

Psychometric properties of the Psychological Ownership Questionnaire

Chantal Olckers^{1,*} and Llewellyn E. van Zyl^{2,3}

¹Department Human Resource Management, University of Pretoria, Pretoria, South Africa

²Department of Human Performance Management, Eindhoven University of Technology, Eindhoven, The Netherlands

³Optentia Research Programme, North-West University, Vaal Triangle Campus, South Africa

*Correspondence

Chantal Olckers, Department of Human Resource Management, University of Pretoria, Private Bag X20, Hatfield 0028, Pretoria, South Africa.

Email: chantal.olckers@up.ac.za

Abstract

Objective: The purpose of this study was to examine the psychometric properties of the multi-dimensional Psychological Ownership Questionnaire when applied in an organisational context. **Method:** A cross-sectional survey research design was employed ($N = 953$) to investigate the factorial validity, internal consistency, measurement invariance and concurrent validity of the instrument. **Results:** The results showed that the five-dimensional factor structure of the Psychological Ownership Questionnaire could be confirmed. No configural, scalar and metric invariances among different age cohorts were shown. The instrument proved to be reliable at both a lower (Cronbach's alpha) and upper (composite reliability) limit level. In relating the instrument to turnover intention, its concurrent validity was proven. **Conclusion:** The Psychological Ownership Questionnaire proved to be a useful, valid and reliable self-report questionnaire for the assessment of psychological ownership within a South African organisational context.

Key words: accountability, belongingness, measurement invariance, self-efficacy, self-identity, territoriality

What is already known about this topic:	What this topic adds:
<ul style="list-style-type: none"> • The Psychological Ownership Questionnaire (POQ) is a widely used instrument to measure psychological ownership, but the literature indicates inconsistency regarding the instrument's factor structure. Previous studies have indicated a one-, four- or five-factor structure. • Although other psychological ownership measures have established invariances across cultural groups, a thorough investigation of the POQ has not been done to corroborate such invariances. • The POQ's internal consistency varies across samples. Previous studies used either Cronbach's alpha or composite reliability as reliability indicators. 	<ul style="list-style-type: none"> • The five-factor structure of the POQ (comprising self-efficacy, self-identity, belongingness, accountability and territoriality) was confirmed to measure psychological ownership in organisational contexts. • The POQ demonstrated no evidence of measurement invariance across various age groups. • The POQ indicated acceptable levels of internal consistency at both the lower (Cronbach's alpha) and upper (composite reliability rho) level limits.

1. INTRODUCTION

Psychological ownership (PO), the psychologically experienced phenomenon that occurs when employees develop possessive feelings about targets, has received substantial attention in multi-disciplinary studies over the past decade (Olckers & Van Zyl, 2017). PO is defined as the state of mind of individuals who feel as though targets of ownership (or parts thereof) are theirs (Pierce, Kostova, & Dirks, 2003). In essence, PO reflects the relationship between an individual and a tangible object (e.g. a laptop) or an immaterial artefact (e.g. a project/idea). Where PO exists, the object or artefact becomes part of the individual's extended self (Avey, Wernsing, & Palanski, 2012; Brown, Pierce, & Crossley, 2014). The development of PO is facilitated by three intra-individual motives: individuals' need to experience efficacy and competence; individuals' need for self-identity; and individuals' need to have a home, a place where they belong (Pierce et al., 2003). If ownership feelings are rooted in this set of motives, it can be assumed that individuals can develop feelings of ownership about numerous types of objects. The experience of PO is also fostered through three different routes or processes: through controlling the ownership target; through intimately knowing the ownership target; and through investing time, resources and abilities in the ownership target. Thus, the more control is exercised over the object of ownership, the more information is gathered about

the object, the more the object can be shaped, and the more the self will be attached to that object (Pierce et al., 2003).

As noted by Olckers and Van Zyl (2017), a significant body of research has been done over the past decade to examine the effects of PO on favourable employee attitudes and behaviours within the organisational context. For example, it was found that employees' feelings of ownership about their organisation (i.e. becoming attached to their work and having the desire to maintain their relationship with the organisation) led to their becoming more integrated into and committed to their organisation (Liu, Wang, Hui, & Lee, 2012). According to Chung and Koo Moon (2011), employees who experience feelings of ownership become more innovative and implement unconventional work processes, which increase the organisation's overall effectiveness. As they gain influence and control at work, employees start feeling possessive about their organisation. Having developed an intimate knowledge of the organisation, they feel they have invested in their organisational roles. When this takes place, individuals typically experience high levels of job satisfaction (Avey et al., 2012). Employees who feel the organisation contributes to meeting their basic needs, will reciprocate by making positive, proactive contributions to the organisation, thus increasing their efforts to engage in the organisation's citizenship behaviour patterns (Avey, Avolio, Crossley, & Luthans, 2009). Brown et al. (2014) further argued that PO, coupled with a sense of responsibility and pride, motivated employees to improve their performance in an organisation.

PO is clearly an important interdisciplinary concept; therefore the measures used to assess it must be valid and reliable. Among the variety of instruments used in academic studies to measure PO, the POQ of Avey et al. (2009) is the most widely used one, but significantly this measure has produced different factor structures and item loadings and fluctuating levels of internal consistency across samples (Olckers & Van Zyl, 2017). With that in mind, this study was undertaken to investigate the psychometric properties of the POQ, more specifically the instrument's factorial validity, internal consistency, measurement invariance and concurrent validity.

2. THE PSYCHOLOGICAL OWNERSHIP QUESTIONNAIRE (POQ)

According to Avey et al. (2009), PO experiences are context-specific and the result of an interaction between various positive ('promotive') and negative ('preventive') psychological states at work. They developed the multi-dimensional POQ based on two independent forms of ownership that emanated from two different approaches to PO: a constructive, *promotive-*

focused approach and a *prevention-focused approach*. Individuals with a promotive PO orientation pursue goals that reflect their hopes and aspirations whereas those with a preventive PO focus are concerned about achieving their goals to avoid punishment for not meeting their obligations.

Avey et al. (2009) developed the POQ to measure PO by means of five dimensions. Four of these, namely, self-efficacy, self-identity, belongingness and accountability, were indicated as promotive dimensions of PO because the behaviour associated with them could benefit an organisation. Territoriality was indicated as a preventive dimension of PO as it focused more on individualistic behaviour than on positive organisational behaviour. The multi-dimensional POQ, its proposed dimensions and a brief description of each are displayed in Figure 1.

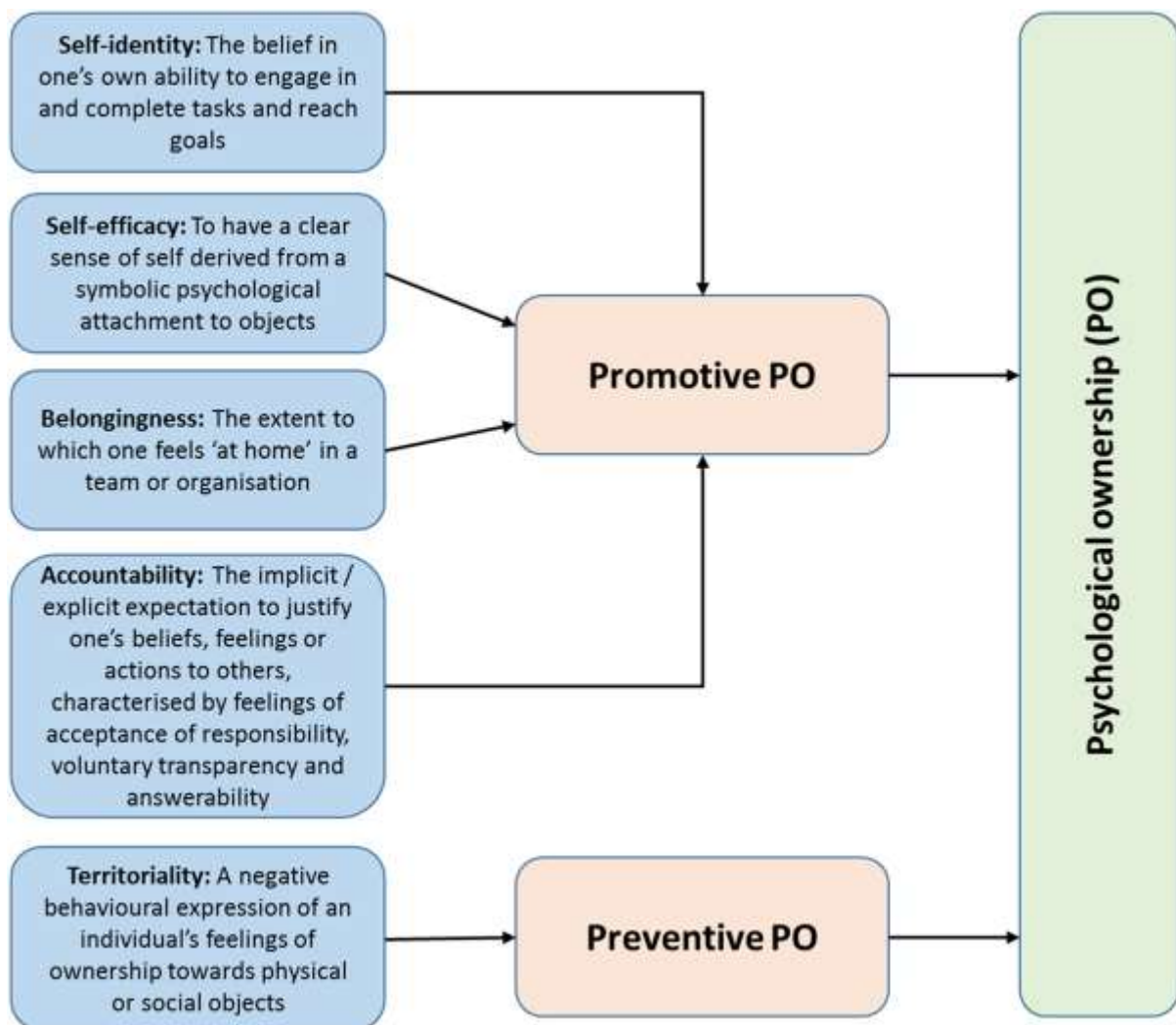


Figure 1. The POQ and proposed dimensions. Reproduced from Olckers, Van Zyl, and George (2017)

2.1. Factorial validity

Avey et al. (2009) confirmed the five-factor structure of the POQ as a multi-dimensional construct. In addition, they confirmed promotive PO as a second-order measurement model and preventive PO as a single-order model. Similarly, Alok (2014) and Olckers and Van Zyl (2016) affirmed the five-factor structure of the POQ. Research conducted by Olckers, Van Zyl, and George (2017) confirmed a four-factor POQ model, showing an overlap between the self-identity and belongingness dimensions. In other studies using the POQ, a one-factor model of overall PO was confirmed (Olckers & Enslin, 2016).

The current study thus hypothesised the confirmation of a five-factor POQ model for use in a South African organisational context. The items of the five subscales were assumed to have the highest factor loadings on their intended factor (*Hypothesis 1*).

2.2. Measurement invariance

The measurement invariance of the POQ across various age groups has not been established in previous research. Motivated by an innate desire for efficacy, self-identity and having a place to dwell, individuals have a need to experience PO. Pierce et al. (2003) argued that although these motives were universal, individual differences occurred that related to the strength of the motives, the individuals involved and the lapse of time. Literature suggests that it takes time to develop PO (Pierce et al., 2003); therefore it is likely to vary across age groups and generations (Bosco & Harvey, 2013). Individuals mature over time and their attachment behaviours differ; for instance, the motives driving adolescents' and young adults' psychological attachment to artefacts may differ from the motives of people who are at the end of their careers because values and needs change over time (Olson & Dover, 1978). Psychological maturity, which can be described as a temporal growth development experience, affects the extent to which individuals perceive and get attached to objects, people and relationships (McCrae & Costa, 1983). Therefore, in the current study it was assumed that individuals at different age levels (younger versus older) differed in their interpretation of PO, in other words, that the POQ demonstrated non-invariance between different age groups in the South African organisational context (*Hypothesis 2*).

2.3. Reliability

The POQ as both a uni- and multi-dimensional measure of PO was found to be a reliable measurement instrument in various studies (Alok, 2014; Avey et al., 2009; Olckers et al.,

2017); however, the level of internal consistency seemed to vary within samples. Predominantly, the internal consistency of the POQ was estimated through the use of Cronbach's alpha, which often resulted in over- or underestimation of the reliability because it assumed that the factor loadings and error variances were equal (Cho & Kim, 2015). Despite Cronbach's alpha's limitations, a study, which assumed POQ as a uni-dimensional ('overall' or one-factor) measure of PO, found an alpha level of 0.95 (Olckers & Enslin, 2016). Similarly, studies where POQ was presented as a five-first-order factorial model found alpha values ranging from 0.75 to 0.84 on territoriality, 0.87 to 0.92 on self-efficacy, 0.89 on self-identity, 0.89 to 0.93 on belongingness, and 0.80 to 0.82 on accountability (Olckers & Van Zyl, 2016; Olckers et al., 2017). In the final permutation, where PO was considered as a second-order latent variable comprising two first-order latent variables, alpha levels were found ranging from 0.70 to 0.90 for promotive PO and 0.70 to 0.84 for preventive PO (Alok, 2014; Avey et al., 2009; Avey et al., 2012).

Given the challenges and critiques associated with the use of Cronbach's alpha, an investigation was done and only one study was found that used a more 'accurate' estimation of internal consistency (i.e. composite reliability) (Wang & Wang, 2012). Olckers and Van Zyl (2016) employed the five-first-order factorial model of PO and reported rho coefficients (as a measure of composite reliability) ranging between 0.80 and 0.93 for the various dimensions of the POQ.

Determining coefficient rho for the POQ corrected for the over- or underestimation of reliability (Olckers & Van Zyl, 2016). Therefore the current study hypothesised that the POQ presented acceptable levels of internal consistency at both the lower (Cronbach's alpha ≥ 0.70) and upper (composite reliability/rho coefficients > 0.80) level limits (*Hypothesis 3*).

2.4. Concurrent validity

A recognised consequence of PO is the intent of individuals to remain with their organisation (Avey et al., 2009). Individuals experiencing PO are more motivated to maintain their working relationship with the organisation and are therefore unwilling to leave the organisation. The current study hypothesised that the POQ was expected to be concurrently valid through being significantly related to turnover intention (*Hypothesis 4*).

3. METHOD

3.1. Design

A cross-sectional, electronic, survey-based research design was employed to determine the psychometric properties of the POQ when used on a sample of South African employees.

3.2. Respondents

The sample ($N = 953$) consisted of the respondents used in four independent South African studies where the POQ and the Turnover Intentions Scale (TIS) were used as antecedent or outcome variables. The ethnicity, age, years of employment and educational information of the respondents are summarised in Table 1.

Table 1 Demographic characteristics

Variable	Category	Frequency (<i>f</i>)	Percentage (%)
Ethnicity	African	112	11.8
	Caucasian	247	25.9
	Indian	116	12.2
	Coloured	144	15.1
	Other	10	1
	<i>Missing or prefer not to be identified</i>	324	34.0
Age in years	18 to 35 years	458	48.1
	36 to 45 years	194	20.4
	46 to 55 years	112	11.8
	56 and older	156	16.4
	<i>Missing or prefer not to be identified</i>	33	96.5
Years of employment	0 to 5 years	546	57.3
	6 to 10 years	177	18.6
	11 to 15 years	82	8.6
	16 to 20 years	58	6.1
	21 years and longer	67	7.0
	<i>Missing or prefer not to be identified</i>	23	2.4
Level of education	Grade 12	99	0.2
	Diploma	124	11.5
	Bachelor's degree	61	15.5
	Postgraduate degree	345	43.6
	<i>Missing or prefer not to be identified</i>	324	0.5

Most of the respondents were Caucasian (25.9%), between the ages of 18 and 35 (49.8%) and

had between nought and five years' work experience (57.3%). More than 40% held at least a postgraduate degree (43.6%).

3.3. Measures

3.3.1. POQ

The POQ (Avey et al., 2009) comprised 16 items: three items each for the four dimensions (self-efficacy, self-identity, belongingness and accountability) of the promotive PO scale, and four items for the feelings of territoriality (preventive PO). Items were rated on a six-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Examples of the items are presented in Table 4.

3.3.2. TIS

The TIS developed by Sjöberg and Sverke (2001) was used to measure turnover intent. Responses to the three-item instrument were captured using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). This Scandinavian-developed scale was validated for use on a South African sample, and a Cronbach's alpha coefficient of 0.79 was reported (Diedericks & Rothmann, 2014).

3.4. Procedure and analyses

Data were collected by means of a self-administered electronic questionnaire containing the related measuring instruments. Where deemed necessary and to increase the response rate, questionnaires were administered by means of hard copy (Van Zyl & Rothmann, 2012). Each questionnaire included a covering letter inviting skilled and highly skilled professionals employed in both public and private organisations in South Africa to participate voluntarily and anonymously in the study. Respondents were assured that their responses would remain confidential and would be used for research purposes only. A questionnaire required about 15 minutes to complete. Permission to conduct the research was obtained from the research institution's research ethics committee.

SPSS v25 and MPlus v8 were employed to process the data. First, *factorial validity* was estimated through employing a confirmatory factor analytic approach and a competing comparative modelling strategy. Structural equation modelling with the maximum likelihood estimator was employed to assess the model fit for both the competing measurement models and the final structural model. The fit indices and associated cut-offs as suggested by Wang and Wang (2012) to be used for model fit are presented in Table 2.

Table 2 Fit indices: Acceptable values and cut-off points

Fit indices	Acceptable values
Chi-square	Lowest value in comparative measurement models
Root Mean Square Error of Approximation (RMSEA)	< 0.08
Standardized Root Mean Residual (SRMR)	< 0.08
Comparative Fit Index (CFI)	> 0.90 but < 0.99
Tucker-Lewis Index (TLI)	> 0.90 but < 0.99
Akaike Information Criterion (AIC)	Lowest value in comparative measurement models
Bayes Information Criterion (BIC)	Lowest value in comparative measurement models

Second, both the upper- and lower-bound levels of *internal consistency* were estimated with both Cronbach's alpha and rho. Acceptable levels of internal consistency for Cronbach's alpha (lower-bound level) were set at 0.70 (Nunnally & Bernstein, 1994) and for rho (upper-bound level) they were set at 0.80 (Wang & Wang, 2012).

Third, *measurement invariance* was investigated based on the age of the respondents. The four age categories for invariance testing are presented in Table 1. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was employed to assess the adequacy of sample size for invariance testing ($p < 0.01$; $KMO < 0.70$) (Cerny & Kaiser, 1977). To assess whether PO was perceived similarly or differently by respondents of different ages, configural (similar factor structures), metric (similar factor loadings), and scalar (similar intercepts) invariances were computed. Wang and Wang (2012) explained that a non-significant difference in chi-square between the configural, metric and scalar models indicated invariance ($p > 0.05$). Correlation coefficients were also computed between overall PO and intention to leave the organisation (ITL) among the different age categories to determine the differences. A two-tailed significance test with an alpha level of 0.01 and a confidence interval of 99% were set.

Finally, *concurrent validity* was estimated through establishing Pearson product moment correlation coefficients and regression paths between PO and ITL (within the total sample). Statistical significance levels were set at a 99% confidence interval ($p < 0.01$). Effect sizes suggested by Ferguson (2009) were used as indicators of practical significance for the

correlations where 0.30 (medium effect) and 0.50 (large effect) were set as cut-off points. The regression path between PO and ITL was estimated through a structural model.

4. RESULTS

The results based on each of the hypotheses are presented separately below. The results are tabulated and briefly interpreted.

4.1. Factorial validity

To determine the factorial validity of the POQ, a competing measurement model strategy (comparing one-, two-, four- and five-factor models of PO) following a CFA approach was employed. No items were omitted from the analysis, and observed variables (measured items) were used as primary indicators of the latent variables within each measurement model (Wang & Wang, 2012). Measurement error terms were left uncorrelated.

The following models were tested:

- **Model 1:** A one-factor model for overall PO was computed. All 16 items loaded directly on one first-order latent variable.

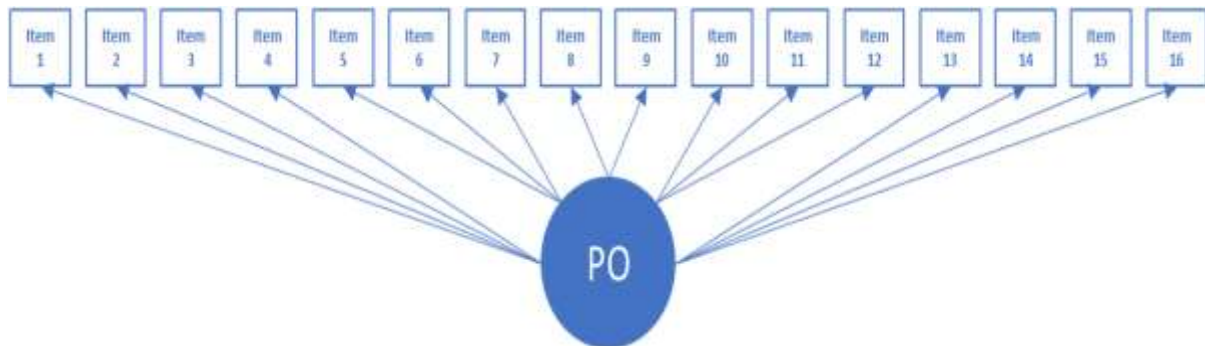


Figure 2. Measurement model 1: one-factor model for psychological ownership

- **Model 2:** A two-factor model comprising *promotive* (including all 12 items of self-identity, self-efficacy, accountability and belongingness) and *preventive* (including all four items of territoriality) ownership behaviours were estimated. These factors were treated as second-order latent variables loading on PO as the formative construct.

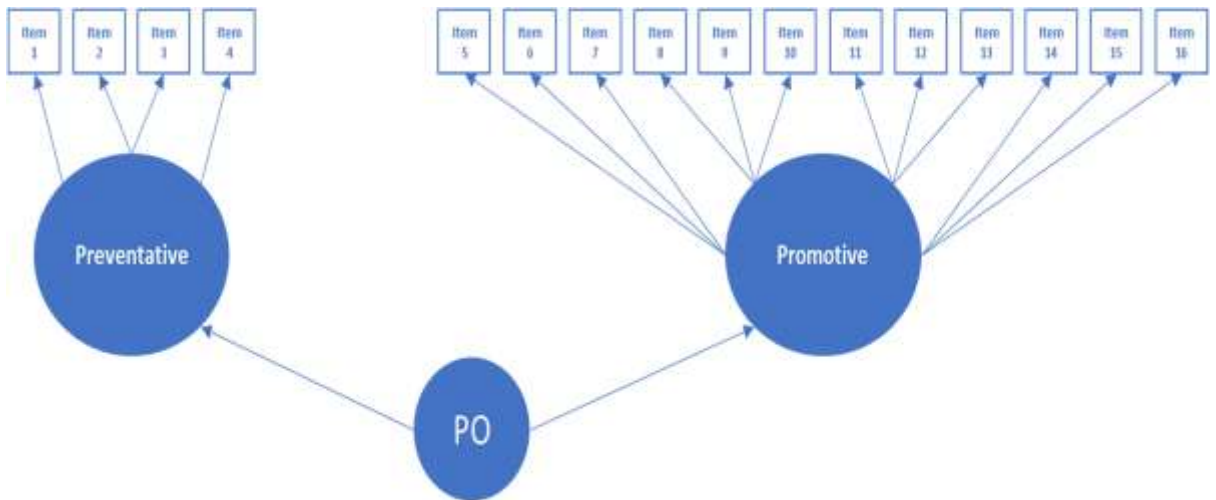


Figure 3. Measurement model 2: two-factor model for psychological ownership

- **Model 3:** A four-factor model comprising self-efficacy (three items), accountability (three items), identity (three items of self-identity and three items of belongingness) and territoriality (four items) was compiled and estimated. These factors were treated as second-order latent variables loading on PO as the formative construct.

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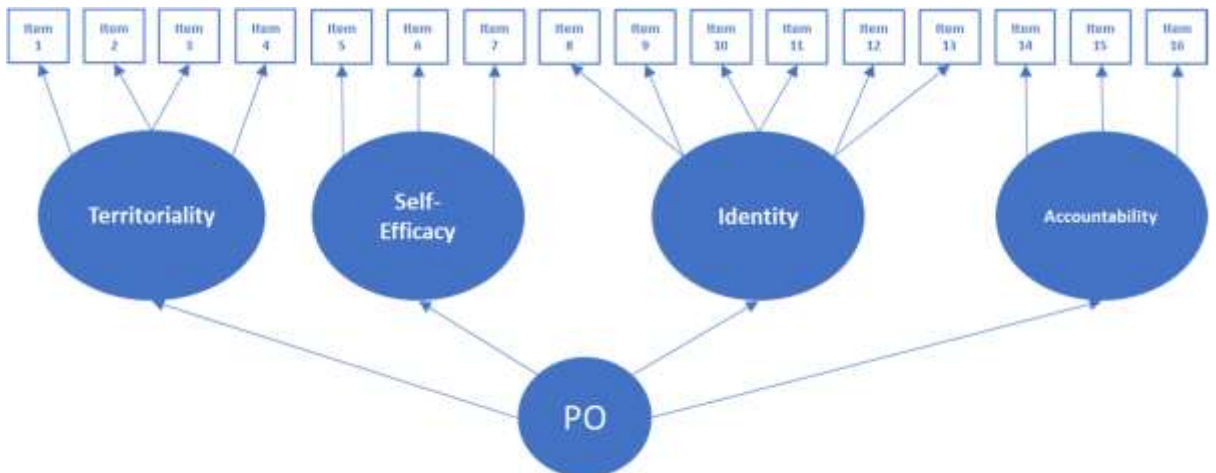


Figure 4. Measurement model 3: four-factor model for psychological ownership

- **Model 4:** The original five-factor model of PO was assessed. Self-identity (three items), self-efficacy (three items), belongingness (three items), accountability (three items) and territoriality (four items) were treated as second-order latent variables loading on PO as the formative construct.

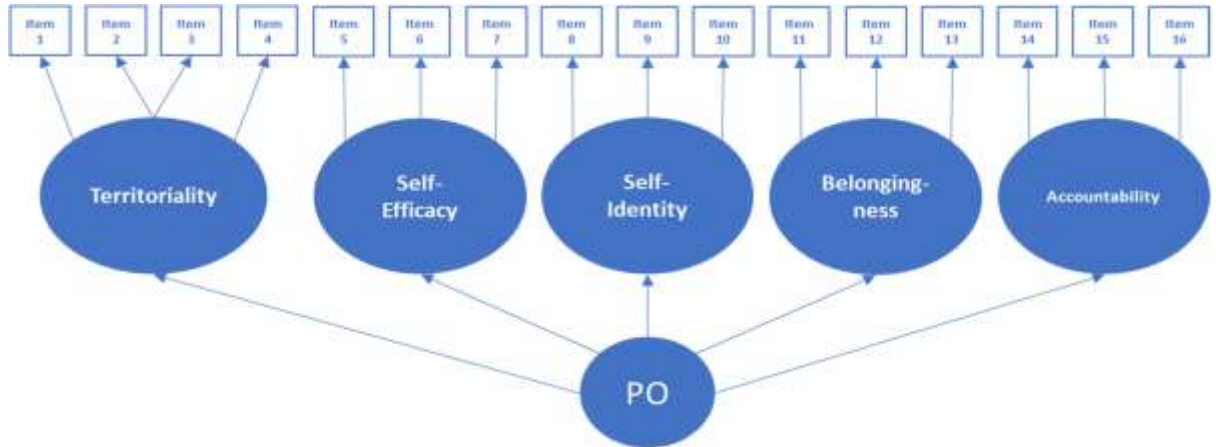


Figure 5. Measurement model 4: five-factor model for psychological ownership

Table 3 provides a summary of the various fit indices produced for all four competing measurement models.

Table 3 Fit statistics for competing measurement models

Model	χ^2	<i>df</i>	TLI	CFI	RMSEA	SRMR	AIC	BIC
Model 1	3502.83*	104	0.53	0.59	0.19	0.14	44288.49	44521.70
Model 2	2669.89*	102	0.69	0.64	0.16	0.11	43459.55	43702.48
Model 3	790.64*	100	0.90	0.92	0.09	0.06	41584.29	41836.94
Model 4	589.43*	99	0.93	0.94	0.07	0.06	41385.09	41642.59

Note. χ^2 = Chi-square; *df* = degrees of freedom; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; BIC = Bayes Information Criterion

* Statistically significant ($p < 0.05$)

As indicated in Table 3, the original five-factor model of Avey et al. (2009) fitted the data best. Model 4 ($\chi^2 = 589.43$; $df = 99$; TLI = 0.93; CFI = 0.94; RMSEA = 0.07; SRMR = 0.06; $p < 0.01$) fitted the data significantly better than the one-, two- or four-factor models. These results suggested that *Hypothesis 1*, namely that a five-factor model would fit the data significantly better, was therefore *accepted*.

Table 4 indicates the results for the standardised item loadings for the five second-order latent variables, showing that the items loaded sufficiently on the respective latent factors (> 0.50). The item loadings for territoriality ranged from 0.58 to 0.74, whereas the loadings for self-efficacy ranged from 0.73 to 0.88. For self-identity, the item loadings ranged from 0.75 to

0.89, for belongingness they ranged from 0.84 to 0.92, and for accountability they ranged from 0.79 to 0.82. Therefore, all item loadings were significantly higher than Wang and Wang's (2012) 0.50 cut-off score.

Table 4 Standardised factor loadings for latent variables

Factor	Item no.	Item text	Loading	S.E.
Territoriality	1	I feel I need to protect my ideas from being used by others in my organisation	0.70*	0.03
	2	I feel that people I work with in my organisation should not invade my workspace	0.64*	0.03
	3	Territoriality – item 3	0.74*	0.02
	4	Territoriality – item 4	0.58*	0.03
Self-efficacy	5	I am confident in my ability to contribute to my organisation's success	0.82*	0.02
	6	I am confident I can make a positive difference in this organisation	0.88*	0.01
	7	Self-efficacy – item 3	0.73*	0.02
Self-identity	8	I feel this organisation's success is my success	0.89*	0.01
	9	I feel being a member in this organisation helps define who I am	0.79*	0.02
	10	Self-identity – item 3	0.75*	0.02
Belongingness	11	I feel I belong in this organisation	0.92*	0.01
	12	I am totally comfortable being in this organisation	0.88*	0.01
	13	Belongingness – item 3	0.84*	0.01
Accountability	14	I would challenge anyone in my organisation if I thought something was done wrong	0.80*	0.02
	15	I would not hesitate to tell my organisation if I saw something that was done wrong	0.82*	0.02
	16	Accountability – item3	0.79*	0.02

Note. Due to copyright of the instrument only two example items of each scale are presented (Avey et al., 2009)

S.E. = Standard error

* p < 0.001;

No cross-loading items

Table 5 Invariance testing model results

	Model	χ^2	<i>df</i>	TLI	CFI	RMSEA	SRMR	AIC	BIC
M1	Configural invariance	110.65*	376	0.89	0.91	0.09	0.07	39525.17	40644.17
M2	Metric invariance	1205.01*	409	0.89	0.91	0.09	0.08	39562.53	40522.37
M3	Scalar invariance	1327.47*	442	0.89	0.90	0.09	0.09	39618.99	40419.66

Note. χ^2 = Chi-square; *df* = degrees of freedom; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; BIC = Bayes Information Criterion

* Statistically significant ($p < 0.05$)

4.2. Measurement invariance

Measurement invariance was assessed in three phases. *First*, the KMO value of each age category was computed to determine sampling adequacy. Originally, separate categories for ages 18 to 25 and 26 to 35 were employed; however, as the KMO was shown to be below the suggested cut-off of 0.70 (Cerny & Kaiser, 1977), these two age categories were collapsed into one. The respondents were finally placed in the following age categories: (a) 18 to 35 ($n = 458$; KMO = 0.87), (b) 36 to 45 ($n = 194$; KMO = 0.80), (c) 46 to 55 ($n = 112$; KMO = 0.84) and (d) 56 and older ($n = 156$; KMO = 0.81). *Secondly*, as shown in tables 5 and 6, measurement invariance was computed. The results indicated no evidence of measurement invariance across the groups. Significant differences in both χ^2 and ΔCFI were found between the configural, metric, and scalar invariance models ($p < 0.05$). Therefore, *Hypothesis 2*, which suggested that the POQ was non-invariant among age categories, was *accepted*.

Table 6 Invariance testing across five different age categories

Model comparison	$\Delta\chi^2$	df	ΔCFI	p
Metric against configural	103.36*	33	0.00	0.000
Scalar against configural	225.60*	66	-0.01	0.000
Scalar against metric	122.46*	33	-0.01	0.000

Note. $\Delta\chi^2$ = Change in Chi-square; df = degrees of freedom; ΔCFI = Change in Comparative Fit Index* No statistically significant differences ($p > 0.05$)

Thirdly, given that *Hypothesis 2* was accepted, correlations between overall PO and ITL were computed to indicate the specific differences in relationship between PO and ITL among the different age categories. The results indicated a statistically significant relationship with a small effect between overall PO and ITL for both the age groups of 18 to 35 ($r = -0.20$; $p < 0.01$) and 36 to 45 ($r = -0.27$; $p < 0.01$). However, no statistically significant relationships could be found between PO and ITL for the age groups of 46 to 55 and 56+. Therefore, there were practical differences in the relationships between overall PO and ITL between the different age cohorts.

Table 8 Descriptive statistics, alpha coefficients, composite reliabilities and Pearson correlations

Variable	\bar{x}	σ	Skewness	Kurtosis	ρ	α	1	2	3	4	5	6
Overall psychological ownership	4.06	0.64	-0.73	1.25	0.94	0.82	-	-	-	-	-	-
Territoriality	2.84	1.01	0.44	-0.13	0.98	0.75	0.28	-	-	-	-	-
Self-efficacy	4.88	0.80	-1.01	2.22	0.99	0.85	0.57	-0.06*	-	-	-	-
Self-identity	4.31	1.20	-0.73	0.02	0.97	0.85	0.77	-0.13*	0.29	-	-	-
Belongingness	4.22	1.22	-0.75	0.11	0.97	0.90	0.78	-0.17*	0.39	0.76	-	-
Accountability	4.46	1.02	-0.81	0.90	0.86	0.84	0.71	0.03*	0.41	0.43	0.45	-
Intention to leave	3.01	1.19	0.01	-0.89	0.89	0.89	-0.22	0.23	-0.15*	-0.32	-0.37	-0.15

Note. 1 = Overall psychological ownership; 2 = Territoriality; 3 = Self-efficacy; 4 = self-identity; 5 = Belongingness; 6 = Accountability; 7 = Intention to leave

* Statistically significant relationship ($p < 0.01$)

Table 7 Correlation coefficients between PO and ITL among age groups

Correlations	18 to 35 years	36 to 45 years	46 to 55 years	56+ years
Overall psychological ownership and intention to leave	-0.20*	-0.27*	-0.12	-0.15

* Statistically significant relationship ($p < 0.01$)

4.3. Internal consistency, concurrent validity and relationships

Table 8 provides an overview of the descriptive statistics (means, standard deviations, skewness, kurtosis), Cronbach's alphas, composite reliabilities and Pearson relationships between the components of the POQ and ITL. The results indicated that all scales and subscales presented with acceptable levels of lower- (Cronbach's alpha > 0.70) and upper-bound limits (composite reliability/rho coefficients (ρ) > 0.80). Therefore, *Hypothesis 3*, indicating that the POQ was a reliable measure, was *accepted*.

Further, concurrent validity was established between PO (as a formative construct) and ITL because the structural model sufficiently fitted the data ($\chi^2 = 786.67$; CFI = 0.94; TLI = 0.92; RMSEA = 0.07; SRMR = 0.07). The regression path results within the structural model as shown in Table 9 indicated that ITL was a significant negative outcome variable of PO ($R^2 = 19.6\%$; $p < 0.01$) with a small effect. The results therefore showed support for *Hypothesis 4*, namely that the POQ was concurrently valid, and this hypothesis was *accepted*.

Table 9 Regression paths within the structural model

Regression path	β	S.E.	p
Psychological ownership \rightarrow Intention to leave	-0.44	0.03	0.00

5. DISCUSSION

The purpose of the current study was to evaluate the psychometric properties of the POQ within organisational contexts. Specifically, the aim was to determine the factorial validity, measurement invariance, reliability and concurrent validity of the instrument for South African organisations. The results confirmed the theoretically based arrangement of Avey et al.'s

(2009) 16-item POQ instrument comprising the five subscales of self-efficacy, self-identity, belongingness, accountability, and territoriality. High levels of factorial validity and internal consistency were established. Measurement non-invariance between the various age cohorts was established, and relational differences between PO and ITL among the different age cohorts were found. However, globally the instrument showed sufficient concurrent validity in relation to ITL.

To establish the factorial validity of the POQ, the fit of four competing measurement models was tested. The five-factor model of PO (comprising self-efficacy, self-identity, belongingness, accountability, and territoriality) fitted the data significantly better compared to the other three measurement models that were tested. The five-factor structure of the POQ as proposed by Avey et al. (2009) was thus confirmed for the South African sample used in this study. In addition, the standardised item loadings for the five latent variables loaded sufficiently on the respective latent factors (> 0.50). Previous studies conducted by Olckers and Van Zyl (2016) and Alok (2014) confirmed the five-factor structure of PO for the POQ.

Measurement invariance was tested by determining configural, metric and scalar invariance among five different age categories. As hypothesised, the POQ demonstrated evidence of non-invariance across the various age groups. Significant differences were found between the configural, metric and scalar invariance models of the different age cohorts. The results thus showed that all the employees in the different age groups did not perceive the items of the five dimensions of the POQ in the same way. Configural results showed a significant difference between the age groups, indicating that the theoretical constructs (self-efficacy, self-identity, belongingness, accountability, and territoriality) as measured by the POQ were perceived differently by the various age groups. The metric results of this study indicated that the same measurement units could not be used among the different age groups. Scalar invariance required that employees from the different age groups who had similar values about self-efficacy, self-identity, belongingness, accountability and territoriality, should display the same values on the total POQ. In this study, this was not evident across the different age groups since the values were dissimilar.

The differences between the various age groups could most probably be ascribed to several individual factors that could influence PO, such as the strength of motives, personality, a strong sense of self and personal values (Pierce et al., 2003). For example, Pierce et al. (2003) argued that individuals with high self-actualisation goals or a strong sense of self might pursue intrinsic targets as opposed to individuals with a weaker self-concept who were more prone to pursue materialistic targets. Cogin (2012) found that employees in the age group 46 and older

valued status and extrinsic rewards for their loyalty and commitment to the organisation whereas employees younger than 46 enjoyed intrinsic and less tangible rewards. Therefore, the latter age group can be demarcated as a group of individuals who have a high self-concept and a higher tendency to develop a sense of PO. Wong, Gardiner, Lang, and Coulon (2008) found that for employees in the age group 46 and older, personal values were of immense importance since they believed that their values formed part of their core identity and that their personal values and work ethics had to be aligned. However, employees in the age group younger than 46 had the perception that their personal values did not have to match work ethics or affect the route to success. With respect to the findings of the current study on this issue, it seemed that the POQ illustrated non-invariance across the different age groups.

The POQ proved to be a reliable instrument since the estimates of internal consistency indicated that all subscales presented acceptable levels at lower-bound internal consistency levels (Cronbach's $\alpha > 0.70$) as well as at upper-bound limits or so-called composite reliabilities ($\rho > 0.80$) (Wang & Wang, 2012). Studies conducted by several other authors (Avey et al., 2009; Avey et al., 2012; Olckers & Van Zyl, 2016) also reported adequate internal reliabilities.

Concurrent validity of the POQ was established by determining the relation between PO and ITL. Results indicated a significant negative relation between PO and ITL. As expected, and confirmed by previous research (Avey et al., 2009; Olckers & Enslin, 2016), ITL was negatively related to PO. Avey et al. (2009) posited that because the relationship between PO and individuals' attraction to an organisation was complex, one might reasonably assume that attraction would diminish the intention to quit.

5.1. Limitations and recommendations

Although the current study provided promising results with respect to the evaluation of the psychometric properties of the POQ for the South African organisational context, several limitations exist. First, the fact that the POQ is a self-report measure could have influenced the results. Self-report measures, which rely on individuals' self-knowledge and subjective experiences of situations, could be subject to common method bias, often resulting in measurement errors. Second, a cross-sectional design was used with the result that no causal relationships could be drawn and the temporal consistency of the POQ could not be determined. Additionally, the cross-sectional research design did not accommodate measurement over time with regard to the varying values of the variables utilised. In future, longitudinal research could

be done to explore the causal relationships between the research variables. Lastly, this study was limited to skilled and highly skilled employed individuals in both public and private organisations within the South African context, which excluded the option of a focused study.

6. CONCLUSION

The results of the current study proved the multi-dimensional POQ to be a useful, valid and reliable self-report questionnaire for the assessment of PO within the South African organisational context. Additionally, the POQ was shown to be significantly negatively related to employees' ITL. The POQ could thus be used in future research within the South African organisational context and possibly also in other contexts elsewhere.

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