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**The effect of strategies of personal resilience on depression recovery in an  
Australian cohort: a mixed methods study**

Short title: Personal resilience and depression recovery

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**Patty Chondros** is the lead biostatistician at the General Practice and Primary Health Care Academic Centre, The University of Melbourne. She has worked at the Academic Centre for over 10 years and in this role she has gained a strong understanding of primary care research and has developed expertise in the design, conduct and analysis of randomised controlled trials and longitudinal studies in the primary care setting. In her role as the biostatistician, she also provides supervision and mentorship to primary care researchers and research higher degree students in research design and quantitative methods.

**Christopher Dowrick** is a general practitioner and Professor of Primary Medical Care at the University of Liverpool. He is Honorary Professor at the Department of General Practice, University of Melbourne. His research and clinical focus are on common mental health problems including depression and medically unexplained symptoms, and he is committed to increasing equity of access to high quality primary care mental health. The second edition of his book *Beyond Depression* was published in 2009. He writes a regular blog [www.wellbecoming.blogspot.com](http://www.wellbecoming.blogspot.com)

**Professor Jane Gunn** is Chair of Primary Care Research and Head of the Academic Centre for General Practice and Primary Health Care, The University of Melbourne, Australia. She serves on many professional committees and is Chair of the Northern Melbourne Medicare Local Board of Directors, and has been chair and member of

NHMRC grant and fellowship review panels. She serves on many Editorial Boards and is a member of the Primary Care Advisory Panel of the BMJ. A practising GP, her current research interests include depression and multimorbidity, which investigates the complex interplay between emotional well-being, physical health and illness.

**Konstancja Densley** is currently involved in a research project on depression in primary care: *diamond* Study. She is responsible for maintaining study databases and monitoring participant progress and assists the study investigators with statistical analysis and literature reviews in the preparation of research findings for presentation and publication. Previously, Konstancja worked in Australian Centre for Post-traumatic Mental Health as a researcher and database coordinator. She conducted national evaluation of post-traumatic stress disorder related programs, and research through undertaking various statistical analyses. She also has experience in research with particular focus on drug and alcohol addiction and depression.

**Kelsey Hegarty** is an academic general practitioner who has general interests in women's health and primary care nursing. She currently works as an Associate Professor in the Department of General Practice at the University of Melbourne and in general practice in inner city Melbourne. She currently leads Postgraduate Coursework in Primary Care Nursing and an Abuse and Violence in primary care research program.

## **The effect of strategies of personal resilience on depression recovery in an Australian cohort: a mixed methods study**

### **Abstract**

Strategies of personal resilience enable successful adaptation in adversity. Among patients experiencing depression symptoms, we explored which personal resilience strategies they find most helpful, and tested the hypothesis that use of these strategies improves depression recovery. We used interview and survey data from the Diagnosis, Management and Outcomes of Depression in Primary Care 2005 cohort of patients experiencing depression symptoms in Victoria, Australia. 564 participants answered a computer assisted telephone interview question at 12 months follow-up, about what they found most helpful for their depression, stress or worries. Depressive disorder and severity were measured at annual follow-up using the Composite International Diagnostic Interview and the PHQ-9 self-rating questionnaire. Using interview responses we categorised participants as users or not of strategies of personal resilience, specifically, drawing primarily on expanding their own inner resources or pre-existing relationships: 316 (56%) were categorised as primarily users of personal resilience strategies. Of these, 193 (61%) reported expanding inner resources, 79 (25%) drawing on relationships, and 44 (14%) reported both. There was no association between drawing on relationships and depression outcome. There was evidence supporting an association between expanding inner resources and depression outcome: 25% of users having major depressive disorder one year later compared to 38% of non-users (adjusted OR 0.59, CI 0.36-0.97). This is the first study to show improved outcome for depression for those who identify as most helpful the use of

personal resilience strategies. The difference in outcome is important as expanding inner resources includes a range of low intensity, yet commonly available strategies.

**Keywords:** Australia, resilience, depression, mixed methods, cohort

## **Introduction**

### *Resilience and depression*

Resilience can be understood as the ability to rebound or spring back, the power of something to resume its original shape or position after compression or bending. For human beings it refers to the capacity for successful adaptation in adversity, the ability to bounce back after encountering difficulties, negative events or hard times (Rutter 2006) or, ‘a stable trajectory of healthy functioning in response to a clearly defined (adverse) event’ (Bonanno 2012). It includes a sense of self-confidence, patience and the ability to adapt to changing circumstances, and a belief that problems can be solved (Connor and Davidson 2003). Resilience is both a trait and an adaptive process. The term can be used to indicate the potential to expand our psychological resources in the face of adversity (Harvey, Mishler et al. 2002, Fredrickson 2003, Taylor 2004). Resilience is, at least in part, predicated on an understanding of the self, not simply as a product of socio-economic circumstances or genetic programming, but as a curious, imaginative person with an innate desire to survive and flourish (Dowrick, Kokanovic et al. 2008, Dowrick 2009).

Published research concerned with resilience and health commonly focus on responses to communal threats (Eggerman and Panter-Brick 2010, Hobfoll, Mancini et al. 2011, Vaughan, Tinker et al. 2012) and natural disasters (Rajkumar, Premkumar et al. 2008, Springgate, Wennerstrom et al. 2011, Casacchia, Pollice et al. 2012, Xu and He 2012). Researchers also consider responses to personal trauma, including sudden or violent loss (Kristensen, Weisæth et al. 2012), being a victim of violence (Zraly and Nyirazinyoye 2010), physical injury (Quayle and Schanke 2010), stroke (Ostir, Berges et al. 2008), material adversity (Canvin, Marttila et al. 2009) or an

actual or potential diagnosis of cancer (Ho, Ho et al. 2010, Hou, Law et al. 2010).

There is an emerging body of research examining biological markers for resilience, including glucocorticoid receptors (Wagner, Marinescu et al. 2012) and neuropeptides (Kozlovsky, Matar et al. 2009, Cohen, Liu et al. 2012).

Focusing specifically on resilience and depression, there is some evidence that, among those at risk of depression can protect against depression through building on personal elements of resilience, that is, what an individual can do themselves, irrespective of their genetic make-up, history or the wider context in which they find themselves. For example, individuals with a hopeful disposition are less likely to experience symptoms of depression following genetic testing for colon cancer (Ho, Ho et al. 2010). An enhancing cognitive style, whereby individuals tend to seek solutions rather than focus on problems, can interact with positive life events to protect against depression symptoms (Haefffel and Vargas 2011). Perceived social support, trusting relationships and a future orientation protect against symptoms of depression among AIDS orphans (Wang, Li et al. 2012). Targeted psychosocial interventions can promote flourishing and resilience (Fava and Tomba 2009, Songprakun and McCann 2012, Min, Yu et al. 2013). However research into resilience and recovery from depression remains sparse. In this paper we report a study of personal resilience strategies that people used and found helpful in their response to symptoms of depression.

*Personal resilience strategies: drawing on relationships and expanding inner resources*

In a previous study (Dowrick C, Kokanovic R et al. 2008), we found people living with symptoms of depression tried a wide range of strategies in response to their symptoms including seeking mainstream health care, drawing support from relationships with family, interaction with friends and colleagues, developing an awareness of their own strengths and virtues, and taking steps to change their way of life to promote positive emotions. Many participants mentioned trying multiple strategies. The analysis revealed two key personal resilience strategies in response to symptoms of depression: drawing on existing social support and affectional bonds including family love, close friendships, positive experiences at work or in education (Masten 2001); and steps taken to build personal strengths and expanding positive emotions (Deegan 2005). In this paper we present results of a study of the impact on depression symptoms of the use of these strategies.

## **Methods**

### *The data*

Our data were drawn from the *diamond* cohort, a mixed methods longitudinal study of the management of depression in primary care, from the state of Victoria in Australia (Gunn, Gilchrist et al. 2008). Ethics approval for the *diamond* cohort was granted by the University of Melbourne's Human Research Ethics Committee. Cohort participants were recruited in 2005 via a sample of 30 randomly selected general practitioners (GPs). From each GP, 600 patients aged 18 to 75 years who had seen their GP for any reason over the previous 12 months were randomly selected, then invited to be screened for depression via a postal survey, using the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff 1977). Those identified

as experiencing symptoms of depression (i.e. scoring 16 or more on the CES-D) were invited into the longitudinal study, of whom just under half agreed to do so, resulting in a cohort of 789 participants at baseline. Baseline surveys and computer assisted telephone interviews (CATIs) were completed between February 2005 and March 2006. Participants were followed up every 3 months from baseline in the first year and annually thereafter. At each time point, participants completed a written survey and a CATI. Details of the cohort design are reported elsewhere (Gunn, Gilchrist et al. 2008). Survey data collected at each time point included demographics, socio-economic measures, measures of depression, quality of life and social participation, experience of abuse, self-rated health, lifestyle factors (such as exercise), quality of life and experience of health care related to depression. For the CATIs, trained interviewers use semi-structured guides to ask about participants' experiences of depression symptoms, their views on its causation, what they had done/tried for it, forms of social support and health services use. In this study we used the interview data about what people described as 'most helpful' for their symptoms. As not all cohort participants self-identified as depressed we asked about depression, stress or worries so as to avoid labelling participants in a way that they might view as stigmatising. Most interviews were around one hour long. Responses were typed verbatim into a database and mostly consisted of a phrase or one to two sentences.

#### *Research questions and research approach*

Our research questions were as follows: (1) Among people who report themselves as experiencing symptoms of depression, which personal resilience strategies do they find most helpful in response to their symptoms? (2) What socio-demographic and health-related factors are associated with the use of these most helpful personal

resilience strategies? (3) Does use of these most helpful personal resilience strategies lead to better depression outcomes?

For our sequential mixed methods study (Creswell 2003, Creswell and Clark 2007) (see Figure 1) we first used the qualitative data to refine definitions of the self-reported use of two personal resilience strategies (drawing on relationships and expanding inner resources) as participants' most helpful response to depression symptoms, and developed hypotheses about the role of these strategies in recovery. We then systematically categorised the *diamond* cohort participants. Using this 'quantitised' qualitative data (Bazeley 2012) along with other data from the same participants we tested our hypotheses. We kept contemporaneous notes of the analysis process that documented the sequential development and testing of the hypotheses. Research team members undertaking the statistical analysis (PC and KD) were not involved with the qualitative analysis and categorisation of participants.

Our hypotheses were: (i) Users of the personal resilience strategy of expanding inner resources alone or in combination with drawing on relationships as their self-reported most helpful strategy in response to depression symptoms are more likely to have a better depression outcome than those who do not. (ii) Users of the personal resilience strategy of drawing on relationships alone or in combination with expanding inner resources as their self-reported most helpful strategy in response to depression symptoms are more likely to have a better depression outcome than those who do not.

*Exploratory analysis to identify personal resilience strategies and refine definitions*

We used the qualitative data from the 12 month follow up CATI, collected between March 2006 and March 2007. Initially FB read a random sample of 30 interview transcripts and FG, CD and JG read between them a further 15 transcripts. We found that the participants revealed personal resilience strategies in response to the following questions:

- a) 'When you first realised you had an issue with depression, stress and worries, what was the first thing you decided to do about it?'
- b) 'Apart from what you have just mentioned, is there anything else that you have tried for depression, stress and worries?'
- c) 'Of everything you have done/tried what was the most helpful? Why?'
- d) 'Of everything you have done/tried what was the least helpful? Why?'

We focused on responses to the question c). However, we considered responses to questions c) and d) together as some participants talked about what was the most helpful after being asked why or after being asked question d), as often occurs in semi-structured interviews. Some participants mentioned more than one thing that was most helpful, in which case all responses were taken into account. Based on our theoretical understanding of the adaptive aspects of resilience and our reading of the data, we developed definitions of expanding inner resources and drawing on relationships.

#### *Implementation of the categorisation of personal resilience*

Two researchers, FB and FG independently categorised each of the 564 participants who provided a response to the relevant questions. Participants were categorised as users of drawing on relationships or expanding inner resources or users of both strategies or users of neither strategy, recognising that categorisation was based on the

strategies they found most helpful. Categorisations were compared, discussed and discrepancies resolved after the first two sets of 50 transcripts, and then after each 100 transcripts. Most of the discrepancies were found early in the process and discussion of discrepancies led to refinement of the classification as described below. Overall, agreement of independent categorisation was 94% and all the 32 discrepancies in coding were resolved. In addition 28 (5%) errors were corrected.

During the process of refining the categories we decided that in order to be categorised as a user of expanding inner resources, the participant had to state that they had actively undertaken a strategy. For example, we decided that participants who described ‘relaxing’ (female, 59 years) or ‘avoiding being overtired’ (female, 64 years) as most helpful, should be categorised as users of expanding inner resources, as these participants took an initiative to be less active. We also categorised participants who said their active faith or religious belief was most helpful, as users of expanding inner resources. If there was no active voice in a statement, for example, ‘I went back on track’ (male, 47 years) the participant was considered to be a non-user of expanding inner resources/drawing on relationships. If a participant had actively sought a new relationship or friendship as a response to their depression symptoms, then that participant was categorised as a user of expanding inner resources. However, there were some participants who had started a new relationship or got married during their episode of depression but there was no evidence that starting this new relationship was a response to their depression. These participants were categorised as users of drawing on relationships. If a participant said ‘talking’ was most helpful, but did not specify who they talked to, the participant was still considered to be a user of drawing on relationships. However, if a participant described a person, as a reason to

'keep going', they were not categorised as a user of drawing on relationships as there was no evidence of support, for example, 'I have to keep myself on track for my sons because I don't want them to see me upset' (female, 55 years). Where a participant described the strategic use or avoidance of alcohol as a response to depression symptoms, they were categorised as using expanding inner resources; for example 'having a few beers . . . once a week three or four beers' (male, 67 years). If an activity was mentioned, but it was not clear that it was specifically undertaken in response to depression symptoms, then the participant was not categorised as a user of expanding inner resources, for example 'I do yoga for lots of things' (female, 65 years) and 'I've played sport for all my life, so that's always, that's helped. I don't do sport as a specific thing to deal with depression' (female, 44 years). We categorised work as expanding inner resources where the participants just referred to work without further description. None of the participants talked specifically about relationships with people at work or about education.

Participants who only mentioned strategies or treatments initiated by a mainstream professional, or their relationship with a mainstream professional, as most helpful, were categorised as not using expanding inner resources or drawing on relationships. We considered mainstream professionals to include: doctors, nurses, counsellors, union officials, police officers and social workers. From the data analysed, it was not possible to tell how actively a person had sought help from these services. However, as complementary therapy is usually actively sought by individuals independent of mainstream care, participants reporting this as most helpful were categorised as users of expanding inner resources unless it was clear the therapy was initiated or provided through mainstream care.

### *Quantitative assessments*

To explore the factors associated with the use of participants' most helpful personal resilience strategies, we used data collected 12 months after entry into the cohort, when the qualitative data used to develop the categorisation of personal resilience was also collected (see Figure 2). We included factors known to impact on incidence, chronicity or recurrence of depression. This included age, socioeconomic status, employment; health status (Ware, Kosinski et al. 1996); experience of partner abuse (Hegarty, Sheehan et al. 1999); physical activity (frequency of vigorous and less vigorous exercise in a normal week) (Armstrong, Bauman et al. 2000); social participation (Baum, Bush et al. 2000), and specific items related to health care services use. Use of depression and anti-anxiety medications were coded using the responses to a self-reported question asking participants which medications (if any) they have been prescribed for their emotional well-being in the past 3 months. Names of the reported medications were then examined by a research pharmacist and classified as depression/anti-anxiety medication. Quality of life was assessed using the brief version of the World Health Organisation quality of life instrument (WHOQOL-BREF) (The WHOQOL Group 1998, Skevington, Lotfy et al. 2004). The Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire was used to measure both anxiety (6 items) and depression severity (PHQ 9 score) (Spitzer, Kroenke et al. 1999). The PHQ-9 score calculated by summing the items has been validated for use in primary care and is used widely in the USA and UK in routine primary care to both aid diagnosis and monitor depression severity over time. We also included data items collected on entry to the *diamond* cohort which were not collected at 12 months: gender, child sexual abuse (MacMillan,

Fleming et al. 1997), the DSM-IV and ICD-10 diagnostic assessments of depression and substance use conducted using the Composite International Diagnostic Interview (CIDI) Auto version 2.1 (World Health Organization. 1997), whether the participant reported having a long-term illness, health problem or disability, or had ever been told by a doctor that they had anxiety or depression.

To examine differences in outcome of depression for those using personal resilience strategies, we used outcome data collected 24 months after entry to the cohort (12 months after the data used for categorisation of personal resilience). Outcome was assessed as depression severity measured using the PHQ-9 score (Spitzer, Kroenke et al. 1999) and major depressive disorder based on the CIDI DSM-IV 10 diagnostic assessment (World Health Organization. 1997).

### *Quantitative analysis*

All analyses were conducted using STATA version 12.1 (StataCorp 2011). Data were summarised using counts and percentages for categorical data, and means and standard deviations (SD) for continuous data.

We examined whether the factors known to impact on incidence, chronicity or recurrence of depression described above, were associated with being a user of expanding inner resources and a user of drawing on relationships. Linear and logistic regression was used to examine the association between the participant characteristics and their use of personal resilience strategies, for continuous and binary outcomes, respectively. Results were reported as differences in mean outcome (Diff) between users and non-users of expanding inner resources or drawing on relationships for

continuous outcomes and odds ratios (ORs) for binary outcomes, with respective 95% confidence intervals (CI) and p values (P).

We examined whether use of expanding inner resources or drawing on relationships was predictive of depression one year later. Linear regression was used for depression severity (PHQ-9) and logistic regression was used for probable major depressive disorder in the past 12 months (CIDI). Multivariable regression was used to examine the relationship between expanding inner resources and drawing on relationships and depression one year later whilst controlling for age, gender, employment status, child sexual abuse, PHQ-9 depression severity in the last 2 weeks and antidepressant use. Moderation was tested by including the interaction between expanding inner resources and drawing on relationships in the multivariable model. Similarly, interaction between each of the resilience strategies and anti-depressant use at 12 months follow up was also tested. For all regression models, generalised estimating equations with robust standard errors were used to allow for the correlated responses of participants that attended the same general practice, provided the estimated intra-cluster correlation for the fitted model was non-negative.

Multiple imputation was used to handle missing data for the 576 cohort participants that responded to the CATI interviews at 12 months. Using 'mi impute mvn' command in Stata 12, 50 data sets were imputed and the estimates of the parameters for each imputed data set were combined using Rubin's rules (Rubin 1987). The imputation model included all the variables of the multivariable model described above and auxiliary variables that were strongly correlated with the depression

outcomes including measures of depression at preceding follow-up times, and variables that were predictive of missing data (participant characteristics, measures of quality of life, child and partner abuse, health and measures of socio-economic status). Continuous variables included in the imputation model were checked for deviation from the normal distribution and transformed to a symmetric distribution when skewed. The imputed outcomes for depressive disorder were dichotomized using adaptive rounding (Bernaards, Belin et al. 2007).

## **Results**

Of the 564 participants who provided a response to the question, ‘Of everything you have done/tried what was the most helpful?’ 316 (56%) were categorised as a user of personal resilience strategies for their depression symptoms. Of these, 193 (61%) were categorised as users of expanding inner resources only, 79 (25%) were categorised as users of drawing on relationships only and 44 (14%) participants were categorised as users of both expanding inner resources and drawing on relationships (see Figure 2). Users of expanding inner resources talked about hobbies, physical exercise, ways of thinking, changing their work, active faith or religious belief, the use of routines and the use of complementary therapies.

Just trying to have some quiet time and not getting too involved but then on the other side probably singing’ (female, 66 years)

Regular strenuous exercise’ (female, 43 years)

My motorbike...you can get on and no one can ring you, you’re on your own and your’ free... no radio and you can actually think about things when you’re riding along’ (male, 44 years)

I have gotten into the practice of avoiding certain scenarios that make things worse’ (male, 44 years)

Work... I’m quite comfortable in working; it’s just part of my everyday living. I’ve always done physical work’ (male, 71 years)

I quit my job (female, 44 years)

The most beneficial thing was yoga (female, 48 years)

Users of drawing on relationships talked about drawing on family love, intimate relationships or close friendships. Being with people or talking to people was mentioned, and for some, pets were most helpful.

I got a lot of support from the town and from my children (female, 75 years)

Feeling accepted by friends (female, 43 years)

Company (male, 61 years)

The dog (female, 43 years)

Users of both strategies talked about an activity such as golf that included exercise and social interaction or said that a number of different strategies were most helpful, such as drawing on friendships and taking exercise.

#### *Associations with the use of personal resilience strategies*

Users of drawing on relationships as the most useful strategy in response to depression reported higher scores on average for social participation and WHOQOL social relationships, (M=60.4, SD=21.7 versus M=50.2 SD=24.7; 95% CI: 5.8 to 14.4,  $p<0.001$ ) and social participation (M=20.6, SD=8.6 versus M=17.6; SD=9.0, 95% CI: 1.6 to 4.4,  $p<0.001$ ), and were less likely to report childhood sexual abuse (21% versus 31%; OR=0.6, 95% CI: 0.4 to 0.9,  $p=0.02$ ). A higher proportion of users of expanding inner resources as the most useful strategy for depression reported having

experienced partner abuse in the last 12 months compared to non-users (40% versus 30%; OR=1.5, 95% CI: 1.1 to 2.2, p=0.03).

Fewer users of expanding inner resources were classified as having major depressive disorder in 12 months before they entered the cohort compared to the non-users (39% versus 57%; OR=0.5, 95% CI: 0.4 to 0.6, p<0.001), but similar proportions for major depressive disorder were observed between users and non users for drawing on relationships (49% in each group; OR=1.0, 95% CI: 0.7 to 1.6, p=0.97). Users of personal resilience strategies were less likely to report that they were ever told by a doctor that they had depression (expanding inner resources: 64% versus 77%; OR=0.5, 95% CI: 0.4 to 0.7, p<0.001; drawing on relationships: 58% versus 75%; OR=0.5, 95% CI: 0.3 to 0.7, p<0.001); less likely to report anxiety (expanding inner resources: 53% versus 64%; OR=0.6, 95% CI: 0.5 to 0.9, p=0.004; drawing on relationships: 41% versus 64%; OR=0.4, 95% CI: 0.2 to 0.6, p<0.001); and fewer were taking antidepressant medication in the past 3 months (expanding inner resources: 21% versus 45%; OR=0.3, 95% CI: 0.2 to 0.5, p<0.001; drawing on relationships: 23% versus 38%; OR=0.5, 95% CI: 0.3 to 0.8, p=0.001). Fewer users of drawing on relationships visited the GP more than 3 times in the past 3 months compared to their counterparts (26% versus 38%; OR=0.6, 95% CI: 0.4 to 0.9, p=0.03). Users of expanding inner resources were also less likely to report taking anti-anxiety medications (3% versus 10%; OR=0.3, 95% CI: 0.2 to 0.6, p=0.001) or visiting a mental health specialist in the past 3 months than non-users (14% versus 26%; OR=0.4, 95% CI: 0.3 to 0.7, p=0.001).

*Use of Drawing on relationships and expanding inner resources and depression outcome*

Of the 576 participants that completed the CATI interview 12 months after entry into the cohort, 454 (79%) completed the CIDI within the telephone interview and 431 (75%) completed the PHQ-9 items in the survey 12 months later. Complete data were available for gender, age and antidepressant use. Eight participants had missing responses for childhood sexual abuse, 64 (11%) had missing responses for both employment status and PHQ-9 depression severity measured 12 months after entry into the cohort. Tables 1 and 2, show the association between use of personal resilience strategies (expanding inner resources or drawing on relationships) 12 months after entry to the cohort and outcomes for depression measured one year later, based on the complete case and multiple imputation analyses.

The prevalence of major depressive disorder (Table 1) and mean PHQ-9 depression severity (Table 2) for the users and non-users of drawing on relationships were similar. There was no evidence to reject the null hypothesis of no association between being a user of drawing on relationships and subsequent depression outcome. There was, however, strong evidence supporting an association between being a user of expanding inner resources and depression status one year later. Twenty-five percent of expanding inner resources users were categorised as having major depression one year later compared to 38% of non-users (Table 1). The unadjusted odds of having a major depressive disorder (as measured by CIDI) for users of expanding inner resources compared to non-users was almost half. The association with not being a user of expanding inner resources and major depressive disorder remained after

adjustment for confounders, although the adjusted odds ratio was closer to one (Table 1). Table 2 shows that on average, users of expanding inner resources scored lower on depression severity than non-users with a difference in means of -1.5 (95% CI: -2.5 to -0.42), equivalent to a standardised mean difference of -0.24 (95% CI: -0.41 to -0.07), where the standard deviation for depression severity was 6.15. However, the difference in the mean PHQ-9 depression severity between users and non-users of expanding inner resources decreased when controlled for other factors, which included PHQ-9 depression severity at 12 months after entry into the cohort. Multiple imputation analyses presented in Tables 1 and 2 gave similar results to the complete case analysis.

There was no significant interaction between being a user of expanding inner resources and drawing on relationships for the two different measures of depression (Tables 1 and 2). Similarly, there was no significant interaction effect of current antidepressant use on being a user of resilience strategies (results not shown).

## **Discussion**

Participants recruited to a cohort in the State of Victoria, Australia, after screening for depression symptoms, could be categorised as users of personal resilience as their most helpful strategy in response to depression symptoms, or not. Those categorised as using these strategies could be further categorised into those drawing on pre-existing relationships actively or passively, and doing this knowingly to help their depression symptoms, or those taking active steps to expand their own inner resources

to give their life greater meaning and purpose and doing this knowingly to help their depression symptoms, or both. This categorisation was based on their answers to an open question about what they found most helpful for their depression symptoms. The categories were broad and included a diversity of different approaches and activities but the key attributes for each category were clear.

Users of any personal resilience as their most helpful strategy for their depression symptoms were less likely to report a diagnosis of depression or anxiety, use of depression medications or high utilisation of health services. It may be that the association between the experience of being given a diagnosis for depression and being less likely to report personal resilience strategies as most helpful for their depression symptoms, is at least in part due to the severity of the depression, as those with more severe depression are more likely to be given a diagnosis. It may also be that those given a diagnosis are less likely to see themselves as having a role in their own recovery, or have limited access to resources to enable them to use personal resilience strategies. It is not possible to distinguish between these possibilities with our study design. Users of expanding inner resources as the most helpful strategy for depression symptoms were more likely to report partner abuse in the previous 12 months, but this was not so for users of drawing on relationships. This may be because partners often isolate the victim from their family and friends or because experiencing partner abuse can lead to diminished trust in others (Hegarty 2006). Users of drawing on personal resilience strategies were less likely to report experiencing childhood sexual abuse than non-users, perhaps reflecting the long term trauma of such abuse (MacMillan, Wathen et al 2009)

### *Limitations*

Participants were categorised based on data where it was clear what participants found most helpful for their depression symptoms. Our categorisation may have excluded some people who did use personal resilience strategies if their response to the interview question was not clear, for example, if they did not use the active voice. Some personal resilience strategies were difficult to categorise, particularly those which involved actively seeking out people to relate to. However, all classification decisions were taken independently of the quantitative analysis team. The categorisation does not capture all personal resilience strategies participants had tried. The categorisation and subsequent analyses do not take account of antecedent factors, including personality and early life experiences (apart from childhood abuse), which could impact on the presence and extent of personal resilience strategies.

Social participation can form an aspect of drawing on relationships, and exercise used to help with depression was considered a form of expanding inner resources, thus explaining the positive associations found. We also recognise that many of the variables found to be associated with use of drawing on relationships or expanding inner resources are likely to be correlated with each other.

Through using participant's own responses, we developed very broad categories. However, the categories were developed from theoretical concepts. The validity of the categorisation was quality assured by being undertaken independently by two

researchers with a high level of inter-categoriser agreement. We took care to separate qualitative and quantitative analysis and developed our hypotheses prior to statistical analysis.

### *Conclusions*

This is the first study to demonstrate that personal resilience is associated with improved depression outcome. One-quarter of those using the personal resilience strategy of expanding inner resources were categorised with a major depressive disorder compared to 38% of non-users. Further, on average, those using the strategy of expanding inner resources had less depression severity 12 months later than the non-users. Even a small shift in the mean depression severity in a general practice population with mild to severe depression is important because the strategy of expanding inner resources included a broad range of low intensity yet commonly available strategies, which in many cases involve no additional cost. The commonality in the category was that the strategy involved the individual taking an initiative specifically in response to their depression symptoms, and that the strategy was not sourced from a health professional. There was a similar finding from a UK based study which demonstrated a significant link between self-reported self-efficacy behaviours (e.g. exercise) at baseline and positive outcome of depression at 6 months (Lynch 2012). Those who, even in a small way, notice an improvement in their depression symptoms when they used the strategy of expanding inner resources gain this positive reinforcement for continuing with this strategy.

However, there is evidence from our analysis of other data from the *diamond* cohort (Boardman, Griffiths et al. 2011) that for some people living with depression, being resilient sometimes fails as a strategy and these people need to accept medical intervention in order to move forward. The lack of evidence for an association between reporting using the personal resilience strategy of drawing on relationships as the most helpful strategy and improvement in depression was an unexpected finding as lack of social support has been associated with increased prevalence of depression (Dalgard, Dowrick et al. 2006). It is possible that most participants recruited to the *diamond* cohort are already drawing on relationships. Although participants recognise drawing on relationships as helpful for their depression, there may be a threshold effect such that once they have sufficient support from relationships, adding more does not add benefit.

The findings of this study raise questions about the role mainstream health care plays for those living with depression. Non-users of personal resilience strategies as most helpful were more likely to have experience of mainstream health care for their depression and more likely to have a major depressive disorder (as measured by CIDI). Our results suggest that individuals make strategic choices about what they do for their depression. When distressed and struggling, individuals may seek help from mainstream health care. It is important for health professionals to recognise patients as individuals with their own strengths on which they may be able to draw in response to their depression (Dowrick 2009).

We considered that the effect of personal resilience strategies on depression outcomes may differ for users and non-users of antidepressants. There was, however, no

evidence to suggest that antidepressant use at 12 months after entry into the cohort modified the effect of being a user of personal resilience strategies on depression outcome 12 months later.

We are aware that some patients are more vulnerable than others, that earlier adverse life circumstances make people more susceptible to depression and to a chronic course of depression. Current adverse circumstances may also render individuals less able to use strategies of personal resilience. We are therefore not advocating an exclusive focus on building resilience, but rather a greater awareness of this as a potential therapeutic strategy. Identification by health professionals of individuals' current levels of self-efficacy (Sherer, Maddux et al. 1982) may be a useful starting point.

Further research is needed to understand how and why people find strategies of expanding inner resources helpful as a response to their depression symptoms and to further understand the role of drawing on relationships. Further research is also needed into ways to encourage, and build on, the use of the strategy of expanding inner resources amongst those experiencing depression symptoms. We do not know whether suggestions made by health professionals to use strategies of expanding inner resources will be as effective as those initiated by the individual with depression. Perhaps a public health approach may be more appropriate, where expanding inner resources is promoted as what people usually do. This allows the idea and initiation of an individual's own response to come from them. This paper gives impetus to research on personal resilience and depression as it provides evidence that, for those

living with depression symptoms, taking active steps to expand own inner resources, to give life greater meaning and purpose, and doing this knowingly to help their depression symptoms, has an impact on depression recovery.

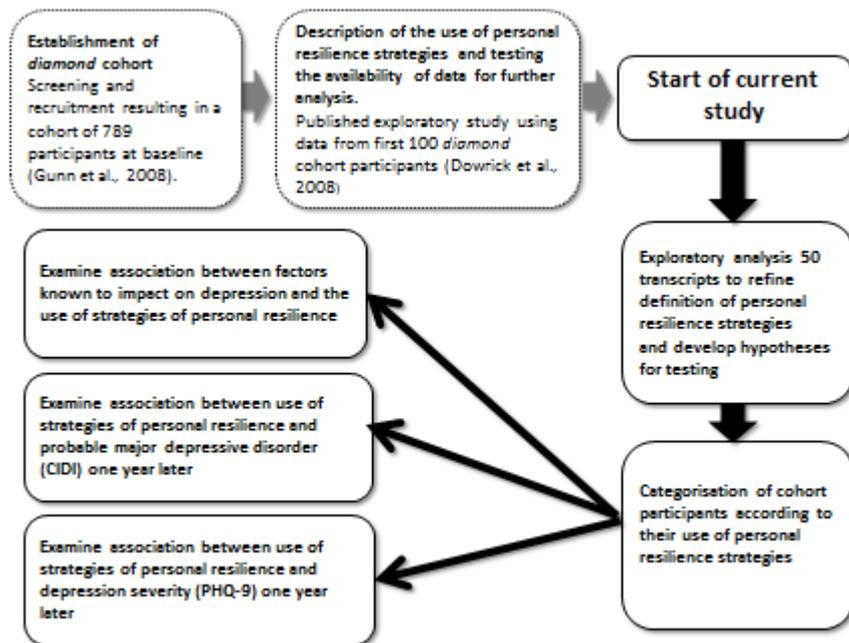
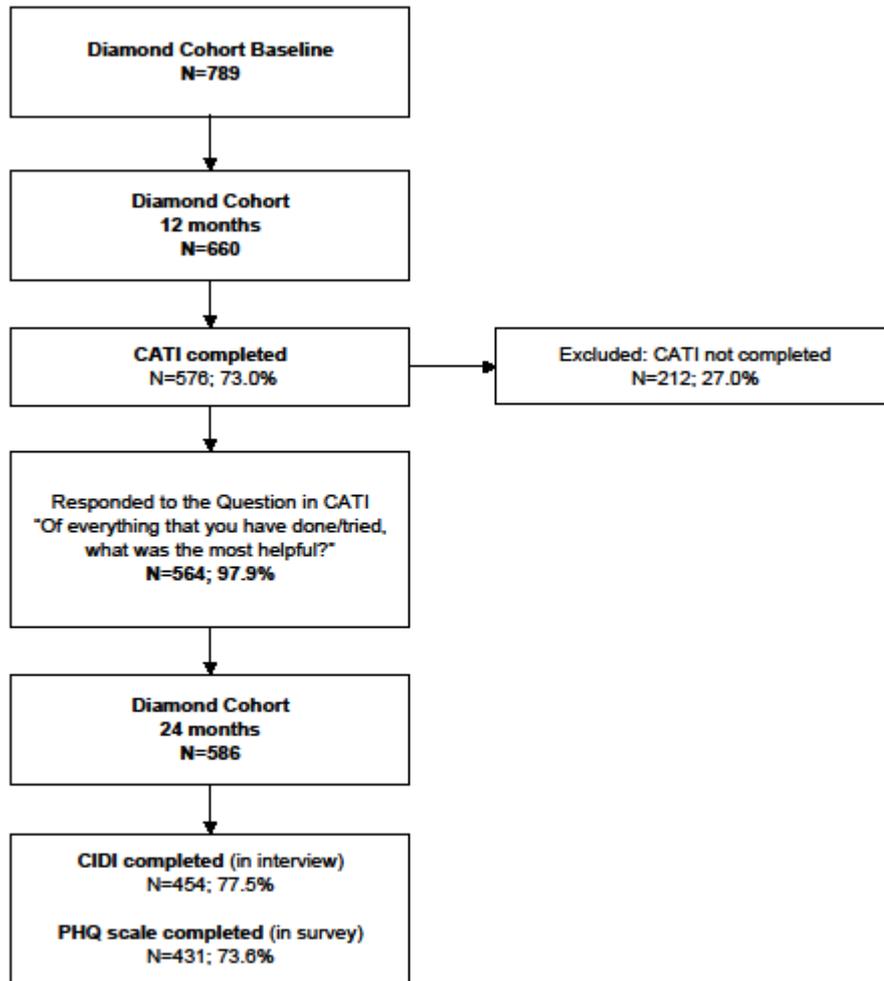


Figure 1 Study Design



**Figure 2** Flow chart of study participants

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## **Declaration of conflicting interests**

None

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