

Serveur Académique Lausannois **SERVAL** [serval.unil.ch](https://serval.unil.ch)

## Author Manuscript

Faculty of Biology and Medicine Publication

**This paper has been peer-reviewed but does not include the final publisher proof-corrections or journal pagination.**

Published in final edited form as:

**Title:** Psychometric Properties of the French Brief Resilience Scale

**Authors:** Jacobs I, Horsch A

**Journal:** European Journal of Health Psychology

**Issue:** 26

**Volume:** 1

**Pages:** 1-9

**DOI:** 10.1027/2512-8442/a000022

In the absence of a copyright statement, users should assume that standard copyright protection applies, unless the article contains an explicit statement to the contrary. In case of doubt, contact the journal publisher to verify the copyright status of an article.

Preprint version

## Psychometric Properties of the French Brief Resilience Scale

Ingo Jacobs<sup>1,2,\*</sup> & Antje Horsch<sup>3,4</sup>

### Short title:

Psychometric Properties of the BRS-F

<sup>1</sup> Medical School Berlin, Germany

<sup>2</sup> Sigmund Freud University Berlin, Germany

<sup>3</sup> Department Woman-Mother-Child, Lausanne University Hospital, Lausanne, Switzerland

<sup>4</sup> Institute of Higher Education and Research in Healthcare, University of Lausanne and  
Lausanne University Hospital, Lausanne, Switzerland

\* corresponding author: Rathenower Str. 23, 10559 Berlin, Germany. [ingojacobs@yahoo.de](mailto:ingojacobs@yahoo.de)

**Funding information:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sections.

**Declaration of interests:** The authors are not aware of any conflict of interests.

**Note.** This version of the article has been accepted for publication but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the final article published in *European Journal of Health Psychology* (2019), 26(1), 1–9. <https://doi.org/10.1027/2512-8442/a000022>

## **Abstract**

The Brief Resilience Scale (BRS) is a reliable and valid assessment of the self-perceived ability to bounce back or recover quickly from stress. The current study translated and validated the French version of the BRS (BRS-F) in a sample of  $N=220$  midwives. In a confirmatory factor analysis, the unifactorial model fitted acceptably to the data. High levels of Tucker's phi implied that the component loadings of the BRS-F and of the original BRS are almost equal. The BRS-F demonstrated good levels of reliability and meaningful correlations with mental health symptoms and burnout. The resilience-mental health difficulties link was fully mediated through emotional exhaustion. Thus, the BRS-F is a psychometrically sound assessment of self-perceived resilience, which is now available to researchers and clinicians in French speaking contexts. The results also suggest that the BRS-F is relevant for use by healthcare professionals who may benefit from interventions aimed at increasing their resilience.

**Key words:** Brief Resilience Scale, burnout, mediation, mental health difficulties, midwives.

## **Introduction**

Over the past two decades, resilience has become a highly popular concept in psychological and medical science (Chmitorz, Kunzler et al., 2018; Reich, Zautra, & Hall, 2010). Resilience captures a person's ability to return quickly to the previous level of functioning despite experiences of significant adversity (i.e., bounce back or recover quickly from stress; Carver, 1998; Smith, Tooley, Christopher, & Kay, 2010). The construct of resilience can be divided into medical resilience (i.e., the objective physical recovery following illness or injury) and psychological resilience (i.e., the subjective recovery after adverse stressful events, which might include illness; e.g., Chmitorz, Kunzler et al., 2018; Reich et al., 2010). In this paper, we adhere to psychological resilience. By emphasizing the ability to bounce back, resilience differs from related concepts, such as thriving (moving to a superior level of functioning following difficult experiences), adaptation (adjusting to a new, stressful situation), or psychological resistance (not becoming stressed or ill in the face of adversity; Carver, 1998).

Although some authors view resilience as a fixed, stable trait, resilience is usually regarded as an outcome or process in response to difficult experiences that is shaped by interactions between individual resources and one's environment, leading to varying levels of resilience across the life-span (Windle, Bennett, & Noyes, 2011). The latter perspective on resilience is consistent with Smith et al.'s resilience model (Smith, Dalen, Wiggins, Tooley, Christopher, & Bernard, 2008; Smith et al., 2010). In this model, the ability to regain homeostasis after experiencing significant stress is considered as a personal resource that is susceptible to change (e.g., by intervention). Smith et al. (2010) regard the belief that one possesses this resource as an important prerequisite for actually being able to recover quickly from stress. They assume that resilience self-efficacy develops when people, who are sufficiently equipped with coping resources, learn via experience, example, or encouragement that they are able to quickly restore their homeostasis. Unlike highly stable personality traits,

resilience self-efficacy shows only moderate to high rank-order stability over intervals up to six months (e.g., Rodríguez-Rey, Alonso-Tapia, & Hernansaiz-Garrido, 2015). In this study, we operationalize resilience as the belief to be resilient (for simplicity, we continue to refer to resilience instead of resilience self-efficacy).

A review on resilience scales concluded that most resilience scales actually assess resources that likely promote resilience and resistance to illness (Windle et al., 2011), which is somewhat removed from the original construct. For example, the Connor Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) assesses personality characteristics (e.g., tolerance of negative affect, personal competence, positive acceptance of change) that may act as protective factors and contribute to a resilient outcome. However, it is incorrect to use these measures of resilience resources as direct indicators of resilience. Smith et al. (2008) accordingly showed that resilience remains specifically and negatively linked to emotional distress and physical symptoms when overlap with resilience resources (e.g., CD-RISC score) was statistically controlled for, whereas the converse held not true. Moreover, Lai and Yue (2014) showed that resilience mediates the effects of resilience resources (i.e., optimism, self-esteem) on physical health. These findings imply that resilience is a more proximate predictor of health outcomes than the broader protective factors that promote one's resilience.

The Brief Resilience Scale (*BRS*; Smith et al., 2008) assesses psychological resilience as a unitary construct. Three positively and three negatively worded BRS items ask for one's self-perceived ability to bounce back from stress (i.e., resilience self-efficacy) rather than one's actual ability. Drawing on four samples of undergraduates, cardiac patients, and women with and without fibromyalgia, Smith et al. (2008) provided evidence for the reliability of the BRS in terms of Cronbach's alpha ( $\alpha \leq .80$ ), for its structural validity as a unifactorial scale by the means of Principal Component Analysis (PCA), for its known-group validity (e.g., group differences between women with and without fibromyalgia), for its convergent validity

with measures of resilience resources, optimism, social support and active coping, as well as for its discriminant predictive validity for physical symptoms, perceived stress, anxiety, depression, negative affect, and fatigue. In a recent review on resilience inventories (Windle et al., 2011), the BRS was the only scale that asked directly for one's ability to recover from stress and it belonged to the three scales that received the highest psychometric ratings. Among others, the BRS has been translated into Dutch (Leontjevas, de Beek, Lataster, & N. Jacobs, 2014), Spanish (Rodríguez-Rey et al., 2015), Brazilian Portuguese (De Holanda Coelho, Cavalcanti, Rezende, & Gouveia, 2016), German (Chmitorz, Wenzel et al., 2018), Chinese (Lai & Yue, 2014), and Malaysian (Amat, Subhan, Jaafar, Mahmud, & Johari, 2014). However, no French version of the BRS is available yet. Using a French-speaking sample of midwives, the current study thus aimed to introduce the French Brief Resilience Scale (*BRS-F*).

Principal component analyses of BRS items consistently extracted one eigenvalue > 1.00, implying a unidimensional structure (Amat et al., 2015; Smith et al., 2008; Lai & Yue, 2014). Confirmatory factor analyses (*CFAs*) of the BRS either supported two highly correlated first-order factors representing positively and negatively phrased items (Rodríguez-Rey et al., 2015), a unifactorial model based on five BRS items (De Holanda Coelho et al., 2016), or a major resilience factor along with a minor method factor for negatively worded items (Chmitorz, Wenzel et al., 2018). We therefore expected that one major factor fits acceptably to the BRS-F data (*H1a*). We also hypothesized that the component structure of the BRS-F and of the original BRS (Smith et al., 2008), the Chinese BRS (Lai & Yue, 2014) and the Malaysian BRS (Amat et al. 2014) can be considered as equal (*H1b*).

In prior research, the BRS demonstrated good levels of reliability with estimates of Cronbach's  $\alpha$  usually exceeding .80 (e.g., Amat et al. 2014; Rodríguez-Rey et al., 2015; Smith et al., 2008; for an exception see Lai & Yue, 2014). However, coefficient  $\alpha$  suffers

several limitations and yields poor estimates of the reliability under some circumstances. Thus, we will also report coefficient omega ( $\omega$ ; McDonald, 1999), which might be more revealing regarding the reliability of the BRS-F. In Chmitorz, Wenzel et al. (2018), coefficient  $\omega$  for the German BRS was  $\omega = .85$ . We hypothesized that the BRS-F shows an adequate level of reliability that is comparable to the reliability of the original BRS (*H2*).

Patient-care professionals are more vulnerable than other professionals to develop mental health difficulties (Aust, Rugulies, Skakon, Scherzer, & Jensen, 2007). Their mental health problems are linked to high quantitative, emotional, sensorial and cognitive demands at work, a high rhythm of work, and a demand for hiding emotions (Aust et al., 2007). Midwives frequently experience their job as stressful and conclude that lack of work resources and poor organization cause the most stress (Knezevic, Milosevic, Golubic, Belosevic, Russo, & Mustajbegovic, 2011). The empathic nature of the caring relationship itself may also contribute to emotional suffering and mental health problems in midwives (Leinweber & Rowe, 2010; Sheen, Slade, & Spiby, 2014). More than two-thirds of midwives in Australia and over 95% of midwives in the UK had been exposed to a traumatic event at work (Leinweber, Creedy, Rowe, & Gamble, 2017; Sheen, Spiby, & Slade, 2015), such as managing traumatic births and perinatal loss (Sheen et al., 2014). Being frequently exposed to work-related stressors can cause mental health problems in midwives, such as anxiety (Muliira, Sendikadiwa, & Lwasampijja, 2015) and posttraumatic stress disorder (PTSD; Leinweber et al., 2017; Sheen et al., 2015). Resilience might thus be highly relevant for midwives, who are facing various work-related stressors on a regular basis. The ability to bounce back is thought to promote one's mental and physical health, as has been confirmed in several populations (e.g., Gloria & Steinhardt, 2014 in postdoctoral research fellows; Lai & Yue, 2014 in Chinese undergraduates; Leontjevas et al., 2014 in Dutch residents of a nursing home rehabilitating unit; Rodríguez-Rey et al., 2015 in Spanish adults; Smith et al., 2008 in

US undergraduates, cardiac and fibromyalgia patients), but not in midwives so far. In general, the work-related mental health of midwives is still understudied and this study thus aimed to fill an important gap (Favrod et al., 2018). We expected that the BRS-F score will correlate negatively with midwives' anxiety, depression, and PTSD symptoms (*H3a*), which would bolster the criterion validity of the BRS-F.

Burnout develops as a prolonged response to chronic interpersonal stressors on the job that consume, exceed, and exhaust one's personal and social resources. It consists of three dimensions: an overwhelming emotional exhaustion, depersonalization (or feelings of cynicism), and (low) personal accomplishments (Maslach & Leiter, 2016). Burnout is a prevalent phenomenon among midwives (e.g., Hildingsson, Westlund, & Wiklund, 2013; Sheen et al., 2015) and resilience might prevent midwives from burning out. In two samples of nurses, resilience resources (i.e., CD-RISC) correlated negatively with emotional exhaustion and depersonalization, and positively with personal accomplishments (Garcia-Izquierdo, Meseguer de Pedro, Rios-Risquez, & Sanchez, 2017; Zou et al., 2016). Research on health care practitioners also showed that resilience correlated positively with personal accomplishments and negatively with emotional exhaustion and depersonalization (Riley, Mohr, & Waddimba, 2018). These findings might generalize to midwives. We therefore expected that midwives' BRS-F score will correlate negatively with emotional exhaustion and depersonalization, and positively with personal accomplishments (*H3b*).

Burnout, an occupation-specific dysphoria, is separable from depression, which is a more broadly based mental health problem. Depression and burnout are thus distinct, yet empirically related concepts (Maslach & Leiter, 2016). Burnout is also negatively linked to one's psychological health (e.g., Garcia-Izquierdo et al., 2017) and positively linked to general psychological distress (e.g., Zou et al., 2016), and PTSD symptoms (e.g., Sheen et al., 2015). Given that higher levels of resilience are supposed to be linked to lower levels of



burnout, which are in turn likely linked to better mental health, it was expected that burnout would mediate the resilience-mental health difficulties link (*H3c*).

## **Methods**

### **Participants and procedure**

Recruitment took place at two university hospitals in the French-speaking part of Switzerland. During staff meetings and by the distribution of flyers, all midwives working at both hospitals were invited to participate. Staff accessing the anonymous online survey found a detailed information sheet before giving informed consent. The survey consisted of seven inventories (results of two inventories are not reported here) and took about 30 minutes to complete. The ethics committee of the Canton de Vaud approved this study (study nr: 237/2013). Of the 280 eligible midwives,  $N=220$  participated (78.6% response rate). Results of this survey unrelated to the present study have been reported in Jacobs, Charmillot, Soelch, and Horsch (2018).

### **Measures**

The *Brief Resilience Scale (BRS)*; Smith et al., 2008) is a 6-item questionnaire designed to assess resilience as self-perceived ability to bounce back or recover quickly from stress. Each item is rated on a 5-point Likert scale (1=*strongly disagree* to 5=*strongly agree*). The three negatively phrased items 2, 4, and 6 were recoded with the result that a higher score indicated a higher degree of resilience. The original BRS showed good levels of internal consistency and test-retest reliability, and adequate factorial, convergent and discriminant validity (Smith et al., 2008). The BRS was translated into French using forward-backward translation and cultural adaptation (Wild et al., 2005). A native French-speaking mental health professional, familiar with terminology of the concept measured by the questionnaire and knowledgeable of the English-speaking culture conducted the forward translation. An independent translator,

whose mother tongue was English and who had no knowledge of the questionnaire, then translated the questionnaire back to English. For both of these steps, emphasis was placed on conceptual and cultural, rather than linguistic equivalence (literal translation). The last author (AH), fluent in both English and French language, then compared both, the original, as well as the translated English version, and discussed any problematic words or phrases that did not completely capture the concept addressed by the original items. Finally, the translated questionnaire was piloted in the target population (three midwives). No final adaptations were required.

The *Hospital Anxiety and Depression Scale - French version (HADS; Bocerean & Dupret, 2014)* assesses anxiety and depression with two 7-item subscales. Each item is scored from 0 to 3, with higher scores indicating greater anxiety or depression. In the current study, ordinal Cronbach's  $\alpha$  for the anxiety and depression subscales were .78 and .77, respectively. The HADS was chosen for this study because it has been widely used (e.g., Smith et al., 2008) and is a well-validated short screening questionnaire.

The *Posttraumatic Stress Disorder 7-item Symptom Scale (PTSD-7; Breslau, Peterson, Kessler, & Schultz, 1999)* is a brief screening scale for DSM-IV PTSD. It measures five symptoms from the avoidance and numbing symptom cluster and two symptoms from the hyperarousal cluster using a dichotomous *yes/no* response format. In the current study, coefficient  $\alpha$  based on tetrachoric correlations was good,  $\alpha = .83$ . The PTSD-7 was included in this study because it is a validated short screening questionnaire for PTSD.

The *French Maslach Burnout Inventory (MBI; Dion & Tessier, 1994)* captures three core dimensions of burnout (Maslach & Jackson, 1981): *emotional exhaustion* (i.e., feeling exhausted and emotionally overextended by one's work; 9 items), *depersonalization* (i.e., impersonal response toward recipients of one's service; 5 items), and *personal accomplishment* (i.e., feeling competent and successful in one's work; 8 items). Each item is

rated on a 7-point scale (1= 'never' to 7= 'every day'). The French MBI showed good psychometric properties (Dion & Tessier, 1994). In the present study, Cronbach's  $\alpha$  of the three MBI subscales ranged from .66 to .87 (for descriptive statistics see Table 1).

*Please insert Table 1 about here*

### **Data analyses**

In order to test the fit of the unifactorial model, the alternative two-factorial model (Rodríguez-Rey et al., 2016), and the alternative method-factor model (Chmitorz, Wenzel et al., 2018), item-level CFAs were performed using EQS 6.2 (Bentler, 2006). The CFAs were based on the standard covariance matrix and robust maximum likelihood estimation (Satorra & Bentler, 2001). The robust  $\chi^2$ -statistic was complemented by four fit indices (cf. Brown, 2006): the comparative fit index (CFI), the Tucker-Lewis Index (TLI; CFI & TLI: acceptable fit  $\geq .90$ ; good fit  $\geq .95$ ), the root mean square error of approximation (RMSEA; reasonable fit  $\leq .08$ ; close fit  $\leq .05$ ), and the standardized root-mean-square residual (SRMR; acceptable fit  $\leq .08$ ; good fit  $\leq .05$ ). For model comparisons, we also used Akaike's Information Criterion (AIC; the model with the smaller AIC fits better). Next, an item level PCA was conducted, one component was retained, and the loading vector was compared with the respective vectors obtained for the original BRS (Smith et al., 2008), the Chinese BRS (Lai & Yue, 2014), and the Malaysian BRS (Amat et al., 2015). The level of congruence was evaluated with Tucker's  $\phi$ . Lorenzo-Seva and ten Berge (2006) suggested that  $.85 \leq \phi \leq .94$  indicates a fair similarity, while  $\phi \geq 0.95$  implies that the two components compared can be considered as equal.

Coefficient  $\varpi$  was estimated with the free software JASP version 0.9 (JASP Team, 2018).

In order to establish criterion validity, correlations between the BRS-F score, mental health and burnout variables will be presented. Finally, a resilience–burnout–mental health difficulties mediation model with three parallel mediators (depersonalization, emotional

exhaustion, personal accomplishments) was tested. The outcome variable was created by aggregating the z-scored anxiety, depression, and PTSD-7 subscale scores. Mediation analysis was carried out in IBM SPSS 22 and PROCESS (Hayes, 2013) using ordinary least squares regression analysis. The 95% bias-corrected confidence intervals of the indirect effects were based on 5000 bootstrap resamples. Significance of an indirect effect was implied when the 95%-CI precluded zero. In all analyses, an a priori significance level of  $\alpha = .05$  was chosen.<sup>1</sup>

## Results

### The factor structure of the French Brief Resilience Scale

Mardia's normalized estimate of multivariate kurtosis was 7.82, indicating the need for the robust Satorra-Bentler-scaled  $\chi^2$ -test statistic. The unidimensional model failed to fit perfectly to the data,  $SB-\chi^2 (df = 9) = 18.51, p = .030$ . However, three fit indices signaled a good model fit (CFI = .97, TLI = .95, SRMR = .04), whereas the RMSEA = .07 indicated a reasonable model fit (AIC = 0.51). All loadings were substantial in size, the mean loading was .68 (range: .57 to .76; see Table 2). The amount of variance that the factor contributed to the items ranged from  $R^2 = .32$  to .58. Thus, the unifactorial model fitted well to the data, the factor structure was meaningful and well-defined with four loadings exceeding .70. In the two-factorial model (Rodríguez-Rey et al., 2016), positively and negatively phrased items loaded on the respective factors and both factors were allowed to correlate. This model reached a good model fit,  $SB-\chi^2 (df = 8) = 17.80, p = .023$ , CFI = .97, TLI = .95, SRMR = .04, and RMSEA = .08, but it did not yield a better fit than the unifactorial model in terms of the  $\chi^2$ -difference test,  $\Delta SB-\chi^2 (df = 1) = 0.59, p = .444$ , and it was even inferior, as indicated by a slightly greater AIC, AIC = 1.80. In the method-factor model (Chmitorz, Wenzel et al., 2018),

---

<sup>1</sup> The current study was not preregistered. In order to increase transparency, data of the current study are available upon individual request to the first author.

a general resilience factor and an uncorrelated method factor with loadings on all negatively phrased items were specified. This model showed a good model fit,  $SB-\chi^2 (df = 6) = 13.45$ ,  $p = .031$ ,  $CFI = .98$ ,  $TLI = .97$ ,  $SRMR = .03$ , and  $RMSEA = .08$ , but it showed a slightly poorer fit than the unifactorial model in terms of the AIC,  $AIC = 1.45$ . Moreover, the method factor was poorly defined (standardized loadings:  $\lambda_2 = .05$ ,  $\lambda_4 = .86$ , and  $\lambda_6 = .13$ ). Taken together, the present data provided support for the unifactorial model, which yielded a good model fit and it fitted comparably or even slightly better to the data than the alternative, less constrained two-factorial and method-factor models (*H1a* confirmed).

A PCA on the BRS-F item scores extracted one eigenvalue  $> 1.00$  (i.e., 3.32) suggesting one component to retain. This component accounted for 55.28% of the variance in the BRS-F items. The mean loading was .75 (range: .65 to .81; see Table 2). Similar to the CFA results, item 4 showed the lowest and item 6 the highest loading. According to Tucker's  $\phi$ , the PCA loadings depicted in Table 2 were highly congruent with the loadings reported in Smith et al. (2008) for the original BRS (samples 1 to 4:  $\phi = .99$ ,  $.99$ ,  $1.00$ , and  $.98$ , respectively), in Amat et al. (2015) for the Malaysian version of the BRS ( $\phi = 1.00$ ), and in Lai and Yue (2014) for the Chinese version of the BRS (Hong Kong data:  $\phi = .97$ ; Nanjing data:  $\phi = .98$ ). Thus, the component structure of the BRS-F equals the component structure of the original BRS and its Chinese and Malaysian versions (*H1b* confirmed).

*Please insert Table 2 and Figure 1 about here*

### **Descriptive statistics and reliabilities**

In the current sample, Cronbach's  $\alpha$  of the BRS-F was  $\alpha = .84$ . Drawing on the F-test to compare coefficients  $\alpha$  from independent samples (Feldt, Woodruff, & Salih, 1987), coefficient  $\alpha$  of the BRS-F did not significantly differ from the respective coefficients  $\alpha$  obtained for the original BRS (Samples 1-3; Smith et al., 2008) and for the Spanish BRS (Rodríguez-Rey et al., 2015), all  $p \geq .11$ . However, it was significantly smaller than the

respective estimates of  $\alpha$  obtained in the fourth US-sample (Smith et al., 2008) and in the Malaysian sample (Amat et al., 2014), and it was significantly larger compared to estimates of  $\alpha$  in both Chinese samples (Lai & Yue, 2014), all  $p < .01$ . Coefficient  $\varpi$  was .84, which is almost identical with the estimates of  $\varpi$  obtained for the German BRS (Chmitorz et al., 2018). This indicates that a high proportion of test variance was due to a general resilience factor. Taken together, the results support the reliability of the BRS-F (*H2* confirmed).

For all six items, participants used the full range of the five-point scale. Item means ranged from  $M = 3.31$  to  $3.95$  suggesting moderate item difficulties and items were slightly skewed and kurtotic (see Table 2). All corrected item-total correlations were satisfactorily, ranging from  $r_{it} = .51$  to  $.69$ . Thus, the BRS-F also showed good distributional properties and satisfactory item-total-correlations.

### **Correlational analysis and mediation analysis**

Midwives who indicated poorer resilience also indicated more symptoms of anxiety, depression and PTSD, more emotional exhaustion and depersonalization, and less personal accomplishments (for correlations see Table 1), thus providing support for the concurrent validity of the BRS-F (*H3a* and *H3b* confirmed).

The standardized path coefficients for the resilience–burnout–mental health difficulties mediation model are shown in Figure 1. The total effect of resilience accounted for 8.8% of the variance in mental health difficulties,  $R^2 = .09$ ,  $F(1,218) = 21.05$ ,  $p < .001$ . When the three core dimensions of burnout entered the model, a total of 29.1% of variance in mental health difficulties was explained,  $R^2 = .29$ ,  $F(4,215) = 22.06$ ,  $p < .001$ . Only a significant partial effect for emotional exhaustion was found,  $\beta = .43$ ,  $p < .001$ . The direct effect for resilience,  $\beta = -.11$ ,  $p = .076$ , and the specific effects for depersonalization,  $\beta = -.01$ ,  $p = .89$ , and personal accomplishments,  $\beta = -.12$ ,  $p = .070$ , were not statistically significant. The bias-corrected

95%-CI for the total indirect effect,  $ab = -.18 [-.27, -.12]$ , precluded zero suggesting significance. A significant portion of the indirect effect was mediated via emotional exhaustion,  $ab = -.15 [-.23, -.09]$ . Depersonalization,  $ab = .002 [-.03, .04]$ , and personal accomplishments,  $ab = -.04 [-.09, .002]$ , did not act as significant specific mediators. The pattern of a significant total effect, a non-significant direct effect and a significant indirect effect are consistent with full mediation (*H3c* confirmed).

## Discussion

This study translated and validated the French version of the BRS (BRS-F) in a sample of midwives. The BRS operationalizes resilience as the self-perceived ability to bounce back (Smith et al., 2008). The unifactorial model showed an acceptable to good model fit, thus confirming the notion of resilience as a unitary construct (De Holanda Coelho et al., 2016; Smith et al., 2008). The less constrained alternative two-factor model (Rodríguez-Rey et al., 2016) and the method-factor model (Chmitorz, Wenzel et al., 2018) did not outperform the unifactorial model. This finding might reflect actual differences in the meaning of resilience between cultures (i.e., German, Spanish, Swiss, Brazilian) or populations (e.g., representative samples, convenience samples, midwives). More stringent research using multi-group CFA based on comparable, sufficiently sized samples from diverse cultures is needed to test the factorial invariance of the BRS across cultures. If factorial invariance can be established, results obtained with the BRS from different cultures can be reliably compared. The present results confirmed at least that the component structure of the BRS-F is comparable with the structure of the original BRS and its Chinese and Malaysian versions. Finding evidence for an equal component structure is a first important step in showing that the structure of a scale may generalize across different cultures and languages (McCrae & Costa, 1997).

The BRS-F also showed good levels of reliability. Cronbach's  $\alpha$  in our study was

comparable to those of the original BRS (samples 1-3; Smith et al., 2008) and the Spanish BRS (Rodríguez-Rey et al., 2015). However,  $\alpha$  was significantly smaller than the  $\alpha$ s obtained in the US sample 4 (Smith et al., 2008) and in the Malaysian sample (Amat et al., 2014), and larger compared to both Chinese samples (Lai & Yue, 2014). We therefore concluded that it is situated in the middle range of previously reported estimates of  $\alpha$  for different versions of the BRS. Moreover, the high level of coefficient omega indicates that the BRS-F total score estimates a latent resilience factor that is common to all six items at a high precision. The high level of precision is comparable with results obtained for the German BRS (Chmitorz, Wenzel et al., 2018).

Criterion validity was established by negative correlations between the BRS-F score and depression, anxiety, PTSD symptoms, emotional exhaustion, and depersonalization, and a positive correlation with personal accomplishments. Although, as far as we know, shown for the first time in a sample of midwives, the latter findings are in line with research on healthcare practitioners showing substantial correlations between resilience and core dimensions of burnout (e.g., Riley et al., 2018). The negative correlations between resilience and mental health variables have not been previously shown in midwives. They are consistent with the more general notion that the ability to bounce back promotes one's mental and physical health (e.g., Gloria & Steinhardt, 2014; Lai & Yue, 2014; Leontjevas et al., 2014; Rodríguez-Rey et al., 2015; Smith et al., 2008; Smith et al., 2010).

Finally, this study demonstrated as far as we know for the first time that the relationship between midwives' resilience and mental health difficulties was fully mediated by their emotional exhaustion. This finding integrates and extends prior research on healthcare professionals showing that resilience resources relate negatively to emotional exhaustion (Zou et al., 2016), and that emotional exhaustion relates positively to mental health difficulties (Garcia-Izquierdo et al., 2017), to general psychological distress (Zou et al.,



2016), and to PTSD symptoms (Sheen et al., 2015). A resilient person is more likely to restore homeostasis in the face of occupational stress, thus feels probably more recovered from it, and experiences lower exhaustion as a consequence, which in turn lowers his or her risk for mental health difficulties. Stated differently, emotional exhaustion is a central mechanism that links resilience to mental health problems.

Our results indicate that the BRS-F is appropriate and relevant for use by midwives who may benefit from interventions aimed at increasing resilience (see Chmitorz et al., 2018, for a review) to enable them to cope with the day-to-day emotional demands and stressors of their work. For example, workshops based on stress inoculation techniques may be helpful (Meichenbaum, 1977). More recently, Grant, and Kinman (2012) developed interactive workshops that cover stress management skills, such as relaxation and time management, as well as sessions that enhance competencies linked to resilience, such as emotional intelligence, reflective practice, social awareness, and empathetic skills. Another idea is the use of challenging patient scenarios that do not fit within learned ‘rules’ as an integral part of ethics teaching as a way of developing resilience (Howe, Smajdor, & Stöckl, 2012).

This study has several limitations: First, the cross-sectional design prevents causal interpretations of the results. Second, data were collected using an internet survey, which may raise questions regarding the quality of the data. However, in previous studies paper-and-pencil and internet-based data collection methods resulted in equivalent data (e.g., Weigold, Weigold, & Russell, 2013). Third, findings are based on self-report data, which might have biased the results (e.g., socially desirable responding). Fourth, the present study draws on a sample of midwives, which may limit the generalizability of the results. In future research, the reliability and validity of the BRS-F should thus be tested in the general population as well. Fifth, although the observed negative associations between resilience and the mental health indicators provide support for the criterion validity of the BRS-F, the full mediation of the

resilience–mental health difficulties link might somewhat mitigate the liability of the criterion analyses. More studies including a broader spectrum of health outcomes (e.g., externalizing pathology, physical symptoms, health-related quality of life) are needed to further substantiate the criterion validity of the BRS-F. Finally, the total effect of resilience and the effect of personal accomplishments on mental health difficulties in the mediation model barely missed statistical significance. Both findings might reflect insufficient statistical power of the current study for detecting small effects. More research with larger samples is needed in order to test whether resilience remains weakly and specifically related to mental health difficulties in the presence of the burnout core dimensions, and whether personal accomplishments establish a second pathway for mediation that might follow from its weak effect on mental health difficulties. Despite these limitations, the present study demonstrates the validity and reliability of the BRS-F in French-speaking midwives and thus makes it accessible to researchers and clinicians in French speaking environments. Future studies may replicate the current findings and aim to investigate the link between resilience and indicators of quality of care in different groups of healthcare professionals.

## References

- Amat, S., Subhan, M., Jaafar, W. M. W., Mahmud, Z., & Johari, K. S. K. (2014). Evaluation and psychometric status of the Brief Resilience Scale in a sample of Malaysian international students. *Asian Social Science, 10*, 240–245. doi: 10.5539/ass.v10n18p240
- Aust, B., Rugulies, R., Skakon, J., Scherzer, T., & Jensen, C. (2007). Psychosocial work environment of hospital workers: validation of a comprehensive assessment scale. *International Journal of Nursing Studies, 44*, 814-825. doi: 10.1016/j.ijnurstu.2006.01.008
- Bentler, P. M. (2006). *EQS 6 structural equation program manual*. Encino, CA: Mutivariate

Software, Inc.

- Bocerean, C., & Dupret, E. (2014). A validation study of the Hospital Anxiety and Depression Scale (HADS) in a large sample of French employees. *BMC Psychiatry, 14*, 354. doi: 10.1186/s12888-014-0354-0
- Breslau, N., Peterson, E. L., Kessler, R. C., & Schultz, L.R. (1999). Short screening scale for DSM-IV posttraumatic stress disorder. *American Journal of Psychiatry, 156*, 908–911. doi: 10.1176/ajp.156.6.908
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*: New York, NY: Guilford.
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues, 54*, 245–266. doi: 10.1111/j.1540-4560.1998.tb01217.x
- Chmitorz, A., Kunzler, A., Helmreich, I., Tüscher, O., Kalisch, R., Kubiak, T., ... & Lieb, K. (2018). Intervention studies to foster resilience – a systematic review and proposal for a resilience framework in future intervention studies. *Clinical Psychology Review, 59*, 78–100. doi: 10.1016/j.cpr.2017.11.002
- Chmitorz, A., Wenzel, M., Stieglitz, R.-D., Kunzler, A., Bagusat, C., Helmreich, I., ... Tüscher, O. (2018). Population based validation of a German version of the Brief Resilience Scale. *PLoS ONE 13*(2), e0192761. doi: 10.1371/journal.pone.0192761
- Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*, 76–82. doi: 10.1002/da.10113
- De Holanda Coelho, G. L. H., Cavalcanti, T. M., Rezende, A. T., & Gouveia, V. V. (2016). Brief Resilience Scale: Testing its factorial structure and invariance in Brazil. *Universitas Psychologica, 15*, 397–408. doi: 10.11144/Javeriana.upsy15-2.brst

- Dion, G., & Tessier, R. (1994). Validation de la traduction de l'Inventaire d'épuisement professionnel de Maslach et Jackson. *Revue Canadienne des Sciences du Comportement*, 26, 210–227. doi : 10.1037/0008-400X.26.2.210
- Favrod, C., Jan du Chêne, L., Martin Soelch, C., Garthus-Niegel, S., Tolsa, J. F., Legault, F., Briet, V. & and Horsch, A. (2018). Mental health symptoms and work-related stressors in hospital midwives and NICU nurses: A mixed methods study. *Frontiers in Psychiatry*, 9, 364. doi: 10.3389/fpsyt.2018.00364
- Feldt, L. S., Woodruff, D. J. & Salih, F. A. (1987). Statistical inference for coefficient alpha. *Applied Psychological Measurement*, 11, 92–103. doi : 10.1177/014662168701100107
- García-Izquierdo, M., Pedro, M., Ríos-Risquez, M., & Sánchez, M. (2017). Resilience as a moderator of psychological health in situations of chronic stress (burnout) in a sample of hospital nurses. *Journal of Nursing Scholarship*, 50, 228–236. doi: 10.1111/jnu.12367
- Gloria, C. T. & Steinhardt, M. A. (2014). Relationships among positive emotions, coping, resilience and mental health. *Stress and Health*, 32, 145–156. doi: 10.1002/smi.2589
- Grant, L. & Kinman, G. (2012) Enhancing wellbeing in social work students: Building resilience in the next generation. *Social Work Education*, 31, 605–621. doi: 10.1080/02615479.2011.590931
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis. A regression-based approach*. New York, NY: Guilford.
- Hildingsson, I., Westlund, K., & Wiklund, I. (2013). Burnout in Swedish midwives. *Sexual & Reproductive Healthcare*, 4, 87–91. doi: 10.1016/j.srhc.2013.07.001
- Howe, A., Smajdor, A. & Stöckl, A. (2012). Towards an understanding of resilience and its relevance to medical training. *Medical Education*, 46, 349–356. doi: 10.1111/j.1365-2923.2011.04188.x

- Jacobs, I., Charmillot, M., Soelch, C. M., & Horsch, A. (2018). *Validity, reliability, and factor structure of the Secondary Traumatic Stress Scale-French version*. Manuscript submitted for publication.
- JASP Team (2018). JASP (Version 0.9) [Computer software]. Amsterdam: University of Amsterdam.
- Knezevic, B., Milosevic, M., Golubic, R., Belosevic, L., Russo, A., & Mustajbegovic, J. (2011). Work-related stress and work ability among Croatian university hospital midwives. *Midwifery*, *27*, 146–153. doi: 10.1016/j.midw.2009.04.002
- Lai, J. C., & Yue, X. (2014). Using the Brief Resilience Scale to assess Chinese people's ability to bounce back from stress. *Sage Open*, *4*, 1–9. doi: 10.1177/2158244014554386
- Leinweber, J., Creed, D. K., Rowe, H., & Gamble, J. (2017). Responses to birth trauma and prevalence of posttraumatic stress among Australian midwives. *Women & Birth*, *30*, 40–45. doi: 10.1016/j.wombi.2016.06.006
- Leinweber, J., & Rowe, H. J. (2010). The costs of 'being with the woman': secondary traumatic stress in midwifery. *Midwifery*, *26*, 76–87. doi: 10.1016/j.midw.2008.04.003
- Leontjevas, R., de Beek, W. O., Lataster, J., & Jacobs, N. (2014). Resilience to affective disorders: A comparative validation of two resilience scales. *Journal of Affective Disorders*, *168*, 262–268. doi: 10.1016/j.jad.2014.07.010
- Lorenzo-Seva, U., & Ten Berge, J. M. (2006). Tucker's congruence coefficient as a meaningful index of factor similarity. *Methodology*, *2*, 57–64. doi: 10.1027/1614-2241.2.2.57
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, *2*, 99–113.
- Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry*, *15*, 103–111. doi:

10.1002/wps.20311

McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *The American Psychologist*, *52*, 509–516. doi: 10.1037/0003-066X.52.5.509

McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah, N.J.: Erlbaum Associates.

Meichenbaum, D. (1977). Cognitive behaviour modification. *Cognitive Behaviour Therapy*, *6*, 185–192. doi: 10.1080/16506073.1977.9626708

Muliira, R. S., Sendikadiwa, V. B., & Lwasampijja, F. (2015). Predictors of death anxiety among midwives who have experienced maternal death situations at work. *Maternal and Child Health Journal*, *19*, 1024–1032. doi: 10.1007/s10995-014-1601-1

Reich, J. W., Zautra, A. J., & Hall, J. S. (Eds.). (2010). *Handbook of adult resilience*. New York, NY: Guilford.

Riley, M. R., Mohr, D. C., & Waddimba, A. C. (2018). The reliability and validity of three-item screening measures for burnout: Evidence from group-employed health care practitioners in upstate New York. *Stress and Health*, *34*, 187–193. doi: 10.1002/smi.2762

Rodríguez-Rey, R., Alonso-Tapia, J., & Hernansaiz-Garrido, H. (2015). Reliability and validity of the Brief Resilience Scale (BRS) Spanish Version. *Psychological Assessment*, *28*, 5, e101–e110. doi: 10.1037/pas0000191

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*, 507–514. doi: 10.1007/BF02296192

Sheen, K., Slade, P., & Spiby, H. (2014). An integrative review of the impact of indirect trauma exposure in health professionals and potential issues of salience for midwives. *Journal of Advanced Nursing*, *70*, 729–743. doi: 10.1111/jan.12274

Sheen, K., Spiby, H., & Slade, P. (2015). Exposure to traumatic perinatal experiences and

- posttraumatic stress symptoms in midwives: prevalence and association with burnout. *International Journal of Nursing Studies*, 52, 578–587. doi: 10.1016/j.ijnurstu.2014.11.006
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E. M., Christopher, P. J., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15, 194–200. doi: 10.1080/10705500802222972
- Smith, B. W., Tooley, E. M., Christopher, P. J., & Kay, V.S. (2010). Resilience as the ability to bounce back from stress: A neglected personal resource? *The Journal of Positive Psychology*, 5, 166–176. doi: 10.1080/17439760.2010.482186
- Tabachnick, B. G. & Fidell, L. S. (2014). *Using multivariate statistics*. Essex, UK: Pearson.
- Weigold, A., Weigold, I. K., & Russell, E. J. (2013). Examination of the equivalence of self-report survey-based paper-and-pencil and internet data collection methods. *Psychological Methods*, 18, 53–70. doi: 10.1037/a0031607
- Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., & Erikson, P. (2005). Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. *Value in Health*, 8, 94–104. doi: 10.1111/j.1524-4733.2005.04054.x
- Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes*, 9, 8. doi: 10.1186/1477-7525-9-8
- Zou, G., Shen, X., Tian, X., Liu, C., Li, G., Kong, L., & Li, P. (2016). Correlates of psychological distress, burnout, and resilience among Chinese female nurses. *Industrial Health*, 54, 389–395. doi: 10.2486/indhealth.2015-0103

Table 1

*Descriptive statistics, coefficient alpha (in parenthesis), and correlations between study variables*

	1.	2.	3.	4.	5.	6.	7.
1. Brief Resilience Scale	(.84)						
2. Depression	-.24***	(.77) <sup>b</sup>					
3. Anxiety	-.19**	.64***	(.78) <sup>b</sup>				
4. PTSD-7	-.27***	.37***	.29***	(.83) <sup>b</sup>			
5. Emotional exhaustion	-.34***	.37***	.37***	.49***	(.87)		
6. Depersonalization <sup>a</sup>	-.23***	.23***	.23***	.25***	.50***	(.69)	
7. Personal accomplishments	.33***	-.31***	-.17**	-.30***	-.39***	-.37***	(.66)
Mean	3.53	5.31	8.38	1.94	19.13	4.64	32.23
Standard deviation	0.74	3.65	4.07	1.77	9.58	3.94	5.42

*Notes: N=219 to 220.*

<sup>a</sup> three scores were altered in order to reduce the impact of univariate outliers (see Tabachnick & Fidell, 2014, p. 111).

<sup>b</sup> coefficient alpha is based on polychoric or tetrachoric correlations.

\*\* $p < .01$ , \*\*\* $p < .001$  (2-tailed).



Table 2

*Descriptive statistics, corrected item-total correlations ( $r_{it}$ ), component loadings (PCA), and standardized factor loadings and explained variance ( $R^2$ ) in the CFA of the BRS-F items*

BRS-F items	<i>M</i>	<i>SD</i>	Skew	Kurtosis	Range	$r_{it}$	Loadings (PCA)	Loadings (CFA)	$R^2$
1. Je tends à rebondir rapidement après des moments difficiles.	3.95	0.89	-0.87	0.43	1-5	.57	.70	.63	.40
2. J'ai du mal à traverser des événements stressants.	3.43	1.01	-0.43	-0.58	1-5	.65	.77	.71	.51
3. Je me remets facilement d'un événement stressant.	3.44	0.95	-0.63	-0.12	1-5	.64	.77	.71	.50
4. Il est difficile pour moi de revenir brusquement à la réalité quand quelque chose se passe mal.	3.54	1.07	-0.51	-0.51	1-5	.51	.65	.57	.32
5. En général je traverse les moments difficiles sans trop de difficulté.	3.31	1.00	-0.36	-0.75	1-5	.62	.75	.70	.49
6. J'ai tendance à prendre beaucoup de temps pour me remettre des revers dans ma vie.	3.51	1.08	-0.46	-0.67	1-5	.69	.81	.76	.58

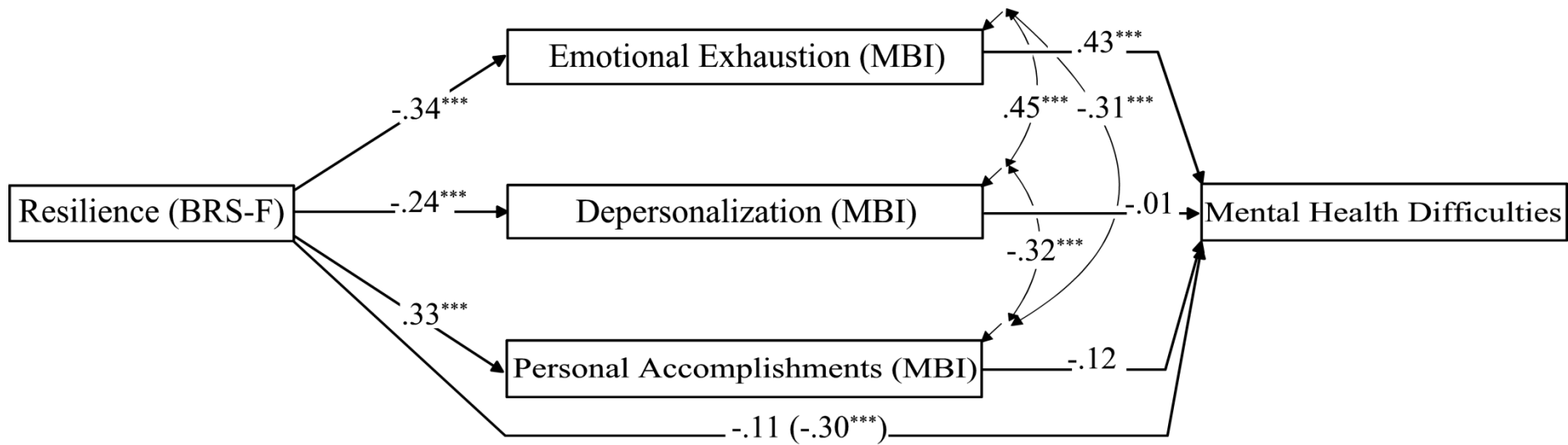


Figure 1: Standardized path coefficients in the resilience–burnout–mental health difficulties mediation model ( $N = 219$ ).

## **Echelle Brève Résilience**

Veillez indiquer pour chaque phrase à quel point celle-ci vous correspond.

1. Non, pas du tout
2. Non, pas vraiment
3. Neutre
4. Plutôt oui
5. Oui, tout à fait

1. Je tends à rebondir rapidement après des moments difficiles.
2. J'ai du mal à traverser des événements stressants.
3. Je me remets facilement d'un événement stressant.
4. Il est difficile pour moi de revenir brusquement à la réalité quand quelque chose se passe mal.
5. En général je traverse les moments difficiles sans trop de difficulté.
6. J'ai tendance à prendre beaucoup de temps pour me remettre des revers dans ma vie.