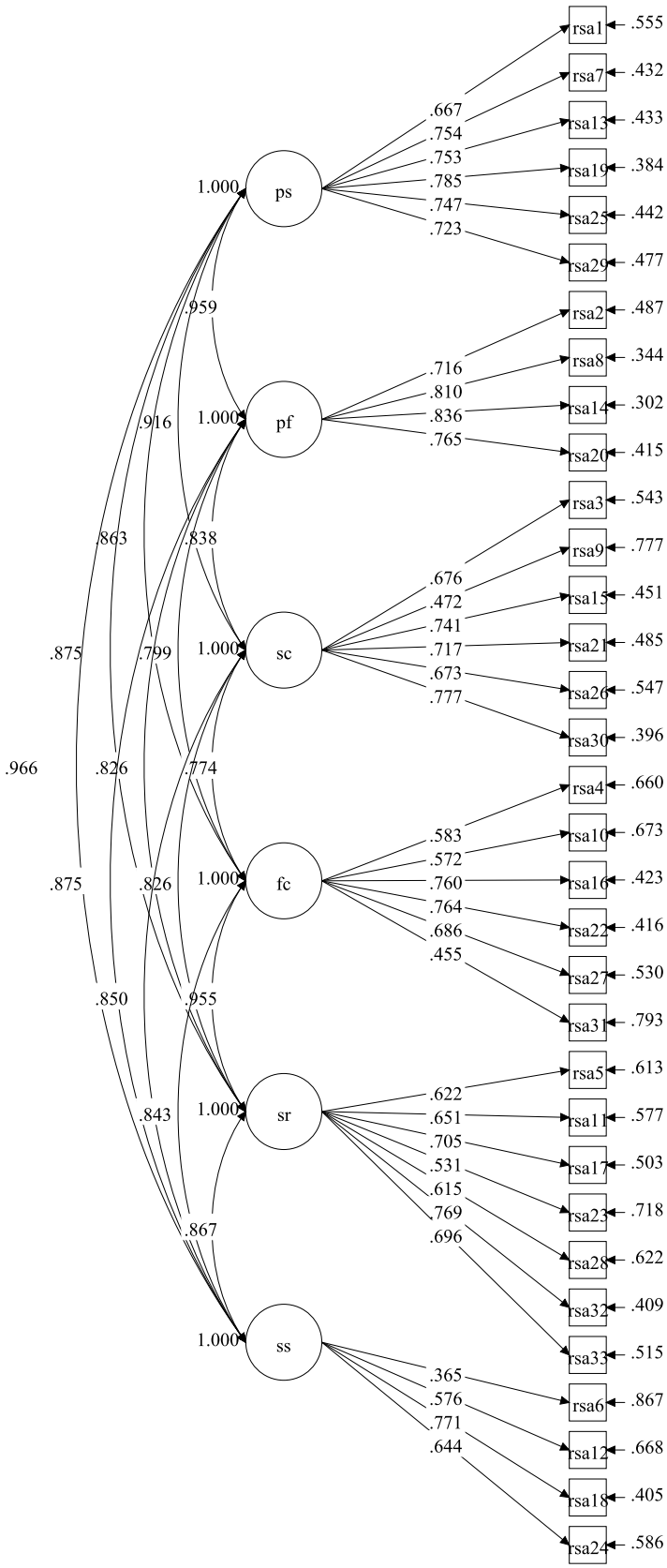

Fig. 1 Factor loadings for the six-factor, 33-item model (China: $n = 798$); ps, perception of self; pf, planned future; sc, social competence; fc, family cohesion; sr, social resources; ss, structured style

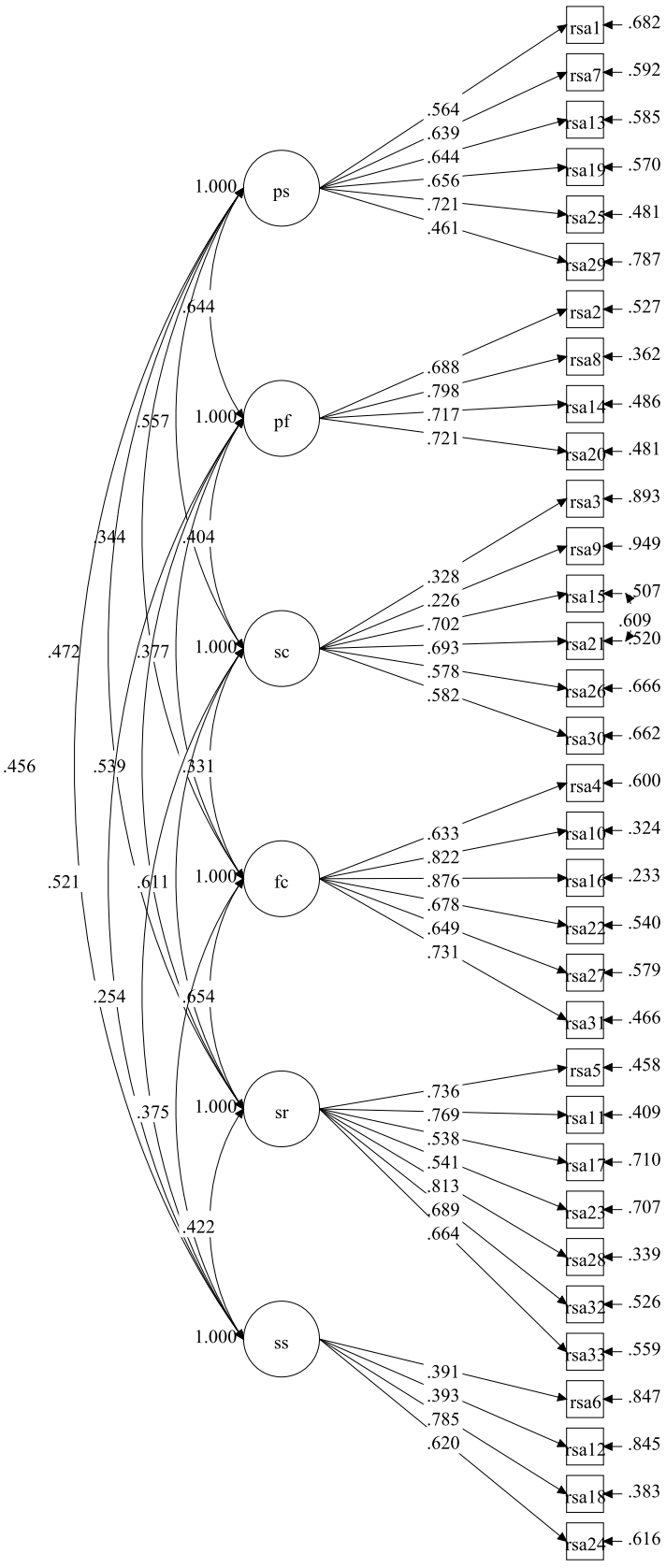

Fig. 2 Factor loadings for the six-factor, 33-item model (Switzerland: $n = 1{,}114$); ps, perception of self; pf, planned future; sc, social competence; fc, family cohesion; sr, social resources; ss, structured style

Table 2 Evaluations of multigroup measurement invariance across the Chinese ($n = 798$) and Swiss ($n = 1,114$) samples (MG-CFA MI)

Model	Type of test	Compared with	χ^2	df	RMSEA	CFI	TLI	SRMR	Δdf	ΔCFI	ΔRMSEA	ΔSRMR	Decision
M1a	China		1262.890 $p < .001$	478	.045 [.042,.048]	.920	.911	.044					
M1b	Switzerland		1315.219 $p < .001$	478	.040 [.038,.043]	.921	.913	.048					
M2	Configural invariance		2574.748 $p < .001$	956	.043 [.041,.045]	.920	.912	.046					
M3	Metric invariance	M2	2811.333 $p < .001$	983	.045 [.044,.047]	.910	.904	.067	27	-.010	.002	.021	Accept
M4a	Scalar invariance	M3	3623.871 $p < .001$	1010	.053 [.051,.054]	.872	.866	.080	27	-.038	.008	.013	Reject
M4b	Partial scalar invariance	M4a	2983.246 $p < .001$	1004	.046 [.044,.048]	.903	.898	.069	22	-.007	.001	.002	Accept

χ^2 Chi-square statistic, *df* degrees of freedom, *RMSEA* root mean square error of approximation, *CFI* comparative fit index, *TLI* tucker lewis index, *SRMR* standardized root mean square error of approximation, *Δ* change in statistical values

cohesion, structured style, self-efficacy, and self-esteem, and negatively with all emotional distress variables. The results indicate that older participants in the Swiss study show higher levels of protective factors and lower levels of emotional distress.

Reliability estimates were generally good across both samples, ranging from α=.64 to.87 in the Chinese sample and ranging from α=.63 to.85 in the Swiss sample for the subscales. The total RSA showed α-values of .96 and .90. However, the structured style subscale showed lower reliability (α<.70) in both samples.

Convergent validity

As expected, the RSA and its subscales correlated significantly and positively with other measures of protective factors, such as satisfaction with life, self-efficacy, and self-esteem, and negatively with measures of emotional distress, such as depressive symptoms, burnout and stress, in both samples (Table 3). Overall, correlation values are moderate to high except for correlations between all mental health scales.

Incremental validity

A three-stage regression was conducted with depressive symptoms as the dependent variable for the Chinese and Swiss data. Satisfaction with life was entered in the first step (Model 1). Secondly, the RSA and the subscales were entered at stage two in separate analyses (Model 2). Most regression models were statistically significant (Table 4). At step one, the hierarchical multiple regression revealed at step one that SWLS contributed significantly to the regression model in the Chinese and Swiss samples, explaining 22%, respectively 23% of the variance. After the RSA total score was entered in step two, an additional 21% were explained in the Chinese model, and an additional 4% were explained in the Swiss model. Substituting the RSA total score with any of the subscales in step three, a maximum of 21% and a minimum of 8% in the Chinese model and a maximum of 9% and a minimum of 1% in the Swiss model were additionally explained. No significant results in the Swiss models were found when entering the social competence, family cohesion, and social resources subscales.

Before running separate SEMs to test the incremental validity of the RSA and its subscales, we established empirical evidence for construct separability between the RSA, depressive symptoms, and the SWLS. Therefore, we ran a unifactorial model and compared it to a three-factor model. The unifactorial model reached non-acceptable model fit values in the Chinese ($\chi^2(1224) = 5465.325$, $p < .001$; RMSEA=.066 [90% CI=.0654 –.068];

Table 3 Descriptive statistics, Cronbach's alphas, McDonald's omegas, and Pearson correlation coefficients for the measurement variables in the Chinese (n = 798) and Swiss (n = 1,114) samples

	Sample			Variables													
		α 95% CI [LL, UL]	ω 95% CI [LL, UL]	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Protective factors																	
1 RSA	China	.96 [.95,.96]	.96 [.95,.96]														
	Switzerland	.90 [.89,.91]	.89 [.88,.91]														
2 RSA ps	China	.87 [.84,.89]	.87 [.85,.89]	.92***													
	Switzerland	.78 [.76,.80]	.78 [.76,.80]	.69***													
3 RSA pf	China	.85 [.83,.87]	.87 [.85,.89]	.87***	.84***												
	Switzerland	.82 [.79,.84]	.82 [.80,.84]	.69***	.50***												
4 RSA sc	China	.83 [.81,.85]	.84 [.82,.86]	.87***	.79***	.73***											
	Switzerland	.70 [.67,.73]	.73 [.70,.75]	.62***	.37***	.28***											
5 RSA fc	China	.79 [.74,.81]	.79 [.74,.81]	.84***	.69***	.64***	.65***										
	Switzerland	.84 [.82,.86]	.84 [.83,.86]	.72***	.29***	.33***	.26***										
6 RSA sr	China	.84 [.80,.86]	.84 [.80,.87]	.87***	.72***	.68***	.68***	.78***									
	Switzerland	.85 [.83,.87]	.85 [.83,.87]	.80***	.39***	.45***	.47***	.61***									
7 RSA ss	China	.64 [.58,.69]	.65 [.60,.70]	.80***	.72***	.66***	.62***	.59***	.64***								
	Switzerland	.63 [.58,.67]	.64 [.60,.67]	.54***	.24***	.38***	.12***	.29***	.31***								
8 Life satisfaction	China	.89 [.88,.91]	.89 [.88,.91]	.60***	.61***	.57***	.56***	.47***	.45***	.43***							
	Switzerland	.87 [.85,.88]	.86 [.85,.88]	.64***	.51***	.55***	.32***	.46***	.49***	.30***							
9 Self-efficacy[1]	China	.83 [.79,.85]	.83 [.80,.86]	.69***	.71***	.66***	.62***	.50***	.52***	.54***	.59***						
	Switzerland	.83 [.81,.85]	.83 [.81,.85]	.44***	.56***	.38***	.24***	.18***	.27***	.16***	.36***						
10 Self-esteem[2]	Switzerland	.83 [.81,.85]	.83 [.81,.85]	.58***	.64***	.49***	.34***	.29***	.39***	.26***	.56***	.48***					

Table 3 (continued)

	Sample			Variables													
		α 95% CI [LL, UL]	ω 95% CI [LL, UL]	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Emotional distress																	
11 Depressive symptoms[1]	China	.89 [.87,.91]	.89 [.87,.91]	-.64***	-.65***	-.58***	-.55***	-.51***	-.56***	-.46***	-.47***	-.48***					
	Switzerland	.75 [.72,.78]	.76 [.73,.79]	-.47***	-.50***	-.47***	-.19***	-.24***	-.26***	-.26***	-.48***	-.31***	-.50***				
12 Burnout[2]	China	.92 [.90,.93]	.91 [.89,.92]	-.79***	-.80***	-.71***	-.71***	-.60***	-.65***	-.64***	-.62***	-.65***		.67***			
13 Stress[2]	Switzerland	.77 [.74,.80]	.77 [.74,.80]	-.56***	-.59***	-.48***	-.26***	-.32***	-.36***	-.29***	-.54***	-.45***	-.57***	.67***			
Demographics																	
14 Age	China			.02	.01	-.01	.01	.03	.06	.00	.06	.03		-.05	-.03		
	Switzerland			.12**	.22***	.04	.03	.08*	.00	.11**	.04	.23***	.17***	-.15***		-.23***	
Descriptive data																	
Range	China			1−7	1−7	1−7	1−7	1−7	1−7	1−7	1−7	1−4		0−4	0−6		21−62
	Switzerland			1−7	1−7	1−7	1−7	1−7	1−7	1−7	1−7	1−5	1−4	1−4		1−5	18−60
M (SD)	China			5.77 (0.70)	5.72 (0.84)	5.69 (0.94)	5.49 (0.88)	5.92 (0.73)	6.00 (0.68)	5.72 (0.82)	4.92 (1.16)	3.34 (0.38)		0.55 (0.46)	1.38 (0.72)		32.86 (6.38)
	Switzerland			5.33 (0.74)	4.71 (1.10)	5.28 (1.18)	5.30 (1.01)	5.52 (1.32)	6.14 (0.85)	4.62 (1.25)	4.97 (1.15)	3.91 (0.66)	3.06 (0.55)	2.20 (0.71)		2.59 (0.70)	27.97 (7.92)
t-test				13.16***	22.35***	8.27***	2.33***	7.75***	3.85***	22.85***	−0.93						
Cohen's *d*				0.61	1.06	0.38	0.19	0.36	0.18	1.01	−0.04						

RSA resilience scale for adults, *ps* perception of self, *pf* planned future, *sc* social competence, *fc* family cohesion, *sr* social resources, *ss* structured style. [1]Different measures have been used;[2]Construct has only been measured in one project. *$p<.05$; **$p<.01$; ***$p<.001$

Table 4 Hierarchical multiple regression predicting depressive symptoms from satisfaction with life and resilience in the Chinese ($n = 798$) and Swiss ($n = 1{,}114$) samples

	China				Switzerland			
	Depressive symptoms				Depressive symptoms			
	Model 1		Model 2		Model 1		Model 2	
Variable	B	β	B	β	B	β	B	β
Constant	1.47***		2.95***		3.66***		4.52***	
SWLS	−0.19***	−0.47	−0.05***	−0.13	−0.29***	−0.48	−0.18***	−0.30
RSA total			-.37***	−0.57			−0.27***	−0.28
R^2	0.22		.43		0.23		0.27	
F	225.12***		293.46***		296.64***		188.79***	
ΔR^2	.22		.20		0.23		0.05	
ΔF	225.12***		282.26***		296.64***		62.86***	
Constant	1.47***		2.59***		3.66***		4.18***	
SWLS	−0.19***	−0.47	−0.05***	−0.12	−0.29***	−0.48	−0.18***	−0.30
RSA ps			−0.32***	−0.58			−0.23***	−0.35
R^2	0.22		0.43		0.23		0.32	
F	225.12***		300.00***		296.64***		235.88***	
ΔR^2	0.22		0.21		0.23		0.09	
ΔF	225.12***		292.46***		296.64***		135.73***	
Constant	1.47***		2.24***		3.66***		4.10***	
SWLS	−0.19***	−0.47	−0.08***	−0.20	−0.29***	−0.48	−0.19***	−0.31
RSA pf			−0.23***	−0.47			−0.18***	−0.30
R^2	0.22		0.37		0.23		0.29	
F	225.12***		229.80***		296.27***		205.18***	
ΔR^2	0.22		0.15		0.23		0.06	
ΔF	225.12***		183.01***		296.27***		88.52***	
Constant	1.47***		2.21***		3.66***		3.81***	
SWLS	−0.19***	−0.47	−0.09***	−0.23	−0.29***	−0.48	−0.28***	−0.46
RSA sc			−0.22***	−0.42			−0.04	−0.06
R^2	0.22		0.34		0.23		0.23	
F	225.12***		206.92***		296.64***		150.60***	
ΔR^2	0.22		0.12		0.23		0.00	
ΔF	225.12***		147.33***		296.64***		3.76	
Constant	1.47***		2.49***		3.65***		3.71***	
SWLS	−0.19***	−0.47	−0.12***	−0.30	−0.29***	−0.48	−0.28***	−0.46
RSA fc			−0.23***	−0.37			−0.02	−0.03
R^2	0.22		0.33		0.23		0.26	
F	225.12***		191.45***		294.78***		147.87***	
ΔR^2	0.22		0.11		0.23		0.00	
ΔF	225.12***		123.22***		294.78***		0.97	
Constant	1.47***		2.85***		3.66***		3.80***	
SWLS	−0.19***	−0.47	−0.11***	−0.27	−0.29***	−0.48	−0.28***	−0.46
RSA sr			−0.30***	−0.44			−0.03	−0.04
R^2	0.22		0.38		0.23		0.23	
F	225.12***		239.11***		296.54***		149.13***	
ΔR^2	0.22		0.16		0.23		0.00	
ΔF	225.12***		197.53***		296.54***		1.55	
Constant	1.47***		2.22***		3.66***		3.89***	
SWLS	−0.19***	−0.47	−0.13***	−0.33	−0.29***	−0.48	−0.27***	−0.44
RSA ss			−0.18***	−0.32			−0.08***	−0.14
R^2	0.22		0.30		0.23		0.24	
F	225.12***		173.34***		296.64***		163.01***	
ΔR^2	0.22		0.08		0.23		0.24	
ΔF	225.12***		94.99***		296.64***		22.96***	

RSA resilience scale for adults, *ps* perception of self, *pf* planned future, *sc* social competence, *fc* family cohesion, *sr* social resources, *ss* structured style. *$p < .05$; **$p < .01$; ***$p < .001$

SRMR=.068 CFI=.745; TLI=.735), and the Swiss datasets ($\chi^2(779)=7304.312$, $p<.001$; RMSEA=.088 [90% CI=.087 –.090]; SRMR=.088 CFI=.560; TLI=.537). However, the three-factor model showed acceptable fit values (China: ($\chi^2(1194)=2710.163$, $p<.001$; RMSEA=.040 [90% CI=.038 –.042]; SRMR=.045 CFI=.909; TLI=0.903); Switzerland: ($\chi^2(749)=1977.894$, $p<.001$; RMSEA=.039 [90% CI=.037–.041]; SRMR=.045 CFI=.917; TLI=.909). Based on the three-factor model, significant path coefficients from the RSA total score and its subdimensions to depressive symptoms over and above life satisfaction were inspected (Figs. S1a-7b in the Supplementary Material). Significant negative paths were detected in the Chinese models for the RSA total score and all subscales. In the Swiss models, only the RSA total score, perception of self, planned future, and structured style subscales resulted in a significant path.

Discussion

This study aimed to examine the original factor structure and psychometric properties of the Resilience Scale for Adults (RSA) in a Chinese and a German-speaking Swiss sample. Consistent with our assumption (hypothesis 1), analyses confirmed the six-factor structure of the scale, as seen in previous cross-cultural studies of the RSA, indicating configural invariance (Anyan et al., 2019; Hjemdal et al., 2011, 2015).

Most importantly, metric invariance was supported, implying that changes in the RSA's raw scores correspond in both countries. Although factor loadings differed in some items, the differences were negligible because of the non-significant overall test. Interestingly, standardized loadings were especially low in the Swiss model for item 9 (social competence factor), which belongs to the social competence factor. This item demonstrated relatively low factor loadings (compared to the other items) in a previous cross-cultural validation, including a Belgian and Norwegian sample (Hjemdal et al., 2011). Furthermore, the item related to being flexible in social settings might have different importance across samples and cultures. Therefore, this item should be used cautiously and needs closer investigation in future validations.

Even though only partial scalar invariance was met, 27 items demonstrated comparable functioning across samples, as indicated by similar factor loadings and item means (hypothesis 3). The latent intercepts varied for items 1, 23, 25 (perception of self), 21, and 26 (social competence), and 23 (social resources), indicating that a certain displacement in scale location existed in the current samples. As a result, mean scores comparisons across the two cultures should be interpreted with caution, particularly for subscales that include non-invariant items. However, as metric invariance was confirmed, structural comparisons, such as comparing relationships between RSA subscales and other psychological constructs, remain valid across both samples. This suggests that while cultural response tendencies influence absolute resilience scores, and certain items may be interpreted differently across cultural contexts, the overall structural relationships between resilience and mental health factors are comparable across these cultures. Moreover, the presence of partial scalar invariance raises the possibility that response style biases, such as acquiescence, may have contributed to elevated scores in the Chinese sample. As mentioned, these biases are more commonly observed in collectivist cultures, where agreement and social harmony are emphasized (Posten & Steinmetz, 2022).

Second, upon closer examination of the mean raw scores of the RSA and its subscales, it is striking that the intercepts of the subdimensions were, on average, significantly higher in the Chinese than in the Swiss sample, except for the factor social resources, where the Swiss participants scored higher. This discrepancy may initially seem counterintuitive based on cultural psychology theories, such as Markus and Kitayama's (2010) framework of interdependent versus independent self-construals, which would suggest a stronger emphasis on relational aspects in collectivist cultures like China. However, this discrepancy may reflect a combination of several factors: contextual influences, response style biases, and culturally independent psychological mechanisms. For example, studies have shown that the tendency to agree with questionnaire items regardless of their content (acquiescence bias) is more prevalent in collectivist cultures, where social harmony and deference are emphasized (Posten & Steinmetz, 2022). These biases may inflate scores on relational and individual resilience factors, complicating direct cross-cultural comparisons. Furthermore, due to the prolonged stress exposure and adaptive coping requirements resulting from the COVID-19 pandemic, data collection may have coincided with heightened resilience-related self-perceptions in China. These factors suggest that resilience, despite being influenced by cultural models, also reflects situational and dynamic factors that transcend simple cultural dichotomies. Future research should explore these mechanisms in more depth, ideally by incorporating measures of response style and contextual stressors to disentangle cultural from methodological effects.

Furthermore, demographic factors, such as age, gender, and occupation, can influence how individuals respond to scales. Both the Chinese sample, consisting of working adults, and the Swiss sample of university students represent rather general, non-clinical populations within their respective cultural contexts. In Switzerland, university attendance

is relatively high among young adults, with approximately 45% of people between 25 and 64 years old having obtained a tertiary-level qualification (Swiss Confederation, 2024), which suggests that this student sample reflects a meaningful but selective subset of young adults in Switzerland. The goal of evaluating resilience in real-world contexts, where stressors and coping strategies are extremely pertinent, served as the basis for the selection. The RSA is designed to capture protective factors relevant at all stages of adult life, despite demographic differences, such as age, education, and occupation, which may have affected the observed resilience patterns. Furthermore, the robustness of the scale is supported by the consistency of structural relationships across samples. However, in order to separate cultural influences from contextual or life-stage effects, future research should replicate these findings using demographically matched samples. Another factor influencing response patterns in cross-cultural validations is the possibility that items and/or response scales are not being entirely understood in the same manner because of particularities in their culture and/or language, which can occasionally complicate translations. Different cultures and languages are adapted to their environment with nuances that other cultures and languages lack. Therefore, we suggest that future investigations test cultural differences by adding additional variables to give information on the samples' characteristics. Additionally, tests should be conducted to determine whether the scale was understood in the same meaning in terms of content and whether specific response patterns can be detected, explaining possible differences.

Reliabilities in both samples were good. However, the sub-dimension structured style demonstrated the lowest reliability in both groups, and the social competence subscale in the Swiss sample had a reliability of.70. This finding aligns with previous studies that have reported lower reliability for structured style (e.g., Anyan et al., 2019; Hjemdal et al., 2015). The lower reliability of these subscales may be more context-sensitive than others, indicating greater variability in how structured coping strategies and social adaptability are perceived and expressed across different cultural contexts. It may be possible that attributes measured in the structured style subscale may be embedded within relational or group-oriented practices in collectivist cultures. In individualist cultures, they may be viewed rather as personal attributes. This divergence could lead to inconsistent responses and lower consistency. Future research should investigate whether adapting item wording or structure enhances reliability in diverse populations.

For the discussion of convergent and incremental validity, it should be noted that no direct comparisons should be made. All other measurements differed except for the RSA, its subscales, and the SWLS. The different instruments across the two samples, particularly for constructs such as self-efficacy and depressive symptoms, limit direct comparability. However, it should be noted that both measures are psychometrically sound and measure the same latent constructs but differ in item content, scale length, and response format, which may influence the magnitude of associations. Since the primary aim was to estimate the validity of the RSA in each cultural context rather than making direct comparisons regarding effect sizes between samples, our study makes a significant contribution to the field of resilience research by providing the first cross-cultural validation of the RSA in Chinese and German-speaking Swiss samples. It offers empirical support for the six-factor structure, confirms metric invariance across cultures, and highlights both structural similarities and culturally specific patterns in resilience expression. These findings contribute to the ongoing discussion of resilience as a universal versus culturally influenced construct and provide a foundation for future studies seeking to refine resilience measurement in diverse populations. First and foremost, consistent with our assumption (hypothesis 4), convergent validity was supported in both samples as all additional variables significantly correlated in the expected direction with the RSA and its subscales in both cultural contexts. These correlations are in line with previous findings investigating these relationships and affirming the scale's validity (Anyan et al., 2017; Capanna et al., 2015; Friborg et al., 2006; Morote et al., 2017).

Furthermore, incremental validity via hierarchical multiple regression models only partially predicted depressive symptoms in both studies, contrary to our assumptions in hypothesis 5. In general, the Chinese models explained much more variance than the Swiss models. They were also all statistically significant, whereas the Swiss models resulted in non-significant changes when entering the subscales of social competence, family cohesion, and social resources, which might be explained by the different use of instruments for depressive symptoms. These differences might also reflect China and Switzerland's divergent public health approaches during COVID-19, as mentioned above. Beyond measurement differences, other potential moderating variables, such as cultural and sample differences in coping strategies, perceived social support, or stress exposure, may also influence the predictive relationship. Examining these factors in future research could provide deeper insights into the mechanisms underlying resilience and their impact on mental health outcomes across cultural contexts and samples.

Similarly, the results of the SEMs supported these findings despite the significant zero-order correlations. Even though the short scale measuring depressive symptoms used in the Swiss models is a reliable and valid instrument, we assume that the findings are influenced by the low number

of items in the depressive symptoms scale. In comparison to the Chinese models, the Swiss models explain less variance and result in non-significant paths in the SEMs. Short scales are less sensitive and do not always register the full spectrum of emotional distress (Rodríguez-Barragán et al., 2023). This might explain the stronger incremental validity in the Chinese sample and the weaker associations in the Swiss sample. Another reason could be a restriction of range within the Swiss sample, whereby the lower variability of depressive symptoms may limit correlations. Such considerations highlight the importance of controlling for measurement as well as cultural context in interpreting evidence of incremental validity. Thus, it would be ideal to retest the incremental validity of a German-speaking Swiss sample using a more extended version of a scale measuring depressive symptoms.

Consequently, this study demonstrated that the German and Chinese versions of the scale provide evidence that the RSA is a useful measure of protective factors associated with resilience. The validity tested in each cultural context confirmed that the scale captures protective factors theoretically and empirically related to constructs such as satisfaction with life or depressive symptoms. From a practical standpoint, the RSA is a valuable tool for assessing protective factors in Chinese and German-speaking samples. The confirmatory factor analysis (CFA) results provide evidence for the scale's structural validity, supporting the use of RSA subscale scores to capture distinct dimensions of resilience. While CFA does not directly determine whether sum scores should be used, it informs the scale's conceptual framework by evaluating whether the subscales reflect distinct but related protective factors. This structural validation is crucial for both research and applied settings, where subscale-level interpretations may provide more nuanced insights than a total resilience score. However, practitioners and researchers in applied settings should be aware of potential cultural variations in how specific resilience dimensions are emphasized and interpreted.

Limitations and implications

First, the study is based on cross-sectional data, which does not allow for a test of consistency (test–retest reliability). It also limits the findings of the incremental validation. Ideally, predictive capacities are being tested using more than one time point. Therefore, future studies should use longitudinal data to give more information on the scale's psychometric properties.

Second, both samples are rather specific. They are both non-clinical samples, giving more profound insight into how a more general population in China and Switzerland interpreted the scale. Nevertheless, a sample of workers and university students might result in different findings than an even more general sample. Furthermore, the sample in China was drawn from no specific region of the country. In contrast, the Swiss student sample was drawn from three specific German-speaking cantons, which might result in a more heterogeneous group compared to the Chinese sample. Cultural differences within the countries may further influence the findings. Therefore, we suggest replicating findings with more general samples from China and Switzerland, considering the context sensitivity of resilience. This could also include analyzing measurement invariance across gender.

Third, finding only partial invariance limits the direct comparability of absolute RSA and subdimension scores. Therefore, the interpretation of group differences should be seen in the light of this limitation.

Fourth, we recognize that different convergent and incremental validity measurement scales do not permit direct comparisons. Although all measures were psychometrically sound and measured the same latent constructs, differences in scale length, response formats, and item wording might have influenced the strength of associations. This methodological inconsistency can lead to potential bias and limit the ability to draw direct conclusions about the differences in validity. Thus, future cross-cultural investigations should use the same instruments to test findings and make direct comparisons. Nevertheless, separate analyses could confirm its validity within each cultural context.

Finally, it is possible that social desirability, influenced by cultural aspects, might have influenced the study's findings.

Conclusion

The present study is the first cross-cultural study investigating the RSA with samples from China and Switzerland. Findings support the RSA's original six-factor structure. It was confirmed that participants in both samples responded similarly to most RSA items, as suggested by measurement invariance testing. The study of conceptual similarities or differences between positive constructs (protective factors and life satisfaction) and between them and negative constructs (depressive symptoms) in the prediction of mental health outcomes (convergent and incremental validities), as well as the verification of the efficacy of the combined use of instruments (Morote et al., 2017) enriches the empirical study of diverse systems of risk and protection. The scale provides a valuable tool for assessing protective factors associated with resilience in diverse cultural contexts: the RSA can be used within each cultural setting to assess protective factors and to examine associations with mental health outcomes, whereas cross-national comparisons of absolute total or

subscale scores should be interpreted cautiously and treated as tentative given only partial scalar invariance. The RSA can be applied in research to better understand resilience mechanisms and inform interventions aimed at strengthening protective factors. Future research should also explore the theoretical underpinnings of the scale by examining whether the six factors can be organized into the two overarching categories of intrapersonal and social resources. Furthermore, given the cultural variations observed in resilience expression, future research should explore localized adaptations of specific subscales and investigate how resilience interacts with other psychological constructs across different sociocultural environments. Longitudinal studies examining resilience over time and its predictive role in mental health outcomes could further enhance the scale's applicability and theoretical foundations.

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Data availability The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declarations

Ethics approval and consent to participate Informed consent was obtained from all participants in the study. Both studies were performed in accordance with the Declaration of Helsinki. They received approval from the Institutional Review Board of the Faculty of Psychology, Beijing Normal University (reference #202106070034) and the Research Ethics Committee of the University for Applied Sciences and Arts Northwestern Switzerland.

Consent to publish Written informed consent for publication was obtained from all participants.

Competing interest The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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