



Resilience in response to life stress: the effects of coping style and cognitive hardiness

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Abstract

Direct effects and buffering models were tested in relation to cognitive hardiness and coping for general health and psychological functioning. Mature age university students ($N=187$) completed measures assessing life event stress and traumatic life experiences (independent variables) cognitive hardiness and coping style (moderator variables), and general health, somatization, anxiety and depression (dependent variables). In general results supported a direct effects model of the relationship between life stress and psychological health. Cognitive hardiness, aspects of coping style and negative life events directly impacted on measures of psychological and somatic distress. In several cases there was also support for a buffering model in which cognitive hardiness moderated the effects of emotional coping or adverse life events on psychological distress. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Introduction

There has been increasing interest in individuals' responses in managing life's adversities. The link between adverse or stressful life events and psychological and physical health has been well established, and many studies report that stressful life events precipitate ill-health and psychological dysfunction (Theorell & Rahe, 1971). However, how much of a direct influence adversity has on psychological or physical health is still hotly debated. Kessler, Price, and Wortman (1985) report only a small direct effect of life stress on psychological and physical health, whilst others

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have found a significant direct effect (e.g. Clements & Turpin, 1996; Sarason, Johnson, & Siegel, 1978). Despite these differences, it is clear that some individuals experience a high level of life stress without their physical or psychological health being compromised.

Rak and Paterson (1996) advocate further study focussing on factors governing resilience despite exposure to adversity. Other studies (e.g. Amir & Sol, 1999; Rutter & Quinton, 1984) report that resilient outcomes only occur once a range of adversity has been experienced and negotiated. Both Rutter (1985) and Pellegrini (1990) state that successful engagement with adversity ‘steels’ individuals rather than sensitising them. Kobasa (1979) also observes that increasing levels of stress are associated with increasing opportunities for resilience.

Rutter (1990) argues the need to differentiate between protective factors (such as IQ or temperament) which are likely to be a given in an individual’s life, and protective mechanisms (such as coping style or explanatory style) which may be developed. He argues that protective mechanisms are generated through successful engagement with adversity. Leonard and Burns (1999) suggest that the development of protective mechanisms is associated with key turning points in an individual’s life, as the negotiation of these turning points can alter developmental trajectories from risk pathways to protective ones. Two prime protective mechanisms suggested by Nowack (1989) are coping style and cognitive hardiness.

1.1. Coping style

One of the factors which has a proven track record in mitigating the relationship between life stress and physical and psychological functioning is coping style (Lazarus, 1999). Lazarus and Folkman (1984) indicate that coping styles can affect how a stressful event is perceived and how it is managed. They describe coping as “all efforts to manage taxing demands, without regard to their efficacy or inherent value” (p. 134). Consequently, coping is not necessarily equated with a good outcome.

However, there is a lack of agreement in the literature about categories of coping style (e.g. Endler & Parker, 1990; Nowack, 1989). Some studies refer to escapist styles of coping as being the most deleterious to health and psychological adjustment (e.g. Proulx, Koverola, Fedorowicz, & Kral, 1995), whilst others describe this style of coping as avoidance (Billings & Moos, 1981). Nowack (1989) observes that a degree of congruence is established if *approach* and *avoidance* categories of coping are used. Commonly used terms for approach-oriented coping are task or problem-focussed coping, referring to active attempts to deal with stress, whilst common terms for avoidance-oriented coping are escapism or emotion-focussed coping, referring to strategies such as rumination or emotional responses to stress (Carver, Weintraub, & Scheier, 1989; Endler & Parker, 1990). Some consistency has been reported in the literature concerning the effects of coping styles, with approach or task-focussed coping associated with better outcomes (e.g. less psychological dysfunction), whilst avoidance or emotion-focussed coping is associated with greater psychological dysfunction (e.g. Higgins & Endler, 1995).

1.2. Cognitive hardiness

Like coping style, cognitive hardiness is an important variable in the life stress/psychological and physical health equation. Kobasa (1979), examining high stress individuals with a low incidence

of illness, coined the term “cognitive hardiness” to describe the adaptive behaviours of these resilient individuals. For Kobasa, cognitively hardy individuals (1) believe that they can *control* or influence events (2), have a *commitment* to activities and their interpersonal relationships and to self, in that they recognize their own distinctive values, goals and priorities in life, and (3), view change as a *challenge* rather than as a threat. In the latter regard, they are predisposed to be cognitively flexible.

Kobasa (1979) and Kobasa and Puccetti (1983) describe cognitive hardiness as a personality variable which has both cognitive and behavioural aspects. It has been found to mitigate the negative effects of stress in relation to illness (Kobasa, 1979) and depression (Nowack, 1989). In a study of older people (65–80 years), Sharpley and Yardley (1999) report that cognitive hardiness is a strong predictor of depression-happiness, with individuals high in cognitive hardiness scoring higher on the happiness end of the continuum.

1.3. *Main and moderator effects models*

The manner in which coping style and cognitive hardiness impact on the stress/health relationship has been contested in the literature. Two models have been proposed. These are the main (or direct) effects model and the moderator (or stress buffer) model (Aldwin & Revenson, 1987; Wilkinson, Walford, & Espnes, 2000).

The main effects model predicts that a variable (such as coping style) has direct and uniform effects on mental health, irrespective of the levels of adversity experienced. The moderator model proposes that a variable such as effective coping buffers an individual against the effects of negative life events or stress, in an interactive way.

Wilkinson et al. (2000) propose that these models may be applicable to the different types of coping, with emotion-oriented coping having negative direct effects (positively predicting distress), compared to task-oriented coping, where high levels of task-oriented coping reduce mental health dysfunction. On the other hand, buffering effects have been also reported, with high levels of task-oriented coping mitigating the adverse effects of stress on mental health (e.g. Aldwin & Revenson, 1987). While studies have reported main effects for cognitive hardiness, with high cognitive hardiness scores related to increased happiness and lowered psychological distress, little has been reported concerning the potential buffering effects of cognitive hardiness on the stress/health relationship. (Nowack, 1989; Sharpley & Yardley, 1999).

1.4. *Measurement issues: stress, psychological and physical health*

Two factors which confound interpretations of the literature concerning life stress and health outcomes are the measurement of life stress and varying operationalisations of psychological and physical health. A range of approaches has been taken in the measurement of life stress, including the measurement of traumatic incidents (Herman, 1997), life event stress (Sarason et al., 1978), and daily hassles (Kanner, Coyne, Schaefer, & Hazarus 1981), with a considerable number of studies implicating traumatic events in current health and psychological functioning, particularly in relation to PTSD symptomatology (e.g. Bernat, Ronfeldt, Calhoun, & Arias, 1998). It has been argued that traumatic events are recalled more reliably than adverse life events, as they function as ‘flashbulb’ memories of unusual vividness and memorability (Vrana & Lauterbach, 1994).

Traumatic events are also thought to be cumulative in their deleterious effect on an individual over time (Herman, 1997).

However, the effect of traumatic events has been notoriously difficult to measure accurately, as the critical factor is the subjective impact of the event on the individual rather than the event itself (Krinley & Weathers, 1995). Goodman, Corcoran, Turner, Yuan, and Green, (1998) describe the Stressful Life Events Screening Questionnaire (SLESQ) which both counts the number of traumatic events and allows for their subjective impact to be taken into account.

Life event measures have been criticised as subject to memory recall problems, biases in hindsight, distortion and under-reporting of events (e.g. Vrana & Lauterbach, 1994; Zimmerman, 1983). Furthermore, undesirable events such as the death of a close family member are likely to have a more detrimental effect for someone than an outstanding personal achievement, yet in the Holmes and Rahe (1967) Social Readjustment Rating Scale, both are summed in the same direction. Sarason et al. (1978) regard life stress in terms of its negative impact, and propose a measure (the Life Experiences Survey) in which participants ascribe their own weightings to life events experienced in the past 12 months. Clements and Turpin (1996) note that accurate recall occurs only when life events have occurred in the recent past, and suggest that 12 months is the optimum time period for measurement of life stress. This time frame has been adopted in most life stress measures (e.g. Clements & Turpin, 1996; Holmes & Rahe, 1967; Sarason et al., 1978).

As with life stress measures, a number of different methods have been used to measure psychological and physical health. Wilkinson et al. (2000) argue that measures of both well-being and distress should be used, denoting opposite ends of a single continuum. Distress may be operationalised as depression, anxiety and negative affect measures, whilst well-being may be operationalised as happiness, life satisfaction and positive affect scales (Headey & Wearing, 1992). Endler and Parker (1990) and Higgins and Endler (1995) utilise measures of psychological and somatic distress, and recommend that measures of anxiety, depression and somatic symptoms are central in the assessment of psychological and physical health.

1.5. The present study

In short, the literature concerning the relationship between negative life events, direct and buffering variables and current psychological functioning has been equivocal. Whilst coping style has been reported as directly affecting outcome measures such as psychological functioning, its role in buffering individuals against the effects of negative life events has not been consistently documented. Similarly, cognitive hardiness has been studied in terms of its direct effects on psychological functioning, but less has been reported concerning its buffering role. Further problems arise through differing measures of life stress, and poorly constructed outcome measures of psychological functioning.

On these bases, the present study tests direct effects and buffering models using coping style and cognitive hardiness as moderator variables. This study also combines a retrospective life stress measure for the last 12 months, the Life Experiences Survey (LES) with a life-time trauma measure, the Stressful Life Events Screening Measure (SLESQ), and a general psychological health measure, the General Health Questionnaire (GHQ), with separate measures for anxiety, depression and somatic symptoms (subscales of the SCL90-R).

Due to problems noted by Endler and Parker (1990) associated with the Ways of Coping Questionnaire (Folkman & Lazarus, 1988), the Coping Inventory for Stressful Situations (CISS)

is used in the present study. Finally, as it is clear that turning points in individuals' lives are significant in the potential development of protective mechanisms, a mature age (over 25 years) student population was engaged to increase the chances of capturing critical life events.

The expectations guiding this study are as follows. First, as the numbers of negative life events or traumatic events (life stress) experienced increase, psychological and somatic distress will also increase. Second, coping style and cognitive hardiness are expected to have both main and interaction effects in relation to life stress and measures of psychological functioning. Specifically, it is expected that task-oriented coping will have a direct effect on the relationship between life stress and current psychological functioning, in that irrespective of levels of life stress, high levels of task-oriented coping will result in lower levels of psychological distress.

Task-oriented coping is also expected to have a moderating effect, in that at high levels of life stress, high scores on task-oriented coping will result in lower levels of psychological distress. Emotion-oriented coping is expected to have a direct effect in elevating levels of psychological and somatic distress, with no buffering effects predicted for this measure. No firm expectations are held for the effects of distraction-oriented and social diversion-oriented coping.

Cognitive hardiness is expected to have a direct effect on the relationship between life stress and current psychological functioning, in that irrespective of levels of life stress, high levels of cognitive hardiness will result in lower assessments of psychological distress. Cognitive hardiness is also expected to have a moderating effect, in that at high levels of life stress, high cognitive hardiness scores will result in lower scores of psychological distress.

Finally, gender differences are expected. Males are expected to use task-oriented coping more frequently than females, with main and interaction effects expected. Finally, females are expected to use emotion-oriented coping to a greater extent than males, with main effects expected in terms of elevated measures of psychological distress.

2. Method

2.1. Participants

This cross-sectional study involved 187 mature age (25 years and over) undergraduate and postgraduate students studying at the University of Tasmania ($N=81$ males, $N=106$ females). Participants' ages ranged from 25 to 59 ($M=38.05$, $SD=9.63$).

2.2. Measures

This study has two independent variables, life event stress and traumatic life experiences. Moderator variables are coping style and cognitive hardiness, and the four dependent variables are general health, anxiety, depression and somatization. These variables were measured through a series of six self-report questionnaires, described below.

2.2.1. Independent variable measures

2.2.1.1. The Life Experiences Survey (LES). The LES (Sarason, et al., 1978) was used to measure life stress. This 57-item questionnaire covers events of the past year, and utilises a 7-point Likert

scale with end-point designations ‘extremely positive’ (+3) to ‘extremely negative’ (–3). Three items were deleted as they were not applicable to an Australian population (e.g. “Joining a fraternity/sorority”). Sample items are: *marriage, death of friend or relative, serious illness of self or family member, academic probation, and failing a subject*. Minor changes in wording were made to make this scale suited to an Australian population. Summing positive scores created a positive change score, whilst the same process for negative scores created a negative change score. Test–retest correlations for positive change scores vary from 0.19 to 0.53, but are more consistent for negative change scores (0.56 and 0.88), and for the total scale score (0.63 and 0.64).

2.2.2. *The Stressful Life Events Screening Questionnaire (SLESQ)*

The SLESQ (Goodman et al., 1998) was used to measure traumatic incidents. This 15-item questionnaire asks respondents to indicate whether a range of traumatic events have occurred at any time in their life, including early childhood. The SLESQ is designed to identify Criterion A events usually associated with PTSD, (as outlined by DSM IV) and to minimise sub-threshold events. It asks participants if they have ever experienced a range of events classed as traumatic, such as: *Were you ever in a life-threatening accident? Was physical force or a weapon ever used against you in a robbery or mugging?* These questions are followed up by questions seeking further detail to assist the scorer to assess whether the events can be rated as traumatic. For example, *Were you hospitalised overnight?, Was your life in danger?* Questions concerning sexual assault are behaviourally specific, and avoid the use of broad terms such as rape. The SLESQ has good test–retest reliability (0.89), and good convergent reliability (0.77). A total score is obtained by summing items which meet Criterion A thresholds.

2.3. *Moderator variable measures*

2.3.1. *The Coping Inventory for Stressful Situations (CISS)*

The CISS (Endler & Parker, 1990) was used to measure coping styles. This scale has 48 items which are rated on a five-point Likert scale, with end-point designations ‘Not at all’ (1) and ‘Very much’ (5). Sixteen items load on three basic subscales. These are Task-oriented, Emotion-oriented, and Avoidance-oriented coping. The Avoidance-oriented scale divides into two further subscales: Distraction (eight items) and Social Diversion (five items). Sample items include: *Focus on the problem and see how I can solve it* (Task-oriented), *Become very upset* (Emotion-oriented), *Treat myself to a favourite food or snack* (Avoidance-oriented). Internal consistencies ranging from 0.72 to 0.91 are reported, whilst test–retest reliabilities are reported as moderate to high, with task and emotion-oriented subscales having the highest reliabilities, above or equal to 0.68 for males and females. Scores are summed across each of the subscales, including distraction and social diversion.

2.3.2. *The Cognitive Hardiness Scale (CHS)*

The CHS (Nowack, 1990) was used to measure cognitive hardiness. This scale derives from Kobasa’s (1979) dimensions of Commitment, Control and Challenge. The CHS has 30 items. Following Sharpley and Yardley (1999), two items related to present employment were deleted, as they were deemed not relevant to the student population sampled in the present study. Items tap personal beliefs about life, and are rated on five-point scales, with end-point designations

‘*Strongly agree*’ (1) and ‘*Strongly disagree*’ (5). Items relate to issues of (1) Involvement or commitment to one’s family, self, hobbies; (2) Challenge: attitudes around viewing life changes as challenges as opposed to threats, and (3) Control: beliefs that one has a sense of control over outcomes in life. Sample items include: *My involvement in non-work activities and hobbies provide me with a sense of meaning and purpose* (Commitment), and *In general, I would prefer to have things well planned out in advance rather than deal with the unknown* (Control). Nowack (1990) reports an internal consistency of 0.83. Items were formatted in such a way that high scores indicated high levels of cognitive hardiness.

2.4. Dependent variable measures

2.4.1. The General Health Questionnaire (GHQ)

The GHQ (Goldberg & Hillier, 1979) is a 28-item scale designed as a general measure of health and psychopathology across four areas: somatic symptoms, anxiety and insomnia, social dysfunction and severe depression. Sample items are: *Have you recently felt that you are ill?* (Somatic), *Have you recently lost much sleep over worry?* (Anxiety and insomnia), *Have you recently felt that you played a useful part in things?* (Social dysfunction), and *Have you recently felt that life isn’t worth living?* (Severe depression). The four factors mentioned above can be utilised as sub-scales, but for this study, the total GHQ score was used.

Goldberg and Williams (1991) describe a range of scoring methods, however in this study a four-point Likert scale was used, with end-point designations of ‘*Not at all*’ (1) and ‘*Much more than usual*’ (4). The higher the score, the more symptoms an individual is experiencing. Goldberg and Williams (1991) report validity coefficients ranging from 0.32 to 0.70 for each of the four subscales, with somatic symptoms recording the lowest validity coefficient. A test–retest reliability of 0.90 is reported.

2.4.2. The SCL90-R

Three subscales of the SCL90-R (Derogatis, 1983) were used. They are the 12-item Somatization subscale, the 13-item Depression subscale and the 10-item Anxiety subscale. Participants register their responses on five-point Likert scales with end-point designations ‘*Not at all*’ (0) and ‘*Extremely*’ (5). Items all relate to ‘*How much that problem has distressed or bothered you during the past 7 days, including today.*’ Sample items are: *How much were you distressed by headaches?* (Somatization), *How much were you distressed by feeling low in energy or slowed down?* (Depression), *How much were you distressed by nervousness or shakiness inside?* (Anxiety). A participant’s score for these three subscales is the sum of the ratings on all items. Derogatis (1983) reports internal consistency coefficients ranging between 0.85 and 0.90, and test–retest correlations from 0.80 to 0.86.

2.5. Procedure

All those who participated read an information sheet that indicated that participation was voluntary. Consent was implied through completion and return of the surveys. Participants were recruited through posters, flyers, a postgraduate e-mail list server, and invitations (423 in all, with

a response rate of 44%) to participate delivered in classes. Return of questionnaires was facilitated through provision of reply paid envelopes.

3. Results

3.1. Analysis strategy

In the first stage of each analysis the dependent measure of psychological distress was regressed on the score for adverse life events. This will be called the Life Events Model. The dependent measures used were the General Health Questionnaire (GHQ), and the depression, anxiety and somatization subscales of the SCL-90. Following the recommendation of Jaccard, Turrisi, and Wan (1990), each of the predictor variables was centred by subtracting the mean from each score.

In the second stage stepwise multiple regression was used to identify measures which made a significant additional contribution to the prediction of a dependent measure after allowing for the effect of the measure of adverse life events. The measures tested for inclusion were coping (task-oriented, emotion-oriented, distraction and social diversion) and cognitive hardiness. The resulting model will be called the Direct Effects Model. As high scores on all dependent variables indicate high psychological distress, an increase in the level of an explanatory variable with a positive regression coefficient tends to increase psychological distress, while an increase in one with one with a negative coefficient tends to reduce it (assuming a causal interpretation).

In the third stage of the analysis, the significant explanatory measures identified at stage two, together with negative life events as measured by the Life Experiences Survey, were combined in all possible multiplicative combinations to assess interaction effects. The significant individual explanatory variables were then entered at step one of the analysis, and a stepwise procedure with a P -value for entry of 0.05 was then used to identify and enter into the regression equation any of the interactions which made significant additional contributions to the prediction of the dependent measure. The resulting model will be called the Interaction Model. An interaction model may be regarded as a buffering model provided there is an interaction term which includes the product of a variable negatively related to the measure of psychological distress (e.g. adverse life events) and a moderator variable not negatively related to psychological distress (e.g. cognitive hardiness) and the interaction term has a significant negative regression coefficient. The magnitude of the interaction effect may be assessed by the change in R^2 .

It should also be noted that in the reporting of these results, some degree of causality is assumed, based on the premise that coping and cognitive hardiness variables may moderate the effects of negative life stress on psychological functioning. Strictly speaking, causality is not demonstrated in the present study as the data are correlational. However, given that moderator effects are present in these results, the assumption of causality is consistent with the literature which argues that coping buffers stressful life events (e.g. Lazarus, 1999).

3.2. Gender differences

Possible gender differences for the various scales were assessed using two-tailed t -tests with a significance level of $P=0.05$. There were no significant differences in mean scores, except for

distraction-oriented and social diversion-oriented coping, where women scored higher than men on both subscales (see Table 1 for gender comparisons).

3.2.1. Results for females

Table 2 shows the results of the regression analyses predicting GHQ scores from coping scales and cognitive hardiness after allowing for the effect of negative life events. Measures that made a significant additional contribution to negative life events in predicting GHQ were emotion-oriented coping and cognitive hardiness. As expected, higher scores in emotion-oriented coping

Table 1
Summary of *t* tests across gender for all measures (*N* = 106 for women, *N* = 81 for men)^a

| Gender | | Mean | S.D. | <i>T</i> |
|----------|--------|-------|-------|----------|
| Les pos | Male | 8.95 | 9.08 | 1.11 |
| | Female | 7.58 | 7.80 | |
| Les neg | Male | 7.84 | 7.40 | −0.22 |
| | Female | 8.08 | 6.96 | |
| SLESQ | Male | 2.23 | 1.96 | 1.21 |
| | Female | 1.88 | 1.93 | |
| Taskcope | Male | 57.79 | 10.14 | 0.86 |
| | Female | 56.34 | 12.30 | |
| Emotcope | Male | 37.41 | 12.77 | −1.55 |
| | Female | 40.24 | 12.08 | |
| Distract | Male | 22.89 | 6.72 | −2.18* |
| | Female | 25.05 | 6.68 | |
| Social | Male | 15.14 | 4.25 | −3.61* |
| | Female | 17.70 | 5.21 | |
| Coghard | Male | 99.49 | 11.20 | 0.65 |
| | Female | 98.30 | 13.31 | |
| GHQ | Male | 47.47 | 11.44 | −0.81 |
| | Female | 48.79 | 10.85 | |
| SCLSomat | Male | 6.09 | 5.89 | 0.01 |
| | Female | 6.08 | 6.11 | |
| SCL Dep | Male | 9.58 | 10.29 | −0.43 |
| | Female | 10.22 | 9.99 | |
| SCL Anx | Male | 4.58 | 5.64 | −0.13 |
| | Female | 4.69 | 5.86 | |

^a *Les pos* refers to positive life events and *Les neg* refers to negative life events, both as measured by the LES; *SLESQ* refers to the Stressful Life Events Screening Questionnaire; *Taskcope* refers to task-oriented coping, *Emotcope* refers to emotion-oriented coping, *Distract* refers to distraction-oriented coping and *Social* refers to social diversion-oriented coping, all as measured by the CISS; *Coghard* refers to cognitive hardiness as measured by the CHS; *GHQ* refers to the General Health Questionnaire; *SCL Somat* refers to the Somatization scale of the SCL90-R, *SCL Dep* refers to the Depression scale of the SCL90-R and *SCL Anx* refers to the Anxiety scale of the SCL90-R.

* *P* < 0.05.

Table 2

Summary of hierarchical and stepwise regression analysis for measures predicting GHQ score for females ($N=106$) and male ($N=81$) participants

| Measure ^a | Females ^b | | | Males ^c | | |
|---------------------------|----------------------|-------|---------|--------------------|------|---------|
| | B | SE B | β | B | SE B | β |
| <i>Life Events Model</i> | | | | | | |
| (Constant) | 20.67 | 0.97 | | 19.47 | 1.17 | |
| LES neg | 0.66 | 0.14 | 0.43** | 0.63 | 0.16 | 0.41** |
| <i>Main Effects Model</i> | | | | | | |
| (Constant) | 19.63 | 0.83 | | 19.47 | 0.93 | |
| LES neg | 0.52 | 0.12 | 0.34** | 0.23 | 0.14 | 0.15 |
| Emotcope | 0.27 | 0.08 | 0.30** | | | |
| Coghard | -0.22 | 0.08 | -0.27** | -0.62 | 0.09 | -0.61** |
| Social | | | | 0.44 | 0.22 | 0.16* |
| <i>Interaction Model</i> | | | | | | |
| (Constant) | 19.38 | 0.82 | | | | |
| LES neg | 0.45 | 0.12 | 0.29** | | | |
| Emotcope | 0.27 | 0.08 | 0.30** | | | |
| Coghard | -0.18 | 0.08 | -0.22* | | | |
| LES neg×Coghard | -0.018 | 0.007 | -0.21* | | | |

^a *LES neg* refers to negative life events, as measured by the LES, *Emotcope* refers to emotion-oriented coping as measured by the CISS, *Social* refers to social diversion-oriented coping as measured by the CISS and *Coghard* refers to cognitive hardiness as measured by the CHS.

^b For females, the Life Events Model, $R^2=0.18^{**}$, when emotion-oriented coping is added at Step 2, $R^2=0.39^{**}$, $\Delta R^2=0.21^{**}$, when cognitive hardiness is added at Step 3, $R^2=0.44^{**}$, $\Delta R^2=0.05^{**}$; when the interaction of negative life events and cognitive hardiness is added at Step 4, $R^2=0.47^{**}$, $\Delta R^2=0.04^*$.

^c For males, the Life Events Model, $R^2=0.17^{**}$, when cognitive hardiness is added at Step 2, $R^2=0.46^{**}$, $\Delta R^2=0.29^{**}$, when social diversion-oriented coping is added at Step 3, $R^2=0.49^{**}$, $\Delta R^2=0.03^*$.

* $P < 0.05$.

** $P < 0.01$.

appear to directly elevate GHQ, whilst high scores in cognitive hardiness tend to reduce GHQ scores. The stepwise procedure identified a negative life events×cognitive hardiness interaction making a significant additional contribution to GHQ scores, with high scores in cognitive hardiness moderating the effects of adverse life events by reducing their impact on the GHQ. The proportion of variance accounted for in the three models was $R^2=0.18$ in the life events model, which increased to $R^2=0.44$ in the main effects model, with another small but statistically significant increase to $R^2=0.47$ in the interaction model.

Table 3 shows the results of the regression analyses predicting SCL Depression from the coping scales and cognitive hardiness, after allowing for the effect of negative life events. Again, the two measures that made a significant additional contribution to negative life events in predicting the dependent measure of SCL Depression were emotion-oriented coping and cognitive hardiness. As with the GHQ, higher scores in emotion-oriented coping directly elevate SCL Depression, whilst high scores in cognitive hardiness tend to reduce SCL Depression scores. The stepwise procedure identified an interaction between emotion-oriented coping and cognitive hardiness, with cognitive

Table 3

Summary of hierarchical and stepwise regression analysis for measures predicting SCL depression scores for female ($N = 106$) and male ($N = 81$) participants

| Measure ^a | Females ^b | | | Males ^c | | |
|---------------------------|----------------------|-------|---------|--------------------|--------|---------|
| | B | SE B | β | B | SE B | β |
| <i>Life Events Model</i> | | | | | | |
| (Constant) | 10.01 | 0.88 | | 9.58 | 1.06 | |
| LES neg | 0.65 | 0.13 | 0.46** | 0.55 | 0.14 | 0.39** |
| <i>Main Effects Model</i> | | | | | | |
| (Constant) | 8.90 | 0.70 | | 9.58 | 0.84 | |
| LES neg | 0.50 | 0.10 | 0.35** | 0.16 | 0.13 | 0.12 |
| Coghard | -0.25 | 0.07 | -0.33** | -0.45 | 0.10 | -0.49** |
| Emotcope | 0.27 | 0.07 | 0.32** | 0.17 | 0.08 | 0.21* |
| <i>Interaction Model</i> | | | | | | |
| (Constant) | 8.04 | 0.78 | | 8.21 | -0.87 | |
| LES neg | 0.47 | 0.10 | 0.33** | 0.34 | -0.12 | 0.25** |
| Coghard | -0.18 | 0.07 | -0.24* | -0.42 | -0.09 | -0.45* |
| Emotcope | 0.24 | 0.07 | 0.29** | 0.17 | -0.07 | 0.21* |
| Emotcope×Coghard | -0.011 | 0.005 | -0.20* | -0.018 | -0.005 | -0.25** |
| LES neg×Emotcope×Coghard | | | | 0.002 | 0.001 | 0.25** |

^a *LES neg* refers to negative life events, as measured by the LES, *Emotcope* refers to emotion-oriented coping as measured by the CISS, and *Coghard* refers to cognitive hardiness as measured by the CHS.

^b For females, the Life Events Model, $R^2 = 0.21^{**}$, when cognitive hardiness is added at Step 2, $R^2 = 0.47^{**}$, $\Delta R^2 = 0.26^{**}$, when emotion-oriented coping is added at Step 3, $R^2 = 0.54^{**}$, $\Delta R^2 = 0.06^{**}$; when the interaction of emotion-oriented coping and cognitive hardiness is added at Step 4, $R^2 = 0.56^{**}$, $\Delta R^2 = 0.03^*$.

^c For males, the Life Events Model, $R^2 = 0.15^{**}$, when cognitive hardiness is added at Step 2, $R^2 = 0.46^{**}$, $\Delta R^2 = 0.30^{**}$, when emotion-oriented coping is added at Step 3, $R^2 = 0.49^*$, $\Delta R^2 = 0.03^*$; when the interaction of emotion-oriented coping and cognitive hardiness is added at Step 4, $R^2 = 0.56^{**}$, $\Delta R^2 = 0.07^{**}$; when the interaction of negative life events, emotion-oriented coping and cognitive hardiness is added at Step 5, $R^2 = 0.60^{**}$, $\Delta R^2 = 0.05^{**}$.

* $P < 0.05$.

** $P < 0.01$.

hardiness moderating the direct effect of emotion-oriented coping on SCL-Depression scores by reducing its impact on this measure. The proportion of variance accounted for in the three models was $R^2 = 0.21$ in the life events model, which increased to $R^2 = 0.54$ in the main effects model, with another small but statistically significant increase to $R^2 = 0.56$ in the interaction model.

Table 4 shows the results of the regression analyses predicting SCL Anxiety from the coping scales and cognitive hardiness after allowing for the effect of negative life events. Once again, the only measures that made a significant additional contribution to negative life events in predicting anxiety scores as measured by the SCL-Anxiety subscale were emotion-oriented coping and cognitive hardiness. Higher cognitive hardiness reduced SCL-Anxiety scores, whilst high scores in emotion-oriented coping had the opposite effect on SCL-Anxiety.

The stepwise procedure identified two significant interactions. On the one hand, the interaction between emotion-oriented coping and cognitive hardiness indicates that high cognitive hardiness

Table 4

Summary of hierarchical and stepwise regression analysis for measures predicting SCL anxiety scores for female ($N=106$) and male ($N=81$) participants

| Measure ^a | Females ^b | | | Males ^c | | |
|--|----------------------|-------|---------|--------------------|-------|---------|
| | B | SE B | β | B | SE B | β |
| Life Events Model | | | | | | |
| (Constant) | 4.60 | 0.54 | | 4.58 | 0.61 | |
| LES neg | 0.31 | 0.08 | 0.37** | 0.19 | 0.08 | 0.25* |
| Main Effects Model | | | | | | |
| (Constant) | 4.05 | 0.49 | | 4.58 | 0.50 | |
| LES neg | 0.24 | 0.07 | 0.28** | 0.04 | 0.08 | 0.05 |
| Emotcope | 0.14 | 0.05 | 0.28** | | | |
| Coghard | -0.11 | 0.05 | -0.25** | -0.23 | 0.06 | -0.45** |
| Taskcope | | | | -0.14 | 0.06 | -0.26* |
| Interaction Model | | | | | | |
| (Constant) | 3.38 | 0.52 | | 4.10 | 0.51 | |
| LES neg | 0.10 | 0.08 | 0.12 | 0.08 | 0.07 | 0.10 |
| Emotcope | 0.12 | 0.05 | 0.24* | | | |
| Coghard | -0.05 | 0.05 | -0.12 | -0.20 | 0.05 | -0.40** |
| Taskcope | | | | -0.12 | 0.05 | -0.21* |
| Emotcope \times Coghard | -0.007 | 0.003 | -0.21* | | | |
| LES neg \times Emotcope \times Coghard | -0.0007 | 0.000 | -0.25* | | | |
| Coghard \times Taskcope | | | | 0.011 | 0.004 | 0.27** |

^a *LES neg* refers to negative life events, as measured by the LES, *Emotcope* refers to emotion-oriented coping as measured by the CISS, *Taskcope* refers to task-oriented coping as measured by the CISS and *Coghard* refers to cognitive hardiness as measured by the CHS.

^b For females, the Life Events Model, $R^2=0.13^{**}$, when emotion-oriented coping is added at Step 2, $R^2=0.31^{**}$, $\Delta R^2=0.18^{**}$, when cognitive hardiness is added at Step 3, $R^2=0.35^{**}$, $\Delta R^2=0.04^*$; when the interaction of emotion-oriented coping and cognitive hardiness is added at Step 4, $R^2=0.40^{**}$, $\Delta R^2=0.05^{**}$; when the interaction of negative life events, emotion-oriented coping and cognitive hardiness is added at Step 5, $R^2=0.44^{**}$, $\Delta R^2=0.04^*$.

^c For males, the Life Events Model, $R^2=0.06^*$, when cognitive hardiness is added at Step 2, $R^2=0.33^{**}$, $\Delta R^2=0.27^{**}$, when task-oriented coping is added at Step 3, $R^2=0.39^{**}$, $\Delta R^2=0.06^*$; when the interaction of cognitive hardiness and task-oriented coping is added at Step 4, $R^2=0.45^{**}$, $\Delta R^2=0.06^{**}$.

* $P<0.05$.

** $P<0.01$.

scores moderate the effects of emotion-oriented coping by reducing its impact on SCL-Anxiety. On the other hand, the three-way interaction between negative life events, emotion-oriented coping and cognitive hardiness indicates that cognitive hardiness further mitigates the effect of emotional coping on adverse life events, with high cognitive hardiness scores reducing the impact of a high level of emotion-oriented coping when combined with a high level of adverse life events. The proportion of variance accounted for in the three models was $R^2=0.13$ in the life events model, which increased to $R^2=0.35$ in the main effects model, with another small but statistically significant increase to $R^2=0.44$ in the interaction model.

The results of the regression analyses predicting SCL Somatization from coping scales and cognitive hardiness after allowing for the effect of negative life events are shown in Table 5.

Table 5

Summary of hierarchical and stepwise regression analysis for measures predicting SCL somatization scores for female ($N = 106$) and male ($N = 81$) participants

| Measure ^a | Females ^b | | | Males ^c | | |
|---------------------------|----------------------|------|---------|--------------------|------|---------|
| | B | SE B | β | B | SE B | β |
| <i>Life Events Model</i> | | | | | | |
| (Constant) | 6.04 | 0.59 | | 6.09 | 0.58 | |
| LES neg | 0.19 | 0.09 | 0.21* | 0.37 | 0.08 | 0.47** |
| <i>Main Effects Model</i> | | | | | | |
| (Constant) | 6.02 | 0.59 | | 6.09 | 0.54 | |
| LES neg | 0.14 | 0.08 | 0.16 | 0.24 | 0.08 | 0.30** |
| Emotcope | 0.18 | 0.05 | 0.34** | | | |
| Distract | -0.22 | 0.08 | -0.24** | | | |
| Coghard | | | | -0.21 | 0.05 | -0.39** |

^a *LES neg* refers to negative life events, as measured by the LES, *Emotcope* refers to emotion-oriented coping as measured by the CISS, *Distract* refers to distraction-oriented coping as measured by the CISS and *Coghard* refers to cognitive hardiness as measured by the CHS.

^b For females, the Life Events Model, $R^2 = 0.05^*$, when emotion-oriented coping is added at Step 2, $R^2 = 0.13^{**}$, $\Delta R^2 = 0.09^{**}$, when distraction-oriented coping is added at Step 3, $R^2 = 0.19^*$, $\Delta R^2 = 0.06^*$.

^c For males, the Life Events Model, $R^2 = 0.22^{**}$, when cognitive hardiness is added at Step 2, $R^2 = 0.34^{**}$, $\Delta R^2 = 0.13^{**}$.

* $P < 0.05$.

** $P < 0.01$.

Variables making a significant additional contribution to negative life events in predicting SCL somatization scores were emotion-oriented coping and distraction-oriented coping. As expected, higher scores in emotion-oriented coping directly elevate SCL-Somatization, whilst high scores in distraction-oriented coping tend to reduce SCL-Somatization scores. The proportion of variance accounted for in the two relevant models was $R^2 = 0.05$ in the life events model, which increased to $R^2 = 0.19$ in the main effects model.

3.2.2. Results for males

The results of the regression analyses predicting GHQ from coping scales and cognitive hardiness after allowing for the effect of negative life events are shown in Table 2. The only measures which made a significant additional contribution to negative life events in predicting GHQ were cognitive hardiness and social diversion-oriented coping. As expected, high cognitive hardiness scores reduce GHQ scores. An unexpected result was that higher scores in social diversion-oriented coping directly elevate GHQ. The proportion of variance accounted for in the two models was $R^2 = 0.17$ in the life events model, which increased to $R^2 = 0.49$ in the main effects model.

Table 3 shows the results of the regression analyses predicting SCL Depression from the coping scales and cognitive hardiness after allowing for the effect of negative life events. As for women, the two measures that made a significant additional contribution to negative life events in predicting SCL Depression were cognitive hardiness and emotion-oriented coping. Higher scores in

emotion-oriented coping elevate SCL Depression, whilst high scores in cognitive hardiness reduce SCL Depression scores.

The stepwise procedure identified an interaction between emotion-oriented coping and cognitive hardiness, with cognitive hardiness moderating the direct effect of emotion-oriented coping on SCL-Depression scores. A three-way interaction between negative life events, emotion-oriented coping and cognitive hardiness indicates that the ameliorating effect of cognitive hardiness on high levels of emotion-oriented coping is reduced for high levels of negative life events. The proportion of variance accounted for in the three models was $R^2=0.15$ in the life events model, which increased to $R^2=0.49$ in the main effects model, with another small but statistically significant increase to $R^2=0.56$ in the interaction model.

Table 4 shows the results of the regression analyses predicting SCL Anxiety from the coping scales and cognitive hardiness after allowing for the effect of negative life events. Measures that made a significant additional contribution to negative life events in predicting anxiety scores as measured by the SCL-Anxiety subscale were cognitive hardiness and task-oriented coping. Higher cognitive hardiness scores reduce SCL-Anxiety scores, and as predicted, high task-oriented coping scores reduce SCL-Anxiety scores. The stepwise procedure also identified a significant interaction between cognitive hardiness and task-oriented coping, indicating that the direct effects of each variable are not additive but are diminished at high levels of each variable. The proportion of variance accounted for in the three models was $R^2=0.06$ in the life events model, which increased to $R^2=0.39$ in the main effects model, with another small but statistically significant increase to $R^2=0.45$ in the interaction model.

The results of the regression analyses predicting SCL Somatization from coping scales and cognitive hardiness after allowing for the effect of negative life events are shown in Table 5. Here, cognitive hardiness is shown to make a significant additional contribution to negative life events in predicting scores on the SCL somatization scale. Once again, high cognitive hardiness scores reduce SCL Somat scores. The proportion of variance accounted for in the two relevant models was $R^2=0.22$ in the life events model, which increased to $R^2=0.34$ in the main effects model.

3.3. *Trauma measure findings*

The trauma measure (Stressful Life Events Screening Questionnaire: SLESQ) did not make a significant contribution to variance in scores on the dependent measures. However, it was interesting to note that the incidence of traumatic events in this population was in line with other studies examining the incidence of trauma (e.g. Amir & Sol, 1999). In the present study, 77% of respondents had experienced one or more traumatic incidents, with 64% experiencing between one and four events.

4. Discussion

4.1. *Support for a main effects model*

These results clearly support a main effects model of the relationship between life stress and psychological health. Cognitive hardiness, emotion-focused coping, avoidant coping and negative

life events all directly impact on measures of psychological and somatic distress. This finding supports other studies which have identified similar main effects (e.g. Higgins & Endler, 1995; Sharpley & Yardley, 1999; Wilkinson et al., 2000).

The buffer or interaction model was also supported in that cognitive hardiness played a moderating role for females in mitigating the effects of negative life events and their impact on psychological health. Cognitive hardiness also had a buffering effect in reducing the effects of emotion-oriented coping on distress measures for both males and females. These buffering interactions were small but statistically significant additional contributions to the variance accounted for.

However, this interaction effect has not been consistently reported in the literature (e.g. Aldwin & Revenson, 1987; Wilkinson et al., 2000). While researchers such as Lazarus (1999) have continued to argue that coping acts as a buffer against stressful life events, in the present study only cognitive hardiness had a buffering effect, with coping styles having direct effects.

4.2. Gender differences

Males and females did not have significantly different scores on any of the variables examined, except for distraction-oriented and social diversion-oriented coping, where women scored higher than men on both subscales. This finding is contrary to those obtained from other studies, where there is evidence that males use more task-oriented coping and females more emotion-oriented and social diversion-oriented coping (e.g. Higgins & Endler, 1995). Higgins and Endler (1995) also report that females experience more somatic symptoms, and more psychiatric symptomatology generally, again contrary to findings from the present study.

Gender differences have been broadly reported in the stress and coping literature (Rutter, 1990; Schissel, 1993; Seiffge-Krenke, 1993), and this study also found differences. It appears that different coping mechanisms operate for each gender in the life stress/psychological health relationship. In the present study, emotion-oriented coping had a consistent direct role in elevating dependent measure scores (GHQ, somatization, anxiety and depression), indicating that whilst females do not use emotion-oriented coping any more than men, when they do use this coping style, it is to their detriment. Again, this finding is generally supported by other researchers (e.g. Endler & Parker, 1990; Haines & Williams, 1997; Higgins & Endler, 1995; Proulx et al., 1995). Females also used distraction-oriented coping to reduce somatic scores, further supporting the main effects model.

As predicted, males used task-oriented coping to their benefit, lowering scores on anxiety. Interestingly, there was a direct effect for social diversion-oriented coping for males in elevating scores on the general measure of psychological symptomatology (GHQ). This was somewhat unexpected, as social support as measured through this subscale has been found to be instrumental for females in decreased scores on similar dependent measures (e.g. Billings & Moos, 1981). Perhaps, as Rutter (1990) argues, the availability of social support is not as important as whether it is utilised. Items from this subscale such as: *Try to be with other people; Visit a friend; Phone a friend* may refer more to availability of social support than mobilising social support networks. This interpretation is consistent with the current results. For both males and females, emotion-oriented coping had a direct effect on depression scores by elevating them.

4.3. A Primary role for cognitive hardiness

Overall, the findings of the present study substantially support predictions. Firstly, negative life events had a direct effect on all measures of psychological distress by increasing their scores. By contrast, the traumatic events measure did not have a significant effect. Cognitive hardiness likewise had a direct effect on measures of psychological and somatic distress, decreasing scores on measures of each of these variables for each gender group. Cognitive hardiness was also shown to have a buffering effect in moderating the adverse effects of negative life events by reducing their impact on the GHQ for females.

Emotion-oriented coping had a direct effect in elevating scores on all dependent measures for females, and on all but two measures for the males.

Cognitive hardiness again played a moderating role with regard to this variable in reducing the direct effect of emotion-oriented coping on depression for both genders, and on anxiety for women.

Cognitive hardiness was also involved in two three-way interactions involving negative life events and emotion-oriented coping. In the first instance, high scores in cognitive hardiness were found to reduce the impact of a high level of emotion-oriented coping on anxiety for women when high levels of adverse life events were present. In the second instance, the ameliorating effect of cognitive hardiness on high levels of emotion-oriented coping on the depression score for men is reduced at high levels of negative life events.

Cognitive hardiness was in fact the single most consistent predictor of decreased scores of psychological and somatic distress in its direct effect role, as well as being the variable which had the most consistent moderator effect. Sharpley and Yardley (1999) reported similar direct effects in their study of retirees. They described Kobasa's (1979) components of *control*, *commitment* and *challenge* as applying to their older participants in the following ways: believing in one's own capabilities (*control*), gaining a strong sense of personal meaning from social activities and enjoying interactions with others (*commitment*), and self-confidence in one's ability to deal with change (*challenge*). It could be suggested that similar mechanisms are at play in this study, and it would be useful in future research to examine the components of this meta-construct of cognitive hardiness, as its role in directly and indirectly influencing psychological distress is significant.

4.4. Coping

Nowack's (1989) conceptualisation of the key themes in coping being *approach* and *avoidance* proved useful in this study. Emotion-oriented coping can be seen as avoidance oriented coping (Endler & Parker, 1990), and the results of the present study are explicable when viewed this way. Emotion-oriented coping had a direct effect in elevating scores of measures of general and psychological health, irrespective of the occurrence of negative life events.

However, Haines and Williams (1997) suggest that expressing emotions and seeking social support can be described as problem engagement. Similarly, Braverman (1992) speaks of the usefulness of emotional venting rather than the sealing over of emotional states or reactions, and it may be that some forms of emotion-oriented coping are beneficial in certain contexts. Against this, the results from the present study are consistent with emotion-oriented coping being viewed as an avoidance style of coping, in that all direct effects involving emotion-oriented coping were

associated with elevated scores on measures of distress. On the other hand, distraction-oriented coping lowered somatic scores for females, indicating that in some situations, avoidance approaches have beneficial effects.

Whilst findings for avoidance oriented coping posed no surprises, approach oriented coping results were not consistent. High scores on task-oriented coping had their expected effect in lowering anxiety as measured by SCL (Anxiety), but only on this one measure, and only for males. While social diversion-oriented coping is generally considered an approach-oriented coping measure, it elevated GHQ scores for males. On this basis, it would appear that social diversion-oriented coping is in fact an avoidance measure: that is, social *diversion* is sought, rather than social *support*.

4.5. *Life stress and outcome measures*

The only life stress measure that made a significant contribution to explaining variance for each of the dependent measures for both genders was negative life events. This is in line with other research (Higgins & Endler, 1995; Sarason et al., 1978) indicating that only the negative life events measure was significant in its effect on physical and psychological symptoms. This finding is somewhat contrary to Kessler et al.'s (1985) contention that life event stress has only a small direct effect on adjustment.

The LES measures stressful life events for the past 12 months only, and the Stressful Life Events Screening Questionnaire (SLESQ: Goodman et al., 1998) was used to measure traumatic events over participants' lives. Many studies have noted links between traumatic events and physical and psychological health (Herman, 1997). Despite the mean number of traumatic events experienced in this population being 2.2, with Vrana and Lauterbach (1994) describing traumatic events as "burned" into memory, it was surprising that the SLESQ did not significantly contribute to score variance in measures of psychological or somatic symptoms.

It is interesting to note that the incidence of traumatic events experienced by these participants was commensurate with that reported in other studies. For example, while the frequency of participants reporting at least one traumatic event was 67% in Amir and Sol's (1999) study and 84% in Vrana and Lauterbach's (1994) study, in the present study 77% of participants reported experiencing one traumatic event, while 64% of participants reported experiencing between two and four traumatic events.

While the present study used measures of distress as dependent variables, other studies (e.g. Sharpley & Yardley, 1999; Wilkinson et al., 2000) have argued that measures of distress should be augmented by well-being measures to effectively measure psychological health. In addition, combining the negative life event measure with a daily hassles measure may be a useful direction for future research in this area (e.g. Kanner et al., 1981), re-examining relationships between variables noted in the present study within the context of a prospective investigation.

Finally, in recent literature, Sense of Coherence—a measure having assessing the comprehensibility, manageability and meaningfulness of life (Frenzy, Carey, & Jorgenson, 1993)—might be profitably investigated in further studies. Given that Sense of Coherence has a pivotal role in positive illness appraisals (e.g. Nesbitt & Heidrich, 2000; Gunzelmann, Schumacher, & Braehler, 2000), vulnerability to burnout (Gana & Boblique, 2000), is positively correlated positive reinterpretation and negatively correlated with avoidance strategies (Fickova & Ruiselova, 1999), its role in buffering psychological distress merits investigation.

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