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Development and Initial Validation of Perceived Research Environment Scale
for Higher Education Academics

Abstract:	There is a growing interest in the perceived research environment for higher education academics. As there is no existing, psychometrically sound scale that directly measures perceived research environment for higher education academics, we designed and validated the Perceived Research Environment Scale for use with this population. In Phase 1, items were developed based on a review of literature, six focus groups, and expert judgment. In Phase 2, the items were then administered to a sample of Indonesian academics (N = 306, M age = 42.29 years). Item analysis and exploratory factor analysis were used to reduce the number of items and determine the factor structure. In Phase 3,

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1

Development and Initial Validation of Perceived Research Environment Scale

for Higher Education Academics

Introduction

Education, research, and services are the three key functions characterizing the

academic profession in modern-day, higher education systems (Eam, 2015), although

academic research and publications have been increasingly emphasised at most universities

around the world, as involvement in research-related activities is recognised as an effective

means to upgrade a university's profile (Nguyen, Klopper, & Smith, 2016). Previous studies

have demonstrated that engagement in research potentially improves teaching quality and

enhances knowledge and competence that contributes to high quality research supervision,

which is critical for developing graduate students as independent researchers (Lindsay,

Breen, & Jenkins, 2002).

Reflecting this, there has been a continuing trend for universities in developed

countries to increase their focus on research, and this tendency has spread to developing

countries, where research is increasingly viewed as a high priority (Nguyen et al., 2016).

Consequently, research has become an important function for academics everywhere, as

research productivity is now a primary consideration in several important organisational

decisions, such as hiring, maintenance of tenure, promotions, and salary increases for

academics (Chen, Gupta, & Hoshower, 2006). As academics are required to publish their

research results nationally and internationally in high quality, peer-refereed journals (Nguyen

et al., 2016), researchers have been interested in identifying the predictors of research

involvement and performance in academics (e.g., Whelan & Markless, 2013).

This research has shown that, among the factors that influence research productivity,

environmental factors are some of the most powerful ones (Bland & Ruffin, 1992), which has

lead researchers to identify the elements that characterise a good research environment (e.g.,

2

PERCEIVED RESEARCH ENVIRONMENT SCALE

Holden, Pager, Golenko, & Ware, 2012). Owen (1992) identified four important components

of a good research environment: research funding, research infrastructure, having active

researchers, and the availability of supportive research administrators. White, James, Burke,

and Allen (2012) demonstrated that a good research environment is one that provides

opportunities to access key resources and support from colleagues and the wider university.

More recently, Nguyen et al. (2016) conducted a qualitative study in Vietnam to examine the

affordances, barriers, and motivations that drive research engagement in academics. Financial

support for research activities was perceived as the main affordance, teaching load as the

main hindrance, and having a collaborative research environment and supportive research

policy settings and practices as motivations for academics to engage in research.

The important role of the research environment is consistent with Bronfenbrenner's

(1979) ecological systems theory. The behaviour of academic peers can be considered a

"micro-environment", which is embedded in larger environments, such as the university

department or research centre, which, in turn, are influenced by university-level policies and

resources. The micro-environment comprises the academic's mentors' and colleagues'

behaviours (i.e., role models and collaborators), other aspects of the department-level

environment (e.g., requirements and recognition), and the university-level environment (e.g.,

incentives and policy guidelines; Mallinckrodt, 1997).

In the nursing area, Pranulis and Gortner (1985) identified several characteristics of

high productivity university departments: faculty competent in research skills, research

valued as desirable outcome goal, role responsibilities included time for faculty to engage in

research activities, compatibility between faculty research activities and organisational

mission and goals, as reflected in the support and rewards for research, support for, and

encouragement of, faculty's efforts to seek extramural funding for research, administrative

3

PERCEIVED RESEARCH ENVIRONMENT SCALE

support for research, and a psychosocial climate supportive of research and beginning investigators.

In the area of psychology, Duffy et al. (2013) interviewed 17 of the most research-productive counselling psychologists within the American Psychological Association accredited counselling psychology program. Participants who were successful in their early career had received mentorship/support while in graduate school, chose research topics that were salient to them and they were passionate about, managed their time effectively, had good collaboration with students and professionals, had structured strategies for writing, worked in a supportive environment, and spent a considerable amount of time outside of work with family or participating in hobbies. The work environment (i.e., participants' day-to-day experiences at work) was identified as one of the main contributing factors. However, despite this evidence regarding the importance of the research environment, no measure has been created specifically to assess the perceived research environment (PRE) of university academics.

Previous Measures of Research-Related Environments

While there is no scale suitable to measure the research environment from the perspective of academics in a university setting, Young and Rice (1983) devised The Research Environment Scale, a 24-item, six-point, Likert-type scale, specifically for nurses. This scale measures aspects of the clinical research environment, such as educational opportunities for nurses to learn about the research process. A sample item: "Nurses have qualified mentors for conducting research". Marsh and Brown (1992) removed six items that were unrelated to the clinical research setting, and used an 18-item version of this scale in a sample of nurses.

Holden et al. (2012) devised the Research Capacity and Culture Tool for use with health professionals to measure indicators of research capacity at the individual, team, and

4

PERCEIVED RESEARCH ENVIRONMENT SCALE

organisation levels. This scale consists of a series of statements, which participants rate on a

scale of 1-10. Sample items: "Find relevant literature" (individual level), "Provide resources

to support staff research training" (team), and "Has a plan or policy for research

development" (organisational).

Previous studies also have demonstrated that the research environment is critical for

advancing graduate student productivity (Royalty, Gelso, Mallinckrodt, & Garrett, 1986); for

example, the research training environment is an important factor in the training of graduate

students in applied areas in psychology (Kahn & Gelso, 1997). Gelso (1979) suggested that

there were 10 ingredients in the research training environment (i.e., all factors in graduate

training programs, departments, and universities that reflect positive attitudes toward

research), including modelling appropriate research behaviours and attitudes, positive

reinforcement and support for research efforts, early and minimally threatening involvement

in research, decoupling research and statistics, facilitating inward reflection for research

ideas, emphasizing that science can be a partly social experience, teaching that all research is

flawed and limited in some way, teaching varied investigative approaches to research,

teaching how science and clinical practice can be wedded, and focusing on how scholarly

activities can be accomplished in practice settings.

Royalty et al. (1986) devised the 45-item Research Training Environment Scale

(RTES) to measure nine of the 10 ingredients of the research training environment that Gelso

(1979) suggested to be influential in promoting students' research interest. The 10th

ingredient (i.e., focusing on how scholarly activities can be accomplished in practice settings)

was omitted, as this was considered an advanced skill. Then, Gelso (1993) abandoned the

idea of "decoupling research and statistics" as there was no empirical support for this aspect.

Gelso, Mallinckrodt, and Judge (1996) reformulated this concept as "teaching relevant

statistics and the logic of research design", and included this in their revision, the 54-item

5

PERCEIVED RESEARCH ENVIRONMENT SCALE

Research Training Environment Scale-Revised (RTES-R). A sample item: "My advisor

offers much encouragement to me for my research activities and accomplishments".

Kahn and Gelso (1997) introduced the idea of instructional and interpersonal factors

within the research training environment. Interpersonal factors include early involvement,

faculty modelling, positive reinforcement, and research as a social experience; and

instructional factors include that all experiments are flawed, looking inward, teaching

relevant statistics, varied investigative styles, and wedding of science and practice. Kahn and

Miller (2000) created a short, 18-item form of the RTES-R by selecting one positively

worded item and one negatively worded item from each subscale based on corrected item-

total correlations.

Present Study

We employed a standard, classic test development approach (cf. DeVellis, 2016) to

develop and provide initial validation support for the PRE Scale for academics. We

conducted a literature review to determine the underlying domains for the construct, and hold

focus group discussions with higher education academics to validate these domains and

ensure that the items developed would be specific to the population's experience. Next, we

generated a list of approximately 70 items, had a group of experts rate them to examine their

content validity, and administered the items along with supporting validity scales to a large

sample of university-based academics. We used item analysis and exploratory factor analysis

(EFA) on one half of the data to trim the number of items to 25 and determine the factor

structure, and applied confirmatory factor analyses (CFA) on the second half of the data to

confirm the factor structure. The reliability and initial validity were then assessed.

Phase 1 - Item Development

The aim of this phase was to create sufficient items to form the basis for the new scale,

which was anticipated, for practical research purposes, to be approximately 25 items in

6

PERCEIVED RESEARCH ENVIRONMENT SCALE

length. We originated approximately twice as many items as would appear in the final

measure (Hinkin, 1998; Kline, 2000). Items were generated based on a review of the

literature (e.g., Gelso, 1979) and a series of six focus groups conducted by the first, third, and

fourth authors, to engage with the target participants, validate the underlying domains of the

construct identified in the literature review, and enhance content validity of the scale items

(Vogt, King, & King, 2004). Participants were 42 academics (7 per group) from a state

university in Central Java, Indonesia, who were requested to reflect on and discuss their own

experiences and to give their opinions regarding characteristics of their university

environment that might motivate or impede them in the conduct of research-related activities.

We recorded the focus groups for later reference.

Accordingly, we identified five broad domains of PRE salient to higher education

academics: beneficial social relationships, positive reinforcement, support and expectations,

focus on research, and positive role models; and created 70 positively worded items (i.e.,

positively worded to minimize response bias; Salazar, 2015), which were written in English

to represent these five domains. Four independent reviewers rated the suitability of each item

to reflect a specific dimension of the construct. We removed 10 items that were considered

overlapping or irrelevant, and adjusted several others, leaving a final list of 60 items.

Following Ægisdóttir, Gerstein, and Cinnarbas (2008), the first author translated the

items into Bahasa Indonesia, and two Indonesian academics examined the expression. The

items were then back-translated blindly into English by two bilingual Indonesian academics.

All authors compared the back-translated versions with the originals, and adjusted the

inaccuracies. The final items were then piloted with five Indonesian academics to check for

readability.

Phase 2 - Item Analysis and EFA

7

PERCEIVED RESEARCH ENVIRONMENT SCALE

The aim of this phase was to identify items to be retained in the scale and to determine the final factor structure. We used item and EFA procedures.

Method

Participants. We obtained data from 598 academics who were recruited from four universities in Central Java, Indonesia, and divided this sample into two sub-samples using a random split procedure to allow for a cross-validation test of results and to reduce sample-specific effects that could potentially influence reliability and validity (Byrne, 2010). Sample A from the split ($N = 306$) was used for Phase 2, and Sample B ($N = 292$) was used for Phase 3 and Phase 4.

Sample A consisted of 50.3% female academics (3.9% did not report gender), whose mean age was 42.29 years ($SD = 10.12$; 52.3% did not report age). A large majority (69.3%) had a masters' degree, and 21.6% a doctorate (9.2% did not report education level). Only a small proportion (1.3%) were professors, 22.5% associate professors, 27.8% assistant professors, 16% lecturers, and 4.6% junior lecturers (27.8% did not report position). The mean tenure was 16.57 years ($SD = 10.04$; 12.7% did not report tenure).

Sample B consisted of 54.1% female academics (3.4% did not report gender). The mean age was 43.39 years ($SD = 9.74$; 49% did not report age), most (62.7%) had a masters' degree and 29.5% a doctorate (7.9% did not report education level). One percent were professors, 20.5% associate professors, 35.6% assistant professors, 15.4% lecturers, and 3.1% junior lecturers (24.3% did not report position). Mean tenure was 16.68 years ($SD = 9.67$; 13% did not report tenure).

There were no differences between Sample A and Sample B on any of the demographic variables: age, $t(1060) = 0.46$, $p = .65$, gender, $\chi^2(1) = 0.82$, $p = .37$, tenure, $\chi^2(2) = 6.93$, $p = .06$, and level of education $\chi^2(2) = 0.20$, $p = .65$.

Materials

8

PERCEIVED RESEARCH ENVIRONMENT SCALE

The 60 items generated in Phase 1 which were expected to reflect the five domains of PRE were administered in a questionnaire along with Organisational Culture/Support for Research (OCSR) and Research Involvement (RI) Scales, which were used to test for construct validity. Higher scores reflect higher levels of each construct.

PRE. This was assessed using the 60 items generated in Phase 1. Example items: "At my university, academics often informally discuss research ideas in their day-to-day discussions" (beneficial social relationship), "At my university, successful researchers have high status" (positive reinforcement), "My university assists researchers to publish by helping them with manuscript preparation (e.g., writing workshops)" (support and expectations), "At my university, academics thinks research is important" (focus on research), and "At my university, many academics publish their research in high quality academic journals" (positive role models); 6-point-scale of 1 = *strongly disagree* to 6 = *strongly agree*.

Organisational culture/support for research. We used the 20-item OCSR Scale (Kortlik, Bartlett, Higgins, & Williams, 2002) to assess academics' perceptions of the organisational culture or support for conducting research. Sample item: "My peers support my efforts to publish in refereed research journals"; 6-point scale of 1 = *strongly disagree* to 6 = *strongly agree*. Cronbach alpha was reported as .88, and validity was supported by finding positive correlations with scales of research confidence (Kortlik et al., 2012).

Research involvement. We used the 24-item Research Involvement (RI) Scale (Whelan et al., 2003) to assess participants' level of engagement in research. Sample item: "Participating in research as part of a collaborative team"; 6-point scale from 1 = *not at all* to 6 = *a great deal*. Alpha has been reported as .98, and construct validity has been supported by finding positive correlations with evidence of greater research output (Whelan et al., 2013).

Procedure

9

PERCEIVED RESEARCH ENVIRONMENT SCALE

The survey was administered by the chief researchers and assistants during working hours. This study was conducted with approval from the authors' university ethics committee, and participants gave their permission to participate.

Results

Item analysis. We assessed: item skew to identify any item whose distribution indicated floor or ceiling effects; the inter-item correlations to identify any pairs of items that were too highly correlated ($r \geq .80$), which might indicate that the items were redundant; the corrected item-total correlations to identify any items with a weak or negative correlation with the total scale ($r < .30$), which might indicate items that were not tapping the construct of PRE; and age, gender, position, tenure, and level of education in relation to each item to identify items that might be responded to differently depending on demographic variables (Kline, 2000). No items were identified as problematic; thus, no items were eliminated.

EFA. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (.94) and statistically significant Bartlett's test of sphericity ($p < .001$) confirmed that the 60 items were suitable for factor analysis. The common variance is of interest in determining the underlying factor structure, thus, we used common factor analysis (i.e., principal-axis factor analysis; Hair, Black, Babin, & Anderson, 2010). As the five anticipated factors were expected to be correlated aspects of an overall perceived environment measure, we utilised a direct oblimin rotation (Hair et al., 2010). Following Hayton, Allen, and Scarpello (2004), we used several criteria to determine the number of factors: the scree plot, Velicer's minimum average partial test, parallel analysis (O'Connor, 2000), at least three items loading on a factor (Costello & Osborne, 2005), and factor interpretability (Hinkin, 1998).

In the first EFA, the scree plot indicated five factors with eigenvalues > 1.0. Velicer's minimum average partial test and the parallel analysis also suggested a five-factor solution. We accepted this solution as these five item groupings were interpretable theoretically and

PERCEIVED RESEARCH ENVIRONMENT SCALE

reflected the five domains initially identified. Then, 35 items were deleted from the solution

because they did not load meaningfully on any factor, or the factor loadings were < .4 and/or

less than twice as strong on the appropriate factor as on the other factor (Hinkin, 1998). The

final five-factor solution accounted for 65.58% of the variance: Factor 1 = 32.94%, factor 2 =

15.56%, factor 3 = 6.81%, factor 4 = 5.40%, and factor 5 = 4.86%. Table 1 displays factor

loadings and eigenvalues.

Factor 1 (5 items; "beneficial social relationship") includes the situation where

individuals perceive that their social relationships support their participation in research-

related activities (α = .88, M = 23.01, SD = 3.85). Factor 2 (5 items; "positive reinforcement")

refers to the situation where individuals perceive positive social and non-social reinforcement

for achievements in research-related activities (α = .92, M = 20.62, SD = 5.90). Factor 3 (5

items; "support and expectations") reflects perceived support and expectations from the

university for conducting research-related activities (α = .86, M = 24.85, SD = 3.21). Factor 4

(5 items; "focus on research") includes perceived emphasises on research-related activities (α

= .92, M = 22.69, SD = 4.53). Factor 5 (5 items; "positive role models") reflects perceived

availability of positive role model for conducting research-related activities (α = .89, M =

21.81, SD = 4.36). The associations among the five factors (range .10 to .47; all p < .001)

were in line with the results from the EFA indicating that the subscales were somewhat

independent, but with overlap among them. Alpha for the full scale was .92.

Insert Table 1 about here

Phase 3 - CFA

This phase aimed to validate the factor structure of the PRE Scale with Sample B.

Using CFA (AMOS Version 4.0; Arbuckle & Wothke, 1995). We examined the 5-factor

structure identified in Phase 2, and then compared this model with a 1-factor model, a

hierarchical, 2nd-order model, and a bifactor model (Reise, Bonifay, & Haviland, 2013).

PERCEIVED RESEARCH ENVIRONMENT SCALE

We used the χ^2 statistic, the normed χ^2 (χ^2/df), the Comparative Fit Index (CFI),

Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) to

examine model fit. A significant χ^2, χ^2/df < 3.0, CFI and TLI values > .92, and RMSEA < .08

indicate satisfactory fit when sample size < 250 and observed variables number between 12

and 30. We then compared the different models using the χ^2-difference test and the Akaike

Information Criterion (AIC), where the lower value indicates a better fit (Hair e al., 2010).

The 5-factor model identified in Phase 2 generated satisfactory fit statistics (see Table

2 for fit statistics for all models). All factor loadings were statistically significant ($p < .001$)

and ranged from .72 to .84 (beneficial relationship), .83 to .91 (positive reinforcement), .55 to

.89 (support and expectations), .76 to .89 (focus on research), and .70 to .89 (positive role

models). Correlations among the latent variables ranged from .10 to .62.

The 2nd-order model (correlations with 2nd-order factor = .43 to .87) and the bifactor

model, but not the 1-factor model, also had satisfactory fit statistics. However, the best-fitting

model was the bifactor model, which was statistically different from the 5-factor model, and

generated the lowest AIC. The bifactor model included a general latent variable (i.e.,

dependent on all 25 items) and five subscale latent variables (i.e., five uncorrelated factors

dependent on their respective five items). This model showed that each item is an indicator of

both a total and subscale aspect, with the results for the total variable representing common

sources of variance after controlling for subscale variances, and the subscale variables

representing variances after controlling for the total variance (Reise et al., 2013).

InsertTable2abouthere

As our results supported multi-dimensionality of the scale (i.e., the 5-factor, 2nd-order,

and bifactor models all had acceptable fit statistics), it needed to be determined whether the

scale should be interpreted at the global or subscale level. We calculated bifactor model-

based reliability estimates and compared the variances explained for the total and subscale

hierarchical, 2nd-order model, and a bifactor model (Reise, Bonifay, & Haviland, 2013).

12

PERCEIVED RESEARCH ENVIRONMENT SCALE

interpretations. Following Rodriguez et al. (2016), we used the Bifactor Indices Calculator

(Dueber, 2017) to calculate Omega, OmegaH, Relative Omega, and the explained common

variance (ECV). Omega, the estimate of the proportion of variance accounted for when

considering all items in a factor, was .96 (general factor), and .91, .94, 86, .92, and .90

(specific factors), indicating high reliability for the general factor and sound to high reliability

for the specific factors, and suggesting all factors have acceptable reliability. OmegaH, the

proportion of unique variance explained by a factor, was .71 (general factor), and was .37,

.62, and .52, .62, and .25 (specific factors). Relative Omega, the proportion of reliable

variance in the multidimensional composite due to a factor, was .74 (general factors), and

was .41, .68, .60, .67 and .28 (specific factors), indicating the majority of reliable variance in

the total scores resides within the general factor. Last, the ECV, the proportion of all common

variance explained by a factor, was .40 (general factors), and was .09, .21, .10, .14, and .06

(specific factors), suggesting a moderately strong global factor, with much less variance

explained by the specific factors. Thus, it can be concluded that interpretation at the total

level (and not the subscale level) will give the more useful measure of PRE, as the total factor

will account for more meaningful levels of variance in the construct.

Phase 4: Construct Validity

This phase aimed to evaluate the initial construct validity of the scale by correlating

scores from the PRE Scale with scores from OCSR and RI Scales. Individuals who reported

stronger research training environments were more likely to perceive their environment to be

more research supportive (Kahn & Miller, 2000), and those who perceived a more research

supportive work environment were more likely to report a positive attitude towards research

and greater research engagement (Royalty et al., 1986). Thus, we expected PRE Scale to be

associated positively with OCSR and RI Scales. These analyses were conducted using

Sample B (N = 292). All correlations were statistically significant and in the expected

13

PERCEIVED RESEARCH ENVIRONMENT SCALE

directions, as reported in Table 3. The results demonstrated that the PRE Scale was associated

with the two other constructs as expected; supporting convergent validity of the scale.

InsertTable3abouthere

Discussion

We devised and reported initial validity evidence for a psychometrically sound, 25-

item scale to assess PRE for higher education academics: The Perceived Research

Environment (PRE) Scale. We operationalised PRE as the organisational environment

perceived by academics, which enables and supports them to learn and conduct research-

related activities and yield scientific publications. The salient domains identified were

beneficial social relationships, positive reinforcement, support and expectations, focus on

research, and positive role models. Content validity was supported by a review of the

literature, focus groups, pilot testing, and use of expert reviewers, whereas construct validity

was supported by the EFAs and CFAs, which indicated that the new scale reflected the five

anticipated inter-correlated domains. The measure can most productively be applied at the

global level, that it is internally reliable, and that the positive associations with the OCSR and

the RI Scale supported its convergent validity.

Previous research has shown the importance of PRE in academics (e.g., Duffy et al.,

2013). The present study provided a comprehensive measure of PRE, which assesses various

aspects of the PRE construct. At 25 items, the scale will be practical and suitable to be used

simultaneously with other scales in both research and practice. Extending PRE research using

this scale has the potential to add to our knowledge and understanding of the PRE from the

perspective of higher education academics, for example when designing research studies,

identifying its nomological network, and examining its across-time correlates.

The PRE Scale also will be of use to those who work with academics at any stage of

their career when they have issues with research-related performance, and it will be useful to

Sample B ($N = 292$). All correlations were statistically significant and in the expected

14

PERCEIVED RESEARCH ENVIRONMENT SCALE

help explore helps and blockages related to their research-related progress and achievement. Practitioners can use the scale as a diagnostic tool at an early stage of career counselling, as well as an evaluation instrument after a series of counselling sessions. At the organisational level, the scale can be used for human resource mapping as a foundation for formulating policies at department, research centre, and university levels.

Limitations

Our study was conducted using a sample of higher education academics from several universities in Central Java. Hence, the conclusions of this study need to be tested on other academic populations. We examined content and construct validity of the scale, and future researchers could focus on establishing predictive validity by, for example, testing the longitudinal associations between scores on the scale at one point in time and subsequent outcomes. We showed that the scale was unrelated to several demographic variables (e.g., age, gender, tenure, level of education), suggesting no inherent bias based on these characteristics; however, future studies need to examine structural invariance on these and other variables to support these results.

Conclusion

The current research has demonstrated support for a scale to measure PRE for higher education academics, although future studies are needed to extend support for its validity and to test its applicability on more diverse populations. Our findings contribute to the body of literature on academics' PRE, and open the way for improved career counselling for academics, research development interventions, and organisational policies.

15

PERCEIVED RESEARCH ENVIRONMENT SCALE

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16

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Journal of Psychoeducational Assessment

17

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Table 1
FactorLoadingsforthePREScale;SampleA(N=306)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1. At my university, academics are willing to involve their colleagues in research projects	**.86**	-.10	-.04	-.07	-.01
2. At my university, academics support one another in their research projects	**.83**	.11	.13	-.04	.01
3. At my university, academics often informally discuss research ideas in their day-to-day discussions	**.83**	-.09	-.04	.03	-.01
4. There is a sense at my university that academics enjoy their research activities	**.71**	.06	.04	.05	.22
5. At my university, researchers actively involve students in their research projects	**.70**	-.09	-.01	.20	-.01
6. My university rewards successful researchers	.03	**-.90**	-.01	.07	.01
7. My university is well known for its research expertise	-.01	**-.89**	.01	-.03	.04
8. At my university, researchers who do well are highly respected by their colleagues	.04	**-.85**	.09	-.01	-.02
9. At my university, there are incentives for successful research activities (e.g., getting published or obtaining a research grant	-.01	**-.83**	.03	.11	-.09
10. At my university, we all celebrate when a colleague is successful (e.g. gets published or obtains a research grant	.08	**-.76**	.13	-.09	.11
11. My university sets clear expectations regarding research output for academics	.01	.01	**.82**	-.06	.01
12. My university has specific programs and funds to help new academics get their research started	.04	.01	**.79**	-.02	.05
13. My university assists researchers to publish by helping them with manuscript preparation (e.g., writing workshops)	-.01	-.03	**.78**	.02	-.03
14. My university has clear expectations that academics will engage in research	.09	-.08	**.76**	.07	-.05
15. Academics at my university know it is expected of them that they attend conferences and present their research	-.08	-.07	**.68**	.11	-.05
16. At my university, academics are encouraged to use a wide variety of research methods in their research	-.01	.05	.06	**-.91**	-.01
17. At my university, researchers are always on the look-out for research collaborators	.06	-.02	.04	**-.86**	.03
18. At my university, academics thinks research is important	.03	.02	.03	**-.85**	-.04
19. At my university, new faculty members are encouraged to publish as soon as they commence work	-.05	-.14	-.08	**-.79**	.09
20. At my university, opportunity for academics to actualize themselves in research is widely open	.08	.16	.08	**-.78**	.07
21. Academics at my university give high priority to their research	.02	.04	.14	-.03	**.86**
22. At my university, many academics publish their research in high quality academic journals	.01	-.03	-.06	-.01	**.86**
23. Academic at my university are strongly focused on research	-.13	.03	-.05	.09	**.83**
24. Academics at my university strive to publish their research in high quality journals	.13	.01	.10	-.01	**.77**
25. Many academics at my university are working on important research projects	.14	-.05	.01	.04	**.70**
Eigenvalues	8.57	4.21	2.06	1.69	1.55
% variance explained	32.94	15.56	6.81	5.40	4.86

Note. Factor 1 = Beneficial social relationships, Factor 2 = Positive reinforcement, Factor 3 = Support, Factor 4 = Encouragement, Factor 5 = Role model; Main loadings highlighted in bold.

PERCEIVED RESEARCH ENVIRONMENT SCALE

Table 2

Model Fit Indices of the 3-Factor, 1-Factor, 2nd-Order Factor, and Bifactor Models for Sample B

(N = 292)

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	χ^2_{Diff}	AIC
5-factor	559.69***	256	2.19	.94	.94	.06	-	697.69
1-factor	2324.78***	270	8.61	.63	.59	.16	$p < .001$	2434.78
2nd order	749.03***	269	2.78	.91	.90	.08	$p < .001$	861.03
Bifactor	513.33***	244	2.10	.95	.94	.06	$p < .001$	675.33

Note. χ^2_{Diff} statistics refer to differences with 5-factor model. *** $p < .001$

PERCEIVED RESEARCH ENVIRONMENT SCALE

Table 3

Summary Data for Sample B (N = 292; correlations above diagonal)

Scale	Indonesian											
	M	*SD*	Range	α	1	2	3	4	5	6	7	8
1. Full scale	112	16.65	28-145	.93	-	.81**	.65**	.63**	.80**	.64**	.47**	.49**
2. Subscale 1 (beneficial social relationship)	22.8?	4.29	5-30	.90		-	.40**	.48**	.52**	.54**	.30**	.35**
3. Subscale 2 (positive reinforcement)	20.36	6.2?	5-30	.94			-	.12*	.49**	.10*	.14*	.24**
4. Subscale 3 (support and expectations)	24.44	3.7?	6-?0	.87				-	.38**	.49**	.38**	.32**
5. Subscale 4 (focus on research)	22.53	4.80	5-30	.?1					-	.39**	.54**	.58**
6. Subscale 5 (positive role models)	21.79	4.59	5-30	.?9						-	.35**	.27**
7. Organisational culture/ support for research	67.24	15.40	24-144	.93							-	.54**
8. Research involvement	100.82	21.12	18-108	.97								-

Note. * *p* < .05; ** *p* < .01; *** *p* < .001

2.Bukti Konfirmasi Review dan Hasil Review Pertama
(7 Okt 2018)

Gmail

Journal of Psychoeducational Assessment - Decision on Manuscript ID JPA-18-0139

Journal of Psychoeducational Assessment   Sun, Oct 7, 2018 at 2:08 AM
<onbehalfof@manuscriptcentral.com> Reply-To:
To:
Cc:

06-Oct-2018

Dear Dr. :

Manuscript ID JPA-18-0139 entitled "Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics" which you submitted to Journal of Psychoeducational Assessment, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter. I appreciate your patience with the review process.

The reviewers noted strengths in the manuscript, particularly its methods and execution; however, the reviewers also expressed concerns about it. Based on the reviewers' responses, I ask that you revise your manuscript to address their comments in a revision. The reviewers were helpful in detailing ways to think about these issues and adjust the manuscript accordingly, so I encourage you to examine their comments carefully as you revise. It is likely I will send your revised manuscript to one of these initial reviewers. As with any manuscript, I cannot guarantee that these efforts will translate to acceptance in JPA.

To revise your manuscript, log into https://mc.manuscriptcentral.com/jopa and enter your Author Center, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

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You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer.

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IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to Journal of Psychoeducational Assessment, your revised manuscript should be submitted within 30 days from receipt of this letter. If it is not possible for you to submit your revision in this amount of time, please advise the Associate Editor before the 30 day period as the link to you article will expire and you will not be able to re-submit your paper without making a specific request.

Once again, thank you for submitting your manuscript to Journal of Psychoeducational Assessment and I look forward to receiving your revision.

Sincerely,
Dr. Renée Tobin
Associate Editor, Journal of Psychoeducational
Assessment tobin@temple.edu

Don Saklofske
Editor

Reviewer(s)' Comments to

Author: Reviewer: 1

Comments to the Author
Thank you for the opportunity to review this manuscript (JPA-18-0139). This article described the development and validation of the Perceived Research Environment Scale (PRES), a faculty-report measure for use in higher education institutions. I hope the following comments will assist the authors in revising their manuscript.

1.)   This study seems to lack of a cohesive, unifying theoretical framework. The authors vaguely reference potential applications of Bronfenbrenner's ecological theory, but it is unclear how this theory guided instrument development and the analyses. The authors also reference several studies exploring various aspects of research environments,
but these variables do not seem to be united in any particular framework. It would have been more compelling for the authors to apply a specific theoretical framework to guide the development of the measure.

2.)   On page 7, the authors describe a method for randomly assigning participants to Samples A and B. They contend that the groups were comparable with respect to several demographic variables; however, I am most interested in knowing whether the groups were comparable with respect to institution. Participants came from only four institutions, and it is likely that participants from the same university would rate their research environments similarly (given that they are likely experiencing similar pressures). Is it possible that either Samples A or B consisted of a disproportionately large or small number of faculty from any one of the four institutions? This might impact the results. Ideally, the sample would have comprised faculty from a variety of different institutions.

On a related note, it might be interesting to see whether faculty from the same institution had similar ratings of their research environments. I suppose the ratings might be similar for some items (availability of funding) but less similar for items that vary more across individuals (e.g., access to informal mentoring).

3.)   The authors note that there were no significant differences between Sample A and Sample B with respect to age. I'm not sure how meaningful this assertion is, given that approximately 50% of participants in both samples did not report their ages. This constitutes a fairly large amount of missing data.

In general, how were missing data handled in this study? This is important to discuss in the manuscript.

4.)   I would have liked to have had some more information about the 42 academics included in the focus groups as well as the four independent reviewers who rated the suitability of the items (p. 6). For example, who were the reviewers and what qualified them for this task?

5.)   The authors administered a measure of research involvement (i.e., the Research Involvement Scale). I would be curious to know if Samples A and B differed with respect to scores on this measure. If one group were more involved in research than the other, the two samples would not be comparable on a very important dimension (especially given the nature of the instrument the authors are developing).

6.)   The authors sampled participants with a wide range of academic roles, including professors and lecturers. I can imagine that some of these positions are not inherently or contractually research roles. Would respondents with positions that were non-research oriented be the best respondents for this type of measure?

7.)   The sample included very few full professors (i.e., approximately 1% of each subsample), which seems problematic for a couple of reasons. First, how might this have impacted the authors attempts to determine whether items were responded to differently by faculty in various positions? Were subsamples for each position (e.g., full professor, associate professor, assistant professor) large enough (and comparable enough in size) to detect response differences across groups? Second, full professors may have more institutional knowledge and research experience than associate and assistant professors. To have so few in the sample appears to be a notable limitation of this study.

8.)   I would have also recommended that the authors collect data regarding the length of time participants had been at their respective institutions. Newer faculty might not have had enough time to form opinions about their respective research environments.

9.)   I would have been interested to see the internal consistency values for the PRES total score and subscale scores in Sample B. I would recommend the authors report these values.

10.)   For the CFA, the authors suggest that three of the four models (i.e., 2nd order model, 5-factor model, and bifactor model) had satisfactory fit statistics. However, CFI values for the 5-factor and 2nd order models were below
.95. Some research has suggested that a more appropriate criterion for CFI values is .95 or greater (rather than .90

or greater). The authors may wish to revise their language accordingly. (Please see Hu and Bentler, 1999; reference provided below.)

11.)   Minor comments:
a.   On page 3, the authors write, "Duffy et al. (2013) interview 17 of the most research-productive counselling psychologists within the American Psychological Association accredited counselling program." Did the authors mean
17 faculty across a variety of APA-accredited programs?
b.   In the implications section, I would further emphasize the potential value of the PRES for informing organizational change. This point is a good one and should be further developed. For example, more detail about the specific uses of the instrument for facilitating organizational improvement would be interesting (and would ultimately make the paper more compelling).

Reference

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis. Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1-55.

Reviewer: 2

Comments to the Author
This manuscript reports on the development and psychometric evolution of a measure of perceived research environment. Specifically, the measure is designed to tap into a construct comprised of a number of dimensions related to an individual's perception of the availability of resources, support, and appreciation of research efforts within the institution in which the individual is employed. I found the manuscript to be clear and well-written. The authors did a nice job explaining the concept of the perceived research environment and why it is important, as well as the previous attempts to at psychometric instruments to capture the construct. As illustrated in the introduction, previous measures have been quite specific to either certain fields (e.g., nursing), or populations (e.g., graduate students). Thus, the authors make a good case for a general perceived research environment scale that could be applicable to Universities or other research institutions, regardless of the specific discipline. However, I would recommend the authors add a paragraph at the end of the introduction, before the "Present Study" section, summarizing this and making this rationale more explicit.

There are other strengths of this paper, including conducting item analyses, evaluation of the internal structure with EFA followed by a CFA in a random hold-out sample to confirm the factor structure. The factor analytic methods were appropriate and fit the theoretical conception of the construct, including use of principal axis factoring, direct oblimin rotation, which allows for correlations among the rotated factors, and the use of Velicer's MAP and parallel analysis to inform the decision on the number of factors to retain. With that said, there are also some areas that should be addressed to improve the paper and the contribution of the study.

I appreciate the fact that the authors conducted focus groups as one of the methods for identifying the important domains of the construct. It would probably be useful if the authors provided a bit more detail about how the information from the focus groups was analyzed, and what dimensions they identified, independent of the dimensions that the identified from the literature review.

The conduct of the item analyses, including evaluation of item response distributions, item-total correlations, and inter-item correlations was appropriate, and an often over-looked step in the process of test development. Although the authors indicated that none of the items were eliminated based upon the item analyses, it would still be useful information to present the results of the item analyses in a table, including mean, standard deviation, skewness, kurtosis, and item-total correlation of each item, as well as the mean item-total correlation, if not for the original set of items, at least for the final set of items after eliminating items due to factor loading issues.

For the EFA, the authors indicate that both the minimum average partial (MAP) and parallel analysis procedures indicated 5 factors, but they do not present the results of the analysis. It is good practice to provide the numbers generated from these procedures that lead to the conclusion. So, for the parallel analysis, the first 6 actual and random eigenvalues can be presented.

Regarding the CFA, the procedures were reasonable, and the fit statistics were appropriate. The computation of Omega's was also useful. My one suggestion here would be to present a table or figure showing the loadings of the bifactor model, which was determined to be the best fitting model.

The validity analyses were fairly limited in scope, but the measures used were reasonable and the correlations found were supportive of construct validity.

The Discussion section was a bit lacking in content. Given that construct validation requires a multitude of evidence from different methods and perspectives, what is especially needed in the discussion section is suggestions for
further developments, such as other constructs, measures, and criterion variables would be useful to further establish the nomological network and construct validity of scores from this measure. I found the statement that the measure

would be useful for "early stages of career counseling" to be perplexing. Perhaps I am missing something, but it seems this measure would only be applicable to someone who is already working in an institution with some kind of research focus. Otherwise, what "research environment" are they reporting on. In addition, it is premature to recommend a measure for applied use after one development study.

3. Bukti Konfirmasi Submit Revisi Pertama, Respon kepada Reviewer, dan Artikel yang Diresubmit (3 Nov 2018)

M Gmail

Journal of Psychoeducational Assessment - Manuscript ID JPA-18-0139.R1

Journal of Psychoeducational Assessment <onbehalfof@manuscriptcentral.com>   Sat, Nov 3, 2018 at 8:08 PM
Reply-To: JPA@sagepub.com
To:

03-Nov-2018

Dear Dr. :

Your manuscript entitled "Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics" has been successfully submitted online and is presently being given full consideration for publication in Journal of Psychoeducational Assessment.

Your manuscript ID is JPA-18-0139.R1.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at https://mc.manuscriptcentral.com/jopa and edit your user information as appropriate.

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Thank you for submitting your manuscript to Journal of Psychoeducational

Assessment. Sincerely,
Journal of Psychoeducational Assessment Editorial Office

Reviewer: 1

Comments to the Author
Thank you for the opportunity to review this manuscript (JPA-18-0139). This article
described the development and validation of the Perceived Research Environment Scale
(PRES), a faculty-report measure for use in higher education institutions. I hope the
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vaguely reference potential applications of Bronfenbrenner's ecological theory, but it is
unclear how this theory guided instrument development and the analyses. The authors also
reference several studies exploring various aspects of research environments, but these
variables do not seem to be united in any particular framework. It would have been more
compelling for the authors to apply a specific theoretical framework to guide the
development of the measure.

Response:
*We updated our previous explanations regarding Bronfenbrenner's theory and this section
on pages 2-3:*
      The important role of the research environment for academics is consistent with
Bronfenbrenner's (1979, 1986) ecological systems theory. This perspective emphasises that,
compared to the objective environment, perceptions of the environment are of primary
significance, because it is these that affect and guide behaviour. Bronfenbrenner argued that
developing individuals are surrounded by interrelated systems. The inner circle, or
microsystem, is where academics have direct, face-to-face contact with significant others,
primarily their colleagues. Clusters of microsystems are called mesosystems (e.g., academics
talking to colleagues from other departments constitutes a linkage between two systems).
Beyond this are settings (i.e., exosystems) that are not experienced directly by the academics,
but nonetheless influence their microsystem through links such as communications from
management. Bronfenbrenner also described a macrosystem, which incorporated the wider
society and culture. The influences here come via policy and reward systems in the
university. Bronfenbrenner further proposed a chronosystem, which captures change over
time in the characteristics of the individual (e.g., career-related transitions) and environmental
change (e.g., national pressure to increase scientific publications and social conditions).
      For the individual academic in the research-focused environment, a relational
viewpoint, which focuses on the developing individual in a changing context, is considered a
useful perspective from which to comprehensively understand occupational and career
behaviours (Vondracek, Lerner, & Schulenberg, 1986). These theorists argued that due to the
continually changing nature of the individual and the context, a dynamic interactional
approach, or a developmental contextual perspective, should be applied to understand
occupational and career development. A developmental contextual point of view proposes
that the context is not only continually changing, but also that the changes are influenced by
the individuals and their characteristics. When considered from this perspective, occupation
and career development reflect an interactive process where individuals both affect and are

affected by the features of their environment, including social, cultural, and physical conditions.

In line with Bronfenbrenner's (1979, 1986) ecological systems theory and Vondracek et al.'s (1986) person-context relationships proposition, individuals will function better, demonstrate adapted outcomes, and be more satisfied when their characteristics fit the demands of the environment. Individuals with a good person-environment fit are also likely to receive favourable feedback and input from the surroundings. Conversely, mismatched individuals will tend to demonstrate poorer outcomes and receive less positive feedback.

Person factors (e.g., personality) and background contextual variables (e.g., socio-economic status) also shape learning experiences and thus affect occupational and career behaviours. From a social cognitive perspective (Bandura, 1991; Lent, Brown, & Hackett, 1994), individual interpretations of these experiences shape the development of self-efficacy (beliefs about one's ability to successfully manage and perform courses of action) and outcome expectations (beliefs about the consequences of given actions). Further, self-efficacy fosters favourable outcome expectations, and both self-efficacy and outcome expectations, independently and jointly, foster interests (e.g., research interests and activity) and the development of goals (e.g., intentions to engage in research activities), which, in turn, motivate research-related actions (e.g., research involvement). The success or failure that follows these actions promotes further learning, which then prompts individuals to revise their self-efficacy and outcome expectations, and, in turn, leads to a change in interests and goals. Thus, providing direct and vicarious research-related experiences, giving the opportunity to engage in various research tasks, and opening up research possibilities, should lead to differentiated beliefs about the academic's own capabilities and consequences of performing a particular behaviour, which, in turn, should cultivate research-focused interests and goals that will become more crystallised over time.

2.) On page 7, the authors describe a method for randomly assigning participants to Samples A and B. They contend that the groups were comparable with respect to several demographic variables; however, I am most interested in knowing whether the groups were comparable with respect to institution. Participants came from only four institutions, and it is likely that participants from the same university would rate their research environments similarly (given that they are likely experiencing similar pressures). Is it possible that either Samples A or B consisted of a disproportionately large or small number of faculty from any one of the four institutions? This might impact the results. Ideally, the sample would have comprised faculty from a variety of different institutions.

On a related note, it might be interesting to see whether faculty from the same institution had similar ratings of their research environments. I suppose the ratings might be similar for some items (availability of funding) but less similar for items that vary more across individuals (e.g., access to informal mentoring).

Response:
The composition of academics from the four institutions did not differ significantly across Sample A and Sample B, $\chi^2(3) = 6.31$, $p = .10$. We added information regarding this on pages 10 and 17.
With respect to the related note on whether academics from the same university reported similar ratings of their research environment, we did not calculate this, for while it might be interesting, we considered it more relevant for future studies, for example, related to whether different research environments were related to different levels of research output.

3.)   The authors note that there were no significant differences between Sample A and Sample B with respect to age. I'm not sure how meaningful this assertion is, given that approximately 50% of participants in both samples did not report their ages. This constitutes a fairly large amount of missing data.

In general, how were missing data handled in this study? This is important to discuss in the manuscript.

Response:
   We retained all cases from participants who completed all of the questionnaire items, as all participants were academics. Only a small number of responses (24 survey booklets) had missing scale data, and these were omitted from the analyses.
   Some participants did not complete some of their demographic variables. We did not delete these cases or estimate any of the demographic data, as these data were used primarily to describe the sample. We added a statement to this effect in the Limitations section:
   "We showed that the scale was unrelated to several demographic variables (e.g., age, gender, tenure, level of education, and institutions), suggesting no inherent bias based on these characteristics; however, we had missing demographic data, and future studies need to confirm this, and examine structural invariance on these and other variables to support the usefulness of the scale."

4.)   I would have liked to have had some more information about the 42 academics included in the focus groups as well as the four independent reviewers who rated the suitability of the items (p. 6). For example, who were the reviewers and what qualified them for this task?

Response:
We added these statements on page 6: "The independent reviewers who rated the suitability of the items consisted of 1 professor in psychology who had expertise in career development and test development and 3 doctoral-level psychology academics who had expertise in test development."

We also added these statements on page 7: "The 42 academics included in the focus groups consisted of 6 professors, 12 associate professors, 12 assistant professor, 6 lecturers, and 6 junior lecturers….."

5.)   The authors administered a measure of research involvement (i.e., the Research Involvement Scale). I would be curious to know if Samples A and B differed with respect to scores on this measure. If one group were more involved in research than the other, the two samples would not be comparable on a very important dimension (especially given the nature of the instrument the authors are developing).

Response:
The scores of the Research Involvement Scale for Sample A and Sample B did not differ significantly, $t(596) = -.33$ ($p = .74$). We added this information on page 10.

6.)   The authors sampled participants with a wide range of academic roles, including professors and lecturers. I can imagine that some of these positions are not inherently or contractually research roles. Would respondents with positions that were non-research oriented be the best respondents for this type of measure?

Response:
        All academics sampled had a research component to their role. The practice of employing academics who are teaching-only or administration-only is rarely employed in Indonesia, unlike in some Western countries.

7.)   The sample included very few full professors (i.e., approximately 1% of each subsample), which seems problematic for a couple of reasons. First, how might this have impacted the authors attempts to determine whether items were responded to differently by faculty in various positions? Were subsamples for each position (e.g., full professor, associate professor, assistant professor) large enough (and comparable enough in size) to detect response differences across groups? Second, full professors may have more institutional knowledge and research experience than associate and assistant professors. To have so few in the sample appears to be a notable limitation of this study.

Response:
We added this comment to the Limitation section on page 16:
        "We only had a very small number of professors in the samples, and the number of associate professors, assistant professors, and lecturers were not proportional. Future studies need to consider the proportion of their sample when collecting data in academics, as this will affect the response regarding perceived research environment."

8.)   I would have also recommended that the authors collect data regarding the length of time participants had been at their respective institutions. Newer faculty might not have had enough time to form opinions about their respective research environments.

Response:
We did have these data, but originally did not consider it as a way to describe the sample. We have now reported these details in the Participants section on page 9-10.

9.)   I would have been interested to see the internal consistency values for the PRES total score and subscale scores in Sample B. I would recommend the authors report these values.
Response:
*We added th*is ese *statement*s *on page 13: "In Sample B, Alpha for the full scale was .93 (M = 112, SD = 16.65), Factor 1 (α = .90, M = 22.87, SD = 4.29), Factor 2 (α = .94, M = 20.36, SD = 6.22), Factor 3 (α = .87, M = 24.44, SD = 3.70), Factor 4 (α = .91, M = 22.53, SD = 4.80), and Factor 5 (α = .89, M = 21.79, SD = 4.59)."*

10.)   For the CFA, the authors suggest that three of the four models (i.e., 2nd order model, 5-factor model, and bifactor model) had satisfactory fit statistics. However, CFI values for the 5-factor and 2nd order models were below .95. Some research has suggested that a more appropriate criterion for CFI values is .95 or greater (rather than .90 or greater). The authors may wish to revise their language accordingly. (Please see Hu and Bentler, 1999; reference provided below.)

Response:
Hair, Black, Babin, and Anderson (2010) provide fit statistics recommendations that are sensitive to sample size and the number of observed variables to be estimated. For example, a significant χ^2, χ^2/df < 3.0, CFI and TLI values > .92, and RMSEA < .08 indicate satisfactory fit when sample size > 250 and observed variables number between 12 and 30. The CFI

values should be greater than .95 when sample size > 250 and observed variables number below 12.
Our sample size was 292 and the number of observed variables were 15.

11.) Minor comments:
a. On page 3, the authors write, "Duffy et al. (2013) interview 17 of the most research-productive counselling psychologists within the American Psychological Association accredited counselling program." Did the authors mean 17 faculty across a variety of APA-accredited programs?

Response:
The sample was comprised of counseling psychology faculty who were the most cumulatively productive. Duffy et al.'s (2013) study focused on a very specific group of psychologists within one subfield of psychology, i.e., counseling psychology. We clarified this statement in the text on page 4.

b. In the implications section, I would further emphasize the potential value of the PRES for informing organizational change. This point is a good one and should be further developed. For example, more detail about the specific uses of the instrument for facilitating organizational improvement would be interesting (and would ultimately make the paper more compelling).

Response:
We accepted your advice. We added the uses of the instrument for facilitating organizational improvement in the implication section.

Reference

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis. Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1-55.

References:
Duffy, R. D., Torrey, C. L., Bott, E. M., Allan, B. A., & Schlosser, L. Z. (2013). Time management, passion, and collaboration: A qualitative study of highly research productive counseling psychologists. *The Counseling Psychologist, 41,* 881-917. doi: 10.1177/0011000012457994
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. (2010). *Multivariate data analysis. A global perspective.* (7th ed.). New Jersey, NJ: Prentice Hall.

Reviewer: 2

Comments to the Author
This manuscript reports on the development and psychometric evolution of a measure of perceived research environment. Specifically, the measure is designed to tap into a construct comprised of a number of dimensions related to an individual's perception of the availability of resources, support, and appreciation of research efforts within the institution in which the individual is employed. I found the manuscript to be clear and well-written. The authors did a nice job explaining the concept of the perceived research environment and why it is important, as well as the previous attempts to at psychometric instruments to capture the

construct. As illustrated in the introduction, previous measures have been quite specific to either certain fields (e.g., nursing), or populations (e.g., graduate students). Thus, the authors make a good case for a general perceived research environment scale that could be applicable to Universities or other research institutions, regardless of the specific discipline. However, I would recommend the authors add a paragraph at the end of the introduction, before the "Present Study" section, summarizing this and making this rationale more explicit.

Response:
We accepted your suggestion. We added these statements on page 6: "It is obvious that there is no general perceived research environment scale suitable for academics. We address this gap by designing a brief, multidimensional, and psychometrically sound instrument that could be applicable to universities and other research institutions regardless of specific disciplines."

There are other strengths of this paper, including conducting item analyses, evaluation of the internal structure with EFA followed by a CFA in a random hold-out sample to confirm the factor structure. The factor analytic methods were appropriate and fit the theoretical conception of the construct, including use of principal axis factoring, direct oblimin rotation, which allows for correlations among the rotated factors, and the use of Velicer's MAP and parallel analysis to inform the decision on the number of factors to retain. With that said, there are also some areas that should be addressed to improve the paper and the contribution of the study.

I appreciate the fact that the authors conducted focus groups as one of the methods for identifying the important domains of the construct. It would probably be useful if the authors provided a bit more detail about how the information from the focus groups was analyzed, and what dimensions they identified, independent of the dimensions that the identified from the literature review.

Response:
We accepted your suggestion. We added these statements on page 7: "The independent reviewers who rated the suitability of the items consisted of 1 professor in psychology who had expertise in career development and test development and 3 doctoral-level psychology academics who had expertise in test development. They independently reviewed the discussions and determined the core ideas, and the team met to synthesise the results. The team identified five salient aspects: of beneficial social relationships, positive reinforcement, support, encouragement, and role modelling."

The conduct of the item analyses, including evaluation of item response distributions, item-total correlations, and inter-item correlations was appropriate, and an often over-looked step in the process of test development. Although the authors indicated that none of the items were eliminated based upon the item analyses, it would still be useful information to present the results of the item analyses in a table, including mean, standard deviation, skewness, kurtosis, and item-total correlation of each item, as well as the mean item-total correlation, if not for the original set of items, at least for the final set of items after eliminating items due to factor loading issues.

Responses:
We accepted your suggestion and added this table:

Table 2
Results of the item analyses

Item	Skewness	Kurtosis	Mean	SD	Item-total correlation
1.	-1.18	2.00	4.57	.93	.62
2.	-1.20	2.43	4.61	.97	.64
3.	-1.05	1.48	4.56	.97	.51
4.	-.73	1.17	4.61	.83	.63
5.	-.97	1.16	4.66	.97	.62
6.	-.90	.14	4.2	1.35	.63
7.	-.81	.10	4.05	1.36	.55
8.	-1.17	.63	4.28	1.32	.56
9.	-.99	.29	4.21	1.34	.52
10.	-.55	-.43	3.88	1.34	.65
11.	-.69	.93	4.96	.78	.41
12.	-.80	1.17	5.15	.73	.37
13.	-.78	.38	4.96	.92	.39
14.	-.68	.70	4.90	.83	.50
15.	-.58	.79	4.87	.76	.39
16.	-1.08	1.32	4.52	1.03	.73
17.	-.83	1.10	4.44	1.02	.72
18.	-1.08	1.38	4.67	1.08	.65
19.	-.81	.71	4.41	1.03	.69
20.	-1.08	1.14	4.53	1.08	.74
21.	-.34	.03	4.08	1.02	.41
22.	-.35	-.46	4.20	1.20	.33
23.	-.55	.15	4.35	1.06	.56
24.	-.61	.22	4.52	1.01	.58
25.	-.69	.91	4.66	.92	.51

For the EFA, the authors indicate that both the minimum average partial (MAP) and parallel analysis procedures indicated 5 factors, but they do not present the results of the analysis. It is good practice to provide the numbers generated from these procedures that lead to the conclusion. So, for the parallel analysis, the first actual and random eigenvalues can be presented.

Responses:
We added this statement on page 11: "The first eigenvalues are: 14.93, 5.20, 2.38, 1.83, and 1.61."

Regarding the CFA, the procedures were reasonable, and the fit statistics were appropriate. The computation of Omega's was also useful. My one suggestion here would be to present a table or figure showing the loadings of the bifactor model, which was determined to be the best fitting model.

Response:
We added these statements on page 14: "Item loadings for factor 1 ranged from .28 to .62, factor 2 from .80 to .89, factor 3 from .30 to .80, factor 4 from .53 to .80, factor 5 from .32 to .55. Item loading for perceived research environment ranged from .35 to 77."

The validity analyses were fairly limited in scope, but the measures used were reasonable and the correlations found were supportive of construct validity.

The Discussion section was a bit lacking in content. Given that construct validation requires a multitude of evidence from different methods and perspectives, what is especially needed in

the discussion section is suggestions for further developments, such as other constructs, measures, and criterion variables would be useful to further establish the nomological network and construct validity of scores from this measure. I found the statement that the measure would be useful for "early stages of career counseling" to be perplexing. Perhaps I am missing something, but it seems this measure would only be applicable to someone who is already working in an institution with some kind of research focus. Otherwise, what "research environment" are they reporting on. In addition, it is premature to recommend a measure for applied use after one development study.

Response:
We accepted your suggestions and revised our statements on page 17:

"Practitioners can use the scale as a diagnostic tool at an early stage of individual's career stage as academics, as well as an evaluation instrument in the next career stages."

And also added these statements on page 17:

"Finally, further developments, such as testing the relationships with other constructs, measures, and criterion variables would be useful to establish the nomological network and construct validity of scores from this measure."

***

Journal of Psychoeducational Assessment

Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics

Journal:	*Journal of Psychoeducational Assessment*
Manuscript ID	JPA-18-0139.R1
Manuscript	Regular Article
Keywords:	perceived research environment, scale development, academics, university, higher education
Abstract:	There is a growing interest in the perceived research environment for higher education academics. As there is no existing, psychometrically sound scale that directly measures perceived research environment for higher education academics, we designed and validated the Perceived Research Environment Scale for use with this population. In Phase 1, items were developed based on a review of literature, six focus groups, and expert judgment. In Phase 2, the items were then administered to a sample of Indonesian academics (N = 306, M age = 42.29 years). Item analysis and exploratory factor analysis were used to reduce the number of items and determine the factor structure. In Phase 3, confirmatory factor analyses were used on a hold-out sample (N = 292, M age = 43.39) to confirm this structure. In Phase 4, we provided evidence for construct validity. The practical uses of this newly developed

1

Development and Initial Validation of Perceived Research Environment Scale

for Higher Education Academics

Introduction

Education, research, and services are the three key functions characterizing the academic profession in modern-day, higher education systems (Eam, 2015), although academic research and publications have been increasingly emphasised at most universities around the world, as involvement in research-related activities is recognised as an effective means to upgrade a university's profile (Nguyen, Klopper, & Smith, 2016). Previous studies have demonstrated that engagement in research potentially improves teaching quality and enhances knowledge and competence, and this contributes to high quality research supervision, which is critical for developing graduate students as independent researchers (Lindsay, Breen, & Jenkins, 2002).

Reflecting this, there has been a continuing trend for universities in developed countries to increase their focus on research, and this tendency has spread to developing countries, where research is increasingly viewed as a high priority (Nguyen et al., 2016). Consequently, research has become an important function for academics everywhere, as research productivity is now a primary consideration in several important organisational decisions, such as hiring, maintenance of tenure, promotions, and salary increases for academics (Chen, Gupta, & Hoshower, 2006). As academics are required to publish their research results nationally and internationally in high quality, peer-refereed journals (Nguyen et al., 2016), researchers have been interested in identifying the predictors of research involvement and performance in academics (e.g., Whelan & Markless, 2013).

This research has shown that, among the factors that influence research productivity, environmental factors are some of the most powerful ones (Bland & Ruffin, 1992), which has led researchers to identify the elements that characterise a good research environment

26

PERCEIVED RESEARCH ENVIRONMENT SCALE

Table 4

Summary Data for Sample B (N = 292; correlations above diagonal)

	Indonesian											
Scale	*M*	*SD*	Range	α	1	2	3	4	5	6	7	8
1. Full scale	112.00	16.65	28-145	.93	-	.81***	.65***	.63***	.80***	.64***	.47***	.49***
2. Subscale 1 (beneficial social relationship)	22.87	4.29	5-30	.90		-	.40***	.48***	.52***	.54***	.30***	.35***
3. Subscale 2 (positive reinforcement)	20.36	6.22	5-30	.94			-	.12*	.49***	.10*	.14*	.24**
4. Subscale 3 (support and expectations)	24.44	3.70	6-30	.87				-	.38***	.49***	.38***	.32***
5. Subscale 4 (focus on research)	22.53	4.80	5-30	.91					-	.39***	.54***	.58***
6. Subscale 5 (positive role models)	21.79	4.59	5-30	.89						-	.35***	.27**
7. Organisational culture/ support for research	67.24	15.40	24-144	.93							-	.54***
8. Research involvement	100.82	21.12	18-108	.97								-

Note. * *p* < .05; ** *p* < .01; *** *p* < .001

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46

4.Bukti Konfirmasi Review dan Hasil Review Kedua (29 Des 2018)

![Gmail logo]

Journal of Psychoeducational Assessment - Decision on Manuscript ID JPA-18-0139.R1

Journal of Psychoeducational Assessment   Sat, Dec 29, 2018 at 12:51 AM
<onbehalfof@manuscriptcentral.com> Reply-To: tobin@temple.edu
To:
Cc: dsaklofs@uwo.ca

28-Dec-2018

Dear Dr. :

Thank you for submitting a revision of the Manuscript ID JPA-18-0139.R1 entitled "Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics" to Journal of Psychoeducational Assessment (JPA). I have now received a review from one of the experts in the field who reviewed your initial submission and has examined your revised manuscript and cover letter. This review is included below for your reference. I have also carefully read the manuscript and your cover letter in response to reviewers' comments.

After reviewing these materials, the reviewer and I noted significant improvement over the last version. As you will see in the review, the reviewer identifies several minor issues. Rather than restating the reviewers' comments here, I will simply ask that you carefully read these comments and adjust the manuscript to address them. Once you do so, I would be pleased to recommend to the Editor, Don Saklofske, that the manuscript be published in JPA.

To revise your manuscript, log into https://mc.manuscriptcentral.com/jopa and enter your Author Center, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

You may also click the below link to start the revision process (or continue the process if you have already started your revision) for your manuscript. If you use the below link you will not be required to login to ScholarOne Manuscripts.

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You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer.

Once the revised manuscript is prepared, you can upload it and submit it through your Author Center.

When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to Journal of Psychoeducational Assessment, your revised manuscript should be submitted within 30 days from receipt of this letter. If it is not possible for you to submit your revision in this amount of time, please advise the Associate Editor before the 30 day period as the link to you article will expire and you will not be able to re-submit your paper without making a specific request.

Once again, thank you for submitting your manuscript to Journal of Psychoeducational Assessment and I look forward to receiving your revision.

Sincerely,
Dr. Renée Tobin

Associate Editor, Journal of Psychoeducational
Assessment tobin@temple.edu

Don Saklofske
Editor

Reviewer(s)' Comments to

Author: Reviewer: 1

Comments to the Author
Thank you for the opportunity to review this revised manuscript (JPA-18-0139.R1). Overall, I appreciate the authors' responsiveness to reviewer feedback and believe their edits have much improved the manuscript. I hope the authors will find the following comments helpful as they continue to revise their manuscript.

1.   I greatly appreciated the authors' expansion of their theoretical rationale in the introduction. However, I would recommend removing the paragraph on the social cognitive perspective (p. 3-4). The study is already situated in the work of Bronfenbrenner (1979) and Vondracek et al. (1986), and applying too many theoretical perspectives makes it hard to distill the study's rationale. Moreover, the social cognitive perspective's emphasis on self-efficacy and other specific individual variables seems less relevant to this study, given that the PRE is intended to measure characteristics of the research environment (and not of the individual academic).
2.   In their response to reviewers, the authors noted that all academics in this setting had research components to their roles. I would recommend stating this in the manuscript.
3.   I appreciated your analysis of potential differences in institutional affiliation between Samples A and B. I also appreciated your reporting internal consistency values in Sample B.
4.   On page 16, the authors state that practitioners can use the PRE as a diagnostic tool for individuals. I am unclear as to why and how this would be useful. Many academics have little control over their research environments. It seems to me that this scale would be much more useful for conducting systems-level needs assessments and planning for departmental/organizational change. I would emphasize these potential applications (rather than emphasizing potential applications for individual academics).
5.   Minor comments
a.   While the manuscript is generally well-written, its first two sentences are "run-on" sentences. I would recommend revising them.
b.   On page 6 (line 43), the sentence beginning with "it is obvious that" could be revised as follows: "To the authors' knowledge, a perceived research environment scale suitable for academics has yet to be published in the peer- reviewed literature."
c.   When referring to internal consistency values, please write "Cronbach's alpha" rather than just "alpha."
d.   On page 4 (line 52), the phrase "or at hobbies" should read "or engaged in hobbies."
e.   In describing the OCSR and the RI measures (p. 10), please use complete sentences (e.g., "A sample item from this measure is…")

5.Bukti Konfirmasi Submit Revisi Kedua,
Respon kepada Reviewer,
dan Artikel yang Diresubmit
(2 Jan 2019)

M Gmail

Journal of Psychoeducational Assessment - Manuscript ID JPA-18-0139.R2

Journal of Psychoeducational Assessment <onbehalfof@manuscriptcentral.com>   Wed, Jan 2, 2019 at 3:24 PM
Reply-To: JPA@sagepub.com
To:

02-Jan-2019

Dear Dr. :

Your manuscript entitled "Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics" has been successfully submitted online and is presently being given full consideration for publication in Journal of Psychoeducational Assessment.

Your manuscript ID is JPA-18-0139.R2.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at https://mc.manuscriptcentral.com/jopa and edit your user information as appropriate.

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Thank you for submitting your manuscript to Journal of Psychoeducational

Assessment. Sincerely,
Journal of Psychoeducational Assessment Editorial Office

MANUSCRIPT ID: JPA – 18 – 0139. R1

Reviewer: 1

Comments to the Author
Thank you for the opportunity to review this revised manuscript (JPA-18-0139.R1). Overall, I appreciate the authors' responsiveness to reviewer feedback and believe their edits have much improved the manuscript. I hope the authors will find the following comments helpful as they continue to revise their manuscript.

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Response:
We accepted your suggestion. We removed the paragraph on the social cognitive perspective (p. 3-4)

2.   In their response to reviewers, the authors noted that all academics in this setting had research components to their roles. I would recommend stating this in the manuscript.

Response:
We accepted your suggestion. We stated it in the Participants section on page 9.

3.   I appreciated your analysis of potential differences in institutional affiliation between Samples A and B. I also appreciated your reporting internal consistency values in Sample B.

Response:
Thank you for your previous suggestion.

4.   On page 16, the authors state that practitioners can use the PRE as a diagnostic tool for individuals. I am unclear as to why and how this would be useful. Many academics have little control over their research environments. It seems to me that this scale would be much more useful for conducting systems-level needs assessments and planning for departmental/organizational change. I would emphasize these potential applications (rather than emphasizing potential applications for individual academics).

<u>***Response:***</u>
We accepted your suggestion. On page 16, we revised our statement: "Practitioners can use the scale for conducting systems-level needs assessments and planning for departmental/organisational change."

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<u>***Response:***</u>
We accepted your suggestions.

a.   *We revised the first two sentences: "Education, research, and services are the three key functions characterising the academic profession in modern-day, higher education systems (Eam, 2015). However, academic research and publications have been increasingly emphasised at most universities around the world, as involvement in research-related activities is recognised as an effective means to upgrade a university's profile (Nguyen, Klopper, & Smith, 2016)."*

b.   *We revised the sentence on page 6 (line 43): "To the authors' knowledge, a perceived research environment scale suitable for academics has yet to be published in the peer-reviewed literature."*

c.   *We revised "alpha" to "Cronbach's alpha" when referring to internal consistency values on page 10, 12, and 13.*

d.   *On page 4 (line 52), we revised "or at hobbies" to "or engaged in hobbies."*

e.   *In describing the OCSR and the RI measures on page 10, we revised our previous sentences to complete sentences: "A sample item from this measure is…"*

***

Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics

Abstract:	There is a growing interest in the perceived research environment for higher education academics. As there is no existing, psychometrically sound scale that directly measures perceived research environment for higher education academics, we designed and validated the Perceived Research Environment Scale for use with this population. In Phase 1, items were developed based on a review of literature, six focus groups, and expert judgment. In Phase 2, the items were then administered to a sample of Indonesian academics (N = 306, M age = 42.29 years). Item analysis and exploratory factor analysis were used to reduce the number of items and determine the factor structure. In Phase 3, confirmatory factor analyses were used on a hold-out sample (N = 292, M age = 43.39) to confirm this structure. In Phase 4, we provided evidence for construct validity. The practical uses of this newly-developed

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Development and Initial Validation of Perceived Research Environment Scale

for Higher Education Academics

Introduction

Education, research, and service are the three key functions characterising the academic profession in modern-day, higher education systems (Eam, 2015). However, academic research and publications have been increasingly emphasised at most universities around the world, as involvement in research-related activities is recognised as an effective means to upgrade a university's profile (Nguyen, Klopper, & Smith, 2016). Previous studies have demonstrated that engagement in research potentially improves teaching quality and enhances knowledge and competence, and this contributes to high quality research supervision, which is critical for developing graduate students as independent researchers (Lindsay, Breen, & Jenkins, 2002).

Reflecting this, there has been a continuing trend for universities in developed countries to increase their focus on research, and this tendency has spread to developing countries, where research is increasingly viewed as a high priority (Nguyen et al., 2016). Consequently, research has become an important function for academics everywhere, as research productivity is now a primary consideration in several important organisational decisions, such as hiring, maintenance of tenure, promotions, and salary increases for academics (Chen, Gupta, & Hoshower, 2006). As academics are required to publish their research results nationally and internationally in high quality, peer-refereed journals (Nguyen et al., 2016), researchers and administrators have been interested in identifying the predictors of research involvement and performance in academics (e.g., Whelan & Markless, 2013).

This research has shown that, among the factors that influence research productivity, environmental factors are some of the most powerful ones (Bland & Ruffin, 1992), which has led researchers to identify the elements that characterise a good research environment

26

PERCEIVED RESEARCH ENVIRONMENT SCALE

Table 4

Summary Data for Sample B (N = 292; correlations above diagonal)

	Indonesian											
Scale	*M*	*SD*	Range	α	1	2	3	4	5	6	7	8
1. Full scale	112.00	16.65	28-145	.93	-	.81***	.65***	.63***	.80***	.64***	.47***	.49***
2. Subscale 1 (beneficial social relationship)	22.87	4.29	5-30	.90		-	.40***	.48***	.52***	.54***	.30***	.35***
3. Subscale 2 (positive reinforcement)	20.36	6.22	5-30	.94			-	.12*	.49***	.10*	.14*	.24**
4. Subscale 3 (support and expectations)	24.44	3.70	6-30	.87				-	.38***	.49***	.38***	.32***
5. Subscale 4 (focus on research)	22.53	4.80	5-30	.91					-	.39***	.54***	.58***
6. Subscale 5 (positive role models)	21.79	4.59	5-30	.89						-	.35***	.27**
7. Organisational culture/ support for research	67.24	15.40	24-144	.93							-	.54***
8. Research involvement	100.82	21.12	18-108	.97								-

Note. * *p* < .05; ** *p* < .01; *** *p* < .001

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Dear Dr. :

I have now carefully read the revised manuscript and your cover letter in response to reviewer comments. After reviewing these materials, I noted that you addressed all issues raised in the last round of reviews. Thus, it is a pleasure to accept your manuscript entitled "Development and Initial Validation of Perceived Research Environment Scale for Higher Education Academics" in its current form for publication in Journal of Psychoeducational Assessment.

Thank you for your fine contribution. On behalf of the Editors of Journal of Psychoeducational Assessment, we look forward to your continued contributions to the Journal.

Sincerely,
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