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Psychometric description of the Life Orientation Test-Revised in a South African sample: A pilot study

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The relevance of dispositional optimism – as measured by the Life Orientation Test-Revised (LOT-R) – in health psychology has been convincingly demonstrated in numerous cross-national studies; however, empirical evidence of its psychometric quality and normative parameters in the South African context are lacking. Firstly, this pilot study aimed to replicate previous international psychometric and normative data analyses, and secondly, to extend the investigation into associations with clinical measures of mental health and associated measures of general psychological well-being and resilience in a South African sample. A sample of 755 adults from South African workplaces (42% women, aged 19–62 years) completed the LOT-R and a selection of self-rated measures of clinical mental health and general psychological well-being and resilience. Life Orientation Test-Revised total mean scores were comparable with international samples, with normative reference data supplied to interpret individual scores. Confirmatory factor analysis suggested a bi-dimensional model as best fit, and two independent factors were identified, namely, optimism and pessimism. Significant correlations with measures of psychological health and well-being were observed. Mental health constructs were better characterised by the presence of pessimism than the absence of optimism. No significant age or gender effects were observed but the role of language requires further clarification. This study provided a psychometric description of the LOT-R in a South African sample, including support for both the bi-dimensionality of the LOT-R in this context and its construct validity. The study further provided preliminary normative data for a local sample against which individual scores can be interpreted.

Keywords: health psychology; normative data; optimism; pessimism; psychological well-being.

Introduction

Dispositional optimism is usually understood as a personality characteristic and conceptualised as a general tendency to expect positive outcomes (Carver & Scheier, 2014; Carver, Scheier, & Segerstrom, 2010). The relevance of the construct of optimism in health psychology has been convincingly demonstrated in numerous studies. Optimism has been associated with differences in mental and physical health, quality of life, adaptive coping styles, life satisfaction, recovery after severe illness and mortality (cf. Hinz et al., 2017, p. 162, for a summary), and has been linked to a range of biological markers and pain responses (cf. Schou-Bredala et al., 2017, p. 217, for a summary). Pertinent to the context of this article, its association with markers of mental health and psychological well-being (e.g. depression, anxiety, fatigue, self-efficacy, perceived stress) has been established in various cross-continental contexts (Yew, Lim, Haw, & Gan, 2015; Zenger et al., 2013; also cf. Schou-Bredala et al., 2017, p. 217, for a summary).

Internationally, the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994) is the tool used most often for measuring dispositional optimism. The LOT-R is a 10-item scale that comprises three items (reflecting optimism) that are scored positively, three items (reflecting pessimism) that are reversed scored and four filler items that are not scored. Items are rated on a five-point Likert scale (0 = strongly disagree, 4 = strongly agree). It has been translated into many languages and psychometrically tested in multiple studies, which included tests of its dimensional structure (Cano-García et al., 2015; Glaesmer et al., 2012; Zenger et al., 2013), temporal stability (Saboonchi et al., 2016) and item response theory (Chiesi, Galli, Primi, Borgi, & Bonacchi, 2013; Steca, Monzani, Creco, Chiesi, & Primi, 2015). Cross-national comparisons suggest that optimism varies between countries (Gallagher, Lopez, & Pressman, 2013; Schou-Bredala et al., 2017). Normative values of the general population are available for Germany (Glaesmer et al., 2012; Hinz et al., 2017), Colombia (Zenger et al., 2013), Brazil (Bastianello, Pacico, & Hutz, 2014), the United Kingdom (Walsh et al., 2015) and Norway (Schou-Bredala et al., 2017) amongst others.

There is an ongoing debate regarding the dimensionality of the LOT-R. The original authors described the scale as a continuum in which pessimism and optimism are viewed as polar opposites and not as separate dimensions (Scheier et al., 1994), and continue to recommend that the LOT-R be used as a unidimensional scale in primary analyses (Carver et al., 2010). In support, some recent studies endorsed the one-dimensionality of the LOT-R and suggested that previously reported bi-factorial structures were artefacts of item wording (Cano-Garcia et al., 2015; Monzani, Steca, & Greco, 2014; Steca et al., 2015). However, most large sample studies using factor analysis tend to describe optimism and pessimism as two, at least partially, independent (but weakly related) factors (Glaesmer et al., 2012; Hinz et al., 2017; Zenger et al., 2013). Researchers further described increased independence of optimism and pessimism with increased age (Creed, Patton, & Bartrum, 2002; Glaesmer et al., 2012; Hinz et al., 2017). Age and gender effects appear to be marginal across international samples (Bastianello et al., 2014; Glaesmer et al., 2012; Hinz et al., 2017; Schou-Bredala et al., 2017; Steca et al., 2015; Zenger et al., 2013).

The LOT-R as a measure for dispositional optimism has been established in South and North America (Bastianello et al., 2014; Scheier et al., 1994; Trottier, Mageau, Trudel, & Halliwell, 2008; Zenger et al., 2013), Europe and Asia (Glaesmer et al., 2012; Hinz et al., 2017; Lai & Yue, 2000; Schou-Bredala et al., 2017; Walsh et al., 2015; Yew et al., 2015) and Australia (Creed et al., 2002). Empirical evidence of its psychometric quality in African samples has not yet been established. The existing South African (SA) empirical studies using the LOT-R have been conducted on a smaller scale (Koen, Van Eeden, & Wissing, 2011; Maree, Maree, & Collins, 2008; Rothmann, Barkhuizen, & Tytherleigh, 2008), each investigating highly specific samples, which limits the extent to which the outcomes could be generalised.

Before the LOT-R can be considered for use in health research with general samples within SA, there is a need to examine the evidence of its validity in the local context. South Africa has a diverse and multilingual population, with wide disparities in education, income and access to health care. In order to provide a psychometric description, a replication of cross-national studies reporting on psychometric properties and population-based norms of the LOT-R is therefore indicated.

This article describes a pilot study designed to establish the usefulness of continuing with population-based data collection for the LOT-R. The study aimed to replicate previous psychometric and normative data analyses and also to extend the investigation into associations with clinical measures of mental health, and associated measures of general psychological well-being and psychological resilience. The study set three specific objectives, namely (1) to provide psychometric description for a SA sample (using the standard English version of the LOT-R), including dimensionality, internal consistency and socio-demographic effects; (2) to explore its associations with mental health and associated psychological markers, in order to consider construct validity; and (3) to provide provisional normative data for SA workplace samples for use in local health psychology research.

Methods
Participants
This pilot study used a sample from SA workplaces ($N = 755$). All participants were considered skilled workers, had a minimum 10 years of schooling and identified themselves as proficient in English, although only about 20% reported English as their first language. The educational inclusion criterion was partially to ensure a level of English proficiency sufficient to complete the LOT-R and other measures. As a result of a technical error, language data were only available for 82% of the sample, with the distribution presented in Table 1. Participants were recruited to complete the measures anonymously during visits to their workplaces, which comprised a wide range of occupational backgrounds (see Table 1).

Measures
The LOT-R was administered in its standard version in English. The original normative study (Scheier et al., 1994) reported a single factor accounting for 48% of variance, with $\alpha = 0.78$. Test–retest reliability ranged from 0.68 over 4 months to 0.79 over 28 months. International studies reported a range of alpha coefficients, from 0.58 to 0.80 (see Table 2), whilst a local study (Koen et al., 2011) reported $\alpha = 0.59$. Psychometric properties of the LOT-R from various cross-national studies are summarised in Table 2 for comparison with figures from the present sample.

Study participants also completed a selection of other measures. Not all participants completed all scales, and the

TABLE 1: Language and occupational backgrounds of sample.

Sample distribution	%
Language	
English	21.3
Setswana	11.7
Sesotho	10.2
Sepedi	7.7
isiXhosa	13.6
isiZulu	13.4
Tsivenda	4.1
isiTsonga	1.9
Afrikaans	12.3
Ndebele	1.4
Siswati	1.4
Other	1.0
Occupational sector	
Catering and hospitality	12.0
Clerical workers	17.0
Communication specialists	14.0
Engineers	11.0
Security forces (police and military)	19.0
Technicians (mechanical and electrical)	19.0
Other	8.0

TABLE 2: Psychometric properties of the Life Orientation Test-Revised.

Source	Variable	N	Factors	LOT-R score		Optimism		Pessimism		Alpha (total score)	Alpha (optimisms subscale)	Alpha (pessimism subscale)	Subscale correlation	
				Mean	SD	Mean	SD	Mean	SD				R	p
Population-based samples														
Glaesmer et al., 2012	Germany	2372	2	15.2	3.8	8.5	2.3	5.3	2.7	0.68	0.70	0.74	-0.20	-
Zenger et al., 2013	Colombia	1500	2	16.1	4.1	9.4	2.5	5.3	2.9	0.58	0.72	0.57	-0.12	0.001
Bastianello et al., 2014	Brazil	844	1	23.6	4.7	-	-	-	-	0.80	-	-	-	-
Hinz et al., 2017	Germany	9711	2	16.2	3.8	8.8	2.5	4.5	2.4	0.66	0.70	0.63	-0.22	-
Schou-Bredala et al., 2017	Norway	1792	-	17.2	3.1	9.7	1.3	4.5	2.8	0.75	0.84	0.77	-0.18	0.001
South African specific samples														
Rothmann et al., 2008	South African academic staff	279	-	21.95	10.5	-	-	-	-	-	-	-	-	-
Maree et al., 2008	South African students	474	-	-	-	-	-	-	-	-	0.64	0.68	-	-
Koen et al., 2011	South African nurses	312	-	14.9	3.4	-	-	-	-	0.59	-	-	-	-
Original validation														
Scheier et al., 1994	Students	2055	1	14.33	-	-	-	-	-	0.78	-	-	-	-
	Bypass patients	159	-	15.16	-	-	-	-	-	-	-	-	-	-
Current sample	South Africa	755	2	16.42	2.9	9.0	1.8	4.6	2.3	0.39	0.45	0.51	-0.007	0.838

LOT-R, Life Orientation Test-Revised.

total N for each scale will be indicated in the applicable tables. The following clinical measures of mental health were included in the study.

The Patient Health Questionnaire for depression (PHQ-9; Gilbody, Richards, & Barkham, 2007) is a nine-item measure that is scored on a four-point Likert scale (range 0–27), with higher scores indicating higher levels of depression. Moderate correlations have previously been reported for the LOT-R and PHQ-9 (Glaesmer et al., 2012), and other scales of depression (Zenger et al., 2013).

The Generalised Anxiety Disorder questionnaire (GAD-7; Löwe et al., 2008) is a seven-item measure that is scored on a four-point Likert scale (range 0–21), with higher scores indicating higher levels of anxiety. Moderate correlations have also been reported for the LOT-R and GAD-7 (Glaesmer et al., 2012), and other scales of anxiety (Zenger et al., 2013).

The CAGE questionnaire for problematic alcohol use (Dhalla & Kopec, 2007) is a four-item measure, scored as YES/NO (range 0–4), with higher scores indicating more problematic alcohol use.

The following measures of general psychological well-being were also included in the study:

- The Stress Overload Scale (SOS; Amirkhan, 2012) is used to indicate appraisals of demands and personal resources. It has 24 scored items using a 5-point Likert scale (range 24–120), with higher scores indicating greater appraisal of stress overload. Two factor scores can also be calculated, namely event load and personal vulnerability. Moderate to strong correlations have previously been reported for the LOT-R and Perceived Stress Scale (PSS; Chang, 1998; Yew et al., 2015).

- The State Trait Personality Inventory, Trait version (STPI; Spielberger, 1996) reflects emotional disposition. It has

four 10-item subscales, each scored on a 4-point Likert scale (range 10–40), with higher scores indicating greater endorsement of the respective emotional dispositions (namely, trait anxiety, curiosity, anger and depression). A strong correlation with trait anxiety was reported in the original validation study (Scheier et al., 1994).

Finally, two scales of psychological resilience were included to examine associations between the LOT-R and other measures from positive psychology:

- The Dispositional Resilience Scale (DRS-15; Bartone, 2007) is a 15-item measure that is scored on a 4-point Likert scale (range 0–45), with higher scores indicating greater resilience. The Mental Toughness Questionnaire (MTQ-18; Clough, Earle, & Sewell, 2002) is an 18-item measure that is scored on a five-point Likert scale (range 18–90), with higher scores again indicating greater resilience. Strong correlations have previously been reported for measures of dispositional optimism and resilience (Sagone & De Caroli, 2015), and the above two measures were specifically included because of their previous use for measuring resilience in SA (Arendse, Bester, & Van Wijk, 2020).

Participants also completed a brief health questionnaire and were asked to indicate their health status with regard to debilitating acute or chronic diseases. Its purpose was to exclude severe medical conditions that could unduly influence responses to the psychological scales.

Analysis

All statistical analyses were conducted by Statistical Package for Social Sciences (SPSS version 27) and analysis of moment structures (AMOS). Internal consistency was examined with Cronbach's alpha, inter-item correlations and corrected item-total correlations. Against the ongoing debate on dimensionality, the lack of previous factor analytic studies from SA and the poor alpha coefficients found in the current sample, a confirmatory factor analysis (CFA) was conducted.

TABLE 3: Goodness-of-fit indices for confirmatory factor analysis.

Model	χ^2	df	χ^2/df ratio	CFI	TLI	RMSEA	90%CI
1-factor	179.954**	9	19.99	0.342	0.534	0.159	0.139–0.179
2-factor	24.642*	8	3.08	0.936	0.832	0.053	0.030–0.077

CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation, 90% CI, 90% confidence interval; df, degree of freedom.
*, $p < 0.01$; **, $p < 0.001$.

Confirmatory factor analysis is a special form of factor analysis used to test whether data fit a hypothesised measurement model (Marker, 2002). The Maximum Likelihood estimator was used to explore a 1- and 2-factor model fit. For a CFA, the global fit χ^2 would be preferred to be small and not significant. This is rarely achieved, and the following indices with cut points were also taken into consideration: the root mean square error of approximation (RMSEA) should be < 0.06 to < 0.08 for continuous data, whilst both the comparative fit index (CFI) and the Tucker–Lewis index (TLI) should be > 0.95 (Schreiber, Nora, Stage, Barlow, & King, 2006).

The effects of socio-demographic variables were explored using Pearson's correlation coefficients (for age effects) and t-tests for independent samples (for gender and language effects). For this analysis, language was coded into two groups, namely, English first language (21.3%) and non-English first language (78.7%).

As mentioned earlier, cross-national comparisons indicated variable scores between countries (Gallagher et al., 2013; Schou-Bredala et al., 2017), requiring individual LOT-R scores to be interpreted using local norms (Glaesmer et al., 2012). In line with best practice for LOT-R reporting (Glaesmer et al., 2012), SA normative data will be presented using standardised scores.

Construct validity was explored by calculating the associations of LOT-R scores and markers of clinical mental health (PHQ-9, GAD-7, CAGE) and general psychological well-being and resilience (SOS, STPI, DRS-15, MTQ-18) using correlation with Correction for Attenuation.

Ethical considerations

This study was a voluntary, anonymous, survey. The approval to conduct the study was received from the Stellenbosch University Health Research Ethics Committee (No. N20-07-078).

Results

The sample of 755 participants (women = 42%, men = 58%) had a mean age of 32.8 (± 7.4; range 19–62). The sample described a positive health status, self-reporting a general absence of debilitating acute or chronic disease. There were no meaningful differences in the composition of the five subsamples referenced in Table 5 with regard to age, gender or language. The sample included a wide distribution across the working age, gender, home language and occupational categories.

The LOT-R total scale mean score was 16.4 (± 2.9), which differed significantly from the means reported by local SA

TABLE 4a: Comparison of means of gender groups for Life Orientation Test-Revised total and subscale scores.

Gender	Mean		SD		t	p	Mean difference
	Women	Men	Women	Men			
Total scale	16.57	16.35	2.83	2.93	-0.948	0.343	0.21
Optimism	8.96	9.08	1.83	1.80	0.876	0.381	0.12
Pessimism	7.61	7.27	2.14	2.33	-0.1907	0.067	0.34

SD, standard deviation.

TABLE 4b: Comparison of means of language groups for Life Orientation Test-Revised total and subscale scores.

Language	Mean		SD		t	p	Mean difference
	English first language	Non-English first language	English first language	Non-English first language			
Total scale	17.34	16.35	3.49	2.70	2.642	0.009	0.99
Optimism	8.97	9.10	2.00	1.83	-0.606	0.545	0.13
Pessimism	8.37	7.25	2.39	2.23	4.299	< 0.001	1.12

SD, standard deviation.

studies presented in Table 2 (t-tests for single samples not reported here). Further basic psychometric properties are reported in Table 2. The LOT-R total score was normally distributed (skewness = 0.317, SE = 0.089; kurtosis = –0.111, SE = 0.178). In terms of internal consistency, the LOT-R performed poorly with a total scale Cronbach's alpha of 0.39. No deletion of items improved the alpha. Corrected item-total correlations ranged from 0.24 to 0.32 for optimism subscale items and from 0.29 to 0.40 for pessimism subscale items. Inter-item correlations ranged from 0.15 to 0.26 for the optimism subscale and from 0.17 to 0.31 for the pessimism subscale.

Dimensionality

The 6-item LOT-R was subjected to CFA, and the results are presented in Table 3. All model fit indices of the CFA indicated that the assumption of a bidimensional structure of the LOT-R fits the data much better than the unidimensional structure. Although the two-factor model did not obtain a non-significant χ^2, the value was not excessively high. The RMSEA (0.053) was sufficiently small (< 0.06), and the CFI (0.93) was close enough to 0.95, although the TLI (0.83) was the exception (Table 3). The two subscales did not significantly correlate with each other ($r = –0.007$, $p = 0.838$), further suggesting two independent constructs, rather than a bipolar scale.

Socio-demographic effects

There were no significant age effects for the total score ($r = 0.056$, $p = 0.125$) or optimism subscale score ($r = –0.031$, $p = 0.394$), with a significant but very small effect for the

TABLE 5: Correlations with selected mental health markers.

Source	Country	Scale sample α	LOT-R (total) r (CA)	LOT-R sub-sample α	Optimism r (CA)	Optimism sub-sample α	Pessimism r (CA)	Pessimism sub-sample α
Glaesmer et al., 2012	Germany	-	-	-	-	-	-	-
PHQ depression		-	-0.32***	-	-0.31***	-	0.19***	-
PHQ general anxiety		-	-0.22***	-	-0.22***	-	0.13***	-
Zenger et al., 2013	Colombia	-	-	-	-	-	-	-
HADS depression		-	-0.41***	-	-0.44***	-	0.19***	-
HADS anxiety		-	-0.39***	-	-0.41***	-	0.18***	-
Scheier et al., 1994	U.S. Students	-	-	-	-	-	-	-
STAI-T		-	-0.53***	-	-	-	-	-
Current sample	South Africa	-	-	-	-	-	-	-
PHQ-9 (depression) (*N* = 458)		0.85	-0.396	0.40	-0.223	0.40	0.288	0.49
GAD-7 (generalised anxiety) (*N* = 458)		0.88	-0.278	0.40	-0.150	0.40	0.207	0.49
CAGE (problematic alcohol use) (*N* = 458)		0.67	-0.301	0.40	0.056	0.40	0.382	0.49
SOS (total) (*N* = 377)		0.94	-0.396	0.41	-0.163	0.37	0.329	0.52
Event load		-	-0.316	-	-0.105	-	0.279	-
Personal vulnerability		-	-0.441	-	-0.209	-	0.348	-
DRS-15 (*N* = 216)		0.65	0.623	0.35	0.571	0.40	-0.265	0.50
MTQ-18 (*N* = 228)		0.86	0.935	0.35	0.556	0.39	-0.627	0.48
STPI-T Anxiety (*N* = 240)		0.75	-0.706	0.52	-0.792	0.24	0.598	0.51
Curiosity		0.69	0.736	0.52	0.978	0.24	-0.544	0.51
Anger		0.80	-0.375	0.52	0.005	0.24	0.543	0.51
Depression		0.78	-0.730	0.52	-0.652	0.24	0.709	0.51

CA, correction for attenuation; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalised Anxiety Disorder scale-7; SOS, Stress Overload Scale; STPI-T, State-Trait Personality Inventory, trait version; DRS-15, Dispositional Resilience Scale-15; MTQ-18, Mental Toughness Questionnaire-18; US, United States; LOT-R, Life Orientation Test-Revised.

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

pessimism subscale score ($r = 0.096$, $p = 0.008$). No significant gender differences were observed (Table 4a). For the sub-sample where language data were available, there was a significant difference in the mean scores between the English first language and non-English first language subgroups (Table 4b) although the mean difference was < 1, which may not be practically meaningful. Differences across language groups for the optimism subscale were non-significant, but significant for the pessimism subscale (mean difference = 1).

Correlations with mental health and associated psychological markers

Construct validity indicators are reported in Table 5. Dispositional optimism correlated with clinical measures of depression and anxiety, and perceived stress overload, with moderate effect sizes. Correlations for the three clinical scales, as well as the SOS, were stronger for the pessimism than for the optimism subscale.

For measures of general psychological well-being, correlations with large effect sizes were observed for dispositional anxiety, curiosity and depression. Furthermore, correlations with large effect sizes were found for the DRS-15 and the MTQ-18. Again, in some cases (e.g. MTQ-18), stronger correlations were observed for the pessimism than the optimism subscale.

Preliminary normative data

In the absence of significant age and gender effects, normative reference data were developed for the full sample (Table 6).

Discussion
Comparisons with other countries and local studies

The total LOT-R mean score of 16.4 was comparable with most international samples (with the notable exception of Brazil; Bastianello et al., 2014), as were the subscale means. The significant differences in the mean scores from local studies may emphasise differences within the SA society – the current sample mean fell in-between the two previous reported local means (which represented discrete and highly individualised samples), and the internationally comparable mean score could possibly be attributed to the wide range of occupational domains included in the present sample, as opposed to the previous SA samples. This may speak to the need for adequately diversified sampling when doing any general health psychology research in SA.

Despite similar LOT-R mean scores, the standardised scores distribution for the SA sample (Table 6) differed in its nuanced spread to normative data from comparable international studies (cf. Glaesmer et al., 2012; Hinz et al., 2017; Schou-Bredala et al., 2017; Zenger et al., 2013), emphasising the requirement for local reference norms to enable meaningful interpretation of individuals' scores.

Psychometrics

Evidence of a two-factor scale structure was found in the results of the CFA, which suggested the hypothesised bi-dimensional model as best fit for this SA sample. The two factors displayed no significant correlation with each other and further appeared to display different patterns of

TABLE 6: Preliminary employed South Africans reference norms.

Raw score	LOT-R total scale		Optimism subscale		Pessimism subscale	
	Percentile	*T*-score	Percentile	*T*-score	Percentile	*T*-score
0	-	-	-	-	0.1	17.6
1	-	-	-	-	0.3	22.0
2	-	-	0.0	11.0	0.9	26.4
3	-	-	0.1	16.6	2.7	30.8
4	-	-	0.3	22.1	6.9	35.2
5	-	-	1.3	27.7	14.8	39.6
6	-	-	4.6	33.2	27.2	43.9
7	-	-	13.0	38.7	43.4	48.3
8	-	-	28.2	44.2	60.7	52.7
9	-	-	49.1	49.8	76.1	57.1
10	1.3	27.9	70.2	55.3	87.5	61.5
11	3.1	31.3	86.0	60.8	94.4	65.9
12	6.4	34.8	94.9	66.4	97.9	70.3
13	11.9	38.2	-	-	-	-
14	20.2	41.6	-	-	-	-
15	31.2	45.1	-	-	-	-
16	44.2	48.5	-	-	-	-
17	57.9	52.0	-	-	-	-
18	70.7	55.4	-	-	-	-
19	81.3	58.9	-	-	-	-
20	89.1	62.3	-	-	-	-
21	94.3	65.8	-	-	-	-
22	97.3	69.2	-	-	-	-
23	98.8	72.7	-	-	-	-
24	99.6	76.1	-	-	-	-

LOT-R, Life Orientation Test-Revised.

correlation with other measures. In this regard, the three clinical scales, as well as the SOS and MTQ-18, showed stronger associations with the pessimism than with the optimism factor. Although the findings around dimensionality appear contrary to some recent reports, which suggested that the LOT-R taps a single construct (Cano-Garcia et al., 2015), it does follow the pattern found with European, South American and Asian population samples (Glaesmer et al., 2012; Lai & Yue, 2000; Zenger et al., 2013). More problematic is the poor internal consistency. The weak alpha stands in contrast with other reports and cautions against an uncritical use of the LOT-R in the African context. Language diversity, particularly in responding to negatively valanced items, may have contributed to the poor internal consistency.

No significant age or gender effects were observed, and it is consistent with previous studies. Home language offered a more complex outcome: whilst there was a significant difference in mean scores between English first language and non-English first language speakers, the difference was very small, and any practical meaning is not yet clear. Further research studies would be required to enhance confidence when using the English version test across SA language groups (at least in cases where appropriate English proficiency can be demonstrated). Interestingly, there was no significant difference across the two language groups for optimism mean scores, but a significant and larger mean difference for pessimism scores. In terms of direct language effect, the use of negatively valanced items – such as the three items of the pessimism subscale – has previously been implied as problematic in non-English first language-speaking SA

samples (Arendse et al., 2020), where the negative wording may require a higher level of English proficiency to interpret accurately. A similar split between positively and negatively worded items have also been observed in Chinese samples (Lai & Yue, 2000). In terms of actual optimism, South Africa's political history resulted in individuals raised with different levels of access to resources and ensuing beliefs regarding future opportunities, which could conceivably have influenced the development of dispositional optimism across different subgroups (which historically were often associated with language). This, however, remains speculative, and further research would be required to investigate these issues formally.

Correlations with markers of associated psychological constructs

Evidence of construct validity was observed in the meaningful correlations with markers of clinical mental health, general psychological well-being and resilience, in this sample of healthy South Africans. In general, correlations with mental health markers were similar or slightly higher than what have been reported in previous studies. As expected, LOT-R scores were associated with depressiveness and anxiety, as well as problematic alcohol use. Emotional disposition, as a measure of general psychological well-being, and quantified by the STPI, showed the highest correlations with dispositional optimism, which closely reflected the original conceptualisation and reported correlations of Scheier et al. (1994). Furthermore, contrary to some previous reports (cf. Glaesmer et al., 2012; Zenger et al., 2013), a general pattern appeared where mental health constructs were better characterised by the presence of pessimism than the absence of optimism. This observation supports previous reports that pessimism, but not optimism, was a better predictor of longer term psychological and physical health outcomes (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997).

The association with perceived stress, whilst in the expected direction, was not as strong as previous reports (Chang, 1998; Yew et al., 2015), although this may be partly because of different measures used (i.e. PSS vs. SOS). The association with resilience measures followed the expected direction. The comparatively weak correlation with the DRS-15 may be instrument, rather than construct, related, as a previous study recommended caution when using the DRS-15 for measuring resilience in the SA context (Arendse et al., 2020). The strong correlations with the MTQ-18 suggest that both the LOT-R and the MTQ-18 may be useful to measure constructs of positive psychology in SA. Across the various instruments, full-scale correlations were stronger, and until further research is carried out, the use of total scores rather than subscale scores would be recommended for future SA health psychology studies. It was noteworthy that the pattern of correlations was consistent across measures of psychological distress (e.g. PHQ-9, GAD-7), as well as measures of psychological well-being (e.g. STPI, MPQ-18).

The evidence of construct validity – in its association with measures of mental health and psychological well-being –

provide support for the use of the LOT-R in local health psychology research.

Limitations and future directions

A number of limitations to this study need to be mentioned. It was a pilot study, with concomitant limited size, and the sample cannot necessarily be considered representative of a general population of proficient English speakers. Furthermore, English proficiency was assumed. The assumption was based partly on self-evaluated proficiency, and partly on reported educational attainment, and it is recognised that education may not be a good proxy for language proficiency in SA. Future SA studies will need to expand sampling to clarify language effects, as well as repeat factor analysis and internal consistency calculations with larger samples. Expanding studies to include other samples of sub-Saharan Africa would further elucidate the influence of localised environments.

When further validation for the use of the LOT-R in African contexts has been obtained, it can be productively applied to local health research. The LOT-R was originally conceptualised to express relationships between dispositional optimism and long-term psychological and physiological health outcomes, and could be used for the same purpose in longitudinal studies to explore relationships between dispositional factors and health in local contexts.

Conclusion

This study made a novel contribution, firstly, by providing support for the bi-dimensionality of the LOT-R in a SA sample, and secondly, by presenting preliminary normative data for a SA sample against which individual scores can be interpreted. In terms of practical application, the wide distribution of participants supported a single set of reference data that can be used across gender and age variables.

This study further provided support that the LOT-R may contribute by extending health psychology research into multiple constructs of clinical mental health, as well as general psychological well-being and resilience, in the local context. However, caution must be observed for possible effects of language proficiency, whilst the poor internal consistency cautions against any uncritical use of the instrument in South African studies.

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Competing interests

The author declares that he has no financial or personal relationships that may have inappropriately influenced him in writing this article.

Author's contributions

C.H.v.W. declares that he is the sole author of this article.

Data availability

The data that support the findings of this study are available from the author, upon reasonable request. The data are not publicly available because of privacy and ethical consideration.

Disclaimer

The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of any affiliated agency of the author.

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