Abstract

Proactive coping and preventive coping are the two most commonly researched forms of future-oriented coping. There is however, contention in the literature regarding the underlying factor structure of proactive and preventive coping: some studies report they are separate constructs, while others have combined them together along with other constructs. Given the growing literature using these forms of future-oriented coping, it is important to clarify the underlying structures of these measures. To inform these discussions, the factor structures of both proactive and preventive coping were empirically assessed with three independent samples. Sample 1 ($N = 181$) investigated the underlying structures using exploratory factor analytic techniques, with the resulting factors then examined in Sample 2 ($N = 282$) and Sample 3 ($N = 345$) using confirmatory factor analyses. The results supported the differentiation between proactive and preventive coping, revealing two distinct factors, however correlations with personality and psychological strain were inconsistent between the samples. These results contribute to recent discussions by demonstrating proactive and preventive coping are both uni-dimensional constructs as measured by the Proactive Coping Inventory, yet the conceptual distinctions may not be supported empirically in older and more educated samples. Future research is required to enhance our understanding of the theoretical distinction between the two coping scales in heterogeneous samples.

Keywords

Proactive Coping, Preventive Coping, Proactive Coping Inventory, Scale Revision

1. Introduction

The importance of effectively managing stressful events due to their potential for negative consequences for individuals, organisations, and society, is widely acknowledged. As the future contains a number of known and unknown stressors, investigating and understanding coping efforts aimed at managing potential future stressors is a valuable area of research that has received recent attention (e.g., Drummond & Brough, in press). Within the future-oriented coping literature, the two most widely researched forms of coping are *proactive coping* and *preventive coping*. Schwarzer (2000) defined proactive coping as efforts aimed at building up resources to enhance one's potential and opportunities for personal growth, while preventive coping involves accumulating resources to reduce the severity of potential negative outcomes.

Schwarzer, Greenglass and colleagues developed a measure of future-oriented coping: the *Proactive Coping Inventory* (PCI; Greenglass, Schwarzer, Jakubiec, Fiksenbaum & Taubert, 1999; Greenglass, Schwarzer & Taubert, 1999b). The PCI consists of seven subscales, six of which assess different components of future-oriented coping (*proactive coping, preventive coping, reflective coping, strategic planning, emotional support seeking,* and *instrumental support seeking*), while the final subscale assesses *avoidance coping*. Coping as measured by the PCI is conceptualised as an "approach to life, an existential belief that things will work out…because the individual takes responsibility for outcomes" (Greenglass et al., 1999a, p. 5). In this regard, proactive and preventive coping as measured by the PCI are considered to be dispositional measures of coping (e.g., Roesch, Aldridge, Huff, Langer, Villodas & Bradshaw, 2009; Zhou, Gan, Knoll, & Schwarzer, 2013).

It is widely recognised that valid and reliable measurement tools are crucial to progress our understanding of conceptual constructs. It is therefore important to investigate

and clarify the measures when mixed findings are reported in the literature. The current paper aims to do this for the measurement of proactive coping and preventive coping.

Similar to the difficulties in assessing the measurement of traditional (past-oriented) coping (e.g., Brough, O'Driscoll, & Kalliath, 2005), the measurement of future-oriented coping has also resulted in inconsistent findings. Replication of the uni-dimensionality of the PCI by independent researchers has produced mixed findings: while some studies have found support for the uni-dimensional nature of the constructs, others have not. For example, both Wu, Chen and Yao (2008) and Roesch et al. (2009) conducted individual assessments of proactive and preventive coping as measured with the PCI, and reported evidence that both measures were uni-dimensional. However, Lopes and Cunha (2008) found evidence to suggest that proactive coping was best represented by two factors: *proactive coping* and *passive coping*, with passive coping comprised of two of the three reverse-worded items. Possible reasons for these differences may be related to the samples utilised in each study. For example, Wu et al. (2008) and Roesch et al. (2009) both sampled university students over-represented by females (65% and 74% respectively) with a mean age of approximately 20 years, whereas Lopes and Cunha (2008) surveyed a group of employees with more evenly distributed gender (51% female) where approximately half of the sample was aged between 26 and 35 years.

Similarly, replication of proactive and preventive coping as individually unique constructs has also produced mixed results. While some research has found support for the distinctiveness of the two constructs (e.g., Gan, Yang, Zhou & Zhang, 2007; Sohl & Moyer, 2009), other research has combined these two measures with other coping and/or personality variables. For example, Moring, Fuhrman, and Zaunszniewski (2011) reported that proactive coping and preventive coping formed one 'planning' factor along with other active coping measures. Similarly, Vernon, Dillon, and Steiner (2009) combined proactive coping with

proactive personality and self-efficacy to produce a single 'proactive' construct. It appears that when investigated in conjunction with other measures, proactive and preventive coping are often combined, although the theoretical explanations for this combination are not clear. Unlike the sample differences that may account for differences in dimensionality, the studies referred to here were all conducted with university students with an average age of approximately 20 years and a higher proportion of female respondents. Furthermore, with the exception of Gan et al. (2007), these samples all consisted of US university students. It is also possible that the type of analyses performed contributed to the different results. For example, Gan et al. performed an EFA with proactive and preventive coping items, followed by CFAs with item parcels. Sohl and Moyer (2009) also used CFAs with item parcelling. Conversely, Moring et al. (2011) performed an EFA using proactive and preventive coping scaled scores (rather than items) along with scaled scores of other coping measures, and Vernon et al. (2009) conducted an EFA with items from scales measuring proactive coping, proactive attitude, and self-efficacy. As Moring et al. only used scaled scores, and as Vernon et al. did not include preventive coping in their analyses, in addition to Gan et al. and Sohl and Moyer using item parcels in their CFAs, further investigation into item-level EFA and CFA analyses with both proactive and preventive coping is warranted.

Research has also reported revisions to the PCI scales, notably via the deletion of scale items (e.g., Lopes & Cunha, 2008; Roesch et al., 2009; Vernon et al., 2009; Wu et al., 2008). It has been consistently demonstrated across a range of samples that the second item of the proactive coping scale ("*I try to let things work out on their own*" – reverse scored) does not load highly on the proactive coping factor, resulting in its deletion (e.g., Chinese college students: Gan et al., 2007; Spanish employees: Lopes & Cunha, 2008; American college students: Roesch et al., 2009 and Vernon et al., 2009; and Taiwanese college students: Wu et al., 2008). These varied samples indicate that the item did not behave as

intended in samples of university students or working adults from different cultures, of varying ages and gender breakdowns. These findings warrant the further inspection of thia second item in subsequent proactive coping research.

Based on the aforementioned examples of prior research, we thought it prudent to conduct an a-priori assessment of the constructs using exploratory factor analytic techniques and follow this with confirmatory analyses, to more clearly understand the underlying structural relationships of the PCI. To maintain consistency with prior research and to more closely understand the constructs as they have been previously tested, we include three samples of university students and working adults with a stronger female-oriented gender breakdown. We hypothesise that; consistent with theory and some existing research, proactive coping and preventive coping are both distinct uni-dimensional constructs (H1).

2. Method

2.1. Participants and Procedure

2.1.1 Sample 1

Sample 1 was comprised of psychology undergraduate university students who participated in exchange for course credit (first year participants only) or a chance to win $150 cash (all other undergraduate students). Hard copy surveys were distributed to a total of 335 research participants, with $N = 182$ usable survey responses collected, representing a 54% response rate. The majority of these respondents were female ($n = 159$; 87%), aged between 17 to 52 years ($M = 23.19$, $SD = 7.01$), and were studying full-time ($n = 171$; 94%). Approximately half of the respondents were in their first year of their bachelor's degree ($n = 92$; 51%), with a quarter in their third year ($n = 45$; 25%).

2.1.2 Sample 2

Sample 2 was comprised of a convenience sample of participants recruited through online networks and University sources. All participants received a link to an online

confidential survey. A total of 286 respondents completed the survey and the majority were female (n = 230; 80%), aged between 15 to 71 years (M = 30.04, SD = 13.02), and had a tertiary qualification (i.e., certificate, bachelor or postgraduate degree; n = 166; 58%). Approximately one quarter of respondents were employed full-time (n = 75; 26%), and 44% (n = 126) were employed part-time, while another quarter were not currently working (n = 85; 29%). Respondents were primarily working in clerical/sales/service job roles (n = 78; 27%) or in professional roles (n = 76; 27%).

2.1.3 Sample 3

Sample 3 was comprised of employees from a not-for-profit organisation involved in health and community service work. An online survey link was sent to all employees inviting them to complete the anonymous survey. A total of N = 352 employees provided useable survey responses. The respondent sample was comprised primarily of females (n = 270; 77%) aged between 41 and 60 years (n = 200; 57%) who had achieved a tertiary qualification (i.e., certificate, bachelor or postgraduate degree; n = 304; 86%), and who were employed full-time (n = 245; 70%).

2.2 Measures

The proactive coping and preventive coping subscales of the PCI (Greenglass et al., 1999b) were used to assess proactive and preventive coping. Proactive coping was comprised of 14 items such as "I am a 'take charge' person", and preventive coping was comprised of 10 items such as "I prepare for adverse events." Responses were scored on a 4-point scale ranging from 1 (not at all true) to 4 (completely true). Greenglass et al. (1999a) reported reliability coefficients between .80 and .85 for proactive coping, and between .79 and .83 for preventive coping.

Optimism was measured with the six-item Revised Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994). Three positively-worded and three-negatively worded

items were scored on a 5-point scale from 0 (strongly disagree) to 4 (strongly agree). An example item is "I'm always optimistic about my future." Reliability coefficients ranging from .70 to .81 have been reported in the literature (Geers, Helfer, Kosbab, Weiland, & Landry, 2005; Mäkikangas, Kinnunen, & Feldt, 2004; Scheier et al., 1994).

Neuroticism was assessed with 12 items from the NEO–Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992). Respondents indicated their agreement or disagreement on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item is "I often feel tense and jittery." Reported reliability coefficients range from .81 to .88 (Costa & McCrae, 1992; Eaton & Bradley, 2008).

Context-free psychological strain was measured using the 12-item General Health Questionnaire (GHQ-12; Goldberg, 1972). Respondents indicated their degree of psychological health over the past few weeks relative to their usual level of health on a 4-point scale ranging from 0 (not at all) to 3 (much more than usual). An example item is "Been losing confidence in yourself?" Acceptable reliability coefficients ranging from .85 to .91 have been reported in the literature (Kalliath, O'Driscoll, & Brough, 2004; Mansell, Brough, & Cole, 2006).

2.3 Statistical Analyses

Given the contention in the literature discussed earlier, we conducted an exploratory factor analysis (EFA) in Sample 1 to clarify the underlying structure of proactive and preventive coping. An oblique rotation was chosen given the relationship between the factors, and decisions about the number of factors to retain were based on a combination of methods including the Scree plot and Horn's (1965) parallel analysis. Once the number of factors to retain was established, removal of items was based on communalities and item loadings below.32, cross-loadings on other factors above .32, and factors with less than three items (Field, 2013).

The resultant factor structure was then validated using confirmatory factor analysis (CFA) in AMOS version 22 with Samples 2 and 3. We report the chi-square (χ^2), the normed chi-square (χ^2/df), the Root Mean Square Estimate of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Incremental Fit Index (IFI), the Akaike Information Criterion (AIC) for nested models, and the change in chi-square ($\Delta\chi^2$).

3. Results

3.1 Preliminary Analyses

Data cleaning was conducted separately on all three samples. Missing values analysis (MVA) revealed each dataset contained less than 5% missing values, and Samples 1 and 3 had a non-significant Little's MCAR test, justifying the use of the Expectation Maximisation (EM) method for value replacement. Sample 2 had a significant Little's MCAR result, suggesting the data were not missing completely at random, however as less than 5% of the data were missing, this result justifies the use of the EM method for value replacement (Tabachnick & Fidell, 2007). Influential multivariate outliers were identified by Mahalanobis distance values that exceeded the critical chi-square value at $p < .001$and Cook's distance values that were greater than twice the Mean (Field, 2013). All influential multivariate outliers were removed from further analyses. After deletion, the final data samples consisted of $N = 181$ (Sample 1), $N = 282$ (Sample 2), and $N = 345$ (Sample 3).

3.2 Factor Structure

The data were suitable for EFA (KMO value of .84, significant Bartlett's Test of Sphericity, $\chi^2(276) = 1568.56$, $p < .001$). The initial result revealed six factors with eigenvalues above 1 that accounted for 60% of the variance. The Scree plot revealed two factors and this was supported by Horn's (1965) parallel analysis. Following an iterative procedure of item deletion for items with factor loadings below .32 on a factor, cross-

loadings above .32, or less than three items per factor, the final solution accounted for 48% of the variance and comprised of two factors: proactive coping (8 items) and preventive coping (5 items). The item loadings and alpha coefficients are displayed in Table 1, with the item wording included in the Appendix. The inter-factor correlations were moderate ($r = .39$, $p < .001$).

Table 1. Item Loadings on the Two-Factor EFA Solution.

	Proactive Coping	Preventive Coping
Proactive 4	**.70**	.07
Proactive 6	**.69**	-.00
Proactive 5	**.66**	-.02
Proactive 10	**.66**	.05
Proactive 11	**.61**	-.08
Proactive 13	**.60**	-.24
Proactive 12	**.58**	.12
Proactive 3	**.56**	-.21
Preventive 8	-.13	**-.83**
Preventive 4	.01	**-.81**
Preventive 3	-.08	**-.73**
Preventive 5	.21	**-.63**
Preventive 1	.17	**-.63**
α	.79	.80

The factor structure identified via EFA in Sample 1 was then tested with CFA and validated in Samples 2 and 3. Using the Bollen-Stine bootstrap with 95% bias corrected confidence levels to estimate the significance of the chi-square estimate, the model fit the data well in each sample: Sample 2 ($\chi^2[64] = 164.12$, $p < .01$, $\chi^2/df = 2.56$, SRMR = .06, CFI = .90, IFI = .90, RMSEA = .08), and Sample 3 ($\chi^2[64] = 222.32$, $p < .01$, $\chi^2/df = 3.47$, SRMR = .05, CFI = .91, IFI = .91, RMSEA = .08). Table 2 reveals the factor loadings in each sample were above .30.

Table 2. Standardised Factor Loadings for Items across each Sample.

	Sample 2	Sample 3
Proactive 3	.65	.67
Proactive 4	.73	.77
Proactive 5	.67	.71
Proactive 6	.58	.59
Proactive 10	.59	.62
Proactive 11	.68	.74
Proactive 12	.49	.50
Proactive 13	.66	.72
Preventive 1	.50	.58
Preventive 3	.60	.63
Preventive 4	.60	.64
Preventive 5	.54	.63
Preventive 8	.53	.65

3.4 Correlations

The correlations between the coping scales, personality, and psychological strain were examined to determine whether the revised scales operated as would be expected based on existing literature. The correlation coefficients are presented in Table 3 and reveal that across the three samples, proactive coping was significantly and positively correlated with preventive coping and optimism, and negatively correlated with neuroticism and psychological strain as would be expected. It is interesting to note that the relationship between proactive and preventive coping are different in each sample, which may be indicative of demographic differences between the samples (such as age). We re-tested the correlation in each sample whilst controlling for gender, age, and educational level, and found no change in the significance of these correlations (S1 $r = .38$, $p < .001$; S2 $r = .52$, $p < .001$; S3 $r = .66$, $p < .001$).

The correlation results also indicate that preventive coping displayed a different pattern of results: whilst correlations were in the expected directions, preventive coping was only consistently positively correlated with optimism in all three samples. In sample 3,

preventive coping was significantly negatively correlated with neuroticism and psychological strain, but these relationships were not significant in Samples 1 or 2. Post-hoc analyses with Fisher's Z-test to compare the dependent correlations (two-tailed) found that the correlations between preventive coping with neuroticism and psychological strain were not statistically different from the correlations between proactive coping with the same variables (neuroticism $z = -0.68$, $p = .49$; strain $z = -0.90$, $p = .37$). The lack of statistical difference between proactive and preventive coping with neuroticism and psychological strain in Sample 3 suggests a non-replication of the results of Samples 1 and 2, providing further mixed findings for the literature.

Table 3. Means (Standard Deviations), Correlations, and Alpha Coefficients for the Research Variables.

	M (SD)	1.	2.	3.	4.	5.
			Sample 1			
1. Revised Proactive Coping	3.06 (0.49)	(.79)				
2. Revised Preventive Coping	2.80 (0.54)	.39***	(.80)			
3. Optimism	2.46 (0.86)	.46***	.15*	(.89)		
4. Neuroticism	2.96 (0.79)	-.45***	-.09	-.61***	(.88)	
5. Psychological Strain	1.04 (0.56)	-.36***	-.13	-.60***	.69***	(.89)
			Sample 2			
1. Revised Proactive Coping	3.03 (0.49)	(.84)				
2. Revised Preventive Coping	2.86 (0.44)	.51***	(.68)			
3. Optimism	2.58 (0.74)	.46***	.19**	(.85)		
4. Neuroticism	2.73 (0.76)	-.36***	-.11	-.64***	(.88)	
5. Psychological Strain	0.91 (0.45)	-.30***	-.03	-.48***	.58***	(.86)
			Sample 3			
1. Revised Proactive Coping	3.17 (0.48)	(.86)				
2. Revised Preventive Coping	3.03 (0.46)	.65***	(.76)			
3. Optimism	2.84 (0.65)	.41***	.31***	(.82)		
4. Neuroticism	2.43 (0.69)	-.20***	-.17**	-.52***	(.87)	
5. Psychological Strain	0.98 (0.50)	-.18**	-.14**	-.37***	.50***	(.90)

Note. Alpha Coefficients are presented on the diagonal.

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

4. Discussion

This paper aimed to address the reported inconsistent results regarding the dimensionality and distinctiveness of proactive coping and preventive coping as measured by the PCI. The hypothesis that proactive coping and preventive coping are each uni-dimensional and distinct constructs was confirmed (H1). The results support the uni-dimensionality and distinctiveness of the scales as evidenced through two distinct factors in the factor analysis, consistent with previous evidence including for example, Taubert (1999), Roesch et al. (2009), Wu et al. (2008), Gan et al. (2007), and Sohl and Moyer (2009). However, the correlation results were inconsistent in terms of the relationships between the coping scales with personality and psychological strain.

Some of the relationships between proactive and preventive coping with personality and psychological strain were consistent with existing literature, but other associations were not. For example, the positive relationship between both types of coping with optimism has been widely reported (e.g., Gan et al., 2007; Sohl & Moyer, 2009), as has the relationship between proactive coping and improved psychological outcomes such as reduced depression (e.g., Anagnostopoulous & Griva, 2012;), psychological burnout (e.g., Angelo & Chambel, 2012; Nizielski, Hallum, Shütz & Lopes, 2013), and psychological strain (e.g., Bergeron & Tylka, 2007). Neuroticism has also been shown to be significantly negatively associated with proactive coping, and negatively but not significantly associated with preventive coping (e.g., Hambrick & McCord, 2010). The results of Samples 1 and 2 concur with this research on preventive coping; however the relationships between preventive coping with neuroticism and psychological strain in Sample 3 were not replicated.

The different results in Sample 3, and the different size of the correlation between proactive and preventive coping in each sample, may be due to sample differences. Whilst the samples were selected to have an over-representation of female respondents consistent

with existing literature, the age and education level of the samples differed. Sample 3 was older and more educated than Samples 1 and 2, so despite age and education having no influence on the correlations between proactive and preventive coping (evidenced by no change when they were partialled out) it may be possible that older and more educated respondents interpret and experience proactive and preventive coping differently to younger, less educated respondents. These inconsistent results provide insight into proactive and preventive coping, and lead to additional questions about the theoretical distinction between them that would be valuable to explore further.

4.1 Research Limitations and Future Directions

The over-representation of females across the three samples is a potential limitation for generalizability of the revised measures and the study findings in general. Comparatively, other published research on proactive coping and preventive coping typically includes female-dominant (student) samples (e.g., Greenglass et al., 1999a; Moring et al., 2011; Roesch et al., 2009; Sohl & Moyer, 2009; Wu et al., 2008), in which case the findings of this study are comparable. However, samples with a more equal representation of gender may provide further insights into how future-oriented coping may behave differently for males and females.

To date, no published research has examined the invariance of proactive and preventive coping over time as measured with the PCI. One of the limitations of this study therefore, was the lack of longitudinal data to validate the factor structure of the scales over time. Preliminary evidence for the stability of the PCI is described by Drummond and Brough (in press), who reported acceptable test-retest reliability for proactive and preventive coping over a six month time-lag. While the factor structures of the two coping measures were supported across three independent samples in this research, it is acknowledged that validation of these revised measures over time is required.

4.2 Conclusions

Via testing across three independent samples, this study supports the uni-dimensional nature of both proactive coping and preventive coping as measured by the PCI, and also provides mixed evidence in support of their distinctiveness from each other. This study has contributed to our understanding of the measurement of proactive and preventive coping by proposing refinements to the scales..Further research is required to investigate potential differences in the interpretation and experience of proactive and preventive coping by male, older and educated samples drawn from heterogeneous occupations.

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Appendix

Items included in the Revised Proactive Coping and Preventive Coping Scales

	Proactive Coping
3.	After attaining a goal, I look for another, more challenging one.
4.	I like challenges and beating the odds.
5.	I visualise my dreams and try to achieve them.
6.	Despite numerous setbacks, I usually succeed in getting what I want.
10.	When I apply for a position, I imagine myself filling it.
11.	I turn obstacles into positive experiences.
12.	If someone tells me I can't do something, you can be sure I will do it
13.	When I experience a problem, I take the initiative in resolving it.
	Preventive Coping
1.	I plan for future eventualities.
3.	I prepare for adverse events.
4.	Before disaster strikes I am well-prepared for its consequences.
5.	I plan my strategies to change a situation before I act.
8.	I think ahead to avoid dangerous situations.

Note. All items are scored on a 4-point scale from 1 (*not at all true*) to 4 (*completely true*).