Validation and Psychometric Properties of the German Version of the Evidence Based Practice Attitudes Scale (EBPAS-36D)

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Abstract

Background: The implementation of evidence-based practice (EBP) in mental health care confers many benefits to patients, and research into factors facilitating the implementation of EBP is needed. As an important factor affecting the implementation of EBP, service providers' attitudes towards EBP emerged. The Evidence-Based Practice Attitude Scale (EBPAS-36) is an instrument with good psychometric characteristics that measures positive and ambivalent attitudes towards EBP. However, a German version is missing. The present study therefore aims to provide a validated German translation of the EBPAS-36.

Methods: The scale was translated and back-translated as recommended by standard procedures. To evaluate the psychometric properties of the translated version, German psychotherapists ($N = 599$) were recruited to participate in an online survey. They provided demographic and professional information, completed the EBPAS-36, the Implementation Climate Scale (ICS) and the Intention Scale for Providers (ISP). Standard item and reliability analyses and exploratory (EFA) and confirmatory factor analyses (CFA) in two subsamples (random split) were conducted and correlations with demographic and professional characteristics calculated.

Results: The item analyses showed a mean item difficulty of $p_i = .64$, a mean inter-item correlation of $r = .18$, and a mean item-total correlation of $r_{itc} = .40$. The internal consistency was very good for the total score ($\alpha = .89$) and ranged from adequate to very good for the subscales (.65 – .89), indicating high reliability. The original factor structure showed an acceptable model fit (RMSEA = .064 (90% CI = .059–.068); SRMR = .0922; AIC = 1400.77), confirming the 12-factor structure of the EBPAS-36. However, a second-order factor structure derived by the EFA had an even better model fit (RMSEA = .057 (90% CI = .052–.062); SRMR = .0822; AIC = 1274.56). When the EBPAS-36 was entered in a hierarchical regression model with the criterion Intention to use EBP, the EBPAS-36 contributed significantly to the prediction (Change in $R^2 = .28$, $p < .001$) over and above gender, age and working in science.

Conclusions: The present study confirms good psychometric properties and validity of a German version of the EBPAS-36 in a sample of psychotherapists.

Contributions To The Literature

- The article provides an authorized German translation of the Evidence-Based Practice Attitudes Scale (EBPAS-36).
- The EBPAS-36D was tested in a large sample of German psychotherapists and demonstrated good item characteristics and internal consistency.
- The EBPAS-36 showed good validity by predicting the intention to use evidence-based practices.
- The examination of the factor structure of the EBPAS-36 advances theoretical considerations regarding the underlying constructs of provider's attitudes towards EBP.

Background

Following the Institute of Medicine (1), adapted from Sackett et al. (2), "evidence-based practice is the integration of best research evidence with clinical expertise and patient values" (p. 147). In order to maintain and improve the effectiveness of health care, the implementation of evidence-based practice (EBP) in routine care is a major objective – in general health care as well as in mental and behavioral health care (3). If successful, EBP implementation may result in several advantages, including participation in informed health care decisions (4) and better outcomes (5) for patients, guidance for the development of treatment plans for practitioners (6), and increased cost-effectiveness of interventions for the health care system (7–9). Thus, facilitating the uptake of EBP is not only in the interest of service users but also in the interest of stakeholders such as government agencies, mental health authorities and insurance companies. Still, a substantial research – practice gap is evident. The translation of research knowledge into practice is delayed (10), resulting in a large proportion of patients receiving interventions that are not justified with respect to their safety, efficacy and/or cost-effectiveness (11). Accordingly, in the past 20 years, enormous efforts have been made to disseminate and implement EBP in mental health care (12–14). This gave rise to a rapidly growing research interest in implementation of EBP in health care (15). Consequently, there is an increasing need for pragmatic measures of potentially important implementation determinants, mechanisms, and outcomes (16, 17).

Identifying factors that either promote or obstruct dissemination and implementation, as well as developing brief, reliable and valid instruments with favorable psychometric properties capturing these mechanisms are an important part of the research agenda (18). These research efforts have identified several determinants of successful implementation of EBP. One well-established factor that has special relevance is service providers' attitudes towards EBP. Service providers' attitudes vary and misconceptions of EBP may contribute to mixed opinions on research findings and its translation to practice (19). Specifically, attitudes can influence the initial decision to consider and use EBP, how it is implemented and whether it is sustained beyond the implementation phase (20–23).

Demographic and organizational factors are also related to attitudes towards EBP (24–29). Regarding age differences, previous studies yielded inconsistent results. While older respondents stated being more willing to adopt EBP if required to and being more open towards EBP use in two studies (30, 31), they also reported perceiving EBP as less clinically useful and less important than clinical expertise (32, 31, 33). In other studies, higher age was associated with a more negative attitude towards EBP (34–37). At present, age effects cannot be dissociated from cohort effects. Results on sex differences were also equivocal with some studies reporting women to show more positive attitudes towards EBP in general, a higher willingness to use EBP (32, 30, 34) if required to do so (30) as well as perceiving EBP as more clinically useful (33), whereas other studies found no sex differences (20, 35, 36).

Regarding organizational factors, Cook et al. (38) found that perceived barriers to adopt EBP in psychotherapy contained institutional factors such as lack of administrative support for training, heavy caseloads and limited session numbers. Furthermore, training issues relating to insufficient time, high cost, lack of training and supervision, as well as training accessibility were commonly noted. These training issues are consistent with barriers found in other studies (39).

Accordingly, high educational support and supervision have been linked to more positive attitudes towards the adoption of EBP (40, 29). The association between the organizational climate for the implementation of EBP and providers' attitudes towards EBP was partially mediated by the organizational support for EBP use (22).

The Evidence-Based Practice Attitude Scale (EBPAS) (20) is an instrument that has been identified as a psychometrically strong measure assessing positive as well as ambivalent attitudes towards EBP (20, 30, 18). In line with suggestions put forward in the literature (41, 18), it is based on mental health dissemination and implementation theories and has been developed in collaboration with service providers and researchers (20, 21, 42). The original 15-item version showed strong psychometric properties and validity in various settings and samples from the US and several European countries (30, 34, 36, 33). In an effort to incorporate additional relevant dimensions that add to the understanding of provider attitudes towards adopting EBP and might increase the utility of the scale, it was expanded by 35 items (EBPAS-50) (21). However, the resulting 50-item version was considered too long, causing irritation by respondents, risking response biases, missing answers and potential for reduced validity (43). Thus, a shorter and more user-friendly 36-item version was developed, retaining the 12 domains of the longer version (43). On the one hand, the domains assess positive attitudes towards EBP: the intuitive *Appeal* of EBP, the willingness to adopt EBP given the *Requirements* to do so, providers' *Openness* to new practices and manualized interventions, the *Fit* of EBP with values and needs of providers and clients, and providers' perceptions of an increased *Job Security* provided by learning EBP, of the *Organizational Support* for learning EBP and of receiving *Feedback* (21). On the other hand, the domains assess ambivalent attitudes towards EBP: the *Divergence* between research-based interventions and current practice, the *Limitations* of EBP due to not addressing client needs, negative perceptions of *Monitoring* by supervisors, the perceived *Balance* of clinical skills and science in therapy, and the *Burden* of learning EBP (21). This scale has shown good psychometric properties and cross-cultural validity in US and Norwegian samples (43).

As argued by Kien et al. (44), German instruments assessing implementation science constructs are scarce and psychometric properties rarely reported. This stands in contrast with the growing relevance and increasing efforts of implementation research in German-speaking countries (45–47). Over the last decades, psychotherapy in Germany has experienced a significant professionalization and focus on EBP. Since 1999, a law ('Psychotherapeutengesetz') regulates the practice of psychotherapy, defining that only state approved practitioners may offer treatment (48). The license can either be granted to medical doctors with a psychiatric or psychosomatic specialization or to psychologists (and to people with a degree in social work and education science for child and adolescent psychotherapy) with a training as psychotherapists (49, 50, 48). Training for the license is provided at state recognized institutions in one of the therapy orientations that are scientifically accepted, i.e. CBT, psychodynamic psychotherapy, psychoanalytic therapy and systemic therapy. In September 2019, the German parliament approved an adapted law that aims to further align the postgraduate training for psychotherapy to the structure of medical education (49). Learning about psychotherapists' attitudes toward EBP in the German health care may inform about their readiness to implement EBP and identify strategies that need to be targeted in implementation efforts. In light of the new 2019 law, such identification is timely, as strategies and implementation measures could then directly be incorporated in the new psychotherapy master program. To the best of our knowledge, two independent German translations of EBPAS-15 exist (51, 52), but no translation of the EBPAS-36 is available. Therefore, the present study aims to present a German translation of the EBPAS-36 and evaluate its psychometric properties.

Methods

Ethics

The online survey study was approved by the Internal Review Board of the University of Marburg (approval number: 2019-58k). Participants received study information and provided informed consent before they were able to access the survey. Data were collected anonymously. All raw data were stored securely at the Department of Clinical Child and Adolescent Psychology at Philipps University in Marburg, Germany.

Participants

Eligible participants were licensed psychotherapists and psychiatrists for adults, children and adolescents as well as psychotherapists and psychiatrists enrolled in postgraduate training to obtain such a license. No exclusion criteria were applied. The link to the online survey was clicked 2.417 times. Overall, 913 participants continued after informed consent. Of these, 863 met the inclusion criteria (i.e., profession). A total of 261 participants were excluded due to drop-out before completion of the EBPAS-36, two due to implausible answers (for example being 99 years old), one due to conspicuous response patterns in EBPAS-36 (e.g., straight-lining despite reverse coded items). Of the remaining 599 participants, 502 were female (83.8 %) and their age ranged from 23 to 82 years ($M = 36.62$, $SD = 11.26$). Roughly half of the sample (56.26 %) stated being in postgraduate training to become psychotherapists or psychiatrists. 42.7 % of the German psychotherapists have ever or are currently working in science. Further information on profession are presented in Table 1.

Table 1.
Demographics and information on profession

Therapy orientation	%	Professional group	%	Current occupation	%
Cognitive Behavior therapy (CBT)	74.5	Psychotherapist in training	40.7	Outpatient practice	64.1
Psychodynamic psychotherapy (PDT)	14.9	Licensed psychotherapist	26.9	Psychiatric hospital	15.1
PDT and psychoanalytic therapy	4.3	Child and adolescent psychotherapist	16.2	Clinic for psychosomatic medicine	6.5
CBT and systemic therapy	2.2	Child and adolescent psychotherapist in training	15.4	Rehabilitation clinic/center	5.0
Other	4.1	Other	0.8	Psychiatric day-clinic	4.5
				University	2.2
				Other	2.6

Procedure

Translation. The translation was carried out in accordance with the WHO recommendations (www.who.int/substance_abuse/research_tools/translation/en/). The EBPAS-36 (43) was translated into German by the second author (JT) and back-translated by the bilingual English-speaking senior author (AB). The back-translation was reviewed by the original authors of the scale (MR, GAA) who provided feedback to assure the items represented the meaning and original constructs. The original and back-translated versions were then reviewed in a consensus meeting of the translating authors. Their consensus version was then reviewed by a group of German clinical psychotherapists (in training) and researchers as well as a graduate linguist for comprehensibility and wording. Their revisions were discussed and considered by the translating authors in a second consensus meeting, resulting in a final German version of the scale (see supplemental material 1).

Recruitment and data collection. All data were collected online via an openly accessible online survey, using the scientific survey platform SoSci Survey (www.soscisurvey.de). The survey was online and accessible from 14th November 2019 to 27th April 2020. The link to the online survey was widely distributed via e-mail lists of professional psychotherapy organizations that all licensed psychotherapists are members of, universities, training institutes, and psychiatric in- and outpatient institutions as well as Facebook groups of psychotherapists and psychiatrists. As an incentive to participate in the study, participants were free to enter into a raffle for a voucher of 500 Euros for a wellness-weekend or a popular events and ticket agent. On the first page of the survey, potential participants received full study information and were required to provide consent before they were able to proceed with the survey. On the last page of the survey, participants were asked whether they wanted to receive information about the study results or to take part in the raffle. If they chose one or both of these options, they were linked to a separate page where they could register their e-mail addresses independently of their survey answers.

Measures

Demographics and information on training and profession. Participants were asked for their age, gender and nationality. Additionally, they completed questions concerning their education and occupation, e.g. their university degree, license status, therapy orientation, and current occupation.

Evidence Based Practice Attitudes Scale (EBPAS-36D). The EBPAS-36 is a brief version of the EBPAS-50, an expanded version of the original 15-item instrument developed to assess mental health and social service providers' attitudes towards adopting EBP (43). The 36 items of the EBPAS-36 load on 12 subscales of three items each: Requirements ($\alpha = .89$), Appeal ($\alpha = .69$), Openness ($\alpha = .75$), Divergence ($\alpha = .65$), Limitations ($\alpha = .82$), Fit ($\alpha = .68$), Monitoring ($\alpha = .77$), Balance ($\alpha = .65$), Burden ($\alpha = .81$), Job security ($\alpha = .89$), Organizational support ($\alpha = .85$), and Feedback ($\alpha = .76$). Respondents are asked to rate their agreement with statements on a 5-point Likert scale ranging from 0 ('not at all') to 4 ('to a very great extent'). Most items are worded in such a way that a higher total score indicates a more positive attitude towards the adoption of EBP; 15 items are scored reversely. A mean of the subscales can be computed to create a total scale. The German instrument, including scoring instructions, can be found in the supplemental materials 1 and 2.

Implementation Climate Scale (ICS). The ICS is an 18-item instrument measuring the implementation climate in organizations and work groups (53). The original English version was translated into German by the first author (KS) and back-translated by the bilingual English-speaking senior author (AB). In order to adapt the scale for psychotherapists in private practice, a parallel version was constructed that captures the implementation climate in the health system. Respondents are asked to rate their agreement with statements describing how the respondents perceive the climate in the institution they work at with regard to the implementation of evidence-based interventions. A 5-point Likert scale ranging from 0 ('not at all') to 4 ('to a very great extent') was used. Six subscales can be calculated: Focus on EBP, Educational Support for EBP, Recognition for EBP, Rewards for EBP, Selection for EBP, and Selection for Openness towards EBP. Means of the subscales are computed to create a total scale. In the present study, the internal consistency for the ICS regarding organizations was Cronbach's $\alpha = .91$ for the total scale and between $\alpha = .77$ (Selection for Openness) and $\alpha = .92$ (Focus on EBP) for the subscales. For the ICS with respect to the health system, Cronbach's α was $.90$ for the total scale and between $\alpha = .77$ (Rewards for EBP) and $\alpha = .88$ (Educational Support for EBP) for the subscales. (A separate manuscript for this measure is in preparation).

Intention Scale for Providers (ISP). The ISP is a 70-item instrument assessing individual behavioral intentions for EBP use (54) based on the theory of planned behavior (55). The original English version was translated to German by the first author (KS) and back-translated by the bilingual English-speaking senior author (AB). Responses are given on 7-point and 4-point rating scales. Seven subscales can be calculated. Direct measurement scales of attitudes (A-D, 5 items, $\alpha = .69$), subjective norms (SN-D, 3 items, $\alpha = .85$), perceived behavioral control (PBC-D, 4 items, $\alpha = .69$) and behavioral intention (BI-D, 4 items, $\alpha = .89$) are generated by calculating the average subscale scores. Indirect measurement scales of attitudes (A-ID, 22 items, $\alpha = .80$), subjective norms (SN-ID, 18 items,

$\alpha = .89$) and perceived behavioral control (PBC-ID, 14 items, $\alpha = .89$) are created by multiplying and summing up the belief and influence items (e.g., Normative Beliefs and Motivation to Comply).

Global assessments. As a subjective self-assessment measure, participants were asked to rate their interest in EBP on visual analogue scales for nine questions (see supplemental material 3). A total score was computed ($\alpha = .84$). At the end of the survey, participants were asked to rate the honesty of their responses ('How honestly did you answer the questions of this study?') and their self-reported tendency towards social desirability when answering the survey ('Did social desirability play a role in the survey?') on visual analogue scales.

Statistical analysis

All statistical analyses were performed using IBM SPSS 26 for Windows (Chicago, IL, USA). For the confirmatory factor analysis (CFA), SPSS AMOS version 26.0.0 was used. P values $< .05$ were set as thresholds for statistical significance in all analyses. For the EBPAS-36D, means were computed if there was a maximum of one missing item per scale. Otherwise, respondents would have been excluded from analyses. For item analyses, item difficulties, corrected item-whole correlations and Cronbach's alpha if item is deleted were calculated. To obtain internal reliability coefficients of the scales and subscales, Cronbach's alpha was calculated. Values above .70 are regarded as acceptable, higher than .80 as good, higher than .90 as excellent. To assess the factorial validity of EBPAS-36D, the total sample was randomly divided into two samples: With the first one, we conducted an exploratory factor analysis (EFA), followed by a confirmatory one (CFA) with the other half. Differences between both samples regarding age, gender distribution and the EBPAS-36D total scale and subscales were examined with independent t-tests. The suitability of data for EFA was assessed with the Kaiser-Meyer-Olkin (KMO) sample adequacy measure (56, 57) and Bartlett's test (58). To determine the number of components for the EFA, Horn's parallel analysis and Velicer's MAP test were conducted using the SPSS programs available online (<https://people.ok.ubc.ca/briocconn/nfactors/nfactors.html>) and the results compared (59). Since parallel analysis of principal factor analysis tends to over-extract factors (60), parallel analysis of principal component analysis was conducted with raw data permutation and 1000 datasets. The EFA was conducted using principal axis factoring analysis with promax correlated factors rotation method. Subsequently, a CFA was conducted to test and compare the original 12-factor structure of EBPAS-36 against a second-order factor structure derived by the EFA, merging the EFA components 4 (Constraints by the institution), 5 (Monitoring) and 6 (Burden) into one second-order factor, and another second-order factor solution that was proposed by Rye et al. (37). Maximum likelihood estimations were used. Since the Mardia-test for multivariate normal distribution is significant ($z = 19.16$) and all variables exceed either the limits for skewness or for excess as postulated by West et al. ((61), skewness < 2 , excess < 7), an increased χ^2 value was expected and the Bollen-Stine bootstrap procedure (1000 samples) was performed. The chi-square test statistic was conducted as model fit index. Since this statistic is dependent on sample size and might lead to rejection of plausible models with increasing sample sizes (62), the χ^2/df ratio was computed. Smaller values indicate better model fit, with values of 3 being regarded as acceptable and values of 2 or smaller being regarded as good (62). Additionally, the root mean square error of approximation (RMSEA), the standardized root mean squared residual (SRMR), the comparative fit index (CFI) and the parsimony-adjusted comparative fit index (PCFI) were reported as fit indices. RMSEA values less than .06, SRMR values less than .08, and CFI values greater than .95 indicate good model fits (63). The Akaike Information Criterion (AIC) was computed to compare the models. Smaller scores indicate a better model fit. To assess the convergent validity of EBPAS-36D, Pearson correlation coefficients were calculated between the EBPAS-36D total scale and the direct and indirect scales of attitudes (A-D, A-ID) of the ISP as well as the interest in EBP score. According to Cohen (64), $r = .50$ indicates high correlations, $r = .30$ medium correlations, $r = .10$ low correlations. To test whether the EBPAS-36D total scale is an incremental predictor of the direct scale of behavioral intention to use EBP of the ISP (BI-D), a hierarchical linear regression analysis with the method ENTER was conducted. Gender and age (block 1), having ever worked in science (block 2), and the EBPAS-36D total scale (block 3) were successively included in the regression model to assess incremental improvements of model fit. Mean differences across gender and professional groups on the EBPAS-36D were assessed with independent t-tests. Pearson coefficients were calculated to assess correlations between age as well as demographic/professional variables and the EBPAS-36D. Lastly, Pearson correlations between ICS and EBPAS-36D were assessed.

Results

Item analysis

Item difficulties of EBPAS-36D ranged between $p_i = .21$ (item 28) and $p_i = .93$ (item 13) with a mean difficulty of $p_i = .64$. The mean inter-item correlation was $r = .18$. The item-total correlations of the individual items with the total scale ranged from $r_{itc} = .07$ (item 26) to $r_{itc} = .62$ (item 2) with a mean item-total correlation of $r_{itc} = .40$. Eight items showed item-total correlations under .30 (see Table 2). Considering the subscales, the correlations of the individual items with their subscales ranged from $r_{itc} = .44$ (item 5) to $r_{itc} = .87$ (item 9 and 29).

Table 2
Item analyses of EBPAS-36D

Item	Short Description	<i>M</i> (<i>SD</i>)	<i>p</i> _i	<i>r</i> _{itc} total	<i>α</i> _{total} if deleted	<i>r</i> _{itc} subscale	<i>α</i> _{subscale} if deleted	Valid <i>n</i>
1	Like to use new therapy/interventions	2.85 (0.80)	.71	.358	.89	.516	.73	599
2	Will follow a treatment manual	2.75 (1.05)	.69	.617	.88	.621	.62	599
3	Will try therapy/interventions developed by researchers	2.99 (0.82)	.75	.572	.88	.615	.62	599
4 (r)	Research based treatments/interventions not useful	3.22 (0.93)	.81	.404	.89	.473	.55	599
5 (r)	Clinical experience more important	1.65 (1.06)	.41	.479	.88	.441	.59	599
6 (r)	Would not use manualized therapy/interventions	3.29 (1.03)	.82	.551	.88	.479	.53	599
7	Makes sense	3.58 (0.63)	.90	.374	.89	.449	.68	599
8	Supervisor required	2.14 (1.10)	.54	.520	.88	.841	.79	595
9	Agency required	2.17 (1.09)	.54	.501	.88	.870	.76	596
10	State required	2.26 (0.96)	.56	.421	.89	.655	.94	598
11	Colleagues happy with therapy	2.92 (0.89)	.73	.429	.89	.517	.59	598
12	Enough training	3.26 (0.86)	.82	.532	.88	.583	.49	598
13	Right for your clients	3.71 (0.62)	.93	.329	.89	.506	.58	598
14	Had a say in how to use the evidence-based practice	3.22 (0.90)	.81	.288	.89	.478	.63	598
15	Fit with your clinical approach	3.51 (0.74)	.88	.272	.89	.522	.54	598
16 (r)	Clients with multiple problems	2.48 (1.07)	.62	.410	.89	.588	.83	579
17 (r)	Not individualized	2.35 (1.11)	.59	.474	.88	.714	.71	579
18 (r)	Too narrowly focused	1.99 (1.10)	.50	.514	.88	.718	.70	579
19 (r)	Work without oversight	2.06 (1.22)	.52	.363	.89	.688	.60	579
20 (r)	Looking over my shoulder	2.18 (1.23)	.55	.292	.89	.626	.67	579
21 (r)	My work does not need to be monitored	1.90 (1.22)	.48	.318	.89	.513	.27	579
22 (r)	Positive outcome is an art	2.73 (0.99)	.68	.489	.88	.524	.46	579
23 (r)	Therapy is an art and a science	1.24 (1.14)	.31	.175	.89	.432	.59	579
24 (r)	Overall competence is more important	1.38 (1.02)	.35	.437	.89	.422	.59	579
25 (r)	Don't have time to learn anything new	2.90 (1.06)	.73	.133	.89	.628	.76	579
26 (r)	Can't meet other obligations	3.02 (1.01)	.76	.067	.89	.726	.67	579

Notes. *p*_i: Item Difficulty. *r*_{itc}: Corrected item-whole correlation. (r): Item to be reverse scored.

Item	Short Description	<i>M (SD)</i>	<i>p_i</i>	<i>r_{itc}</i> total	<i>α</i> _{total if deleted}	<i>r_{itc}</i> subscale	<i>α</i> _{subscale if deleted}	Valid <i>n</i>
27 (r)	How to fit evidence-based practice in	2.87 (1.14)	.72	.199	.89	.618	.78	579
28	Help me keep my job	0.83 (1.11)	.21	.431	.89	.653	.95	577
29	Help me get a new job	1.52 (1.32)	.38	.538	.88	.870	.76	578
30	Make it easier to find work	1.50 (1.32)	.38	.522	.88	.850	.78	577
31	Continuing education credits provided	2.25 (1.33)	.56	.470	.88	.642	.88	579
32	Training provided	2.54 (1.20)	.64	.587	.88	.806	.71	579
33	Ongoing support provided	2.41 (1.17)	.60	.549	.88	.728	.79	579
34	Enjoy feedback on performance	2.92 (0.87)	.73	.312	.89	.574	.71	579
35	Feedback helps me to be better	3.28 (0.82)	.82	.380	.89	.709	.53	579
36	Supervision helps me to be better	3.59 (0.69)	.90	.214	.89	.511	.76	579
Notes. <i>p_i</i> : Item Difficulty. <i>r_{itc}</i> : Corrected item-whole correlation. (r): Item to be reverse scored.								

Reliability

The internal consistency of the EBPAS-36D total scale was $\alpha = .89$ and would not have benefitted from removing any item. Internal consistencies of the EBPAS-36D subscales were Requirements $\alpha = .89$; Appeal $\alpha = .69$; Openness $\alpha = .75$; Divergence $\alpha = .65$; Limitations $\alpha = .82$; Fit $\alpha = .68$; Monitoring $\alpha = .77$; Balance $\alpha = .65$; Burden $\alpha = .81$; Job security $\alpha = .89$; Organizational support $\alpha = .85$; Feedback $\alpha = .76$.

Subscale Correlations

The correlation coefficients between the EBPAS-36D total scale and the 12 subscales are presented in Table 3. The highest correlation was between the total scale and the Openness subscale ($r = .689$). On subscale level, high correlations were between the Appeal and Fit subscales ($r = .609$), the Divergence and Limitations subscales ($r = .550$), the Openness and Divergence subscales ($r = -.531$), the Appeal and Openness subscales ($r = .514$) and the Job Security and Organization Support subscales ($r = .547$).

Table 3
Pearson Correlations of EBPAS-36D Total Scale, EBPAS-36D Subscales and Age

	2	3	4	5	6	7	8	9	10	11	12	13	Age
1 EBPAS-36D Total scale	.586**	.618**	.689**	-.677**	-.602**	.427**	-.471**	-.536**	-.232**	.613**	.665**	.425**	-.441
2 EBPAS-36D Requirements	-	.465**	.359**	-.281**	-.177**	.261**	-.135**	-.199**	.016	.411**	.376**	.151**	-.410
3 EBPAS-36D Appeal		-	.514**	-.376**	-.208**	.609**	-.091*	-.127**	-.002	.289**	.436**	.286**	-.376
4 EBPAS-36D Openness			-	-.531**	-.359**	.340**	-.113**	-.281**	-.082*	.391**	.468**	.261**	-.424
5 EBPAS-36D Divergence				-	.550**	-.214**	.203**	.452**	.119**	-.258**	-.393**	-.096*	.230**
6 EBPAS-36D Limitations					-	-.081	.256**	.445**	.185**	-.251**	-.267**	-.059	.160**
7 EBPAS-36D Fit						-	-.034	-.032	-.088*	.107**	.252**	.272**	-.176
8 EBPAS-36D Monitoring							-	.350**	.182**	-.151**	-.120**	-.264**	.137**
9 EBPAS-36D Balance								-	.126**	-.179**	-.220**	-.018	.182**
10 EBPAS-36D Burden									-	.113**	.168**	-.063	-.172
11 EBPAS-36D Job security										-	.547**	.223**	-.371
12 EBPAS-36D Org. support											-	.291**	-.388
13 EBPAS-36D Feedback												-	-.232
Notes. $n = 574-599$. EBPAS-36D: German version of the Evidence-Based Practice Attitudes Scale * $p < .05$ ** $p < .001$													

Validity

For analyses regarding factorial validity, 25 (4.2%) of the participants were excluded as they had more than one missing item in at least one subscale of the EBPAS-36D, so that no means could be calculated. Of those 25 excluded participants, 80.0% dropped out of the survey during the EBPAS-36D after item 15. Of those included in analyses ($n = 574$), six participants (1.0%) had missing information on only one item of EBPAS-36D, none had more than two items missing. More than 98.9% of the included participants answered all items. Split samples for EFA and CFA showed no group differences on mean age, gender, and EBPAS-36D total scale or subscales (see supplemental material 4).

EFA. The sample adequacy measure (KMO = .844) and significant Bartlett's test ($\chi^2 (630) = 5616.83, p < .001$) indicated suitability of data ($n = 296$) for analysis. Parallel analysis and MAP test both recommended the extraction of six factors. The six extracted factors accounted for 57.56% of variance. Table 4 shows the rotated factor matrix. Eleven items loaded on factor 1 and explained 24.33% of the variance (factor loadings from .357 to .844). Ten items loaded on factor 2 and explained 9.41% of the variance (.410 to .773). Factor 3 comprised six items that explained 7.92% of the variance (.343 to .969). Three items loaded on factor 4 and explained 5.93% of the variance (.735 to .946). Three items loaded on factor 5 and explained 5.27% of the variance (.549 to .815). Factor 6 comprises three items that explained 4.71% of variance (.693 to .841). With the exception of item 2 of the Openness subscale, items of the original subscales loaded on the extracted factors together. Item 3 of the Openness subscale showed nearly equally high factor loadings on factor 1 (.357) and factor 2 (-.335).

Table 4
EFA: Rotated factor pattern matrix

Component/ Item (Original subscale)	1 Positive alignment with EBP	2 Reservations towards EBP	3 Institutional endorsement	4 Constraints by the institution	5 Monitoring	6 Burden
7 (Appeal)	.844					
13 (Fit)	.818					
15 (Fit)	.754					
14 (Fit)	.659					
12 (Appeal)	.646					
35 (Feedback)	.602					
11 (Appeal)	.524					
34 (Feedback)	.488					
36 (Feedback)	.418	.335				
1 (Openness)	.400					
3 (Openness)	.357	– .335				
18 (Limitations)		.773				
17 (Limitations)		.715				
5 (Divergence)		.683				
16 (Limitations)		.611				
2 (Openness)		– .559				
6 (Divergence)	– .361	.556				
22 (Balance)		.535				
24 (Balance)		.503				
4 (Divergence)		.415				
23 (Balance)		.410				
29 (Job Security)			.969			
30 (Job Security)			.956			
28 (Job Security)			.754			
32 (Org. Support)			.416			
33 (Org. Support)			.349			
31 (Org. Support)			.343			
9 (Requirements)				.946		
8 (Requirements)				.882		
10 (Requirements)				.735		
19 (Monitoring)					.815	
20 (Monitoring)					.695	
21 (Monitoring)					.549	
26 (Burden)						.841
27 (Burden)						.715
25 (Burden)						.693
Notes. <i>n</i> = 296.						

CFA. The path diagrams of the original 12-factor structure (model A), a second-order 4-factor structure derived by the EFA (model B) and the second-order 3-factor model established by Rye et al. (37) (model C) are shown in Figs. 1, 2 and 3, respectively. Although model fit of the original factor structure was

adequate, both second-order models showed even better model fits (see Table 5). For all three models, all regression weights were significant.

Table 5
CFA: Model fit indices

Model	χ^2	<i>df</i>	<i>p</i>	χ^2/df	RMSEA [90% CI]	SRMR	CFI	PCFI	AIC
A	1232.77	582	.001 ^a	2.12	.064 [.059; .068]	.0922	.856	.791	1400.77
B	1098.56	578	.001 ^a	1.90	.057 [.052; .062]	.0822	.885	.812	1274.56
C	1121.06	579	.001 ^a	1.94	.058 [.053; .063]	.0857	.880	.809	1295.06

Notes. *n* = 278. Model A: Original 12-factor model. Model B: Second-order model derived by EFA. Model C: Second-order model by Rye et al. a: Bollen-Stine-corrected. RMSEA: Root mean square error of approximation, SRMR: Standardized root mean residual, CFI: Comparative fit index, PCFI: Parsimony-adjusted CFI, AIC: Akaike information criterion.

Correlation analyses. The EBPAS-36D total scale correlated with the direct scale of attitudes (A-D, $r = .663$, $p < .001$, $n = 574$) and the indirect scale of attitudes (A-ID, $r = .531$, $p < .001$, $n = 126$) of the ISP. The global 9-item assessment of participant's interest in EBP correlated with the EBPAS-36D total scale ($r = .529$, $p < .001$, $n = 566$).

Regression analysis. The EBPAS-36D total scale was included in a hierarchical regression model to predict the Behavioral Intention Scale of the ISP as a third block, subsequent to the predictors gender and age (block 1) and ever or currently working in science (block 2). The inclusion improved the model fit (Change in $R^2 = .28$, $F = 267.32$, $p < .001$) and the significant regression coefficient of the EBPAS-36D total scale ($\beta = 2.13$; $t = 16.35$; $p < .001$) indicated incremental prediction beyond the previous predictors (see Tables 6 and 7).

Table 6
Model summary

Model	R^2	R^2_{corr}	<i>SE</i>	<i>F</i>	<i>df</i>	<i>p</i>	Change in R^2	<i>F</i>	<i>p</i>
1	.098	.095	1.54	29.30	2; 540	< .001			
2	.156	.151	1.49	33.17	3; 539	< .001	.058	37.01	< .001
3	.436	.432	1.22	103.99	4; 538	< .001	.280	267.32	< .001

Notes. *n* = 543. Dependent variable: Behavioral Intention Scale of Intention Scale for Providers. Model 1: Gender, Age. Model 2: Gender, Age, Work in Science. Model 3: Gender, Age, Work in Science, EBPAS-36D Total Scale.

Table 7
Regression coefficients

Model		β	95% CI of β	<i>SE</i>	<i>t</i>	<i>p</i>
1	(Constant)	7.55	6.98 ; 8.13	.29	25.78	< .001
	Gender	0.12	-0.24 ; 0.47	.18	0.65	.519
	Age	-0.05	-0.06 ; -0.04	.01	-7.64	< .001
2	(Constant)	8.81	8.12 ; 9.50	.35	25.11	< .001
	Gender	0.03	-0.31 ; 0.37	.17	0.16	.873
	Age	-0.05	-0.06 ; -0.03	.01	-7.47	< .001
	Work in Science	-0.79	-1.05 ; -0.54	.13	-6.08	< .001
3	(Constant)	1.22	0.14 ; 2.29	.55	2.23	.026
	Gender	0.17	-0.11 ; 0.45	.14	1.18	.237
	Age	-0.01	-0.02 ; 0.00	.01	-2.02	.044
	Work in Science	-0.35	-0.56 ; -0.13	.11	-3.27	.002
	EBPAS-36D total scale	2.13	1.88 ; 2.39	.13	16.35	< .001

Notes. *n* = 543. Dependent variable: Behavioral Intention Scale of Intention Scale for Providers.

Group Differences and Correlations

Compared to women, men scored lower on the EBPAS-36D total scale ($t(570) = 2.59$; $p = .010$) and the subscales Requirements ($t(592) = 2.91$; $p = .004$), Appeal ($t(595) = 3.73$; $p < .001$), Fit ($t(595) = 2.91$; $p = .004$) and Organizational Support ($t(579) = 2.66$; $p = .008$). Age was correlated with the EBPAS-36D total

scale and all subscales (see Table 3), indicating more negative attitudes towards EBP with increasing age. Consistent with this, licensed psychotherapists differed from psychotherapists in training on all subscales and the total scale of the EBPAS-36D ($t(445.82) = -7.581; p < .001; d = -.72$).

The EBPAS-36D total scale was associated with the total score of the ICS on organizations and work groups ($r = .432, p < .001, n = 408$), but not with the total scale of the ICS on the health system ($r = .138, p = .080$) that was exclusively completed by licensed psychotherapists and psychiatrists working in private practices ($n = 161$). The self-rated honesty when answering the survey showed a small correlation with the EBPAS-36D total scale ($r = .146, p = .001, n = 556$).

Discussion

The present study is the first to present a German version of the EBPAS-36 and investigates its validity and psychometric properties. In a sample of psychotherapists and psychiatrists, the original factor structure was confirmed and the EBPAS-36D demonstrated good item properties, internal consistency and convergent validity.

Regarding the psychometric properties of the individual items, most item difficulties were in the medium range. In the context of attitude measurements, a high item difficulty translates into low endorsement of the item. Medium difficulty is desirable as it is optimal to differentiate between respondents with different attitudes. Items of the subscales Fit, Feedback and Appeal received high approval (subscale means > 3.2), whereas items of the subscales Burden, Job Security and Divergence were less strongly endorsed (subscale means < 1.3). Removing any item would not have improved the internal consistency of the total scale and could result in poor content validity. While correlations between items and their subscales were at least in the medium range, item-whole correlations demonstrated considerable variability. Consistent with this, the subscales Fit, Monitoring, Burden and Feedback showed only moderate correlations with the EBPAS-36D total scale and only few subscales showed high inter-correlations, namely the subscales Appeal and Fit, Divergence and Limitations, Openness and Divergence, Appeal and Openness, and Job Security and Organizational Support. This accords well with previous results in US and Norwegian examinations of the EBPAS-36 that demonstrated high inter-correlations only between the Appeal and Organizational Support subscales (US) and between the Limitations and Divergence, and the Job Security and Organizational Support subscales (Norway) (43).

The internal consistency of the EBPAS-36D total scale obtained is good and comparable to those found for the US and Norwegian versions. The internal consistencies of the subscales ranged from acceptable to good, with the subscales Appeal, Divergence, Fit and Balance demonstrating the lowest internal consistencies, as seen in the Norwegian sample (43). In consideration of the extreme brevity of the subscales (3 items), the overall reliability of the EBPAS-36D subscales can be considered high.

The CFA confirmed the 12-factor structure of the original EBPAS-36 by demonstrating adequate model fit. Nonetheless, two second-order factor structures, one derived by EFA in the present sample and one that was proposed by Rye et al. (37), showed even better model fits. Therefore, second-order models might map the actual underlying construct of attitudes towards EBP even better than the original factor structure. The four second-order constructs we found are: Positive alignment with EBP, consisting of the Openness, Appeal, Fit and Feedback subscales, Reservations towards EBP, consisting of the Divergence, Limitations and Balance subscales, Institutional Endorsement, consisting of the Job Security and Organizational Support subscales and Constraints by the institution, consisting of the Requirements, Monitoring and Burden subscales.

As expected, the EBPAS-36D showed high correlations with two other scales assessing attitudes towards the use of EBP, the direct and indirect measurement scales of attitudes of the ISP. This confirms the convergent validity of the scale. Accordingly, a high correlation was found between the EBPAS-36D and a global assessment of participant's interest in EBP, a nine-item subjective self-rating of one's interest in research on psychotherapy and clinical psychology, clinical guidelines, EBP and treatment manuals with high face validity. Moreover, the EBPAS-36D allowed incremental prediction of the intention to use EBP as assessed with the Behavioral Intention Scale of the ISP beyond gender, age and working in science.

Responders of the 50-item version of the scale commented on being annoyed and fatigued by answering the items (43). This might result in response biases and missing answers, limiting the validity of the scale. The acceptability of the shorter EBPAS-36D appears to be higher as indicated by a substantially lower amount of missing answers in the current study.

In the present sample of German psychotherapists, higher age was associated with less favorable attitudes towards EBP. Consistent with this, licensed psychotherapists reported more negative attitudes compared to psychotherapists in training. While this result is in contrast to two previous studies reporting higher scores on the Requirements and Openness subscales of the EBPAS with increasing age (30, 31), it is in accordance with other studies (34–37). As assumed by van Sonsbeek et al. (33), professionals may rate their own clinical experience higher than EBP with increasing age and experience. However, it should be noted that as yet, age effects may be confounded by cohort effects, since psychotherapy training underwent considerable changes in Germany over the last 30 years. Concerning sex differences, women reported more positive attitudes towards EBP in the present study. Sex differences were apparent for the total scale and the subscales Requirements, Appeal, Fit and Organizational Support. This result adds to other research demonstrating more positive attitudes towards EBP in women (32, 30, 34, 37, 33). Still, these sex differences were not found consistently (20, 35, 36), which is why possible moderators should be investigated in future research.

As demonstrated in previous studies (31, 21), provider's attitudes towards EBP were associated with organizational climate for the implementation of EBP. Since psychotherapists working in private practices were unable to rate the implementation climate of any organization or work group, those participants were asked to rate a parallel version of the ICS, capturing the implementation climate in the German health system. Interestingly, individuals' attitudes towards EBP were not associated with their evaluation of the implementation climate of the health system. One reason for this might be that the German health system does not provide support for EBP to a similar extent as some organizations do, thus not leading to more positive attitudes towards EBP (22). Another reason might be that psychotherapists with a positive attitude towards EBP are able to choose organizations with a better implementation climate for EBPs or affect

the implementation climate of the organization they work at, while they are probably unable to choose a health system according to its implementation climate or affect the implementation climate of the health system.

When interpreting the results of the present study, some limitations must be borne in mind. All data are based on self-reports in a cross-sectional online survey. A large proportion of the sample reported to have ever or currently been working in science and having a cognitive behavioral therapy approach. The findings refer to a convenience sample that is most likely self-selected for interest in EBP and not representative (65) of the population of mental health providers. This does not affect the evaluation of the psychometric properties of the EPBAS-36D; still future studies with representative samples should seek to confirm the results. Although the dropout rate in the present study can be considered as average for online surveys (66), a selection bias cannot be precluded with only particularly interested participants completing the survey (67). Finally, although a definition of EBP preceded the questionnaire, some comments indicated that individual participants may have been uncertain about the exact meaning of EBP. Future research should assess the comprehensibility of the definition to ensure that all participants rate the same construct.

Conclusions

In order to be successful, implementation efforts need to consider providers' attitudes towards EBP. Thus, reliable instruments assessing positive as well as ambivalent attitudes are crucial. Although further validating research is required, the present study confirms good psychometric properties and validity of a German version of the EPBAS-36 in a sample of psychotherapists. Additionally, a second-order model of attitudes towards EBP is proposed.

Abbreviations

AIC: Akaike Information Criterion

CBT: Cognitive Behavioral Therapy

CFA: Confirmatory Factor Analysis

CFI: Comparative Fit Index

EBP: Evidence-based practices

EBPAS: Evidence-based Practice Attitudes Scale

EFA: Exploratory Factor Analysis

ICS: Implementation Climate Scale

ISP: Intention Scale for Providers

PCFI: Parsimony-adjusted Comparative Fit Index

RMSEA: Root Mean Square Error of Approximation

SRMR: Standardized Root Mean Squared Residual

US: United States

Declarations

Ethics approval and consent to participate

The study was approved by the Internal Review Board of the University of Marburg (approval number: 2019-58k). Participants received study information and provided informed consent. Data were collected anonymously.

Consent for publication

Not applicable

Availability of data and materials

The datasets analyzed in the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

KS, AB and HC designed the study. KS, JT and AB translated the instruments. MR and GAA provided feedback on the translations. KS collected the data. KS and AB analyzed the data and drafted the manuscript. JT provided a first draft of the introduction. HC, MR and GAA commented on the initial draft and critically revised it. All authors have read and approved the final version of the manuscript.

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Figures

Figure 1

Model A: Original 12-factor structure

Figure 1

Model A: Original 12-factor structure

Figure 2

Model B: Second-order 4-factor structure derived by EFA

Figure 2

Model B: Second-order 4-factor structure derived by EFA

Figure 3

Model C: Second-order 3-factor model established by Rye et al. (37)

Figure 3

Model C: Second-order 3-factor model established by Rye et al. (37)

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