

Social Problem-Solving Processes and Mood in College Students: An Examination of Self-report and Performance-based Approaches

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Abstract Previous research has consistently linked poor problem-solving with depression and anxiety. However, much of this research has failed to directly assess real-life problem-solving, relying on self-appraisal or responses to hypothetical problems. This study examined real-life problem-solving in three groups of college students: non-depressed/non-anxious controls; anxious; and mixed depressed/anxious. Participants completed a diary of the interpersonal problems they encountered, and their attempts to solve them. Real-life social problem-solving was also assessed by asking participants to recall past problem solutions. Participants also completed the Social Problem-Solving Inventory-Revised (SPSI-R) and the Mean Ends Problem Solving (MEPS) task. The real-life problem-solving tasks revealed significant differences between the groups, with the mixed depression/anxiety participants exhibiting less effective strategies compared to the control group. However, there were no group differences in MEPS performance, or within the constructive problem-solving style component of the SPSI-R. No deficits were found within the anxious group. Both the anxious and the mixed depressed/anxious groups expressed negative attitudes towards problem-solving. Results have implications for social problem-solving research and suggest that current assessment procedures may be unable to detect impairments in real life problem-solving. Therefore a diary procedure where individuals record their response to the problems they encounter in everyday life may prove a valuable addition to the current battery of assessment procedures.

Keywords Depression · Anxiety · Social problem-solving · Ecological validity

Introduction

Social problem-solving is the complex cognitive-behavioural process whereby an individual attempts to discover adaptive ways of coping with problematic situations in everyday living (D’Zurilla et al. 2006). It comprises problem orientation, a general motivational and appraisal

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component, and problem solving style, the cognitive and behavioural activities a person uses to cope with problems (D’Zurilla et al. 2002).

Despite the vast amount of research that has been generated in the social problem-solving domain, its ecological validity remains questionable because of the methods typically employed for its assessment (D’Zurilla and Maydeu-Olivares 1995; Foxx and Faw 2000; van Nieuwenhuijzen et al. 2005). By definition, social problem-solving is concerned with problems in the context of the ‘real world’, yet the most consistently utilised measures focus on self-appraisal of problem orientation and problem-solving style (e.g. Social Problem-Solving Inventory-Revised: D’Zurilla et al. 2002), or solution generation in response to hypothetical problem scenarios (e.g. Means End Problem-Solving Task: Platt and Spivack 1975). It is well established that attitudes and intended actions are often only moderately correlated with actual behaviour (e.g. Ajzen and Fishbein 1977), and recent research has found evidence of this discrepancy in relation to social problem-solving (Shewchuck et al. 2000; van Nieuwenhuijzen et al. 2005). Thus, research needs to utilise a wide battery of assessment procedures encompassing problem orientation, problem-solving style *and* global measures of real-life problem-solving that ascertain how solutions are implemented in the ‘real world’ (D’Zurilla et al. 2004; Nezu 2004).

It is important that accurate and valid assessments of social problem-solving are developed since social problem-solving plays a significant role in psychological adjustment, constituting an important coping strategy that has the potential to reduce or minimise psychological distress (D’Zurilla and Nezu 1990). The links between social problem-solving and emotional disorders have been examined using traditional measures of social problem-solving assessment. This research has consistently linked depression, anxiety and worry with poor problem orientation (e.g. Haugh 2006; Kant et al. 1997; Marx et al. 1992; Robichaud et al. 2003). As regards a constructive problem-solving style, research has also consistently linked clinical depression with a deficit in problem-solving skills (e.g. Goddard et al. 1996; Howat and Davidson 2002; Marx et al. 1992). However, research with analogue groups have yielded inconsistent findings, with some studies uncovering skills deficits (e.g. Gotlib and Asarnow 1979; Kant et al. 1997) whilst others have not (e.g. D’Zurilla et al. 1998; Goddard et al. 1997; Haugh, 2006; Mayo and Tanaka-Matsumi 1996). As regards anxiety, skills deficits tend not to be found in either clinical or analogue groups (e.g. Davey 1994; Haaga et al. 1995; Haugh, 2006; Marx et al. 1992).

While the pattern of social problem-solving deficits in depression and anxiety has been extensively researched, it remains unclear how these mood disorders are associated with problem-solving performance in ‘real-life’. The only published study examining ‘real-life’ problem-solving in depression/anxiety asked participants to recall problematic events from their own life that were similar to previously presented hypothetical MEPS scenarios (Marx et al., 1992). Participants reported their past problem-solving behaviour, and, in retrospect, an ‘ideal’ strategy. Clinically depressed participants, compared with non-depressed controls, reported less effective actual problem-solving behaviour and generated less effective ‘ideal’ strategies. Clinically anxious participants also reported less effective actual problem-solving behaviour, yet their ideal strategies were not significantly different to those of the non-depressed group. Marx et al. suggested that the two clinical groups suffered from deficits at different stages of social problem-solving, with the depressed participants having difficulties in the earlier cognitive phases, whilst anxious participants’ impairments were specifically at the implementation stage. This argument is reinforced by recent theories of worry as a ‘thwarted problem-solving process’, whereby worrying may represent a constructive attempt to resolve problems. However, this process is “thwarted” by trait factors, such as poor problem orientation, that interfere with an individual’s ability to successfully apply their intact problem-solving skills (Davey et al. 1996; Dugas et al. 1998). Thus, these findings

demonstrate the need to assess all stages of the problem-solving and solution implementation processes, particularly in groups where traditional assessment procedures have often failed to demonstrate skills deficits.

One limitation of the Marx et al. (1992) study was that the real-life problem-solving task relied heavily on memory. Research has indicated that depressed patients often have difficulty recalling specific events from autobiographical memory (cf. Goddard et al., 1996; Williams 1996) and thus may have more difficulty in accurately remembering their actions in each situation. A further limitation of the Marx et al. study was that the anxious sample demonstrated relatively high levels of dysphoric mood, making it unclear whether their problem-solving deficits were primarily linked to anxiety or dysphoria. Empirical research and clinical observation demonstrate that anxiety and depression, both at clinical and sub-clinical levels, often co-occur (e.g. Brown et al. 2001; Endler et al. 2003). Furthermore, research has suggested that depression rarely occurs without anxiety, with anxiety disorders often preceding the onset of depressive disorders (Alloy et al. 1990; Wittchen et al. 2000). Reflecting this pattern of comorbidity, it proved particularly difficult in the current study to recruit a sample of individuals exhibiting symptoms of 'pure' depression. Therefore, it was decided to compare anxious individuals who were not depressed with anxious individuals who were. This permitted the separate effects of anxious and depressive symptoms to be examined.

The present study examined the relationship between real-life problem-solving and traditional measures of social problem-solving. Participants were drawn from a college population for a number of reasons. Being young and experiencing high levels of affective distress are two factors that increase the likelihood of experiencing depression and anxiety, arguably making student populations particularly relevant groups within which to investigate the development of symptoms (e.g. Kessler et al. 2005; Sandin et al. 2004; Sorenson et al. 1991; Vrendenberg et al. 1993). Moreover, as individuals receiving treatment for depression and/or anxiety were explicitly excluded, the current sample was free from any bias introduced by treatment methods (Vrendenberg et al. 1993). Real-life social problem-solving performance was assessed prospectively using a diary method, whereby participants recorded a number of interpersonal problems as they occurred, their actual problem solving behaviour and, in retrospect, their ideal solutions. Participants also completed a real-life performance measure similar to that used by Marx et al (1992) and two more traditionally utilised measures of social problem-solving processes and performance: the SPSI-R and MEPS.

On the basis of the existing empirical literature it was hypothesised (i) that anxious and depressed mood would both be associated with poor problem orientation, as assessed by the SPSI-R, and (ii) that neither mood state would be associated with deficits in ability to generate problem-solving strategies, assessed using the SPSI-R, MEPS task, and also via the participants' retrospective accounts of the 'ideal' strategies they could have applied in real-life situations. However, it was further hypothesised that the two mood states would be associated with deficits in global real-life problem-solving performance, as indexed by participants' accounts of their actual responses to problem situations in both the diary and Personal-MEPS tasks.

Method

Design & Participants

The study employed a between-subjects design with participants categorised into three groups on the basis of their scores on the Depression (HADS-D) and Anxiety (HADS-A) scales of the

Hospital Anxiety and Depression Scale (Zigmond and Snaith 1983). On both scales, scores of 0–7 represent the normal range, 8–10 are ‘borderline’ and 11+ are ‘clinically significant’ (Snaith and Zigmond 1994). Participants with scores in the normal range on both scales were designated ‘Control’, those with HADS-A scores above 11 and HADS-D scores in the normal range as ‘Anxious’ (Anx), and those with HADS-A and HADS-D scores above 11 as ‘Mixed Depression/Anxiety’ (Dep/Anx). The study’s exclusion criteria were any individuals receiving treatment for depression or anxiety. Fortynine first-year college students agreed to take part in the study, although four (two anxious and two control) withdrew during the diary completion phase. Thus, 45 participants completed the study ($n = 15$ in each group). Participants received course credits for participation.

Materials

Hospital Anxiety and Depression Scale

The HADS (Zigmond and Snaith 1983) is a self-report measure of depressive and anxious symptom severity. It consists of two scales, Anxiety (HADS-A) and Depression (HADS-D), each comprising seven symptoms. The participant rates themselves on a scale of 0 to 3 for the severity of each symptom over the last week. The clinical cut-off for each scale is 8 with scores between 8 and 10 indicating ‘borderline’ cases (Snaith and Zigmond, 1994). The HADS is considered to have equally good sensitivity and specificity as other commonly used self-rating screening instruments (Bjelland et al. 2002; Herrmann 1997), and allows both anxious and depressive symptoms to be screened through the completion of a single questionnaire.

Social Problem-Solving Inventory-Revised

The SPSI-R (D’Zurilla et al., 2002) is a 52 item self-report inventory assessing social problem-solving processes. Participants rate statements describing the use of each process on a scale of 0 (not at all true of me) to 4 (extremely true of me). Of the five component scales, two assess problem orientation and three problem-solving style:

- (a) Positive Problem Orientation (PPO): A constructive problem-solving cognitive set involving a belief in one’s own ability to solve problems and a general disposition towards appraising problems as challenging rather than threatening.
- (b) Negative Problem Orientation (NPO): A dysfunctional cognitive-emotional set involving doubt in one’s ability to solve problems and the tendency to perceive problems as threatening.
- (c) Rational Problem-Solving (RPS): A constructive problem-solving style characterised by effective application of a number of problem-solving skills, such as problem definition and formulation, generation of alternative solutions, decision-making, and solution implementation and verification.
- (d) Impulsivity/Carelessness Style (ICS): A dysfunctional problem-solving style relating to application of problem-solving skills. High scorers are characterised by impulsive, careless and hurried application of problem-solving skills.
- (e) Avoidance Style (AS): A dysfunctional problem-solving style relating to the application of problem-solving skills. High scores are characterised by procrastination, passivity or inaction.

Standard scores range from 47 to 135 for PPO, 68–165 for NPO, 52–144 for RPS, 61–177 for ICS, and 69–156 for AS. Scores in the range of 86–114 are considered to be the ‘norm group average’ for each scale (cf. D’Zurilla et al. 2002).

Mean Ends Problem Solving Task

The MEPS (Platt and Spivack 1975) consists of 10 vignettes that describe the start of a problematic situation and its resolution. The task for the participant is to detail the actions required for the given solution to be reached effectively. Various amendments to the original have been proposed. In order to improve the consistency of administration of the MEPS, Butler and Meichenbaum (1981) suggested excluding some of the less relevant scenarios, whilst House and Scott (1996) recommend that participants are asked to provide their ideal solution, rather than simply to 'complete the story'. In the present study both of these variations were adopted. Four scenarios used by Goddard et al (1996, 1997) were utilised: making friends in a new neighbourhood; a break up of a relationship; failing out with friends; and problems with one's boss. The scenarios were presented in the second person to impart personal relevance to the situation. Each of the MEPS scenarios was read to the participant, who followed them on index cards. Participants were instructed that they could take a few minutes to consider the strategy they would use to solve the problem. They were then asked to verbally relay their strategy to the experimenter. Their responses were tape recorded. Each participant received one practice item, prior to the four test items, to ensure that they understood the procedure.

In its original version, the MEPS was marked only for 'relevant means' (the number of discrete steps that are judged by the rater as being relevant to enabling the protagonist to reach the solution) using criteria supplied by Platt and Spivack (1975). However, following suggestions from Butler and Meichenbaum (1981), a number of subsequent studies have additionally marked responses for 'effectiveness'. In the present study the first author scored responses for relevant means and effectiveness on a likert-type scale from 0 (not at all effective) to 7 (very effective). Scores were averaged for each participant across the four problems. An independent rater, who was unaware of each respondent's group membership, scored 31% of responses, with Pearson product-moment correlation coefficients being calculated to assess inter-rater reliability. These were .81 for relevant means and .76 for effectiveness.

'Personal-MEPS' Task

The P-MEPS task, based on the procedure used by Marx et al. (1992), evaluated solutions that had been generated by the individual in response to real-life problems. Immediately following the conventional MEPS procedure, participants were provided with a copy of all four MEPS scenarios. For each they were asked to remember and write down a similar situation, or one from the same general life area (i.e. relationships, friends, work, or neighbours) that they had personally experienced. If they failed to recall a problem then the scenario was marked 'no recall' and they continued with the next scenario. Taking each scenario in turn the participant was verbally asked to recount (i) how they had actually handled the problem and (ii) to outline, in retrospect, what strategy they would consider 'ideal'. The participant's responses were tape recorded.

The actual strategies provided were marked for relevant means (P-MEPS Actual Means) and effectiveness (P-MEPS Actual Effectiveness) in the same way as the conventional MEPS task, with inter-rater reliability coefficients being .90 for P-MEPS Actual Means and .81 for P-MEPS Actual Effectiveness. Participants' ideal strategies tended to add to the actually strategy already provided, rather than involve the creation of an entirely separate strategy. This made it difficult to mark these strategies for relevant means, and they were thus marked for effectiveness only (P-MEPS Ideal Effectiveness). The inter-rater reliability coefficient for

P-MEPS Ideal Effectiveness was .75. Scores for all three variables were averaged across the number of situations recalled to provide a mean score for each.

Real-life Problem-Solving 'Diary' Task

Participants were asked to record in a 'diary' at least four interpersonal problems that they faced over the 2–4 week period following the baseline interview. 'Interpersonal problems' were defined as 'situations that present difficulty and where the solution is not immediately obvious', and if participants were still unsure of what to record they were reminded of the two problem-solving tasks they had already completed (MEPS and P-MEPS tasks) and the types of problem these included.

The format for the recording of problems was an adaptation of the Problem Solving Self Monitoring form developed by D'Zurilla and Nezu (1999). Participants were asked, firstly, to outline a number of features of the problematic situation, rate its importance to their own well-being on a likert-type scale from 0 (not at all important) to 7 (extremely important); secondly, to explain what they did to try and solve the problem; and thirdly to describe the outcome. Participants were also asked what strategy, in retrospect, they believe would have been ideal. Where a participant had recorded more than four problems, the four that were rated as most important by the participant were utilised for scoring purposes. It rapidly became apparent that the number of relevant means varied, with some problems requiring fewer steps yet still being resolved effectively. Since this reduced comparability between participants, relevant means were not analysed further. Both actual and ideal strategies were marked for effectiveness in the same way as the MEPS and P-MEPS tasks. Inter-rater reliability coefficients were .85 for Diary Actual Effectiveness and .75 for Diary Ideal Effectiveness.

In order to gain insight into problem-solving processes as they occur within the real world, the diaries were content analysed for different types of problem-solving cognitions and behaviours. Within the diaries each problem-solving statement (cognitions/behaviours) was identified and coded into one of three categories; functional, avoidant or impulsive-careless. These three categories were chosen to correspond with the three factors comprising problem-solving style in the model of social problem-solving proposed by D'Zurilla and colleagues (e.g. D'Zurilla et al. 2004). The functional category related to a rational problem-solving style, whereby the individual demonstrated rational, deliberate, systematic and skilful application of effective problem-solving techniques. This included any functional attempts involving problem definition and formulation, decision-making, solution generation, or solution implementation and verification (e.g. "I need the money so I phoned and explained.", "I weighed up the pros and cons of the choice I had to make.", "I confronted him and tried to find out the truth by talking to him."). The avoidant category related to any problem-solving occurrences characterised by procrastination, passivity, dependency, avoidance, inaction or denial (e.g. "I was not in the mood to try and do anything about it myself.", "I tried to get my flatmate to get my phone back.", "'Bottled it' and said nothing to her.", "My father has been away for nearly four months, and is planning on coming back next month, and I hadn't done it yet."). The impulsive-careless category relates to problem-solving occurrences that involve impulsive or careless actions, such as lack of consideration of few alternatives (e.g. "I, who was so keen and looking forward to seeing the movie, was irritated at this point and I began criticising my brother for not keeping his promise.", "I got very frustrated...", "I think I may have been a bit short-sighted and now possibly ruined everything."). The proportion of each type of problem-solving occurrence was calculated for each participant. The first author analysed all responses for problem-solving cognitions/behaviours, and coded responses into one of three categories: functional, avoidant or impulsive/careless. An independent rater, who

was unaware of the respondent's group membership, coded 25% of responses. Inter-rater reliability was acceptable (Cohen's Kappa = .93).

Procedure

Participants completed the tasks in the following order: HADS, SPSI-R, MEPS and P-MEPS tasks. Participants were then instructed on how to complete the diary task and an appointment was made for them to return in approximately 2–4 weeks to return the diary.

Results

Participants

Demographic data for the three groups are displayed in Table 1. Between groups contrasts were conducted to compare the levels of depression and anxiety between the three groups. This confirmed that the Control and Anx groups were significantly less depressed than Dep/Anx, and did not differ from each other. The Control group reported significantly less anxious mood than the Anx or Dep/Anx groups, who did not differ from each other. A further point to note is the observed difference in gender ratio between the three groups, with a higher proportion of females in the Dep/Anx and Anx groups. This gender difference reflects the prevalence of clinical and non-clinical anxiety and depression in the general population (e.g. Kessler et al. 1993; Lewinsohn et al. 1998; Weissman and Olfson 1995). However, such gender differences may act as a complicating factor in the interpretation of any between-group differences in social problem-solving ability/appraisal. Between-group comparisons examined scores on these variables for the male and female participants within the Control group. No significant gender differences were uncovered. Thus, all subsequent analyses utilised the mixed-gender groups.

Relationships between Social Problem-Solving Variables

In order to provide information regarding the convergent and divergent validity of the newly developed diary task, correlations were calculated between scores on all social problem-solving

Table 1 Demographic data for participants across three mood groups

	Dep/Anx (<i>n</i> = 15)	Anx (<i>n</i> = 15)	Control (<i>n</i> = 15)	Contrasts (<i>t</i>)		
				Dep/Anx vs. Control	Dep/Anx vs. Anx	Anx. vs. Control
Female:Male	14:1	11:4	6:9			
Age (\bar{x} , <i>sd</i>)	20.73 (4.64)	23.20 (4.71)	22.93 (5.57)	1.21	1.35	.15
HADS-D Score						
(\bar{x} , <i>sd</i>)	11.80 (1.01)	3.47 (1.36)	2.87 (2.36)	14.60***	13.62***	.98
(<i>min,max</i>)	(11.00,14.00)	(1.00,6.00)	(0,7.00)			
HADS-A Score						
(\bar{x} , <i>sd</i>)	12.73 (1.98)	12.53 (1.77)	4.53 (1.85)	12.03***	.29	11.74***
(<i>min,max</i>)	(11.00,17.00)	(11.00,16.00)	(2.00,7.00)			

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

Table 2 Descriptive statistics and correlations between social problem-solving variables ($n = 45$)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	\bar{x}	sd
1. SPIS-R PPO	–												95.20	17.51
2. SPIS-R NPO	-.61***	–											105.73	16.47
3. SPIS-R RPS	.76***	-.34	–										97.84	14.50
4. SPIS-R ICS	-.24	.66***	-.34	–									98.64	16.36
5. SPIS-R AS	-.47**	.53***	-.35	.49**	–								102.20	15.32
6. MEPS RM	-.11	.14	-.02	.18	.16	–							3.35	.92
7. MEPS Eff	.15	-.18	.15	-.13	-.08	.63**	–						4.12	.74
8. P-MEPS RM	.29	-.31	.37	-.21	-.22	.43**	.43**	–					2.63	1.01
9. P-MEPS Actual Eff.	.41**	-.41**	.42**	-.37	-.37	.29	.56***	.80**	–				3.80	.95
10. P-MEPS Ideal Eff.	.22	-.35	.18	-.30	-.23	.43**	.68***	.73**	.85***	–			4.39	.87
11. Diary Actual Eff.	.45**	-.28	.36	-.21	-.28	.02	.46**	.14	.35	.26	–		4.02	.91
12. Diary Ideal Eff.	.11	-.12	.29	-.14	-.13	-.19	.45**	.24	.19	.18	.49**	–	5.00	.65

variables, across all three groups of participants. These correlations, alongside descriptive statistics, are displayed in Table 2.

Possession of a positive problem orientation was significantly associated with more effective strategies on both the P-MEPS and diary tasks. Furthermore, strategy effectiveness on the P-MEPS task was significantly associated with higher self-appraisal of rational problem-solving skills and a more negative problem orientation. Interestingly, neither scores of relevant means nor effectiveness on the MEPS task were significantly associated with any of the SPSSI-R subscales. MEPS Effectiveness scores were, however, significantly correlated with performance on outcome measures of real-life social problem-solving ability/performance (P-MEPS Actual Effectiveness and Diary Actual Effectiveness) and participants' ability to generate 'ideal' strategies in both the P-MEPS and diary tasks. However, these correlations were not high enough to suggest that the MEPS, P-MEPS and diary tasks were indexing the same process. Furthermore, performance on the two tasks investigating real-life problem-solving performance, the P-MEPS and diary tasks, did not significantly correlate with each other.

Group Differences in Social Problem-Solving Variables

The current study aimed to establish whether group differences existed in social problem-solving ability (i.e. Dep/Anx vs. Anx. vs. Control). Table 3 [r1] summarises the findings from the various social problem-solving measures. Each problem-solving variable was analysed separately, via one-way ANOVA, with the exception of the SPSSI-R where the five scales were analysed together using MANOVA. In the event of an omnibus group effect reaching significance at $p < .05$, Tukey's HSD comparisons were utilised to locate any differences.

Group Differences in Social Problem-Solving Processes

Problem-solving processes were assessed using the SPSSI-R. The overall MANOVA showed a significant main effect of group (Pillai's criterion; $F(10.78) = 3.30, p < .005$). The univariate analyses (with multistage bonferroni corrections) indicated that there were significant differences between the groups for the SPSSI-R variables of Negative Problem Orientation ($p < .001; \alpha = .005/5$), Avoidance Style ($p < .013; \alpha = .005/4$), Positive Problem Orientation ($p < .017; \alpha = .005/3$), and Impulsivity-Carelessness Style ($p < .025; \alpha = .05/2$). However, the overall group difference for Rational Problem-Solving was not significant. Post-hoc comparisons revealed that the Dep/Anx participants demonstrated a significantly less positive problem orientation relative to the controls, and a significantly more negative problem orientation. They demonstrated no difference from the controls in rational problem-solving skills, yet they scored more highly on both impulsivity-carelessness style and avoidance style. The Anx participants demonstrated a significantly more negative problem orientation than controls. They showed no significant difference to the controls for any of the other SPSSI-R variables. The Anx and Dep/Anx groups differed from each other with respect to negative problem orientation, with the Dep/Anx demonstrating a significantly more negative problem orientation. No other significant differences were found between the Anx and Dep/Anx groups.

Group Differences in Hypothetical Problem-Solving Performance

Hypothetical problem-solving performance was measured using the MEPS task. There was no significant main effect of group for either relevant means or effectiveness.

Table 3 Summary of descriptive statistics and post-hoc comparisons, as a function of different social problem-solving components (orientation, style/skills and real-life performance)

	(Possible Range)	Dep/Anx \bar{x} (sd)	Anx \bar{x} (sd)	Control \bar{x} (sd)	ANOVA	Tukey's HSD	
						Dep/Anx vs. Control	Anx vs. Control
Problem Orientation							
SPSI-R Pos. Problem Orientation	(47–135)	85.13 (12.67)	93.87 (20.02)	106.60 (12.32)	7.35**	**	ns
SPSI-R Neg. Problem Orientation	(69–165)	118.93 (12.83)	107.47 (13.57)	90.80 (8.65)	21.26***	***	*
Problem-Solving (Skills)							
SPSI-R Rational Problem-Solving	(52–144)	92.80 (13.57)	96.20 (14.07)	104.53 (14.16)	2.81	–	–
SPSI-R Imp-Carelessness Style	(61–177)	107.47 (17.70)	98.07 (15.83)	90.40 (10.98)	4.80*	*	ns
SPSI-R Avoidance Style	(69–156)	112.10 (17.12)	99.13 (13.72)	95.40 (9.60)	6.00**	**	ns
MEPS Relevant Means	(N/A)	3.40 (0.98)	3.30 (0.75)	3.35(1.07)	.04	–	–
MEPS Effectiveness	(0–7)	3.83 (0.67)	4.12 (0.82)	4.40 (0.66)	2.33	–	–
P-MEPS Ideal Effectiveness	(0–7)	3.99 (0.73)	4.41 (0.95)	4.75 (0.80)	3.10	–	–
Diary Ideal Effectiveness	(0–7)	4.80 (0.60)	5.05 (0.78)	5.15 (0.56)	1.14	–	–
Problem-Solving (Real-life Performance)							
P-MEPS Actual Means	(N/A)	2.24 (0.73)	2.56 (0.75)	3.09 (1.31)	3.00	–	–
P-MEPS Actual Effectiveness	(0–7)	3.29 (0.94)	3.88 (0.96)	4.23 (0.84)	4.29 *	*	ns
Diary Actual Effectiveness	(0–7)	3.52 (0.76)	4.13 (0.98)	4.40 (0.77)	4.31*	*	ns

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

Group Differences in Actual 'Real-Life' Problem-Solving Performance

Actual 'real-life' problem-solving performance was measured by the strategies reported in both the P-MEPS and diary tasks. The groups did not differ in the number of problems recorded/recalled in either task (P-MEPS; $F(2,42) = .55, ns$; Diary; $F(2,42) = .58, ns$) or importance of problem ratings in the diary task ($F(2,42) = .09, ns$). ANOVA revealed significant group differences in effectiveness in both tasks. Post-hoc comparisons showed that the Dep/Anx group, but not the Anx group, implemented less effective strategies than the Control group, in both indices. No other post-hoc comparisons were significant. There was no significant main effect of group for P-MEPS Actual Means.

Group Differences in 'Ideal' Problem Solutions

Ability to generate 'ideal' problem solutions was indexed using the retrospective ideal solutions generated in the P-MEPS and diary tasks. There was no overall significant group main effect in either case.

Content Analysis of Participants' Diaries

The diaries were content analysed and each problem-solving statement was coded as functional, avoidant or impulsive/careless. A summary of the proportions of each problem-solving statement type, as a function of group, is displayed in Table 3.

One-way ANOVAs were utilised to establish any differences between the groups with respect to the proportions of the different cognition and behaviour types. A significant difference emerged for the proportion of functional problem-solving statements. Post-hoc comparisons (Tukey's HSD) revealed that the Dep/Anx group reported proportionally fewer functional problem-solving cognitions and behaviours compared with the Control group. It is of note that whilst the Anx group were not significantly different from either of the other groups, their proportion of functional problem-solving statements was closer to that reported by the Control group and, on average, some 13% higher than the Dep/Anx group.

No significant difference was found between the groups for the proportion of avoidant problem-solving statements; however, the effect approached significance. It can be seen that there is a tendency for the Dep/Anx group, and to a lesser extent the Anx group, to report proportionally more avoidant responses. Finally, a significant difference between groups emerged for the proportion of impulsive/careless problem-solving responses, with post-hoc comparisons revealing that the Anx participants reported significantly fewer impulsive/careless problem-solving statements than the Dep/Anx participants. It is also noteworthy that whilst the Control group's proportion of impulsive/careless problem-solving statements did not significantly differ from either of the other two groups, it was much closer in value to that of the Dep/Anx group than the Anx group.

Discussion

Consistent with predictions made in the introduction the mixed depression/anxiety group reported poorer problem orientation than controls, as indexed by both problem orientation scales of the SPSI-R. Thus, they viewed problems as significant threats to well-being and lacked self-confidence in their ability to solve them. However, compared with controls, they were able to produce equally effective 'ideal' strategies in response to both

hypothetical and real-life problems. Furthermore, they showed no deficits in self-reported constructive problem-solving style as indexed by the Rational Problem-Solving scale of the SPSI-R. This is consistent with previous studies that have failed to uncover skills deficits in non-clinically depressed samples (e.g. Goddard et al. 1997; Mayo and Tanaka-Matsumi 1996). By contrast, and in line with prediction, the mixed depression/anxiety group demonstrated less effective strategies than controls when reporting actual current and past problem-solving behaviour.

The pattern of findings from the SPSI-R suggests potential explanations for the mixed depression/anxiety participants' poor real-life problem-solving performance. They exhibited a clear deficit in problem orientation indicating negative attitudes towards their problems and their ability to solve them. D'Zurilla et al. (2004) suggest that a positive problem orientation facilitates rational problem-solving, making positive outcomes more likely; conversely a negative problem orientation contributes to impulsive/careless or avoidant problem-solving styles, making positive outcomes less likely. Consistent with this argument, the Dep/Anx group gained higher scores on the Impulsivity-Careless and Avoidance Style subscales of the SPSI-R. Thus, whilst their problem-solving skills appear intact, as demonstrated by their ability to generate effective strategies at a cognitive/verbal level on the MEPS task, the dysfunctional application of these skills is associated with and may cause a deficit in real-life problem-solving behaviour.

The content analysis of problem-solving statements within the diary task to some extent supports this proposal, with the proportion of problem-solving cognitions/behaviours coded as functional being significantly fewer for the mixed depression/anxiety group and a trend towards more avoidant problem-solving statements. However, in contrast to the SPSI-R results, the content analysis did not reveal that the mixed depression/anxiety group reported more impulsive-careless problem-solving cognitions/behaviours. This difference could be explained in one of two ways. Firstly, the depressed group's negative beliefs and reactions towards problems may have resulted in a more general negative assessment of their problem-solving on the SPSI-R; however, if this is the case, it is difficult to explain why these negative appraisals did not impact upon scores on the RPS subscale. Secondly, the content analysis may have lacked sensitivity to impulsive/careless problem-solving. Of the three coding categories, determination of those problem-solving statements belonging to this group was the most difficult. Without the presence of words or phrases expressing quick action, later regret, or lack of control (e.g. *'I ended up storming out', 'I was just going to jump in and say it', 'I just retaliated and said...'*), an action which might have been taken with little thought or consideration for the consequences could have been coded as functional.

These findings raise a number of questions regarding the relationship between problem-solving deficits, dysphoric mood and the development of depressive symptoms. The result of the present study taken together with those of Marx et al (1992) in clinical groups, suggest that deficits within different components of the problem-solving process may depend upon level of symptom severity. Specifically, dysphoric mood may be associated with behavioural implementation deficits, whilst cognitive skills deficits are related to more severe clinical levels of depression. Behavioural deficits appear to be a function of repeated episodes of deficient solution implementation, which lead to negative outcomes, and hence to dysphoric mood. However, individuals who have developed a dysphoric mood state through such mechanisms appear, nonetheless, to be able to generate ideal strategies in retrospect. This may provide the chance to rectify earlier mistakes to prevent further negative outcomes and an escalation to more severely depressed mood. What may then become important is whether dysphoric individuals actually implement these revised strategies, or take heed of their failure for future problem-solving activities.

Marx et al. (1992) propose that differences in performance on 'ideal' strategy generation tasks (MEPS and P-MEPS/diary 'ideal' strategies) reflect the difference between one's capability to generate effective strategies and one's ability to implement them. This is a plausible explanation, yet it is possible that the differential performance on these tasks could be explained in other ways. Poor performance on the diary task, in contrast to the MEPS task, may reflect differences between how an individual responds to personally relevant 'real-life' problems compared with hypothetical scenarios. Poor performance on the diary task may be the result of difficulty in generating effective strategies, but the MEPS task does not provide a fair representation of how individuals develop strategies in response to their own 'real-life' problems. In order to assess strategy generation in response to 'real-life', as opposed to hypothetical problems, participants were asked to retrospectively generate 'ideal' strategies on the P-MEPS and diary tasks. However, whilst these problems were more personally relevant, the retrospective nature of the task meant they were not necessarily 'immediate' personal issues. Furthermore, participants were able to utilise the outcome of the initial problem-solving attempt as feedback, which if unsuccessful may have guided their generation of an alternative and more effective 'ideal' strategy. In order to be able to fully delineate between the processes of strategy generation and solution implementation as they occur in the 'real world' one needs to ascertain the strategy that an individual *intends* to implement prior to problem-solving, and compare this with the actual strategy that is implemented.

Previous research (e.g. Dugas et al. 1998; Marx et al. 1992) has shown that poor problem-solving may also be implicated in anxious symptomatology. In line with previous studies, the non-clinically anxious participants in this study showed no clear differences from controls with respect to constructive problem-solving style, as indexed by the relevant SPSP-R scales and the MEPS task. However, contrary to Marx et al.'s findings with clinically anxious participants, they did not demonstrate any deficits on real-life problem-solving performance variables. The only variable on which they differed from controls was with respect to a more negative problem orientation, suggesting that they lacked self-confidence in their ability to solve problems, and viewed such situations as threatening. However, when presented with problematic scenarios they were able to develop and implement solutions of equal effectiveness to control participants. Furthermore, these findings are not in line with the 'thwarted problem-solving' concept of worry proposed by Dugas et al, which suggests that a poor problem orientation 'thwarts' the implementation of intact problem-solving skills. These conflicting results may suggest that behavioural-implementation deficits characterise clinical, but not non-clinical, anxiety. Alternatively, the discrepancy may reflect the fact that Marx's clinically anxious sample exhibited relatively high levels of depression. Although they did not fulfil the Research Diagnostic Criteria (Spitzer et al. 1978) for Major Depressive Disorder, their mean Beck Depression Inventory (Beck et al. 1961) score was relatively high at 16.1, and would likely equate to the level of depression in the present Dep/Anx group who did demonstrate similar deficits in 'real-life' problem-solving performance.

As the diary constitutes a new addition to the current battery of procedures utilised to assess social problem-solving, its convergent and divergent validity was examined by exploring its relationship with existing social problem-solving indices. The findings suggest that the diary methodology is accessing related, but not identical processes to the more traditional measures. The effectiveness of 'actual' strategies reported on the diary task was significantly correlated with positive problem orientation, suggesting that an individual's ability to view problems positively is important in terms of generating and implementing effective strategies in response to everyday problems. No other SPSP-R subscale was significantly correlated with performance on the diary task at $p < 0.01$. However, these correlations were in the expected direction and may have reached significance with a larger sample size. One important

consideration in interpreting the relationship between the SPSSI-R and the diary task, and how this relates to the group differences discussed earlier, lays in the nature of the task instructions. The SPSSI-R asks participants to report how they typically respond to problems in general, including interpersonal problems, intrapersonal problems and impersonal problems. In contrast, the diary task, along with the MEPS and P-MEPS tasks, focuses on interpersonal problems. Thus, the way people report how they approach and attempt to solve interpersonal problems may differ from the way they respond to problems in general. It is currently not known how social problem-solving abilities differ across different types of problems, and this is an important avenue for future research to explore.

Interestingly, the effectiveness of the 'actual' strategies reported on the P-MEPS task was significantly correlated with self-assessment of positive problem orientation, negative problem orientation and rational problem-solving. The P-MEPS task assessed *past* problem-solving behaviour; thus, these associations may reflect the influence of an individual's current self-appraisals on accurate recall of past events or, conversely, the impact of past problem-solving behaviours on an individual's current perceptions. Ratings of effectiveness for both 'ideal' and 'actual' strategies on the diary task were positively correlated with MEPS effectiveness ratings, suggesting that performance on the diary task does involve the process of means-end thinking. Yet, these correlations are not high enough to suggest means-end thinking is the only process involved in the development/implementation of 'actual' and 'ideal' strategies in response to real-life problems. Furthermore, no significant relationship emerged between performance on the P-MEPS and diary tasks, which may reflect the difference between an individual's past and current problem-solving abilities/performance. Taken together these findings highlight the need for social problem-solving to be assessed via a battery of tests, which include global indices of *current* real-life problem-solving performance.

The diary task, thus, holds a number of advantages over the more traditional approaches to assessing social problem-solving. Whilst related to self-appraisal of social problem-solving processes and incorporating means-end thinking, it extends beyond these to provide a global measure of social problem-solving ability/performance. In doing so, it provides a more ecologically valid measure with the potential to capture what individuals actually do when faced with problems rather than what they believe they *should* or *would* do. As van Nieuwenhuijzen et al (2005) explain, real-life situations elicit greater involvement and emotion, often allow less time for reflection, and may be less influenced by socially desirable response tendencies. Thus, the diary provides an opportunity to discover how individuals react when faced with personally relevant problems rather than hypothetical scenarios. A further consideration is the extent to which responses on the diary task reflect problem-solving when it occurs under emotional conditions, compared with potentially 'calmer' and less emotionally driven circumstances of the MEPS task's hypothetical scenarios. It is feasible to suggest that the greatest emotional involvement occurs whilst the individual is attempting to resolve the issue and, as such, is reflected in the 'actual' strategies reported in the diary task. In turn, it is likely that whilst their 'ideal' strategies may be less influenced by the 'in the moment' emotions present in the 'actual' strategies, they are still likely to be more emotive than the MEPS scenarios, due to their personal relevance.

Conversely, the use of real-life performance based approaches to social problem-solving assessment is not without its limitations. One potential difficulty with the diary procedure, or any method that involves observation of actual problem-solving events as they occur within a naturalistic setting, is the lack of control the experimenter has over the situations that arise. This means that the problems participants experience can vary widely, making interpretation of findings more difficult. For instance, it is possible that the mixed depression/anxiety group generated and implemented poorer strategies because their problems were actually more

difficult, or less familiar, than those faced by the other two groups. Furthermore 'difficulty' of a problem is, to some extent, dependent upon an individual's perception. Although there were no significant differences when participants rated the importance of their problems to their overall well-being, further ratings of these dimensions (i.e., perceived difficulty and familiarity) would have been preferable and are recommended for future research.

Further issues can be highlighted with respect to the diary task used in this study. Firstly, it is unclear the extent to which participants complied with the instructions to record details of the problem as soon after the event as possible. It is recommended that future research, where possible, incorporates electronic diaries that can time-stamp entries. Secondly, it is possible that where participants were asked to provide 'ideal' strategies in retrospect, some participants interpreted this to mean the 'most effective' strategy, whilst others the 'most preferred'. The use of a more specific instruction would be advantageous.

A more general limitation of the current study is the different proportions of males and females within the three groups. There were more females in the mixed depression/anxiety and anxious groups. Therefore, it could be argued that the differences found in problem orientation were due to this disparity, as previous research has suggested that females report poorer problem orientations compared to males (D'Zurilla et al. 1998; Robichaud et al. 2003). However, the pattern of results across the three groups is similar when selecting only female participants, and no gender differences were found on these variables within the control group. This provides reassurance that female gender is not driving the noted effects, although future research is necessary to confirm this.

In conclusion, this study examined social problem-solving, in particular real-life problem-solving, within individuals with mild to moderate depressed and/or anxious mood. Within these non-clinical groups, both anxiety and depression were associated with deficits in problem orientation, whilst 'real-life' performance deficits were specific to those experiencing depressive symptoms. Most importantly, these findings throw into question the ecological validity of traditional methods of social problem-solving assessment and suggest that they may be insensitive to deficits in real-life social problem-solving. Effective problem-solving intervention strategies depend on the accurate assessment of *all* relevant impairments, and the present results suggest that a diary methodology assessing real-life social problem-solving behaviour may be a crucial complement to the current battery of more hypothetical assessment procedures.

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