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Construction and standardisation of an instrument measuring lecturers' persistence to publish in Scopus-indexed journals

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Abstract

Academic publishing is a critical aspect of research, contributing to knowledge dissemination and career advancement. However, there is a paucity of standardised instruments for assessing academics' persistence in publishing. This study developed and validated the Persistence to Publish Questionnaire (PPQ) as a valid and reliable tool for evaluating academics' persistence to publishing in Scopus-indexed journals. The PPQ was developed through a rigorous process, including item generation, content validity assessment, pretesting, and pilot testing of items. A sample of academics (n = 262) from various disciplines across two public universities in Cross River State participated in the validation process. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to determine the instrument's factor structure and evaluate its fit. The results from the analysis revealed that the PPQ is a multidimensional instrument with five underlying factors – persistence in manuscript preparation, manuscript submission, handling revisions, dealing with rejections, and publication delays. The PPQ exhibited strong reliability in terms of internal consistency, with Cronbach's α values ranging from .89 to .99. McDonald's ω and split-half reliability corrected with the Spearman-Brown prophecy formula (rtt) results further supported its reliability. Construct validity evidence showed both convergent and discriminant validity, confirming that the PPQ effectively measures persistence to publish. The PPQ represents a valuable contribution to the field of academic publishing. It offers an opportunity for researchers and institutions to assess the degree to which academics are willing to publish, empowering researchers and institutions to identify areas of improvement and provide targeted support. This tool holds promise for enhancing research productivity and quality within the global academic community.

Introduction

The concept of persistence to publish is relatively new and has not been extensively defined in the literature. However, to understand the phrase "persistence to publish", it is important to get an overview of the word "persistence." Persistence is the quality of consistently maintaining one's determination and motivation to achieve goals, refusing to give up even in the face of potential challenges or obstacles (Quintana et al., 2022). It involves a resolute commitment to continue striving towards desired outcomes and a willingness to overcome difficulties that may arise along the way. In a more recent definition, Styk et al. (2023) conceive persistence as the capacity to embrace and persevere in the face of challenges and overcome obstacles to attain predetermined or self-established objectives.

Various related concepts, such as perseverance, grit, and tenacity, underscore individuals' unwavering commitment to achieving their goals (Duckworth et al., 2007; Williams & DeSteno, 2008). These concepts highlight the depth of individuals' engagement in pursuing their objectives, with some considering it an inherent aspect of their character (Constantin et al., 2011). The cited authors argued that persistence should be distinguished based on whether the goal is short-term or long-term, as this distinction can impact the level of effort required. When pursuing short-term goals, individuals must focus on sustaining their attention, enduring boredom, stress, and setbacks, as well as overcoming distractions or obstacles that may arise. In contrast, pursuing long-term goals demands a sustained commitment, necessitating significant resources and an extended investment of time.

The concept of persistence has been the subject of numerous studies, leading to various conceptualisations and associated terms, such as goal pursuit, commitment, self-control, courage, drive, diligence, and conscientiousness (Khindri & Rangnekar, 2022; Styk & Klinkosz, 2020; White et al., 2017). In the past, one common method used to assess adult persistence involved placing individuals in challenging situations requiring endurance (Lufi & Cohen, 1987). This was achieved through physical endurance tests (Cleeton & Knight, 1924) or by assigning them lengthy and almost unsolvable intellectual tasks (Morgan & Hall, 1926). Another approach, widely employed in educational settings, involved observing individuals in real-life situations requiring persistence and comparing dropouts to graduates in specific activities such as schools or educational programs (Wood, 1968).

Furthermore, questionnaires have been utilised as a method of measuring persistence. For instance, Wang (1932) developed a self-appraisal schedule, a 111-item questionnaire to assess persistence. Mukherjee (1974) created the Persistent Disposition Questionnaire, which he claimed could be valuable in studying achievement-oriented personality. Lufi (1979) devised a 67-item scale to evaluate persistence in the academic domain. However, these scales have not gained significant popularity, potentially due to inadequate validation. The lack of existing instruments urged Hart (2014) to develop and validate an instrument with acceptable psychometric properties that could measure persistence among higher education students. Since then, a few instruments have been developed to measure persistence in different populations (see examples in De Luca et al., 2016; Porter et al., 2020; Thalib et al., 2019).

Similarly, Kozlowski and Fouad (2022) developed a scale to measure academic persistence among college students following psychometric procedures. Additionally, Lockhart et al. (2022) constructed and established the validity and reliability of a questionnaire to measure persistence among students in Science, Technology, Engineering and Mathematics (STEM) programmes. In the same year, Quintana et al. (2022) validated the Spanish version of the "motivational persistence scale"; a scale previously developed in English by Constantin et al. (2011). Although these scales were all developed to measure persistence across different populations and contexts, none was developed to measure the concept of "persistence to publish", and none of the existing scales was developed in Africa. For these reasons, there was a need for a scale to be developed to address the gaps. Thus, the "Persistence to Publish Questionnaire (PPQ)" was developed in this study. A detailed description of the PPQ is provided in subsequent sections of this article.

Measuring lecturers' persistence to publish in Scopus-indexed journals holds significant pertinence, warranting the creation of an instrument designed to assess and evaluate this critical aspect of academic scholarship. Firstly, publishing research in Scopus-indexed journals signifies the quality and impact of an academic institution's research output. It serves as a visible marker of academic prestige, which is instrumental in attracting top talent and fostering valuable research collaborations. Secondly, Scopus-indexed journals have a vast international readership and are recognised worldwide. Thus, measuring lecturers' persistence to publish in these journals ensures that their research findings reach a broad global audience, facilitating the dissemination of knowledge on a global scale.

Furthermore, funding agencies and institutions often consider lecturers' publication records when allocating research grants and resources. Measuring this persistence improves the likelihood of securing research funding, which is essential for advancing meaningful research projects and supporting academic programmes. Additionally, a strong publication record is frequently a prerequisite for academic progression through promotions. By measuring persistence in publishing, lecturers can effectively demonstrate their commitment to scholarly contributions, which are central to career development. Moreover, measuring lecturers' persistence to publish serves as a quality assurance mechanism for universities and institutions. It ensures that faculty members consistently uphold a high standard of research and scholarship, reinforcing the institution's commitment to research excellence.

With the concept of persistence clarified; it is important to attempt to define and conceptualise "persistence to publish" by deriving ideas from the meaning of persistence. "Persistence to publish" can be defined as the sustained and determined effort of an academic staff or researcher to pursue the publication of their scholarly work consistently. It involves the commitment and dedication to overcome

challenges, setbacks, and obstacles throughout the publication process. Persistence to publish reflects the continuous drive to contribute to the body of knowledge in a specific field or discipline by submitting research reports or scholarly articles to reputable journals or publishing outlets. This concept encompasses the resilience, perseverance, and tenacity required to navigate the rigorous and competitive publishing landscape, including manuscript preparation, submission, peer review, revisions, delays, rejections or eventual acceptance and dissemination of the research. To persist in the publication process, strong motivation and belief are required in the process of sharing research findings with the broader academic community and society at large. Researchers may encounter multiple rejections from journals or face challenges during peer review. However, individuals who possess the persistence to publish remain undeterred by these obstacles and view them as opportunities for improvement and growth.

Styk et al. (2023) considered persistence to be a multidimensional construct and developed a scale to measure persistence, with perseverance and perfectionism as sub-dimensions. Similarly, other researchers have also approached persistence as a multidimensional construct. For instance, one dimension of persistence can be understood as the ability to persevere despite challenges, another as the ability to persist in the face of fear, and yet another as the capacity to maintain persistence despite inadequate circumstances (Howard & Crayne, 2019). Thus, in this study, persistence to publish is viewed as a multidimensional concept that encapsulates the determination, passion, resilience, commitment to quality, and effective time management required to successfully navigate the process of sharing research findings with the wider academic community. Furthermore, due to the series of activities and potential setbacks researchers face in the publication process, persistence is required at every stage, further contributing to the multidimensionality of the concept. For instance, researchers must demonstrate persistence from initial idea and conceptualisation of their research project to the final publication and dissemination of the research outcome. At the outset, persistence is needed to formulate a research question, design a study, and obtain ethical approvals and funding. Researchers must overcome challenges in recruiting participants, collecting data, and ensuring the quality and validity of their research results,

Persistence is crucial in crafting an adequately developed and coherent manuscript during the writing phase. Researchers must invest time and effort in conducting thorough literature reviews, analysing and interpreting data, and effectively communicating their findings. This process may involve numerous revisions, addressing feedback from co-authors, mentors, and reviewers. The peer review process often presents additional hurdles that require persistence. Researchers may face rejection or receive critical feedback on their work. Persistence is essential in responding to reviewer comments, revising the manuscript, and resubmitting it for further consideration. It may take multiple rounds of revision and re-submission before achieving publication. Persistence is necessary to deal with potential delays, waiting periods, and uncertainties inherent in the publication process. Researchers may experience extended review timelines, unexpected editorial decisions, or changes in journal requirements. In line with this thinking, the conceptual model in Figure 1 was developed to show these processes with persistence at the centre of the activities.

Figure 1 shows that persistence to publish can be demonstrated across five crucial activities, including: manuscript preparation, submission, handling revisions, dealing with rejections and publication delays. In each of these activities, there are specific challenges that academic staff will face; requiring only persistence to overcome them. These challenges are presented as a bulleted list in the bigger boxes in the model. As shown in the conceptual model, the challenges vary with each activity. Single-headed arrows are used in the model to show the next activity/challenge that an academic staff will face after completing the previous activity. On the other hand, double-headed arrows show two-way activities, implying that fulfilling one and moving to the next activity could return you to the previous activity.

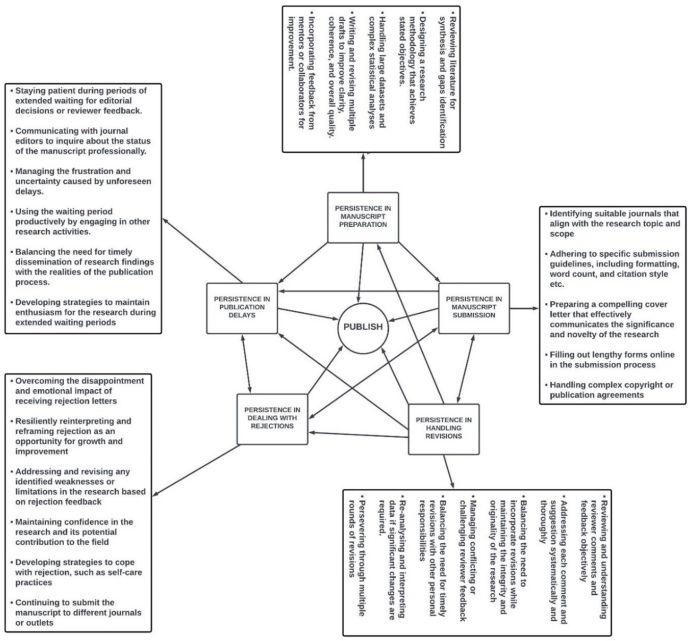


Figure 1: Conceptual model of academic staff persistence to publish.

Purpose of the study

The main purpose of this study was to develop and validate the Persistence to Publish Questionnaire (PPQ). The specific objectives of this study are to:

1. Explore the factor structure of the PPQ through exploratory factor analysis (EFA).
2. Validate the factor structure using confirmatory factor analysis (CFA).
3. Assess the internal consistency of the PPQ items through reliability analysis.
4. Test the content, criterion, and construct validity of the PPQ.
5. Establish scoring procedures and guidelines for interpreting PPQ scores

Methods

Research design

The study adopted the cross-sectional survey research design. The choice of a cross-sectional survey design is justified as it efficiently captures data at a single point in time, aligning with the study's goal of developing and validating the Persistence to Publish Questionnaire (PPQ). This approach allows for the collection of diverse responses, assessment of psychometric properties, and immediate application of the PPQ. The validity process of this study will follow the framework provided in Figure 2.

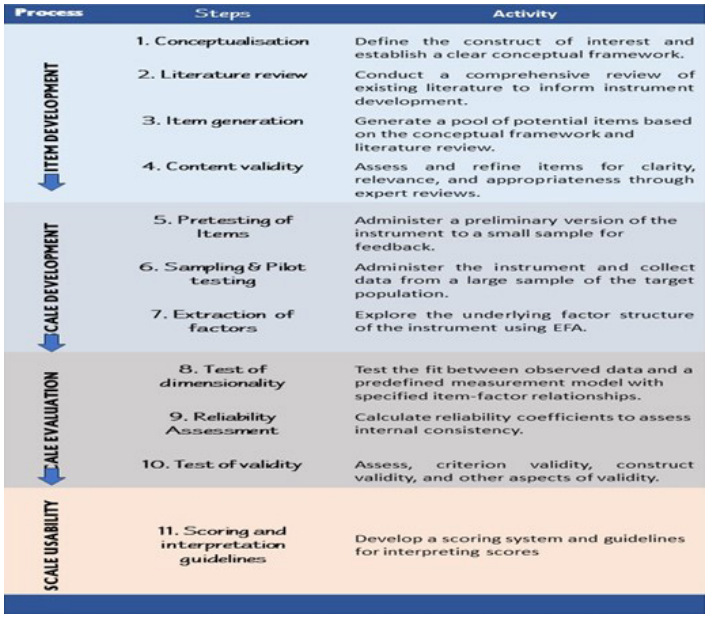


Figure 2: Framework showing the validity process of this study.

Purpose of the instrument and conceptualisation

The PPQ was developed to measure lecturers' persistence to publish in Scopus-indexed journals. The concept of persistence to publish is defined as the unwavering commitment and sustained effort of academic staff to consistently pursue the publication of their scholarly work, overcoming challenges and obstacles throughout the process. The researchers considered developing the instrument due to the lack of a previously developed instrument measuring the construct globally and in the study context.

Item generation

Some of the items included in the PPQ were adapted and modified from the "Self-Appraisal Schedule" (Wang, 1932), "Persistent Disposition Questionnaire" (Mukherjee, 1974), and Persistence in the Academic Domain Questionnaire (Lufi, 1979). However, most of the items in the PPQ were based on the researchers' experiences with the publication processes and dynamics in Scopus-indexed journals. The initial version of the PPQ comprised 40 items arranged on a six-point Likert-type scale format, with response options such as "Very Strongly Disagree," "Strongly Disagree," "Disagree," "Agree," "Strongly Agree," and "Very Strongly Agree."

Content validity

The Persistence to Publish Questionnaire (PPQ) underwent face and content validity assessment by nine independent experts, with feedback received from seven of them. These experts, primarily in Research, Measurement and Evaluation, and Educational Psychology, had extensive academic and research backgrounds. Most were aged 50 to 59, with two aged 60 or older, and one below 40. They held doctorate degrees and had over a decade of teaching and research experience. The assessment involved rating each questionnaire item for relevance, clarity, simplicity, and lack of ambiguity on a four-point scale. Higher ratings (three and four) indicated items were relevant and clear in measuring the construct, while lower ratings (one and two) suggested irrelevance or ambiguity. Their independent ratings were collated and scored, following the quantitative approach to content validity suggested by some scholars (Hadi et al., 2020; Lawshe, 1975; Zamanzadeh et al., 2014). In deciding which items should be retained, revised or deleted, the average proportion of experts' agreement was computed to determine the Item Content Validity Index (I-CVI) and Scale Content Validity Index (S-CVI), as shown in Table 1.

The results in Table 1 suggest that the I-CVIs for most variables across relevance, clarity, simplicity and ambiguity were acceptable. However, the researchers examined the I-CVIs of individual items to identify those with values lower than 0.70. Items, such as: MPR1, MPR2, MPR3, MPR4, MPR5, MSU4, MSU5, and MSU8 had an I-CV value of 0.67, respectively for clarity. Again, items, such as: MPR1, MPR2, MPR6, MSU1 and HRE1 had an I-CVI value of 0.67 for simplicity, respectively. Furthermore, items, such as: MSU1 and MSU5 had an I-CVI value of .67, respectively for ambiguity. All the items listed above were revised for improved relevance, clarity, simplicity and unambiguity, where applicable, following the experts' suggestions.

Table 1: Item- and Scale-content validity indices for persistence to publish variables.

	Basis	Manuscript preparation	Manuscript submission	Handling revisions	Dealing with rejections	Publication delays
I-CVIs	Relevance	.83 (all items)	.83 – .99	.99 (all items)	.99 (all items)	.83 – .99
	Clarity	.67 – .83	.67 – .83	.99 (all items)	99 (all items)	.83 – .99
	Simplicity	.67 – .83	.67 – .99	.67 – .99	.99 (all items)	.83 – .99
	Ambiguity	.83 (all items)	.67 – .99	.67 – .99	.83 – .99	.83 – .99
S-CVIs	Relevance	.83	.85	.99	.99	.98
	Clarity	.73	.79	.99	.99	.98
	Simplicity	.77	.83	.96	.99	.98
	Ambiguity	.83	.81	.85	.90	.92

Note: I-CVIs of .70 or above suggest that the item has an acceptable rating (with 70% or more of the experts' agreement). Values between 0.50 to .69 suggest that the items need revisions; values below .50 indicate that less than 50% of experts agree, suggesting that such items should be discarded.

Pretesting the questions

A focus group session was conducted with 10 university lecturers, six from the University of Calabar and four from the University of Cross River State, all of whom had previously published in Scopus-indexed journals. The session aimed to gather qualitative input on a survey. Participants were given physical copies of the survey to review and discuss, providing feedback on item relevance, clarity, and comprehensibility. The session, lasting about an hour, was audio-recorded for transcription. Analysis of lecturer opinions and suggestions led to survey revisions, including refining item wording and addressing ambiguity. These insights, from lecturers not involved in the main study or expert validation, improved the survey's content validity and relevance.

Sampling and pilot testing

Before conducting the pilot study, careful consideration was given to the sample size required to ensure the reliability of results, particularly in the context of structural equation modelling (SEM) techniques like confirmatory factor analysis (CFA). SEM generally demands large sample sizes for robust results (Boateng et al., 2018; Hadi et al., 2020; Owan et al., 2022b). Determining the exact sample size is complex, relying on factors like model complexity, latent variables, statistical power, and effect size. While there's no universal consensus, several guidelines exist. Some recommend a minimum of 300 respondents (Clark & Watson, 2016; Tabachnick & Fidell, 2013), while others suggest ratios like 20 to 1 (Kline, 2015), 10 to 1 (Schreiber et al., 2006), or 5 to 1 (Bentler & Chou, 1987).

In this context, a sample of 330 lecturers was targeted for the pilot study, all of whom had previously published in Scopus-indexed journals. Ultimately, 285 responses were obtained, with 45 lecturers not participating. Despite the attrition, the sample size was deemed suitable for factor analysis or SEM, considering it was close to the recommended 300. Additionally, Comrey and Lee's scale suggests 300 as a "good" sample size for SEM (Comrey & Lee, 1992).

Results

Demographic characteristics of the respondents

The demographic profile of the 285 respondents in the pilot sample revealed a balanced gender distribution, with 51.6% males and 48.4% females. Regarding age, 26.7% were under 40, 24.2% between 40 and 49, 21.4% between 50 and 59, and 27.7% were 60 or older. In terms of education, 54.4% held master's degrees, while 45.6% were doctorate holders. The rank distribution among participants showed that 18.9% were Assistant Lecturers, 14.7% were Lecturer II, 19.3% were Lecturer I, 13.7% were Senior Lecturers, 20.4% were Associate Professors, and 13.0% were Professors. These demographic details provide a comprehensive overview of the pilot study's participant characteristics.

Exploratory Data Analysis

To evaluate data normality, multiple tests, including histograms, Shapiro-Wilk's, Kolmogorov-Smirnov, and Q-Q plots, were employed. While minor deviations from normality were observed in the histograms, with some items exhibiting bell-like shapes, most Shapiro-Wilk and Kolmogorov tests yielded insignificant results. Efforts to detect outliers included scrutinising the dataset for out-of-range values introduced during data imputation, but none were found. Boxplots were also utilised to identify potential outliers across all items, yielding no outliers. Data were assessed for multivariate outliers using a Mahalanobis Distance Test (Tabachnick & Fidell, 2013), resulting in the identification and removal of 23 such outliers. This process reduced the number of cases from 285 to 262. Descriptive statistics were computed and Table 2 shows that the mean values range from 3.48 to 3.70. These values are all acceptable for a six-point Likert scale instrument. The standard deviations, ranging from 1.61 to 1.80, indicate some variability or dispersion in the responses around the mean. The skewness values range from -0.15 to 0.23, and kurtosis values range from -1.41 to -1.06. These results provided further evidence that the data possess some normal distribution properties.

Table 2: Descriptive atatistics of the items in the PPQ.

Dimensions	Items	M	SD	Skew.	Kurt.
Persistence in Manuscript preparation	MPR1	3.70	1.71	-0.15	-1.25
	MPR2	3.70	1.71	-0.15	-1.25
	MPR3	3.70	1.71	-0.15	-1.25
	MPR4	3.37	1.65	0.14	-1.22
	MPR5	3.70	1.71	-0.15	-1.25
	MPR6	3.70	1.71	-0.15	-1.25
	MPR7	3.51	1.66	-0.04	-1.23
	MPR8	3.70	1.71	-0.15	-1.25
Persistence in Manuscript Submission	MSU1	3.60	1.68	-0.09	-1.26
	MSU2	3.55	1.64	0.01	-1.21
	MSU3	3.48	1.72	0.04	-1.26
	MSU4	3.62	1.79	-0.10	-1.37
	MSU5	3.65	1.71	0.01	-1.32
	MSU6	3.51	1.70	-0.04	-1.25
	MSU7	3.66	1.69	-0.09	-1.28
	MSU8	3.58	1.73	-0.07	-1.30
Persistence in Handling Revisions	HRE1	3.66	1.74	-0.15	-1.25
	HRE2	3.41	1.72	0.05	-1.30
	HRE3	3.56	1.73	-0.05	-1.28
	HRE4	3.58	1.75	-0.15	-1.33
	HRE5	3.53	1.69	-0.04	-1.21
	HRE6	3.57	1.77	-0.10	-1.32
	HRE7	3.58	1.70	-0.08	-1.20
	HRE8	3.55	1.66	-0.09	-1.20
Persistence in Dealing with Rejections	DWR1	3.44	1.66	0.13	-1.19
	DWR2	3.39	1.69	0.09	-1.25
	DWR3	3.29	1.64	0.23	-1.09
	DWR4	3.60	1.69	-0.10	-1.18
	DWR5	3.52	1.69	-0.02	-1.28
	DWR6	3.32	1.61	0.16	-1.06
	DWR7	3.32	1.64	0.18	-1.13
	DWR8	3.47	1.67	0.03	-1.21
Persistence in Publication Delays	PDE1	3.30	1.71	0.23	-1.19
	PDE2	3.35	1.73	0.18	-1.24
	PDE3	3.29	1.72	0.20	-1.21
	PDE4	3.34	1.73	0.16	-1.25
	PDE5	3.37	1.72	0.15	-1.24
	PDE6	3.36	1.72	-0.02	-1.28
	PDE7	3.45	1.80	0.04	-1.41
	PDE8	3.39	1.72	0.14	-1.24

Extraction of factors

Exploratory Factor Analysis (EFA) was performed on the pilot data obtained for the items in PPQ. Principal Axis Factoring (PAF) was the extraction method, with a varimax rotation, used to identify the factorial structure of the scale. The analysis was set to extract factors with Eigenvalues greater than one, while items with loadings below .50 were suppressed. It initially yielded an 11-factor outcome. Sampling accuracy was acceptable (KMO = 0.813), and Bartlett's test yielded a significant value, $\chi 2(780) = 8502.19$, $p < .001$. The 11 factors cumulatively explained 72.93% of the total variance. Nevertheless, examining the rotated factor matrix revealed several problematic and dysfunctional items. For instance, several items did not load unto any factor, such as PDE7, MPR4, DWR8, DWR5, MPR7, HRE8, MSU4, HRE4, DWR4 and MSU5. Thus, they were deleted. Two items (HRE2 and PDE6) were deleted because they did not correlate with other items in the analysis. Furthermore, two items (MSU3 and MSU6) loaded to factor 6. However, a minimum of three items are needed to retain a factor. As a result, the two items were also deleted.

The analysis was re-performed without the problematic items using the same settings. The result extracted five factors with Eigenvalues greater than one. The five factors jointly explained 79.70% of the total variance. The Scree plot in Figure 3 also shows that five factors have Eigenvalues greater than one. Relatively, factors 1, 2, 3, 4, and 5 explained 21.95, 19.73, 16.24, 11.49 and 10.29% of the total variance,

respectively. The rotated factor matrix was examined for naming purposes. The factors were named "persistence in manuscript preparation (factor 1)", "persistence in publication delays" (factor 2), "persistence in handling revisions" (factor 3), "persistence in dealing with rejections" (factor 4) and "persistence in manuscript submission" (factor 5). The KMO value of sampling adequacy was 0.87, while Bartlett's test of sphericity was statistically significant, $\chi2(325) = 8311.95$, $p < .001$. The summarised results can be found in Table 3.

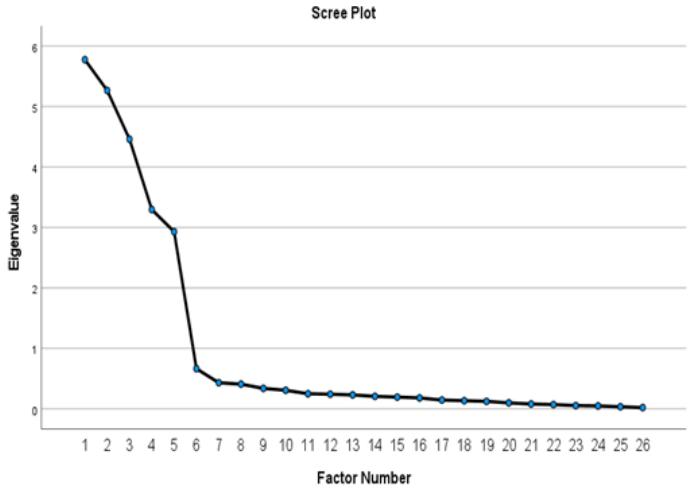


Figure 3: Scree plot showing the factors in the PPQ with their Eigenvalues.

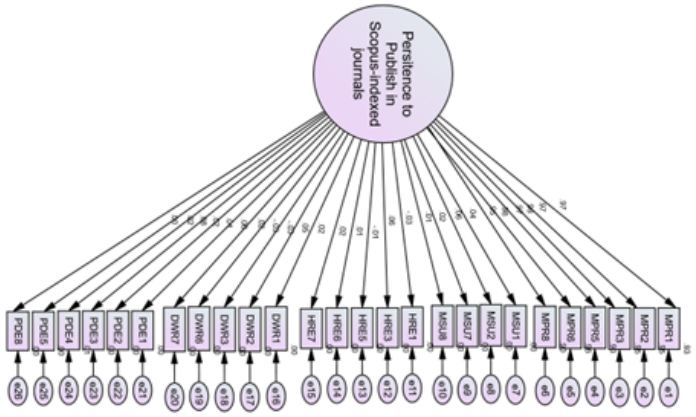
Table 3: Loadings of Exploratory Analysis for the PPQ.

Factors	Item Label	EFA			
		λ	λ^2	ε	z
Persistence in Manuscript Preparation	MPR6	.98	.96	.04	26.06
	MPR3	.98	.95	.05	20.58
	MPR2	.97	.95	.05	18.27
	MPR5	.97	.94	.06	14.90
	MPR1	.97	.93	.07	14.03
	MPR8	.95	.89	.11	9.00
	SUM	5.81	5.62	0.38	102.84
Persistence in Publication Delay	PDE1	.94	.88	.12	7.81
	PDE3	.94	.88	.12	7.68
	PDE5	.93	.87	.13	7.09
	PDE2	.93	.86	.14	6.41
	PDE8	.92	.84	.16	5.91
	PDE4	.90	.81	.19	4.84
	SUM	5.55	5.14	0.86	39.74
Persistence in Handling Revisions	HRE5	.91	.83	.17	5.36
	HRE7	.91	.83	.17	5.23
	HRE3	.89	.79	.21	4.32
	HRE6	.87	.76	.24	3.55
	HRE1	.86	.74	.26	3.35
	SUM	4.44	3.95	1.05	21.82
Persistence in Dealing with Rejections	DWR3	.81	.65	.35	2.31
	DWR1	.80	.64	.36	2.23
	DWR6	.79	.63	.37	2.11
	DWR2	.78	.61	.39	2.03
	DWR7	.77	.60	.40	1.92
	SUM	3.96	3.13	1.87	10.62
Persistence in Manuscript Submission	MSU7	.94	.89	.11	8.67
	MSU2	.90	.81	.19	4.74
	MSU1	.88	.78	.22	3.97
	MSU8	.54	.30	.70	0.77
	SUM	3.27	2.77	1.23	18.15

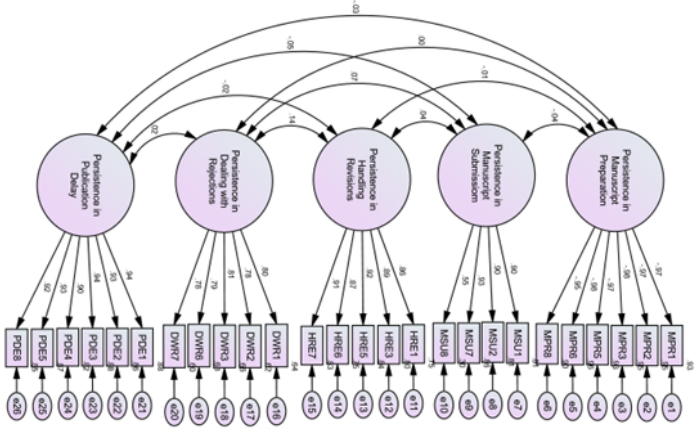
Test of dimensionality

A dimensionality test was performed through Confirmatory Factor Analysis (CFA). This study used four competing CFA models to determine the best-fitting model. These models include: the single-factor model (Model 1), the oblique or correlated factor model (Model 2), the hierarchical or second-order factor model (Model 3) and the Bifactor model (Model 4). Table 4 depicts the single-factor, oblique, second-order factor and bifactor CFA models. Table 5 shows that the single-factor model does not fit the data well. The $\chi2$ value is 5394.10 with 299 degrees of freedom and a significant p-value. The RMSEA value of 0.256 and SRMR value of 0.246 exceeded the recommended benchmark, indicating a poor fit. The CFI value of 0.386 and TLI value of 0.333 fell below the desired criteria, further supporting a poor fit for this model. The oblique model demonstrates a better fit compared to the single-factor model. The $\chi2$ value is 537.23, with 289 degrees of freedom and a significant p-value. The RMSEA and SRMR values of value .057 and .027 met the requirements for acceptability, suggesting a good fit. The CFI value of .970 and TLI value of .966 exceeded the desired thresholds, further supporting the acceptability of this model.

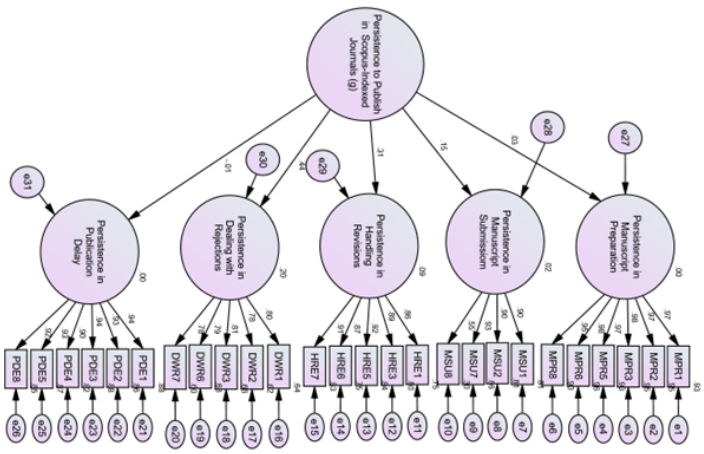
The second-order model shows an even better fit compared to the single factor and oblique models. Although the Chi-square test is significant $\chi2(294) = 538.64$, $p < .05$, the RMSEA and SRMR values of .056 and 0.032 met the requirements for retaining the model. Furthermore, the CFI and TLI values of .971 and .967 exceeded the desired thresholds, further supporting a better fit of this model. Lastly, the bifactor model demonstrates the best fit among the considered models. Even though the Chi-square test is significant, $\chi2(273) = 417.72$, $p < .05$, the RMSEA and SRMR values of .045 and .013 met the recommended benchmark thresholds, indicating the best fit. The CFI value of .983 and TLI value of .979 exceeded the desired thresholds, further supporting the superior fit of this model. The single-factor model had a poor fit, while the oblique, second-order, and bifactor models showed progressively better fit. The bifactor model displayed the best fit among the models considered, with the lowest RMSEA and SRMR values and the highest CFI and TLI values.



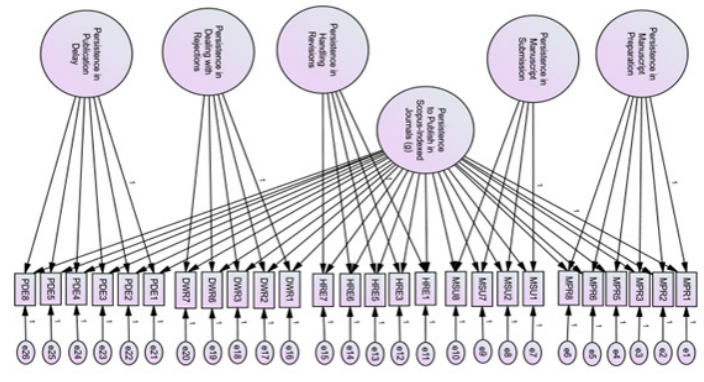
Model 1: Single-factor or unidimensional CFA model.



Model 2: Oblique or correlated factors CFA model.



Model 3: Nested or higher-order CFA model.



Model 4: Bi-factor CFA model.

Table 4: Standardised confirmatory factor analysis loadings for the single, oblique, second-order and bifactor models of the PPQ.

	Single Factor Model	Oblique or Correlated Factor Model					(Schmid-Leiman transformation) Second-order Model						Bi-Factor or Nested Model					
	G	1	2	3	4	5	g	1	2	3	4	5	g	1	2	3	4	5
MPR1	.97	-.97					.03	.97					-.05	.97				
MPR2	.97	-.97					.03	.97					-.06	.97				
MPR3	.98	-.98					.03	.98					-.08	.98				
MPR5	.97	-.97					.03	.97					1.0	1.0				
MPR6	.98	-.98					.03	.98					-.06	.98				
MPR8	.04	-.95					.03	.95					-.04		.94			
MSU1	.06		.90				.13		.90				.04		.90			
MSU2	.02		.90				.13		.90				.02		.90			
MSU7	.01		.93				.14		.93				.01		.93			
MSU8	-.03		.55				.08		.55				-.01		.55			
HRE1	.06			.86			.27			.78			-.01			.86		
HRE3	-.01			.89			.27			.81			-.01			.89		
HRE5	.01			.92			.28			.83			.00			.92		
HRE6	.02			.87			.27			.79			.02			.87		
HRE7	.02			.91			.28			.82			.00			.91		
DWR1	.05				.80		.35				.64		.01				.80	
DWR2	-.03				.79		.36				.63		-.01				.79	
DWR3	-.03				.81		.36				.65		-.02				.81	
DWR6	.02				.79		.36				.64		-.02				.79	
DWR7	.06				.78		.36				.62		-.01				.78	
PDE1	.95					.94	-.01					.92	.01					.94
PDE2	.02					.93	-.01					.91	.02					.93
PDE3	.01					.94	-.01					.92	.02					.94
PDE4	.00					.90	-.01					.89	.02					.90
PDE5	.02					.93	-.01					.91	.01					.93
PDE8	.08					.92	-.01					.90	.02					.92
Latent S[1]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.00	.02	.09	.20	.00	1.0	1.0	1.0	1.0	1.0	1.0
λ (unique)								1.00	1.0	.91	.80	.98						
λ (Second order)								.03	.15	.31	.44	-.01						

Notes: 1 = Manuscript preparation; 2 = Manuscript submission; 3 = Handling revisions; 4 = Dealing with rejections; 5 = Persistence in publication delays.

Table 5: Comparison of the four competing models.

Model	χ^2(df)	RMSEA	SRMR	CFI	TLI
Single factor	5394.10(299), p < .05	.256	.246	.386	.333
Oblique	537.23(289), p < .05	.057	.027	.970	.966
Second-order	538.64(294), p < .05	.056	.032	.971	.967
Bi-factor	417.72(273), p < .05	.045	.013	.983	.979
Recommended Benchmarks	p > .05	< .08	< .08	≥.95	≥.95

Bifactor Model Test

The bifactor model proved the best-fitting model among the four competing CFA models using traditional fit indices, such as RMSEA, Chi-Square, SRMR, TLI, and CFI. However, there has been much criticism of using traditional fit indices to evaluate the bifactor model. Relying solely on traditional goodness-of-fit indices, such as CFI and RMSEA, when evaluating bifactor models using SEM techniques can result in false positives (Sellbom & Tellegen, 2019; Ventura-León et al., 2021). This is because these indices do not adequately consider the influence of the general factor and specific factors on the individual items (Bonifay et al., 2017; Flores-Kanter et al., 2018). Research suggests that traditional goodness-of-fit indices may statistically favour bifactor models (Morgan et al., 2015). This may explain why the model outperformed all other models across the three instruments in the current study. Therefore, it is important to employ alternative methods and indices that explicitly assess the impact of the general and specific factors in bifactor models to evaluate their fit and validity comprehensively. Therefore, some auxiliary measures were used to evaluate the bi-factor model for increased reliability and acceptability.

The Excel package "BifactorIndicesCalculator" developed by Dueber (2017) was used to generate the auxiliary fit indices based on the results of general and specific factors obtained from the AMOS program and earlier reported in Tables 4. These include Omega Coefficients, Explained Common Variance (ECV), Percentage of Uncontaminated Correlations (PUC), Factor Determinacy (FD), Construct Replicability (H), and Average Relative Parameter Bias (ARPB). Omega coefficients assess the internal reliability of multidimensional composites in various forms: Total Omega (ω), Subscale Omega (ωS), Hierarchical Omega (ωH), and Hierarchical Omega for Subscale (ωHS). These coefficients aid in assessing the reliability, dimensionality, and validity of measurement models. Based on these parameters, the bifactor model was re-evaluated, with results in Table 6.

Table 6 shows that the ω for the general factor is .96. At the sub-scale levels, the values of ωS are greater than .70, suggesting high internal consistency across the sub-scales and instruments. For ωH, values of .80 or higher are needed to provide unidimensionality (Rodriguez et al., 2015). An examination of Table 6 shows that unidimensionality was not achieved for the general factor of the instrument. This is because the value of the ωH was .01, well below the required value of ≥ .80. The results provide support that the instrument is multidimensional. However, at the subscale level, all the ωH values are above the .80 threshold, suggesting that the items within each factor (subscale) are measuring, to a large extent, a dominant trait/factor.

A look at the ECV values revealed a value of .048. This value is well below the recommended value of 0.60 or higher needed to justify the unidimensionality of the instrument. Therefore, the instrument can be considered multidimensional based on the ECV grounds at the scale level. IECV values of .85 at the item level will yield a unidimensional model (Stucky & Edelen, 2015). Table 6 shows that the IECV range of values for the PPQ is .00 to .49. Again, these values are well below the .85 threshold. These results provide strong support for

the bifactor model across the three instruments.

In using the PUC criteria, a value less than .80 is needed to validate the results of the ECV. It has been suggested that when the PUC is greater than .80, the ECV is irrelevant (Ventura-León et al., 2021). As shown in Table 6, the PUC value of the instrument is marginally greater than .80, meaning that the ECV results reported earlier should be reconsidered. However, the PUC being greater than .80 is not a sufficient reason to consider the instrument unidimensional since, in addition to being greater than .80, the ECV must be greater than .60 for unidimensionality to be established. From another perspective, PUC and ECV must be greater than .70 to achieve unidimensionality (Rodriguez et al., 2015). Therefore, the results in Table 6 do not meet these conditions, suggesting that the instrument is multidimensional.

For the FD, values of .80 or above (Gorsuch, 1983) or greater than .90 (Grice, 2001; Rodriguez et al., 2015) are required to allow an estimate of the general factor score. Table 6 shows that the FD coefficient met the recommended benchmark. This further supports the choice of the bifactor model, where the general factor can be estimated alongside specific factors. Furthermore, evidence was gathered for all the subscales regarding the H values. The H values of three scales and all subscales are greater than .70, as recommended by experts. This means that the instrument and its corresponding subscales are well-defined by the number of retained items measuring them and are more likely to be stable in other studies (Ventura-Léon et al., 2021).

The ARPB measures the difference between the factor loadings of the bifactor facto and general factor model. Scholars have recommended values in the range of .12 and .15 as ideal for retaining the general factor model; otherwise, the bifactor model would be favoured. Table 6 shows that the ARPB value is 0.22, outside the range of permissible values. This provides support for the multidimensional bifactor model for the PPQ.

Table 6: Auxiliary fit assessment of the dimensionality of the bifactor CFA model of the PPQ.

Dimensions	ECV (S&E)	ECV (NEW)	ω/ω_S	ω_H/ω_{HS}	Relative ω	H	FD
General Factor	.05	.05	.96	.01	.01	1.0	.99
Manuscript Preparation	.22	.82	1.0	1.0	.98	.98	.99
Manuscript Submission	.17	1.0	.93	.93	1.0	.96	.98
Handling revisions	.18	1.0	.95	.95	1.0	.95	.98
Dealing with rejections	.14	1.0	.89	.89	1.0	.89	.95
Publication delays	.24	1.0	.97	.97	1.0	.97	.99
IECV = .000 to 0.492; PUC = 0.831; ECV = .048; ARPB = .22							

Notes: ω = Omega; ω_H = Omega Hierarchical; ω_S = Omega for Specific factors; ω_{HS} = Omega hierarchical for the subscales; H = Construct Replicability; FD = Factor Determinacy; IECV = Item Explained Common Variance; PUC = Percent of Uncontaminated Correlations; ECV = Explained Common Variance (ECV), Average Relative Parameter Bias (ARPB). For unidimensionality of the general or subscales: $\omega > .80$; $\omega_H > .80$; $\omega_S > .80$; $\omega_{HS} > .80$; H > .80; FD > .90; IECV > .80; PUC > .70; ECV > .60; ARPB = .12 to .15

Reliability assessment

The reliability evidence for the instruments was gathered using three measures of internal consistency – Cronbach alpha (α), McDonald's omega (ω) and split-half reliability corrected with the Spearman-Brown prophecy formula (rtt). Using multiple measures of internal consistency is informed by their overlapping strengths and weaknesses, and using all three allowed the researchers to triangulate their results and obtain a more robust understanding of internal consistency. For instance, relying solely on Cronbach's alpha as a measure of internal consistency has several weaknesses. First, Cronbach's alpha assumes that all items in a scale are essentially measuring the same underlying construct (Dunn et al., 2014; McNeish, 2018), which may not always be the case. Second, Cronbach's alpha is sensitive to the number of items in a scale (Flora, 2020), meaning that longer scales tend to yield higher alpha values, even if some items are weakly related to the overall construct. Conversely, shorter scales may have lower alpha values, even if they are highly internally consistent. To address these weaknesses, researchers often use additional measures of internal consistency, such as McDonald's omega and split-half reliability, to obtain a more comprehensive assessment of the reliability of measurement instruments.

Table 7 shows that the questionnaire demonstrates strong internal consistency, with Cronbach's α values ranging from .89 to .99, indicating high internal consistency across all factors (such as persistence in manuscript preparation, publication delays, handling revisions, dealing with rejections, and manuscript submission). Similarly, MacDonald's ω reliability estimates range from .89 to .99, indicating good reliability. The split-half reliability corrected with the Spearman-Brown prophecy formula (rtt) values ranges from .87 to .98, suggesting strong internal consistency for all factors.

Table 7: Cronbach's alpha and McDonald's omega and Split-half reliability estimates of the PPQ.

Sub-scales	K	M	SD	α	ω	r_{tt}
Persistence in Manuscript Preparation	6	22.00	9.94	.99	.99	.98
Persistence in Manuscript Submission	4	14.33	5.81	.89	.97	.98
Persistence in Handling Revisions	5	17.91	7.88	.95	.95	.95
Persistence in Dealing with Rejections	5	16.75	6.91	.89	.89	.90
Persistence in Publication Delays	6	20.04	9.69	.97	.90	.87

K = Number of items in a subscale; M = Mean; SD = Standard deviation; α = Cronbach alpha; ω = McDonald's omega. r_{tt} = Split-half reliability corrected with Spearman-Brown prophecy formula. For all reliability measures, values > .70 indicate acceptable internal consistency.

Item level reliability analysis was performed to assess the quality and consistency of individual items within each sub-scale. It is useful for identifying weak or problematic items and understanding how each item contributes to measuring the underlying construct. For persistence in manuscript preparation sub-scale, Table 8 shows that items exhibit robust internal consistency, with Cronbach's alpha (α) and McDonald's Omega (ω) values of .99 across all items. This suggests that these items effectively measure the same underlying construct. The corrected item-total correlations (ITC) for these items are also notably high, indicating strong item-scale relationships. Additionally, the squared multiple correlations (SMC) suggest that a significant proportion of each item's variance is accounted for by the Manuscript Preparation scale. Consequently, removing any of these items is unlikely to enhance the internal consistency of the scale.

The persistence in manuscript submission sub-scale demonstrates good internal consistency for all items, with α and ω values ranging from .83 to .94. However, item MSU8 displays a relatively lower α value compared to the others. The corrected item-total correlations (ITC) for MSU1, MSU2, MSU7, and MSU8 are moderately high, indicating reasonably strong item-scale relationships. The squared multiple correlations (SMC) suggest that a substantial proportion of each item's variance is explained by the persistence in the

manuscript submission sub-scale. However, removing item MSU8 might have a marginal positive impact on the scale's internal consistency.

The persistence in handling revisions sub-scale showcases high internal consistency, with item α and ω values consistently at .94. This indicates that the items collectively measure the same construct effectively. The corrected item-total correlations (ITC) for these items are also notably high, denoting strong item-scale relationships. Furthermore, the squared multiple correlations (SMC) suggest that a significant proportion of each item's variance is accounted for by the persistence in handling revisions sub-scale. Consequently, removing any of these items is unlikely to improve the internal consistency of the scale.

Table 8: Item-level reliability estimates for the PPQ.

Scale	Items	M	SD	SM	SS^2	ITC	SMC	α	ω
Manuscript preparation	MPR1	3.70	1.71	18.30	68.75	.96	.93	.99	.99
	MPR2	3.62	1.70	18.37	68.81	.97	.94	.99	.99
	MPR3	3.71	1.69	18.29	68.78	.97	.95	.99	.99
	MPR5	3.66	1.71	18.34	68.75	.96	.94	.99	.99
	MPR6	3.62	1.70	18.37	68.49	.98	.96	.99	.99
	MPR8	3.69	1.71	18.31	69.13	.94	.89	.99	.99
Manuscript submission	MSU1	3.60	1.68	10.73	19.19	.80	.75	.83	.85
	MSU2	3.55	1.64	10.77	19.16	.83	.75	.82	.85
	MSU7	3.66	1.69	10.67	18.33	.87	.78	.80	.83
	MSU8	3.51	1.73	10.82	22.26	.53	.32	.94	.94
Handling Revisions	HRE1	3.66	1.74	14.25	40.43	.84	.71	.94	.94
	HRE3	3.56	1.73	14.35	40.08	.87	.76	.94	.94
	HRE5	3.53	1.69	14.38	40.26	.88	.80	.94	.94
	HRE6	3.57	1.77	14.34	40.06	.85	.72	.94	.94
	HRE7	3.58	1.70	14.33	40.25	.88	.78	.94	.94
Dealing with rejections	DWR1	3.44	1.66	13.31	31.11	.75	.57	.87	.87
	DWR2	3.39	1.69	13.37	31.05	.73	.55	.87	.87
	DWR3	3.29	1.64	13.47	31.22	.76	.58	.87	.87
	DWR6	3.32	1.61	13.43	31.80	.74	.56	.87	.87
	DWR7	3.32	1.64	13.44	31.70	.73	.53	.88	.87
Publication delays	PDE1	3.30	1.71	16.74	65.50	.92	.86	.97	.97
	PDE2	3.35	1.73	16.69	65.45	.91	.85	.97	.97
	PDE3	3.29	1.72	16.75	65.28	.92	.86	.97	.97
	PDE4	3.34	1.73	16.70	65.88	.89	.80	.97	.97
	PDE5	3.37	1.72	16.67	65.42	.92	.86	.97	.97
	PDE8	3.39	1.72	16.65	65.76	.90	.84	.97	.97

M = Item mean; SD = Item Standard Deviation; SM = Scale Mean if Item Deleted; SS^2 = Scale Variance if Item Deleted; ITC = Corrected Item-Total Correlation; SMC = Squared Multiple Correlation; α = Cronbach's Alpha if Item Deleted; ω = McDonald's Omega if Item Deleted

For persistence in dealing with rejections sub-scale exhibit good internal consistency, with α and ω values consistently at .87. This suggests that the items collectively measure the intended construct reasonably well. The corrected item-total correlations (ITC) for these items are moderately high, indicating reasonably strong item-scale relationships. While the squared multiple correlations (SMC) suggest that a moderate proportion of each item's variance is explained by the Dealing with Rejections scale, removing any of these items might slightly enhance the scale's internal consistency.

Regarding persistence in publication delays sub-scale, the items demonstrate high internal consistency, with α and ω values consistently at .97. This indicates that the items effectively measure the same underlying construct. The corrected item-total correlations (ITC) for these items are also notably high, indicating strong item-scale relationships. Additionally, the squared multiple correlations (SMC) suggest that a substantial proportion of each item's variance is accounted for by the persistence in publication delays sub-scale. As a result, removing any of these items is unlikely to improve the internal consistency of the scale.

Convergent and discriminant validity tests

The result of the construct validity of the instrument is presented in Table 9. The Average Variance Extracted approach was used, with values above .50 providing evidence of convergent validity (Owan, et al., 2022a; Rönkkö & Cho, 2022). The PPQ achieved convergent validity since the range of AVE values is .63 to .94, above the cut-off value of .50.

The instrument was also assessed for discriminant validity using the Fornell-Larcker approach (Fornell & Larcker, 1981). In this approach, the Average Variance Extracted (AVE) square root is computed for each factor, and these values are compared with the correlation estimates off the diagonal. For discriminant validity to be achieved, the square root of the AVE for each factor should be greater than the correlation estimates between that factor and other factors (off-diagonal correlations). This indicates that each factor shares more variance with its measures than with measures of other factors (Owan et al., 2022a). As shown in Table 9, all the bolded values are greater than the correlation coefficients, suggesting that discriminant validity is achieved for all the factors in the instrument.

Table 9: Construct validity evidence for the PPQ.

S/N.	Factors	AVE	CR	1	2	3	4	5
1	Persistence in manuscript preparation	.94	.99	**.97**				
2	Persistence in publication delays	.86	.97	.03	**.93**			
3	Persistence in handling revisions	.79	.95	.01	-.03	**.89**		
4	Persistence in dealing with rejections	.63	.89	.00	.02	.14	**.79**	
5	Persistence in manuscript submission	.69	.90	.04	-.05	.04	.07	**.83**

Notes: AVE = Average variance extracted (Values > .50 indicate convergent validity); CR = Composite reliability estimates (Values > .70 are acceptable); Bolded values are square roots of AVE. The square root of AVE > Correlation estimates off-diagonal for discriminant validity.

Scoring and interpretation guidelines

Scoring the Persistence in Publishing Questionnaire (PPQ) involves several key steps to effectively measure an individual's level of persistence in the academic publishing process. These steps are designed to provide a comprehensive assessment of an individual's attitudes and behaviours related to academic publishing, and the scoring guidelines ensure consistency and reliability in data interpretation. Firstly, the PPQ utilises a 6-point Likert scale for item responses, ranging from 1 (Strongly Disagree) to 6 (Strongly Agree). Each item on the questionnaire corresponds to a specific aspect of persistence in academic publishing, and respondents provide their level of agreement or disagreement with these statements. The PPQ is structured into five distinct factors, each representing a unique dimension of persistence in the publishing process. These factors include "Persistence in Manuscript Preparation," "Persistence in Publication Delays," "Persistence in Handling Revisions," "Persistence in Dealing with Rejections," and "Persistence in Manuscript Submission."

To calculate factor scores, researchers should sum the scores of the individual items belonging to each factor. For example, to determine the "Persistence in Manuscript Preparation" factor score, sum the scores of items MPR1, MPR2, MPR3, MPR5, MPR6, and MPR8. Repeat this process for each factor to obtain factor-specific scores. Additionally, a total score for the PPQ can be computed by summing all the item scores across all factors. This overall score provides a comprehensive measure of an individual's persistence

in academic publishing. Higher total scores indicate a greater level of persistence, while lower scores suggest lower persistence. Researchers should consider interpreting subscale scores individually to gain insights into specific aspects of persistence. Each subscale reflects a different dimension of the publishing process, enabling a more nuanced analysis of an individual's publishing persistence. Factor-level analysis can also be valuable, allowing researchers to examine patterns of persistence in each specific area. This approach can help identify strengths and weaknesses in different aspects of the academic publishing process.

While specific score thresholds can be established for various purposes, researchers should base these thresholds on their research objectives and the distribution of scores within their sample. To ensure the reliability and validity of the PPQ scores, it is crucial to follow these scoring guidelines consistently across different samples and studies. Additionally, considering context and research objectives when interpreting scores is essential for drawing meaningful conclusions based on PPQ results.

Discussion

The current study on the development and validation of the Persistence to Publish Questionnaire (PPQ) is firmly anchored in the existing body of research on the persistence of academics in the realm of scholarly publishing. It builds upon and extends prior research in several ways, contributing to the ongoing discourse on the factors that shape academics' unwavering commitment to publishing their scholarly work. First and foremost, the study addresses a critical gap in the literature by providing a comprehensive instrument, the PPQ, designed to measure the construct of persistence to publish. While previous studies have explored various aspects of academic publishing, such as barriers, motivations, and publication productivity (e.g., Andriani et al., 2020; Lambovska, 2022; Lambovska & Todorova, 2021), there has been a notable absence of a standardised tool to assess the overarching concept of persistence in this context. The PPQ fills this void and offers researchers a reliable and validated instrument for measuring academics' persistence in publishing.

Moreover, the study aligns with prior research that emphasises the significance of understanding the challenges and obstacles academics face in the publishing process. The concept of persistence to publish is rooted in the recognition that scholars often encounter a multitude of hurdles (See Cleeton & Knight, 1924; Lufi & Cohen, 1987; Morgan & Hall, 1926). These challenges have been explored individually in past research, but the PPQ synthesises them into a coherent framework, acknowledging their interconnectedness and cumulative impact on academics' publication persistence.

In terms of item generation, the study draws on both established scales (such as those developed by Lufi, 1979; Mukherjee, 1974; Wang, 1932) and the researchers' experiences, a methodological approach that echoes previous research efforts to develop contextually relevant measurement tools. This fusion of existing scales with experiential insights reflects a commitment to building upon the strengths of prior research while tailoring the instrument to the unique dynamics of publishing in Scopus-indexed journals.

The study also contributes to the ongoing discussion on the psychometric properties of measurement instruments. It supports previous studies attempting to measure the concept of academic persistence (Constantin et al., 2011; De Luca et al., 2016; Kozlowski & Fouad, 2022; Lockhart et al., 2022; Porter et al., 2020; Quintana et al., 2022; Thalib et al., 2019), even though the focus and contexts are different. Nevertheless, by employing a rigorous process of content validation, including expert assessments and pretesting with experienced lecturers, the study aligns with previous research emphasising the importance of face and content validity in instrument development (e.g., Boateng et al., 2018; Owan et al., 2022a; Owan et al., 2022d). Additionally, the use of exploratory and confirmatory factor analysis mirrors the methodological choices made in earlier studies that sought to establish the dimensionality and construct validity of measurement instruments (Ekpenyong et al., 2022; Owan et al., 2022c). The multidimensions of the PPQ, including manuscript preparation, submission delays, revisions, rejections, and publication delays, support previous research, which reveals that persistence is a multidimensional variable (Howard & Crayne, 2019; Styk et al., 2023).

Furthermore, the study's exploration of the bifactor model, including the use of auxiliary measures to comprehensively assess its fit and validity, is in line with emerging research that highlights the limitations of traditional goodness-of-fit indices for bifactor models (e.g., Bonifay et al., 2017; Flores-Kanter et al., 2018; Morgan et al., 2015; Sellbom & Tellegen, 2019; Ventura-León et al., 2021). This methodological refinement underscores the researchers' commitment to advancing the field of instrument construction and validation with global best practices in psychometric analysis. Thus, developing the PPQ not only bridges a significant gap in the literature but also aligns with and extends the existing body of research on persistence in academic publishing. It draws on established research traditions and methodological approaches while introducing innovative elements that enhance our understanding of the complexities surrounding scholars' persistence to publishing their work in reputable journals, such as those in Scopus. Ultimately, this instrument can be used to support research that contributes to a broader understanding of the factors that drive and sustain academics' persistence in the face of publishing challenges.

Limitations and future research focus

The current study represents a significant step in instrument development for measuring persistence to publish. However, it is important to acknowledge its limitations and offer future research directions to further enhance the instrument's validity and applicability across diverse academic contexts. First, the findings may have limited generalisability since the study primarily focused on lecturers with experience in publishing in Scopus-indexed journals, which could restrict the applicability of the developed instrument to this specific academic population. Future research should consider

extending the validation process to encompass a more diverse sample of academics from various disciplines and career stages.

Additionally, while content validity was assessed through expert ratings and feedback, the study did not explore other forms of validity evidence, such as criterion and predictive validity. To enhance the instrument's robustness, future research should consider evaluating the PPQ's validity in predicting actual publishing behaviour and outcomes, thereby establishing its predictive validity. This entails investigating the extent to which the PPQ can predict actual publication rates, submission frequencies, or the quality of publications in Scopus-indexed journals. Future research should assess the criterion validity of the PPQ by examining how closely the instrument developed in this study relates to other instrument measuring similar constructs. Furthermore, measurement invariance is a critical consideration that was not tested in the present study. Given potential cultural and contextual variations in the publishing process, future research should examine the measurement invariance of the PPQ across different groups to ensure its validity and comparability.

Although the study employed multiple reliability measures, it primarily focused on internal consistency measures. Future research could explore other aspects of reliability, such as test-retest reliability and inter-rater reliability. Test-retest reliability would assess the instrument's stability over time, while inter-rater reliability would examine consistency among different raters or observers, particularly in cases where multiple perspectives contribute to the assessment. Future research could employ alternative validation techniques, such as item response theory (IRT) or generalizability theory (G theory) on the PPQ.

Conclusion

This study has successfully developed and validated the Persistence to Publish Questionnaire (PPQ), an invaluable instrument for assessing academics' commitment to publishing in Scopus-indexed journals. The PPQ underwent a rigorous development process, including item generation, content validity assessment, pretesting, and pilot testing. Both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) corroborated the five-factor structure, with the bifactor model emerging as the best-fitting model for the PPQ. The instrument demonstrated robust internal consistency. Construct validity evidence strongly supported both convergent and discriminant validity, affirming that the PPQ effectively measures persistence to publish while distinguishing it from related constructs. Thus, the PPQ offers a powerful tool for researchers and institutions to assess academics' persistence in publishing in Scopus-indexed journals. This instrument can be used to identify individuals or departments with lower levels of persistence, enabling the development of targeted interventions and support mechanisms. Researchers can employ this instrument to explore the antecedents and consequences of publishing commitment, deepening our understanding of the academic publishing process.

This study, therefore, presents the PPQ as a standardised tool for evaluating academics' persistence to publishing in Scopus-indexed journals. The results of the study have significant implications for informing research policy, shaping institutional support, and guiding interventions to enhance researchers' persistence in publishing. Institutions can use the PPQ as an assessment tool to gauge the publishing persistence of their faculty members. This data can inform the development of interventions, such as workshops, seminars, or mentorship programmes, aimed at enhancing researchers' skills and resilience in the face of common publishing challenges.

The results of the study may guide institutional strategies for fostering a culture of continuous improvement in publishing skills. For instance, institutions and policymakers can use the PPQ to identify academics who may need additional support in manuscript preparation, manuscript submission, handling revisions, dealing with rejections, and publication delays. This information can be used to tailor policies that address these challenges, whether through targeted training programmes, mentorship initiatives, or the provision of resources to support academics in handling various stages of the publication process. Integrating these programmes into graduate training, faculty development initiatives, or ongoing professional development opportunities can contribute to a culture of continuous improvement in publishing skills.

Furthermore, the PPQ can be used by funding agencies to evaluate the persistence of researchers to publish in Scopus-indexed journals. This can help funding agencies to identify researchers who are committed to publishing and support their research activities. The PPQ can also be used by publishers to evaluate the persistence of authors to publish in their journals. This can help publishers to identify authors who are committed to publishing and provide them with necessary support to improve the quality of their manuscripts. The PPQ can also play a role in performance evaluation processes for researchers. Recognising and rewarding persistence in publishing can incentivise academics to invest more effort in this aspect of their work. Institutions may consider incorporating publishing persistence as one of the criteria for tenure and promotion decisions, thereby reinforcing the importance of sustained commitment to scholarly dissemination.

Given the standardised nature of the PPQ, it allows for potential benchmarking across institutions and on a global scale. Researchers and institutions can compare their scores to national or international averages, fostering healthy competition and collaboration. Collaborative efforts can be initiated to share best practices in addressing common challenges identified by the PPQ, promoting a collective approach to enhancing research productivity. Overall, the PPQ is a valuable tool for shaping interventions that address specific challenges faced by researchers, ultimately contributing to the advancement of knowledge dissemination and research quality within the academic community.

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