The Efficacy of Symbolic Modeling and Vicarious Reinforcement in Increasing Coping-Method Adherence

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Abstract

The aim of this study was to test a method of increasing adherence to a coping method assignment in individuals interested in reducing stress. Eighty university students and 48 adult non-students were asked to write about their emotions for 15 minutes per day over three days. Participants were randomly assigned to experimental or control conditions, with the experimental manipulation being an adherence intervention involving symbolic modeling and vicarious reinforcement. A word count and self-report measures showed significantly higher adherence in the adherence intervention group. Additionally, the adherence intervention group showed significantly more reduction in distress than the writing instructions only group. Finally, the amount of adherence was significantly associated with amount of reduction in self-reported distress. The results provide the first evidence of the efficacy of symbolic modeling and vicarious reinforcement in increasing the use and clinical benefits of a recommended coping method.

Keywords: Adherence, coping, emotional, expression, modeling

The Efficacy of Symbolic Modeling and Vicarious Reinforcement in Increasing Coping-Method Adherence

Effective treatment is the usual objective of healthcare consultations. However, this normally cannot be achieved through the efforts of the healthcare provider alone. The client's willingness to adhere to treatment recommendations is often essential. Unfortunately, research suggests that adherence in healthcare occurs only about 50% of the time (Haynes, 2001). This discouraging statistic extends to the completion rate of homework assignments given in psychotherapy (Spiegler & Guevremont, 2003, p. 397). A number of studies have found that adhering to tasks aimed at enhancing psychological health correlates with superior treatment outcomes (e.g., Addis & Jacobson, 2003; Bryant, Simons, & Thase, 1999; Coon & Thompson, 2003; Kazantis & Lampropoulos, 2002; Schmidt & Woolaway-Bickel, 2000).

The problem of non-adherence reaches beyond clinical settings. Messages promoting methods of improving or preserving health abound in self-help books and web sites, public service advertisements, government brochures, and in the teaching of psychology and personal development classes. However, only some individuals adopt recommended pro-health behaviors. For instance, many adaptive methods of coping with stress such as writing about one's emotions (see e.g., Pennebaker, 2004), although extolled by experts, are not commonly practiced. It seems that recommendation alone of a coping method is often insufficient to ensure its use. A question arises of what beyond expert recommendation might lead to higher use of coping methods. In clinical settings, this

question is often framed as one of adherence or compliance (e.g., Openshaw, 1998; Tompkins, 2002).

Although the need for empirically supported methods of maximising adherence to psychological healthcare recommendations has been voiced (e.g., Scheel, Hanson, & Razzhavaikina, 2004), research addressing this goal has thus far been restricted to medical healthcare, where reinforcement has the most evidence of efficacy in increasing adherence (Spiegler & Guevremont, 2003). There appear to be no published studies in which the researcher employed experimental methodologies to investigate the efficacy of specific tactics for enhancing adherence to psychotherapy assignments. There also appear to be no published studies evaluating the efficacy of specific efforts to encourage individuals not in therapy to use a suggested coping method.

Psychotherapy experts have developed several models of adherence. These emphasize factors such as the client's stage of change (Derisley & Reynolds, 2000), the client's ability and motivation to adhere (Malouff & Schutte, 2004), the client's beliefs relating to the assignment (Tompkins, 2002), and relationships among client, therapist, and task characteristics (Detweiler & Whisman, 1999). The model of Malouff and Schutte (2004) uses social cognitive theory (sometimes called social learning theory; Bandura, 1986) as its foundation.

Social Cognitive Theory and Adherence

Social cognitive theory (Bandura, 1986) postulates that human emotions and behavior result from influences such as modeling and reinforcement. There is some evidence of the theory's utility in the area of adherence. Schlenk and Boehm (1998) found that positive reinforcement delivered by contingency contracts generated long-term increases in treatment adherence in Type II diabetes patients. Social reinforcers such as medallions

and certificates were found to be efficacious in encouraging aftercare attendance in drug dependent individuals (Lash, Burden, Monteleone, & Lehmann, 2004). Other successful medical adherence studies used prompting, positive reinforcement, and self-monitoring in multicomponent interventions (Haynes, Sackett, & Gibson, 1976; Logan et al., 1979). However, because these interventions included a variety of additional modalities, the relative contribution made by individual elements is uncertain.

As there has been no published experimental research on methods of increasing adherence to psychotherapy assignments, there is no evidence that adherence methods based on social cognitive theory will produce positive effects in this domain. However, Detweiler and Whisman (1999) and Ockene (2001) have proposed that strategies derived from the theory could heighten adherence to health-related recommendations.

Modeling is a key element of social cognitive theory. According to Bandura (1986), much of human behavior is learned not through trial and error, but through observing others. This modeling can be live, videotaped, or symbolic (e.g., behavior described in words). Given the ubiquity of its workings in everyday life, it is hardly surprising that modeling has shown success in several experimental studies aimed at influencing behavior. The most famous of these is Bandura's (1965) Bobo Doll experiment, which demonstrated that children will readily emulate violent behavior.

In addition to affecting the behavior of observers through demonstration, models can influence observers via the consequences of the model's actions. When people observe a behavior being rewarded, it becomes more likely that they will perform the behavior themselves (Bandura, 1986). This phenomenon, known as vicarious reinforcement, is another element of social cognitive theory. Vicarious reinforcement is frequently used in aiding behavioral change, particularly in the treatment of phobias (e.g., Gilroy, Kirkby,

Daniels, Menzies & Montgomery, 2003; Wiederhold & Wiederhold, 2003). There is also evidence of its value in encouraging adaptive psychological health attitudes. For instance, Buckley and Malouff (2005) used modeling and vicarious reinforcement to instill more positive attitudes toward psychotherapy in university students and other members of non-clinical populations.

Selection of a Coping Method for Adherence Evaluation

To be valuable in a practical sense, adherence tactics should demonstrate clinical effects (Schlenk, Burke, & Rand, 2001). Hence, it is crucial that a coping method studied in an adherence study have evidence of its efficacy. One coping method that has some empirical evidence of efficacy in reducing distress involves emotional expression through writing. Studies have shown that individuals tend to experience reductions is distress as a result of writing about their emotions and the situations that led to them (e.g., Alford, Malouff, & Osland, 2005; Campbell & Pennebaker, 2003; Largo-Marsh & Spates, 2002; Pennebaker, Colder, & Sharp, 1990; Richards, Beal, Seagal, & Pennebaker, 2000; Pennebaker, Kiecolt-Glaser, & Glaser, 1998). A meta-analysis (Smyth, 1998) showed an effect size (Cohen's *d*) of 0.66 for nine studies that included psychological well-being as an outcome measure, with some indications that students benefited more than nonstudents and men more than women.

It seems also that individuals need not commit large quantities of time to writing about their emotions in order to experience salutary effects. As little as fifteen minutes three times a week appears to be sufficient to achieve positive outcomes (Pennebaker & Seagall, 1999).

The mechanisms underlying the apparent therapeutic effects of written emotional expression are unclear. There are many purported explanations for the phenomenon,

including desensitization through repeated exposure to the emotions (Sloan, Marx, & Epstein, 2004), clarification of seemingly inexplicable emotional experiences through organizing them on paper (Borden, 1992; Pennebaker, 1997), cognitive restructuring (Lepore, Greenburg, Bruno, & Smyth, 2002), and cathartic effects of writing (King, 2002). Whatever the explanation for the positive outcomes associated with written emotional expression, it appears to be a coping method worthy of targeting for enhanced use. A further reason for targeting the method is that, fitting in with general adherence problems, there is evidence that some people are disinclined to try writing as a means of coping, at least as part of a study. For instance, when assessing the willingness of individuals with asthma or rheumatoid arthritis to participate in a writing study, Smyth, Stone, Hurewitz, and Kaell (1999) found that 50-60% of individuals who showed an initial interest declined to participate after they received further information regarding the nature of the study and the requirements of participation. About half of those declined to participate for no given reason; the others declined due to the time required.

Assessing Adherence to an Expressive Writing Assignment

There are various possible ways of assessing adherence to an expressive writing assignment. Appropriate measures include a participant's self-rating of the degree to which she or he completed the assignment, self-reports relating to the frequency and duration of writing, and objective measures of adherence, such as a word count (J. W. Pennebaker, personal communication, February 22, 2005). Semi-objective measures such as a rating of adherence from a third person reading the writings might also be used if the participants' writing is legible. Self-ratings have the advantage of great knowledge collected over relevant time frames. Objective and semi-objective measures have the advantage of being resistant to experimenter-demand effects.

Hypotheses

This study tested three hypotheses. Hypothesis 1 predicted that when compared to a writing instructions only group, individuals who received an adherence intervention involving symbolic modeling and vicarious reinforcement would exhibit significantly higher adherence to an expressive writing assignment.

Hypothesis 2 predicted that participants in the adherence intervention group would show more of a reduction in psychological distress than participants in the writing instructions only group. This hypothesis was based on the supposition that exposure to the adherence intervention would result in participants doing more writing, and the extra writing would help reduce distress.

Hypothesis 3 predicted that higher levels of adherence to the writing assignment would correlate positively with reductions in psychological distress. Because a relationship between therapeutic homework adherence and treatment outcome tends to be found in psychotherapy (Kazantis, Deane, & Ronan, 2000; Scheel et al., 2004), it seemed likely that the same relationship would exist between the amount of emotion-focused writing a person completes and therapeutic gain.

Method

Participants

One hundred and twenty-eight volunteers (74 women and 54 men) entered the study. Participants included 80 students in psychology classes at a rural university in Australia, as well as 48 nonstudent residents of the Sydney metropolitan area recruited at their workplace or elsewhere. We recruited both students and nonstudents in order to test whether they differed in response to the adherence intervention and in order to maximize the number of

participants. Participants' ages ranged from 18 to 61 years, with the mean age being 34.30 (*SD* = 10.48). Individuals were invited to participate in the study if they wished to learn a new method of coping with stressors. Those interested met in small groups later to begin the study.

Experimental Condition

Participants in the adherence intervention group received an adherence intervention based on principles of social cognitive theory. The adherence intervention, comprising symbolic modeling and vicarious reinforcement, had two parts:

Written model. Participants in the adherence intervention group received a written model of adherence to the writing assignment. This came as the written output of one fifteen-minute session of written emotional expression, demonstrating adherence to the instructions given to all participants. Participants were informed that the writer was a 31-year-old male who had recently lost his job in a welfare agency. The writer's fifteen minutes (221 words) of writing centered on his experience of job loss, its accompanying emotions, and the meaning he attached to the emotions. He described feelings of "almost uncontrollable rage," interpreting them as being protective from the sense of failure. The writing became more subdued towards the end of the piece, when the writer reasoned that he could find a more suitable job. A brief written follow-up on his psychological condition informed participants of his subsequent feelings of clarification and increased wellbeing, which he attributed to writing. It also gave objective information regarding his situational improvement, i.e., he had since been re-employed.

Video model. Participants in the adherence intervention group also viewed a five-minute film featuring three people who had benefited from engaging in written emotional

expression. The first person on the film was a 35-year-old woman who described the cathartic effects of expressive writing: "Once you've gotten it onto paper, that's it - it's gone, and you feel lighter." She referred specifically to the termination of a romantic relationship, describing writing about it as a "lifeline." The second speaker, a 26-year old man, began by acknowledging that males are not typically encouraged to explore their emotions. He then spoke of the clarity he derived from writing about his emotions, and ended by commending the coping method as a "great way to find out about yourself". Finally, a 23-year-old woman described how writing assisted her in making sense of negative emotions, recounting a betrayal in a romantic relationship. She attributed the alleviation of her anger and distress to writing, and closed by affirming that written emotional expression acts as a release of tension "like crying."

Control Condition

Participants in the writing instructions only group were not exposed to the adherence intervention strategies. Otherwise, they received the same treatment as those in the experimental condition; they thereby served as a control for receiving instructions about the writing method of coping and seeing a brief relevant video without receiving an experimental adherence intervention. In order to avoid the possible confound of film vs. no film, these participants viewed a three and a half minute segment of *Discovering Psychology* (WGBH, 1989). The film segment explored the creative self, focusing on art production and the stifling effect of competition on creativity. While the film related somewhat to written emotional expression in its exploration of alternative means of self-expression, it related neither to stress reduction nor to persuading people to engage in writing.

Measures

Adherence self-rating. This measure, developed by Primakoff, Epstein, and Covi (1986), is a single item gauging the degree of assignment completion on a six-point scale. A score of 0 denotes no attempt at the assigned work; 1 indicates that the rater attempted the assignment, but was unable to execute any of it; 2 indicates that rather than attempting the assigned work, she or he engaged in a related activity; 3 indicates partial completion of the assignment; 4 indicates completion; and 5 indicates that the rater did more of the assigned work than was requested.

Previous studies using Primakoff and colleagues' adherence item have found positive relationships between client and therapist ratings of adherence and measures of therapeutic outcome (Abramowitz, Franklin, Zoellner & DiBernardo, 2002; Bryant, Simons & Thase, 1999; Leung & Heimberg, 1996). Psychotherapists have also used the scale to rate clients' adherence to assignments. Woody and Adessky (2002) found good inter-rater reliability between psychotherapists (r = .88).

Days/Minutes Self-Rating. This item required participants to indicate the number of days on which they wrote and the number of minutes on each day.

Word Count. The study also included an objective measure of adherence, a word count of the expressive writing completed by participants. To increase reliability, rules regarding counting were established, e.g., if the participant dated the page, this was not counted; blank spaces signified word separation; acronyms were classed as one word; hyphenated words were counted as two words.

General Health Questionnaire-12. The General Health Questionnaire-12 (GHQ-12; Goldberg, 1992) measures psychological distress. We used this scale because of its brevity and its good psychometric qualities, and because it showed sensitivity to intervention in a prior study evaluating the efficacy of an emotional writing intervention similar to the present

one (Alford et al., 2005). The scale contains twelve assessment items, each examining an aspect of the psychological distress experienced by the rater. Typical items ask: *Have you… felt unhappy or depressed? felt you couldn't overcome your difficulties? felt capable of making decisions about things?*. The response options range includes 0= *not at all,* 1= *no more than usual,* 2= *rather more than usual,* and 3= *much more than usual*. Reverse scoring is applied to questions aimed at detecting psychological wellbeing. There are different ways of scoring the scale (Donah, 2001); we used the simplest, summing the responses. Scores range from 0 to 36, with higher scores denoting more psychological distress. The version of the GHQ-12 used at pre-intervention asked about distress in the past few weeks. We used this version to obtain a relatively stable measure. The version used at post-intervention asked about the past week, because was this time period hypothesized to be affected by the adherence intervention.

The scale has evidence of good reliability with a Cronbach's alpha coefficient of .89 (Jacob, Bhugra, & Mann, 1997). It has evidence of good test-retest reliability (r = .73) over two weeks (Hardy, Shapiro, Haynes, & Rick, 1999). The validity of the scale has been evidenced by high correlations between other measures of distress and GHQ-12 scores, including those obtained in an extensive World Health Organization Study (Goldberg et al., 1997). The GHQ-12 showed sensitivity to changes in distress produced by an intervention involving written emotional expression in a non-clinical population (Alford et al., 2005).

Procedure

The number of participants in each session group ranged from two to eight. All sessions commenced with participants completing the pre-intervention GHQ-12. Every questionnaire contained a space for participants to provide a unique code word, which would

remain the same throughout the study. This enabled the preservation of anonymity as well as the matching of pre and post questionnaires provided by each participant. Participants also received a general instruction sheet, which clarified the rationale behind the use of a code word and advised when they should complete subsequent questionnaires.

A description of the task followed the completion of initial questionnaires. All participants were asked orally to "Please write for a minimum of fifteen minutes a day over at least the next three days about your deepest emotions relating to a traumatic event or stressor you have experienced. Really let go and explore your feelings and thoughts about it. Write about what the emotions mean and/or what they suggest that you do." Written instructions to the same effect, which have been found to facilitate homework completion in behavioral medicine (Cox, Tisdelle, & Culbert, 1988), were also provided. These were based on those devised by Pennebaker (1989) for use in writing interventions. The students completed the writing at times and places of their own choosing.

Post-intervention questionnaires included the adherence items and the post-intervention GHQ-12. These questionnaires, writing paper, and a stamped and addressed envelope were given to each participant following the provision of task instructions. Participants were asked to complete these final questionnaires in ten days. We chose that time period to give the participants a week after completing the writing to experience benefits; we were not interested in momentary effects, and we did not expect long-term effects. These procedures were the same for all participants.

The experimenter next randomly assigned participants to the experimental or control condition through the drawing of a token. Participants in the adherence intervention group read the writing sample and then viewed the writing intervention film. Participants in the writing instructions only group viewed the control condition film.

All participants received at least one and as many as three emails reminding them to return the final questionnaires and any writing they had completed. As all materials provided by participants were anonymous, the first two emails advised that sending a reply message would preclude further reminders. The first email was sent ten days after participants received the initial instructions on the writing task. Subsequent emails were sent weekly to participants who did not respond to a previous email.

Results

One hundred and nine of the 128 participants who entered the study completed and returned final questionnaires, providing full data. Sixteen participants did not return final questionnaires, thus providing only pre-intervention data. The two conditions did not differ significantly in dropout rate, with 6 of 61 (10%) lost in the experimental condition and 10 of 67 (15%) in the control, $x^2 = 0.20$.

One participant, a 21-year-old male in the writing instructions only group, sent a reply to the first reminder email in which he gave his codename and also wrote "I could not comply with your instructions – sorry." This response was considered sufficient to justify the assignment of scores of zero on each adherence measure to this participant. The participant provided no data on the post-GHQ-12; therefore, complete data sets ranged from 111 (for analyses involving distress) to 112 (for analyses involving only adherence).

Preliminary Analyses and Assumption Testing

Table 1 shows demographic characteristics and outcome measure means for the study completers in each condition. All pre-intervention differences between conditions were nonsignificant. The between-groups difference in proportion of women/men was nonsignificant, chi square = 0.96, $p = .33$. The between-groups difference in

student/nonstudent proportion was nonsignificant, chi square = 2.01, $p = .16$. The difference between the groups in participant age was nonsignificant, $F = 1.74$, $p = .19$. The mean pre-intervention GHQ scale scores of participants in each condition, which varied from about 11 to 14, were higher than those for thousands of adults in community surveys in the same country, where the means were about 9 and the *SD*s about 10 (Donath, 2001).

Cronbach's alpha for the GHQ, the measure of distress, was .90 at pre-intervention, with N = 128. Before proceeding with word counts for the entire sample, an inter-rater reliability check was performed on 26 randomly selected participant submissions of writing. The counts of the two independent raters were very similar, with the largest discrepancy four words. The two counts produced an intraclass correlation coefficient that rounded to 1.00.

The four measures of adherence, days of writing, minutes of writing, word count, and adherence self-rating, were highly intercorrelated, with Pearson correlations ranging from .77 to .86. Because analyzing the measures together could lead to multicollinearity problems, we standardized scores for the adherence measures and summed them to produce a single measure of adherence. Combining the four measures produced a highly reliable dependent variable (Cronbach's alpha = .95, $n = 112$).

Prior to conducting the main analyses, we screened the data for outliers and tested for violations of assumptions of normality, homogeneity of variance, and linearity of associations. Using the standards suggested by Tabachnick and Fidell (2001), we found no adjustments were needed.

Main Analyses

Hypothesis 1 predicted that when compared to a writing instructions only group, individuals who received the adherence intervention would exhibit significantly higher adherence to the writing assignment. Table 1 shows the means for composite adherence for

the two groups. A between-groups ANOVA with group, gender, and student/not as the independent variables indicated that participants in the adherence intervention group adhered significantly more than participants in the writing instructions only group, $F(1, 104) = 5.90$, $p = .017$. This result provided support for Hypothesis 1. There were no significant effects for gender or whether the participant was a student or not or for any interactions. Cohen's *d* for group differences in composite adherence was 0.43, indicating a small effect size for composite adherence, according to the standards of Cohen (1988), who described .20 as the minimum for a small effect and .50 as the minimum for a moderate effect.

Table 1 shows the means for the four individual adherence measures for each group. On every measure, the adherence intervention group showed more adherence; each group difference was significant at $p < .05$ one-tailed.

Hypothesis 2, that participants in the adherence intervention group would show greater reduction in psychological distress than participants in the writing instructions only group over the course of the intervention, was tested with a mixed-design, between-groups and repeated-measures, ANOVA. The between-groups variables included the condition to which the participants were assigned, as well as their gender and student-nonstudent status. The repeated-measures (time) variable involved distress, measured pre and post-intervention. Table 1 shows the means for the groups. The results supported the hypothesis in that group X time interaction was significant, $F(1, 103) = 5.04$, $p = .027$, indicating that the adherence intervention group showed significantly greater reduction in distress than the comparison group,. There was no significant interaction effect involving gender or student status. Cohen's *d* for the group differences in distress reduction was 0.34, a small effect by Cohen's (1988) standards. As a test of impact from the perspective of an individual in the study, we determined which participants decreased in distress by at least ½ *SD* (3 points), the

minimum suggested by Cohen for a moderate effect, and compared the two groups on these percentages. For the adherence intervention group, 27 of 55 individuals (49%) decreased by ½ *SD*; for the writing instructions only group, 17 of 56 (30%) decreased by ½ *SD*. The difference between groups was significant, $x^2 = 4.07$, $p = .044$.

In order to determine whether the emotional writing overall produced a reduction in distress, we compared all the participants at pre and post-intervention using a repeated-measures ANOVA. The results showed that all participants together showed a significant reduction in distress, $F(1,110) = 15.67$, $p < .001$.

Hypothesis 3 proposed that higher adherence to the writing assignment would correlate positively with reductions in psychological distress. In all the participants together, composite adherence was significantly associated with reduction in distress, $r(109) = .39$, $p < .001$, supporting the hypothesis. For the experimental condition, $r(53) = .35$, $p = .009$; for the control condition, $r(54) = .40$, $p = .002$. Individual measures of adherence correlated with reduction in distress at .34 for word count and for minutes and at .39 for days and for self-rating of adherence, with all correlations significant at $p < .001$, with $n = 111$. The same correlations calculated within each condition were all significant at $p < .05$.

In order to assess whether adherence mediated reductions in distress, we followed the steps suggested by Kenny (2006). To show mediation, one must first find a correlation between the predictor (here assignment to condition: adherence intervention or not) and the outcome (here change in distress). The correlation was significant, $r(109) = .17$, $p = .037$ one-tailed. The second step involves showing that the mediator (here composite adherence) correlates with the outcome (distress reduction). It did, at $r(109) = .39$, $p < .001$ one-tailed. The third and fourth steps involve showing that in a multiple regression with the predictor (condition) and mediator (adherence) entered together, the semi-partial correlation of the

mediator is significant (here it equals .37, $p < .001$, with $n = 110$) and the semi-partial correlation between the predictor (condition) and the outcome (distress reduction) decreases from its 0-order correlation (here it decreased from .17 to .09, at which level it was nonsignificant, $p = .30$, with $n = 110$). Hence, the results show that adherence at least partly mediated the association between condition and reduction in distress.

Discussion

The results provide support for Hypothesis 1, that when compared to a writing instructions only group, individuals who received an adherence intervention involving symbolic modeling and vicarious reinforcement would exhibit significantly higher adherence to the writing assignment. The composite adherence measure and all four of the individual adherence measures, including the word count, which was an objective measure, showed higher adherence in the adherence intervention group. This outcome adds to existing evidence supporting the functionality of social cognitive theory in bringing about behavioral changes (e.g., Haynes et al., 1976; Lash et al., 2004; Logan et al., 1979; Pentz & Kazdin, 1982; Rosenthal & Reese, 1976; Schlenk & Boehm, 1998). Moreover, the outcome provides the first evidence in support of (a) the efficacy of applying social cognitive theory in the specific context of increasing adherence, as recommended by Detweiler & Whisman (1999) and Ockene (2001), and (b) the symbolic modeling and vicarious reinforcement aspects of the adherence model of Malouff and Schutte (2004).

These results also provide evidence of construct validity for the various measures of adherence in that scores on them were highly intercorrelated and also correlated with clinical improvement. This might be most important for the one-item adherence self-rating of Primakoff et al. (1986), which has been used in studies of various clinical intervention even though it has had limited published evidence of validity.

Although the adherence intervention group adhered significantly more, the mean scores on adherence measures showed only partial adherence in both groups. Furthermore, Cohen's *d* indicated that the adherence intervention exerted a small effect; hence, there is room for further improvement. The reason for the small effect is not clear-cut. It could be that the intervention applied in this study was weak. It is also possible that methods necessary for obtaining data on adherence, e.g., sending reminder emails and including adherence assessment questions, had the effect of making adherence between groups more similar than it otherwise would have been, as is often the case in research settings (see Schron & Czajkowski, 2001). Alternatively, it may be that adherence interventions targeting the low use of coping methods will typically yield small effects. Effects of this magnitude are consistent with those generally found in the most successful interventions aimed at enhancing adherence to medication regimens (Haynes, 2001).

It is possible that a psychotherapist could produce a similar adherence effect for any of various client home assignments with a similar adherence method. Further research with psychotherapy clients and specific assignments would be needed to determine this.

The findings support Hypothesis 2, that participants in the adherence intervention group would show greater reduction in psychological distress than participants in the writing instructions only group over the course of the intervention. This finding suggests that the adherence method tested produced not just greater adherence but also greater clinical benefit, which is the ultimate goal of seeking adherence (Schlenk et al., 2001. Hence, when psychologists recommend emotional expression in writing to members of the public for stress management, they could use the present adherence method to increase the mental health effects.

The mean pre-post distress reduction in this study, which was about half a standard deviation across both conditions, was somewhat lower than in a recent study using a similar writing intervention and the same distress measure but with a different sample (child protection officers; Alford et al., 2005), which found a mean distress reduction of about one standard deviation. Whether the present adherence intervention would have more, less, or the same impact in other specific samples such as that is unknown.

The results support Hypothesis 3, that higher adherence to the writing assignment would correlate positively with reductions in psychological distress. This finding shows that, as with psychotherapy assignments (Scheel et al., 2004), there was a relationship between the level of assignment completion and therapeutic improvement. The finding also serves to validate further the adherence measures, all of which were correlated with level of reduction as one would expect of a valid measure of coping-method adherence. Although the association found is consistent with use of the coping method leading to decreased emotional distress, the finding, being correlational, cannot by itself support a causal conclusion. The experimental-method findings of increased adherence and increased clinical benefit help provide the basis for causal conclusions.

The results with regard to gender and student status having no association with amount of distress reduction are inconsistent with some prior findings with regard to well-being effects involving mood and adjustment (Smyth, 1998). Sample differences on some unrecognized variable might explain the inconsistency.

The method of the present study had both strengths and limitations. The strengths included the experimental design, the assessment of both adherence and clinical effect, and the inclusion of an objective measure of adherence.

One limitation involves the sample. The participants were mostly either university students or urban workers. It is unknown whether the results would generalize to other types of individuals. On the positive side, analyses did not detect significant interactions between adherence or distress effects and either student status or gender, suggesting that the intervention had similar effects across student status and gender.

A second limitation is that the adherence intervention may have led to demand effects in which the participants in that condition indicated more than their actual adherence. However, the word count would not be affected by demand effects of that sort, and all the adherence measures, including the word count, were highly intercorrelated, and each showed a significant effect.

A third limitation involves the lack of any reading in the control group, while the adherence participants received a brief example of emotional writing to read. It is possible that simply reading anything could have produced the increased adherence and distress reduction in the adherence condition.

A fourth limitation involved the lack of a content evaluation by a third person of the writings. We did not want to unduly burden participants by asking them to type or to write legibly, and, the writings as a collection were not legible enough for that type of analysis. However, the high intercorrelations among the four adherence measures, including a subjective rating of adherence and an objective measure of words written, along with the correlations between adherence measures and distress reduction, provide some evidence adherence was validly measured.

A final limitation is that there were no objective measures of distress and no long-term follow-up of distress levels. Further research would be needed to determine whether a single brief adherence intervention can have objectively measured, long-term effects on

clinical outcome. One might think that continued application of adherence methods would be needed to produce a continuing effect.

Overall, the results of this study suggest that symbolic modeling with vicarious reinforcement is worthy of further study as a method of increasing adherence to healthcare recommendations.

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Table 1

Group Demographics and Descriptive Data for Participants who Completed the Study

Variable	Condition	
	Experimental (n = 55)	Control (n = 57)*
Students (% of condition)	36 (65%)	32 (56%)
Women (% of condition)	35 (64%)	30 (53%)
Age mean (*SD*)	35.80 (9.29)	34.05 (11.40)
Number of days wrote mean (*SD*)	2.13 (1.45)	1.67 (1.42)
Total minutes of writing mean (*SD*)	39.02 (34.59)	26.05 (25.65)
Number of words written mean (*SD*)	623.49 (531.75)	436.65 (509.56)
Adherence self-rating mean (*SD*)	3.29 (1.59)	2.44 (1.81)
Adherence composite Z mean (*SD*)	0.80 (3.70)	-0.77 (3.49)
Pre-intervention GHQ mean (*SD*)	14.15 (5.68)	12.56 (5.25)
Post-intervention GHQ mean (*SD*)	11.04 (4.48)	11.38 (4.35)

*n = 56 for GHQ measures.

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