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A Longitudinal Study Into the Interplay Between Problem Orientation and Adolescent Well-Being

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Past research has documented a link between negative problem orientation (NPO) and poor emotional well-being, but little of this research has focused on adolescence or has collected multiple waves of data. The authors conducted a 3-wave longitudinal survey of 841 adolescents in Grades 8, 9, and 10 (428 boys, 411 girls, 2 unidentified). The survey included measures of NPO, sadness, fear, hostility, and joviality. Structural equation modeling (AMOS 7.0; J. L. Arbuckle, 2006) revealed that adolescents high in NPO experienced increases in fear, sadness, and hostility, and decreases in joviality compared with adolescents low in NPO with the same baseline levels of affect. The evidence that affect predicted future levels of problem orientation was less consistent. We discuss the implications of these findings for problem-solving interventions and for the early identification of at-risk adolescents.

Keywords: problem orientation, well-being, emotion, longitudinal, social problem solving

Adolescence can be a tumultuous time. Research suggests that adolescent well-being decreases during early to middle adolescence, reaching its lowest point at age 16 (Csikszentmihalyi & Hunter, 2003). It may therefore be beneficial to provide adolescents with training that helps them to cope effectively with stressful life events.

Social problem-solving training has been described as the sine qua non of behavior change programs for youth (Frauenknecht & Black, 2004). Research has found problem-solving training to be successful at increasing social problem-solving skills, reducing social adjustment problems, and improving emotional and physical well-being (Frauenknecht & Black, 2004; Malouff, Thorsteinsson, & Schutte, 2007; Nezu, 2004). Problem-solving training generally targets two interrelated abilities: problem orientation and problem solving proper (Frauenknecht & Black, 1995). Problem orientation encompasses the metacognitive aspects of problem solving (e.g., problem-solving self-efficacy), whereas problem solving proper refers to the application of skills in finding and implementing adaptive solutions to problems (e.g., generating alternatives). The present article focuses exclusively on problem-solving orientation. This construct consistently relates to mental health and is of central importance to problem-solving therapy (Heppner, Witty, & Dixon, 2004).

Negative problem orientation (NPO) can be conceived of as the extent to which people do not believe they can effectively cope with a wide range of problems, reacting to problems as if they were threats rather than challenges and avoiding rather than approaching problem-solving activities (D'Zurilla & Nezu, 1999; Frauenknecht & Black, 1995; Heppner et al., 2004). Effective problem orientation involves several skills that are hypothesized to be teachable (D'Zurilla & Nezu, 1999). First, effective problem orientation involves being sensitive to detecting problems and being prepared to engage in problem-solving activity. Second, it involves being able to focus on adaptive problem-solving thoughts and to move away from unproductive thoughts (e.g., excessive rumination about the past). Third, it involves being able to persist when obstacles and emotional distress are encountered (D'Zurilla & Nezu, 1999).

A key question for psychologists who counsel adolescents is "Does problem orientation lead to better well-being, or is it merely a consequence of well-being?" If it is merely a consequence, then it may not make sense for counselors to target it. D'Zurilla and his colleagues hypothesized that there is a reciprocal link between problem solving and adjustment (D'Zurilla, Chang, & Sanna, 2004). This suggests that NPO should lead to increased negative emotionality (e.g., higher levels of depression and anxiety) and that increased negative affect should lead to increased NPO. Similarly, increased NPO should lead to decreased positive affect and vice versa. Surprisingly little longitudinal research has been conducted that has addressed this question (cf. Dixon, Heppner, Burnett, Anderson, & Wood, 1993; Nezu & Ronan, 1988). The present article reports a three-wave, 3-year longitudinal study that examined the extent to which problem orientation is a likely antecedent and/or a consequence of negative and positive affect.

Problem Orientation and Emotional Well-Being

Research suggests that there is a distinction between positive problem orientation and NPO (Maydeu-Olivares & D'Zurilla, 1996; Maydeu-Olivares, Rodrigues-Fornells, Gomez-Benito, & D'Zurilla, 2000). Nonetheless, the measure used in the present study does not make this distinction, with eight of nine items measuring NPO. We therefore focus on NPO in our review and

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discussion; NPO should be of particular relevance to our study because we focused largely on negative affective states. Conceptually, it is of central importance to the problem orientation component of problem-solving therapy (Frauenknecht & Black, 1995; Heppner et al., 2004).

NPO occurs when a person has low self-efficacy with respect to cognitive set (has low confidence in intellectual capacity), emotional set (identifies negative affect connected with problem solving), and behavioral set (avoids a situation rather than engaging in problem solving; Frauenknecht & Black, 2004). There are three general areas of research that suggest that NPO is linked to emotional well-being: cross-sectional research, intervention research, and longitudinal research.

Cross-Sectional Research

The majority of research involving problem orientation has been cross-sectional and demonstrates a clear link between NPO and negative states. For example, NPO predicts depression, hopelessness, and suicidal ideation in normal and psychiatric samples (D'Zurilla, Chang, Nottingham, & Faccini, 1998). NPO has also been linked to anxiety, worry (Dugas et al., 2007), and general distress (Frauenknecht & Black, 1995). There is also evidence that low positive affect is predictive of high NPO (Ciarrochi & Scott, 2006) and low problem-solving confidence, which is related to the cognitive component of NPO (Elliot, Sherwin, Harkins, & Marmarosh, 1995; Frauenknecht & Black, 1995; Heppner & Peterson, 1982). NPO has been predictive of a number of other negative outcomes, including poorer grades (Frauenknecht & Black, 1995), deviant sexual interests among sex offenders (Nezu, Nezu, Dudek, Peacock, & Stoll, 2005), substance abuse problems (Godshall & Elliott, 1997), and health problems (Nezu, 2004).

Intervention Research

Problem-solving therapy appears to be generally effective in improving mental health and adjustment, and generally more effective than treatment as usual or placing clients into wait-list groups or attention/placebo groups (D'Zurilla & Nezu, 1999; Malouff et al., 2007; Townsend et al., 2001). Importantly, there is some evidence that training in the problem orientation component of problem-solving therapy might be critical to improving mental health. Nezu and Perri (1989) found that depressed individuals who received problem-solving therapy with problem orientation training experienced significantly greater decreases in depression than did those who received problem-solving therapy without problem orientation training (Malouff et al., 2007; Nezu & Perri, 1989). In a meta-analysis, Malouff et al., (2007) found that problem-solving therapy studies that included training in problem orientation had larger effect sizes than studies without problem orientation training.

Longitudinal Research

There have been only three studies that have examined the link between individual differences in problem-solving skill and well-being. All three have been conducted with university students. One study examined the link between NPO and emotional well-being in a 1-year longitudinal study and found that NPO predicted future levels of anxiety, stress, and depression, even when controlling for baseline measures of these variables (Ciarrochi & Scott, 2006). NPO also predicted lower positive affect when controlling for baseline positive affect.

Two longitudinal studies measured problem-solving skill with the Problem Solving Inventory (PSI; Heppner & Peterson, 1982), which is highly correlated with NPO ($r = .63$; Frauenknecht & Black, 1995). Nezu and Ronan's (1988) 3-month longitudinal study found an interaction between stress and problem-solving skill in predicting future depression, even when controlling for baseline depression. People with less skill tended to react more poorly to stress, experiencing greater levels of depression. Neither the Ciarrochi and Scott (2006) study nor the Nezu and Ronan (1988) study measured problem-solving orientation at Time 2 and therefore could not evaluate the extent to which emotional experience may have predicted NPO.

Dixon and colleagues measured problem-solving skill and depression at two time points within a single semester (Dixon et al., 1993). They found that skill predicted future depression but depression did not predict future skill, suggesting that depression may be a consequence of low skill rather than a cause.

The Present Study

The present longitudinal study is unusual in its length (3 years) and focus (adolescents). The main purpose of the study was to evaluate D'Zurilla et al.'s (2004) claim that there is a reciprocal link between problem orientation and emotional well-being. That is, we expected to find evidence that NPO is both an antecedent and consequence of sadness, fear, and low positive affect. A second, closely related purpose of the study was to evaluate the extent to which Frauenknecht and Black's (1995) Problem Orientation Inventory is useful in identifying idiosyncratic vulnerabilities in adolescents; vulnerable adolescents might benefit most from problem-solving therapy. The problem orientation instrument could be considered useful to the extent that it predicts future well-being, over and above concurrent levels of well-being.

Method

Participants and Procedure

Participants were students who attended five high schools in a Roman Catholic diocese of New South Wales, Australia. The diocese encompasses the city of Wollongong (population about 250,000) as well as southwestern metropolitan Sydney, ensuring a diverse socioeconomic sample. For example, the spread of occupations of the fathers of our participants closely resembled national distributions (Australian Bureau of Statistics, 2004): professionals (20.4%; 16.5% nationally), associated professionals (15.1%; 12.7% nationally), intermediate production and transport (11.2%; 13.4% nationally), tradespersons (34.3%; 21% nationally), managers (4.8%; 9.7% nationally), laborers (3.3%; 10.8% nationally), advanced clerical (1.2%; (.9% nationally), intermediate clerical (5.5%; 8.8% nationally), and elementary clerical (4.3%; 6.1% nationally). Additionally, 22% of respondents lived in nonintact families, and national divorce rates were 29% at the time of the study (Australian Bureau of Statistics, 2005); 19.77% were exposed to a language other than English in the home, and the

national figure was 15.8% (Australian Bureau of Statistics, 2006). Country of birth was Australia for 96.3% of the adolescent participants, 72.2% for the participants' mothers, and 70.2% for their fathers. Concerning religious faith, 86.5% of the students reported being Roman Catholic, 2.9% were Protestant, 3% were Muslim, 0.9% were Jewish, 5.2% listed "other," and 4.2% had no religious affiliation.

Students were surveyed in the middle of Grades 8, 9, and 10 in high school. A total of 841 participants (428 boys, 411 girls, 2 unidentified) completed at least two of the three waves of data collection, and these participants were used in the present analyses. Eighteen participants completed only 1 year of data collection, 246 completed 2 years, and 577 completed 3 years. We compared 2-year completers with 3-year completers on every variable in the study and found no significant differences, $p > .05$. There are a number of ways to deal with missing data, but expectation/maximization (EM) procedures appear to yield the least biased estimates (Allison, 2002; Howell, 2008); we thus utilized EM imputation to replace missing values.

Consent from schools, parents, and students was obtained each year, and students were then invited to participate or continue in a study on youth issues. Administration of the questionnaires took place during regular class times under the supervision of the research team and teachers. Students completed the questionnaires anonymously and without any discussion. At the conclusion of the sessions, students were thanked for their participation and debriefed.

Materials

Problem Orientation Scale. The nine-item Problem Orientation Scale consists of three 3-item subscales that evaluate cognitive, emotional, and behavioral aspects of problem orientation (Frauenknecht & Black, 1995). Participants responded to items using a 5-point rating scale ranging from 0 to 4, with high scores indicating a propensity toward NPO and an avoidance of problems. The instrument demonstrated good internal consistency in the present sample ($\alpha_8 = .82$; $\alpha_9 = .85$; $\alpha_{10} = .84$; subscripts refer to internal consistency at each grade) and has shown good discriminant, convergent, and predictive validity (Ciarrochi & Scott, 2006; Ciarrochi, Scott, Deane, & Heaven, 2003; Frauenknecht & Black, 1995).

Positive and Negative Affect Schedule—Expanded Form (PANAS–X; Watson & Clark, 1994). We used the PANAS–X (Watson & Clark, 1994) to assess fear (e.g., "afraid," "scared"; six items), sadness (e.g., "sad," "blue"; five items), hostility (e.g., "angry," "hostile," irritable"; six items), joviality (e.g., "joyful," "delighted," "excited," "enthusiastic," "happy"; eight items). Ratings were made on a 5-point scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Research has shown the subscales to have adequate internal consistency, discriminant validity, and criterion-related validity (Watson & Clark, 1994). The PANAS scales used in this study have been shown to overlap substantially with adolescent measures of depression ($R = .69$, $R^2 = .48$) and anxiety ($R = .69$, $R^2 = .48$; Leeson, Heaven, & Ciarrochi, 2009).

The reliabilities for the subscales were all adequate in the present sample: fear ($\alpha_8 = .85$, $\alpha_9 = .89$, $\alpha_{10} = .88$); sadness ($\alpha_8 = .91$, $\alpha_9 = .92$, $\alpha_{10} = .93$); hostility ($\alpha_8 = 82$, $\alpha_9 = .85$, $\alpha_{10} = .84$); joviality ($\alpha_8 = .94$, $\alpha_9 = .94$, $\alpha_{10} = .95$). We could not sample every affective state, but the categories of fear, sadness, hostility, and joviality capture a broad range of important states. Fear and sadness are related to two of the most common affective disorders: anxiety and depression (Kessler et al., 1994; Watson & Clark, 1994). There tend to be fewer dimensions of positive states (Watson & Clark, 1994), and the joviality scale we used in the present study appears to capture a broad range of positive emotion labels.

Plan of Analyses

The main analysis utilized structural equation modeling (AMOS 7.0; Arbuckle, 2006) to compare the fit of models that vary in complexity. We began with a full model, which contains an estimate of all 1- and 2-year autoregressive effects (e.g., from Grade 8 joviality to Grade 10 joviality) and 1- and 2-year cross-lagged effects (e.g., from Grade 8 joviality to Grade 10 NPO). We then compared this model with a model that contains correlated measurement errors across lags for the same instrument, a relatively common feature of longitudinal data (Kline, 1998). Then we compared the best fitting model with ones that sought to drop the 2-year autoregressive and cross-lagged effects.

Structural equation modeling was used to analyze the raw data, and estimation was made with the maximum likelihood method. As suggested by Hu and Bentler (1999), several goodness-of-fit measures were used to assess the models. We assumed good model fit if the root mean square error of approximation (RMSEA) was below .06 and the Tucker–Lewis index (TLI) and the comparative fit index (CFI) were greater than .95 (Hu & Bentler, 1999; Martens, 2005).

We conducted two types of analyses to ensure that our findings were robust. First, we conducted typical parametric analyses. Second, to deal with multivariate normality issues, we conducted nonparametric bootstrap analyses using 1,000 samples and the bias-corrected percentile method (Mooney & Duval, 1993). We did not declare an effect to be significant unless it was significant in both analyses.

Results

Table 1 presents the key descriptive statistics and correlations between the variables. As expected, NPO (O in the table) was associated with concurrent and future levels of fear, sadness, hostility, and low joviality. Fear and sadness tended to correlate modestly with each other and to correlate only slightly with joviality. Concerning the means, we found evidence for significant increases in affect and negative problem orientation, and significant decreases in joviality, all Fs$(2, 840) \geq 25$; all ps $< .001$.

As a first step prior to reporting structural equation modeling, we used multiple regression analyses to determine if prior levels of NPO and affect predicted future levels of NPO and affect, while controlling for baseline levels of these variables. For example, we examined the impact of NPO in Grade 9 on joviality in Grade 10, while controlling for joviality in Grades 9 and 8. A Bonferroni-adjusted alpha (.004) was used in testing each cross-lagged effect. The analyses revealed that problem orientation significantly predicted future sadness ($\beta_{g9} = .10$, $\beta_{g10} = .10$), fear ($\beta_{g9} = .15$, $\beta_{g10} = .23$), hostility ($\beta_{g9} = .09$, $\beta_{g10} = .18$), and joviality ($\beta_{g9} = .94$, $\beta_{g10} = -.09$). fear ($\beta_{g9} = .18$, $\beta_{g10} = .12$), sadness ($\beta_{g9} =$

Table 1
Descriptives and Correlations Involving Joviality (J), Fear (F), Sadness (S), Hostility (H), and Negative Problem Orientation (O) From Grades 8 to 10

Problem orientation	J8	J9	J10	F8	F9	F10	S8	S9	S10	H8	H9	H10	O8	O9	O10
O8	−.33	−.24	−.24	.39	.30	.28	.43	.30	.27	.41	.24	.25	1.00	.52	.36
O9	−.23	−.33	−.29	.35	.46	.40	.36	.53	.41	.32	.50	.40	.52	1.00	.60
O10	−.10	−.24	−.27	.29	.35	.49	.31	.45	.51	.29	.39	.50	.36	.60	1.00
M	33.3	32.1	31.4	10.0	11.1	10.9	8.4	9.8	9.8	10.5	11.6	11.8	9.8	10.7	11.6
SD	6.4	6.8	6.9	3.8	4.8	4.6	4.2	5.2	5.2	3.6	4.7	4.5	6.1	6.9	6.2
Skew	−1.1	−0.99	−0.74	1.5	1.3	1.4	1.7	1.2	1.3	1.2	1.2	0.98	0.82	0.94	0.94
Kurtosis	1.4	0.99	0.33	3.0	1.5	1.7	2.5	0.65	0.94	1.3	1.6	0.57	0.48	0.94	0.93

Note. All skewness and kurtosis statistics were significant.
All correlations were significant ($p < .05$).

.17, $\beta_{g10} = .19$), and hostility ($\beta_{g9} = .13$, $\beta_{g10} = .11$) significantly predicted future NPO, whereas joviality had no effect.

To conduct structural equation modeling, we represented measurement error in problem-solving orientation and emotional well-being by using three item parcels, the number of parcels needed to avoid certain statistical problems (Hau & Marsh, 2004). Items were placed into parcels in order to reduce the parameters estimated and thereby ensure sufficient power in the modeling and especially in estimating correlated errors.

The problem-solving orientation parcels were based on three subscales (evaluating cognition, emotion, and behavior) of the Problem Orientation Scale (Frauenknecht & Black, 1995). The loadings of each of these item parcels on the latent construct tended to fall between .70 and .75 for Grades 8 through 10. The parcels for affective states were divided as equally as possible, given that items per scale were not always divisible by three (e.g., joviality had two parcels with three items and one parcel with two items). All affect parcels loaded above .70 on the latent factors across all the years, with the exception of one fear parcel in Grade 8, which loaded .63 on the latent factor.

We sought to determine the best fitting model for testing the cross-lagged effects of NPO and affect on future levels of these variables. When we assumed correlated error over time for fear, sadness, hostility, and joviality (Model 2), the model fit for fear, sadness, hostility, and joviality was substantially improved (see Table 2). When we assumed no 2-year cross-lagged effects, the fit of the models was not lowered, so we retained this assumption. When we assumed no 2-year autoregressive effects, the fit of all models was significantly lowered (all $ps < .01$), and we therefore rejected this assumption. The measures of fit suggested that the final Model 3 provided adequate fit across the three affective states in that TLI and CFI were greater than .95 and RMSEA was less than .05 (Hu & Bentler, 1999; Martens, 2005).

Figure 1, Figure 2, Figure 3, and Figure 4 present the results of the final model. As expected, NPO showed moderate stability (with 25%–36% of variance explained by previous values of NPO), and affective states showed somewhat modest stability (with about 9%–25% of variance being explained by previous values). In all three analyses, NPO predicted future levels of affect, when controlling for concurrent levels of affect. This effect oc-

Table 2
Model Fit Indices for Structural Equation Models With Grade 8 and 9 Negative Problem Solving Orientation (NPO) and Affect Predicting Grade 9 and 10 NPO and Affect

Model	χ^2	*df*	χ^2 diff	TLI	CFI	RMSEA
Fear						
1. Full model	715.4	120		.91	.93	.077
2. Model 1 & correlated errors repeated measures	280.6	102	434.8*	.97	.98	.046
3. Model 2 & no 2-year cross-lagged effects	281.9	104	−1.27	.97	.98	.045
Sadness						
1. Full model	850.6	120		.91	.93	.085
2. Model 1 & correlated errors repeated measures	275.2	102	575.4*	.97	.98	.045
3. Model 2 & no 2-year cross-lagged effects	276.1	104	−0.9	.98	.98	.044
Hostility						
1. Full model	763.9	120		.88	.91	.08
2. Model 1 & correlated errors repeated measures	222.9	102	541.0*	.97	.98	.038
3. Model 2 & no 2-year cross-lagged effects	228.2	104	−5.3	.97	.98	.038
Joviality						
1. Full model	988.96	120		.88	.91	.09
2. Model 1 & correlated errors repeated measures	315.64	102	673.32*	.97	.98	.05
3. Model 2 & no 2-year cross-lagged effects	318.9	104	−3.26	.97	.98	.05

Note. χ^2 diff indicates the difference from previous model; TLI = Tucker—Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation.
* $p < .05$.

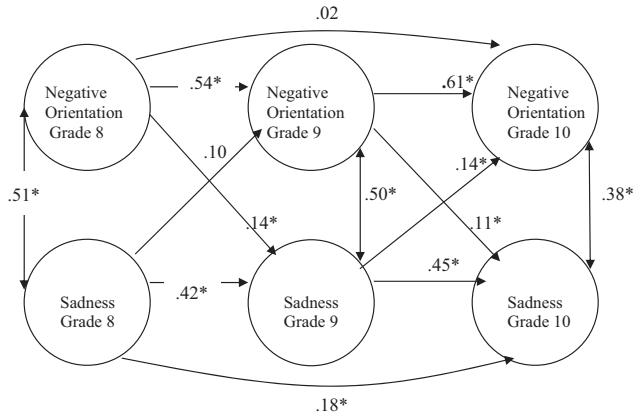

Figure 1. Standardized coefficients for cross-lagged panel analysis involving negative problem orientation (Negative Orientation) and the experience of sad mood states among adolescents in Grades 8, 9, and 10. Coefficients were considered significant only if they were found to be significant in parametric and nonparametric analyses. * $p < .05$.

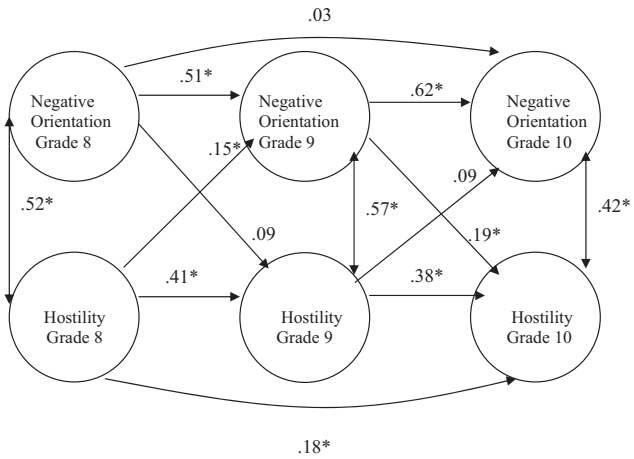

Figure 3. Standardized coefficients for cross-lagged panel analysis involving negative problem orientation (Negative Orientation) and the experience of hostile mood states amongst adolescents in Grades 8, 9, and 10. Coefficients were considered significant only if they were found to be significant in parametric and nonparametric analyses. * $p < .05$.

curred for the lag between Grades 8 and 9 in all analyses except that for hostility and the lag between Grades 9 and 10 in all analyses. It suggests that adolescents who are high in NPO tend to experience greater increases in negative affect and reductions in joviality, relative to adolescents low in NPO with the same baseline level of affect. In contrast, the effect of affective states on future NPO was less reliable. There was evidence that sadness in Grade 9 led to increased NPO in Grade 10 and that fear and hostility in Grade 8 led to increased NPO in Grade 9. None of the other cross-lagged effects from affect to NPO were significant.

Finally, we estimated the extent to which NPO and affect had an indirect relationship on Grade 10 affect via its relationship to Grade 9 NPO and affect. Grade 8 NPO had a significant indirect effect on Grade 10 fear (standardized estimate = .16), sadness (.12), hostility (.12), and joviality (.10). Similarly, Grade 8 affective states that indirectly related to NPO included fear (.16), hostility (.12), and sadness (.12) but not joviality (.02, $p > .1$).

Sex Effects

Girls tended to be higher than boys in fear, sadness, and joviality, ps $< .05$. Girls also had greater NPO in Grades 9 and 10, ps $< .05$. Given these sex differences, we sought to evaluate whether the key cross-lagged effects presented in Figures 1–4 generalized across sex. For example, we sought to determine whether NPO predicted negative affect equally well in both boys and girls.

We utilized multiple-group analysis to fit a model simultaneously to boys and girls. We utilized the structural equation models presented in Figures 1–4 and compared a model that

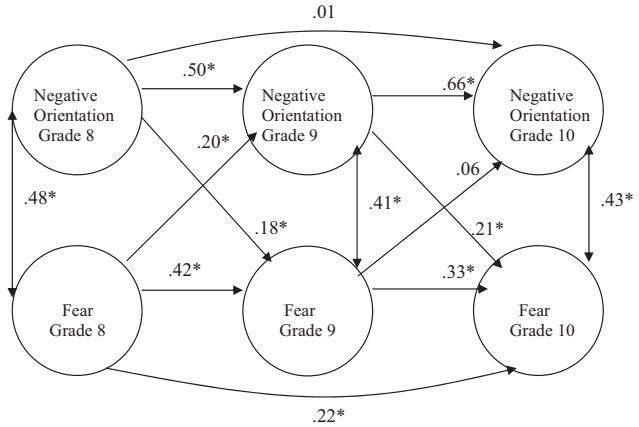

Figure 2. Standardized coefficients for cross-lagged panel analysis involving negative problem orientation (Negative Orientation) and the experience of fearful mood states among adolescents in Grades 8, 9, and 10. Coefficients were considered significant only if they were found to be significant in parametric and nonparametric analyses. * $p < .05$.

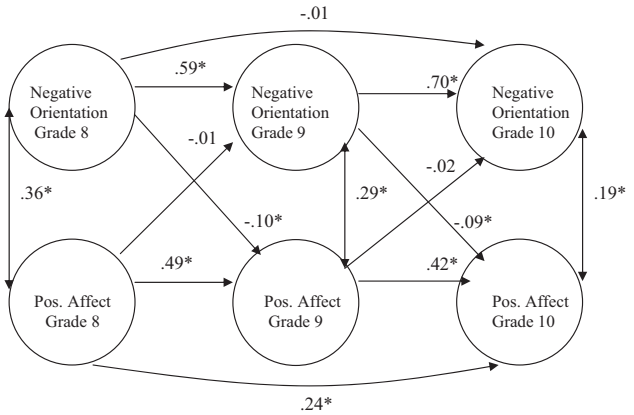

Figure 4. Standardized coefficients for cross-lagged panel analysis involving negative problem orientation (Negative Orientation) and the experience of positive mood states among adolescents in Grades 8, 9, and 10. Coefficients were considered significant only if they were found to be significant in parametric and nonparametric analyses. * $p < .05$.

assumed that cross-lagged effects were equal between boys and girls with one that did not make this assumption. There were no significant differences between the models, $\chi^2(4, N = 841) < 5$, $p > .05$, suggesting that the cross-lagged effects did not differ between boys and girls. We also utilized multiple group analysis to explore sex differences in within-wave relationships. Using a Bonferroni correction, $\chi^2(1, N = 841) = 8.21$, we found no significant differences between boys and girls.

Additional Analyses

The above structural equation modeling analyses were conducted separately to allow sufficient power to estimate indicator weights and correlations between repeated errors. We next sought to estimate the relationship between constructs simultaneously and specifically to examine the extent to which NPO predicted unique variance in each of the affective states. To ensure sufficient power, we focused on path models and the observed variables. The model involved combining the path models captured in Figures 1–4. This model estimated covariances between each variable, cross-lagged effects across years, and 1- and 2-year autoregressive effects. There was a good model–data fit, $\chi^2(42, N = 841) = 143.96$, $p < .05$, TLI = .96, CFI = .98, RMSEA = .054. The results essentially replicated the findings in Figures 1–4. Problem orientation significantly predicted future levels of sadness ($\beta_{g8} = .12$, $\beta_{g9} = .14$), fear ($\beta_{g8} = .16$, $\beta_{g9} = .18$), joviality ($\beta_{g8} = -.08$, $\beta_{g9} = -.09$), and hostility ($\beta_{g8} = .09$, $\beta_{g9} = .16$). In contrast, fear ($\beta_{g8} = .08$, $p < .001$; $\beta_{g9} = .005$, *ns*), sadness ($\beta_{g8} = .06$, *ns*; $\beta_{g9} = .10$, $p < .05$), joviality ($\beta_{g8} = .03$, *ns*; $\beta_{g9} = .02$, *ns*), and hostility ($\beta_{g8} = .07$, *ns*; $\beta_{g9} = .06$, *ns*) were less reliable predictors of problem-solving orientation.

In our final analyses, we used structural equation modeling (EQS 6.1; Bentler, 2006) to conduct latent growth curve analysis to model intraindividual change in NPO and affect between Grades 8 and 10, and the relationship between change in NPO and affect. Latent growth modeling (LGM) allows one to assess whether there are reliable individual differences in change trajectory and to explicitly model the role of measurement error in the specification of the individual change trajectory. Thus, one can obtain an estimate of the relations between true mean NPO and affect as well as the true rate of change in NPO and affect (Bub, McCartney, & Willet, 2007).

We utilized robust standard errors to deal with skewness of the variables (Bentler, 2006). We used the first set of LGM analyses to reveal the individual differences in change over time that were present in the data (Bub et al., 2007) before including predictor variables. Every model included an intercept factor, with weights for each of the three observed variables in Grades 8–10. This left sufficient degrees of freedom to estimate one growth factor (Duncan, Duncan, & Strycker, 2006).

Preliminary repeated-measures analysis suggested that the change over time in problem orientation and joviality (see Table 1) could be explained entirely in terms of a linear factor, Fs > 30, $p < .01$, with the quadratic effects not approaching significance, ps $> .1$. Thus, we estimated a simple linear growth trajectory for these two variables (with weights of 0, 1, and 2 for Grades 8, 9, and 10, respectively). In contrast, repeated-measures analysis suggested that fear, sadness, and hostility had a significant linear and quadratic effect, with the mean of Grade 8 being smaller than that of Grades 9 and 10 (all Ts > 5, ps $< .01$), but Grades 9 and 10 did not differ from each other (all ps $> .1$; see Table 1). We thus estimated a growth factor with weights of 0, 1, and 1 for these variables.

The model fit the data very well for affective states, with nonsignificant chi-squares, $\chi^2(2, N = 841) < 4.6$, $p > .05$, CFI $> .98$, RMSEA $< .05$. The LGM for NPO was significant, $\chi^2(2, N = 841) = 44.4$, $p < .05$, and fit was less than optimal, with CFI = .93 and RMSEA = .16. Assuming correlated errors between intercept and growth factor ($r = -.47$) significantly improved fit, with the chi-square no longer being significant, $\chi^2(1, N = 841) = .4$, $p > .05$, CFI $> .98$, and RMSEA $< .01$.

We next examined the variance components in the models to assess whether there were significant individual differences in the growth factor. All analyses showed significant individual differences: fear ($\sigma^2 = 3.66$, $SE = .75$); sadness ($\sigma^2 = 5.70$, $SE = .99$); hostility ($\sigma^2 = 7.1$, $SE = .64$); and joviality ($\sigma^2 = 2.58$, $SE = .78$); NPO ($\sigma^2 = 10.14$, $SE = 1.17$), indicating that there was individual variability in the rate that negative affect increased, joviality decreased, and NPO increased.

We next evaluated whether NPO in Grade 8 would predict growth in affect (e.g., increasing fear) for Grades 8–10. NPO significantly predicted the intercept of fear ($B = .241$, $SE = .02$) and joviality ($B = -.34$, $SE = .038$) but did not predict the growth parameters. This indicates that adolescents high in NPO in Grade 8 joviality tended to have the highest fear and lowest joviality in Grades 8–10. NPO predicted the sadness ($B = .30$, $SE = .027$) and hostility ($B = .068$, $SE = .025$) intercept, and also the sadness ($B = -.054$, $SE = .027$) and hostility ($B = -.256$, $SE = .02$) slope. Thus, adolescents high in NPO also tended to have the highest levels of sadness and hostility. The slope findings indicate that the strength of relationship between Grade 8 NPO and sadness and hostility decreased with each year (see also Table 1). For example, Grade 8 NPO was linked with sadness at $r = .43$ in Grade 8, $r = .30$ in Grade 9, and $r = .27$ in Grade 10. This reducing correlation means that, at the individual trajectory level, individuals high in NPO in Grade 8 were more likely to initially experience negative emotions in Grades 8 but to recover somewhat from the negativity in Grades 9 and 10. The intercept results indicate that they did not fully recover and remained more negative than did their low-NPO counterparts. Finally, we examined the relationship between latent growth in NPO and latent growth in affect. As expected, the increasing growth in NPO was associated with increasing growth in sadness ($r = .60$), fear ($r = .50$), hostility ($r = .55$), and decreasing joviality ($r = -.38$).

Discussion

The present study presents clear evidence that NPO is a precursor to fear, sadness, hostility, and low joviality. Cross-lagged effects going from NPO to affect were consistently significant and generalized across girls and boys. There was somewhat less consistent evidence that affect is a precursor to NPO.

There has been some past evidence to suggest that NPO is a precursor to decreased well-being. Intervention research suggests that reducing NPO leads to improved well-being (Malouff et al., 2007; Nezu & Perri, 1989). Two-wave longitudinal research with adults suggests that NPO predicts future anxiety, stress, and depression, even when controlling for baseline levels of affect (Ciar-

rochi & Scott, 2006; Dixon et al., 1993; Nezu & Ronan, 1988). The present study is distinctive in that it focused on individual differences in NPO among adolescents and collected three waves of data across 3 years.

The significant cross-lagged effects for the first wave of data (Grades 8–9) suggest that adolescents high in NPO experienced increases in sadness and fear, and low joviality, relative to those low in NPO with the same baseline level of affect. Our cross-lagged analysis provided conservative estimates of the impact of NPO because it controlled for the effect that NPO had at the baseline time period. At baseline, NPO explained approximately 16% of the variance in negative affect and approximately 9% of the variance in joviality.

The significant cross-lagged effects for the second wave of data (Grades 9–10) represent the extent that change in NPO from Grade 8 to 9 predicted changes in affect from Grade 9 to 10. If NPO is a precursor, as we have hypothesized, then changes in NPO should temporally precede changes in affect, which is what we found. This finding does not prove a causal link involving NPO but at least is consistent with it. The finding is also consistent with past research that suggests that the problem orientation component of problem-solving training may be of particular importance in promoting adolescent mental health (Malouff et al., 2007; Nezu & Perri, 1989). The impact of NPO appears to extend beyond 1 year: Grade 8 NPO was found to predict Grade 10 affect indirectly through its influence on Grade 9 affect.

Our latent growth analysis suggests that individuals reliably differed with respect to their NPO trajectory. Some adolescents experienced an increasingly negative problem orientation trajectory, and this trajectory was associated with worsening affect. NPO in Grade 8 also predicted increasingly negative affect during the next year, but it did not predict growth over the whole 3 years. This means that adolescents high in NPO in Grade 8 were not necessarily "spiraling out of control." They experienced more negative affect during the following year, but this did not mean they continued to get worse in subsequent years. Some adolescents improved in NPO and experienced improvements in their emotional experience, whereas others experienced diminishing NPO and increasingly negative emotional experience.

The hypothesis that NPO is a consequence of affect (D'Zurilla et al., 2004) received mixed results. We did find that Grade 8 sadness and hostility and Grade 9 fear predicted future NPO. The other cross-lagged effects involving negative affect were in the expected direction and only of slightly lower magnitude than were the significant effects. The effects involving joviality predicting NPO were not close to significance. In general, we have to conclude that there is no clear evidence that affect leads to NPO, until additional evidence is collected.

The effects of NPO observed in this study are quite comparable with adult longitudinal studies that controlled for baseline levels of affect. Ciarrochi and Scott (2006) found longitudinal effects of NPO ranging from beta of .12 (depression) to .20 (anxiety) in a 1-year longitudinal study. Nezu and Ronan (1988) found a .15 link between problem-solving orientation and future depression (over a 3-month period), and Dixon and colleagues (1993) found depression effects ranging from .14 to .19 (a single-semester period). These effects were quite comparable with what we observed over several years (see Figures 1–3). The effect sizes were small in our research and in past adult research. However, it should be noted that these effects represented change in affect when one controlled for often-substantial relationships between NPO and affect at baseline.

One limitation of the present study is that both NPO and affect were measured with self-reports. It is possible that the correlations between NPO and affect were inflated by method variance. For example, it may be that adolescents who "faked good" on the NPO measure also "faked good" on the joviality measure. While method variance may inflate correlations within the same time period, it is unlikely to have a similar effect in predicting change. Thus, we used NPO and affect as covariates in predicting upstream variables, and whatever variance these variables had in common (e.g., method variance) would tend to be controlled for (Lindell & Whitney, 2001). Nevertheless, it would be preferable to have multiple methods of measurement. For example, it would be beneficial to have multiple informants (e.g., peers, parents) and behavioral measures of problem solving. Using multiple methods would allow the researcher to examine the extent to which problem-solving orientation per se predicts future affect, as opposed to other factors associated with self-reported problem orientation.

Our sample was fairly representative of the Australian population in terms of occupations and marital status of parents but was a bit heavily weighted toward Roman Catholics (see *Participants and Procedure* section). Future research will be needed to examine the generality of these findings in other samples. Another limitation involves our use of only some of the PANAS scales and our exclusion (due to time limitations) of other PANAS subscales such as guilt, serenity, and self-assurance. Future research should investigate the relevance of NPO to these other states. Finally, another limitation is that NPO focuses almost exclusively on the negative aspects of problem orientation. Research suggests that positive problem orientation is only modestly correlated with NPO and is distinctive in factor analysis (Maydeu-Olivares & D'Zurilla, 1996; Maydeu-Olivares et al., 2000). A related line of research suggests that positive affectivity and negative affectivity are distinct and may have distinctive underlying biological systems, termed the *behavioral activation* and the *behavioral inhibition* systems, respectively (Gable, Reis, & Elliot, 2000; Watson, 2002; Watson & Clark, 1994). There is some evidence that NPO correlates most strongly with negative affectivity and positive problem orientation correlates with positive affectivity (Chang & D'Zurilla, 1996; McMurran, Egan, Blair, & Richardson, 2001). It may be that improving NPO reduces anxiety, sadness, and excessive reactivity to negative events. In contrast, increasing positive problem orientation may increase positive affectivity, sensitivity to reward, and reward-seeking behavior. Future adolescent research is needed to examine the relative contribution of NPO and positive problem orientation to emotional well-being and adaptive behavior.

In conclusion, NPO appears to be more of a precursor than a consequence of affective states. The Problem Orientation Scale (Frauenknecht & Black, 1995) used in this study appears to be useful in identifying adolescent strengths and weaknesses in problem orientation. Those students high in NPO are more likely to have an emotionally "down" year unless they are given training in problem orientation. Future research could use the Problem Orientation Scale as a way of identifying adolescents who are at risk for emotional problems and who might most benefit from problem-solving counseling.

Our research focused on a specific component of the problem-solving therapy intervention package (D'Zurilla & Nezu, 1999). We believe that this component has general utility and can be used with other types of interventions, such as Beck's cognitive behavioral therapy (CBT; A. T. Beck, 1976; J. S. Beck, 1995) or acceptance and commitment therapy (ACT; Ciarrochi & Bailey, 2008; Hayes, Strosahl, & Wilson, 1999). For example, counselors in CBT or ACT can help clients to recognize problems in their everyday life, for instance, by teaching them to use feelings as a cue that a problem exists (D'Zurilla & Nezu, 1999). The counselor can also help clients learn to recognize and let go of self-defeating thoughts related to problem solving, such as, "If I have a problem, that means I'm abnormal" or "All my problems are caused by me." The longitudinal research presented here, combined with dismantling intervention research (Nezu & Perri, 1989), suggests that training in problem-solving orientation may be of benefit to adolescents.

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