ePREP: COMPUTER BASED PREVENTION OF RELATIONSHIP DYSFUNCTION, DEPRESSION AND ANXIETY

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This study evaluated the efficacy of a computer–based relationship focused preventive intervention (ePREP) relative to a depression and anxiety focused computer–based preventive intervention (CBASP) and a control group. Ninety–one young adults in dating relationships were randomly assigned to one of the three conditions. Assessments were conducted at baseline and at an eight week follow up. Participants in the ePREP and CBASP interventions experienced significantly reduced symptoms of depression and anxiety and significant improvements in relationship relevant variables relative to controls. The outcomes from the two treatment conditions did not significantly differ from one another. These findings suggest that computer–based preventive interventions may be a viable and efficacious means for preventing depression, anxiety, and relationship distress.

Several prevention focused relationship education programs have been shown to be efficacious (Jakubowski, Milne, Brunner, & Miller, 2004) and the challenge therefore, is to find methods of dissemination that will increase use of empirically supported treatments (Markman et al., 2004). One potentially powerful means of dissemination is to offer programs via computers and computer based networks. Computer based interventions have been shown to be efficacious in treating a number of different disorders (Tate & Zabinski, 2004). For instance, Cukrowicz and Joiner (in press) showed that the Cognitive Behavioral Analysis System of Psychotherapy (CBASP; McCullough, 2000) administered via computer to college students reduced symptoms of depression and anxiety relative to a control group. A recent meta–analysis (Cavanagh & Shapiro, 2004) found that clients who have received computer based in-

terventions see them as a valid form of treatment. This is an important finding because clients' perceptions of a prescribed treatment have the potential to determine whether they will stick with it.

To our knowledge no study has investigated a computer delivered relationship preventive intervention. We therefore examined the efficacy of an electronically delivered version of an empirically supported relationship prevention program, Prevention and Relationship Enhancement Program (ePREP). In doing so we attempted to replicate Curkrowicz and Joiner's (in press) findings as well as to examine the common and unique impacts of an individually focused versus relationship focused intervention. Given the association between relationship well–being and mental health (see Fincham & Beach, 1999) as well as the alleviation of depressive symptoms through couple therapy (Cordova & Gee, 2001), relationship focused intervention has the potential to improve both relationship and individual well–being.

The purpose of the present study therefore was to examine the impact of individually focused and relationship focused computer based interventions on symptoms of depression, anxiety, and relationship functioning. We tested the following hypotheses:

H1: Participants in ePREP will experience gains in relationship functioning. In addition, they will experience significant decreases in symptoms of depression and anxiety despite the fact that the ePREP intervention does not make any mention of depression or anxiety or provide specific skills for dealing with these symptoms. Observed reductions in depression and anxiety in the ePREP condition will not differ from those in the depression and anxiety focused CBASP treatment.

H2: Those who attain greater mastery of the material taught will demonstrate greater gains than those with lower mastery, and those who more fully implement the material taught in their respective interventions will demonstrate greater gains than low implementers.

METHOD

Participants were 91 introductory psychology students at a large public university in the northeast. They were recruited from the undergraduate psychology subject pool and received course credit for their participation. Only persons who had been in a romantic relationship for four months or longer were eligible to participate in the study. Participants were told that the purpose of the study was to examine romantic relationships among college students and how they change over time.

Women made up 59% of the sample. Ethnic background was distributed as follows, Caucasian, 60.9%; Asian, 18.7%; African American, 5.5%; and "Other", 14.3%. Participants were randomly assigned to take part in one of the three interventions.

In mid fall semester participants were recruited to participate in the study. They completed a battery of questionnaires that assessed their own levels of depression and anxiety and the current quality of their relationship and then took part in one of three computer–based interventions (described in detail below). After completing their assigned intervention, participants were given a paper copy of the information covered in the intervention and were informed that they would be contacted by e–mail each week for the next seven weeks. These e–mails directed them to an online survey that assessed how fully they were implementing the material learned in their intervention. It also included a reminder that if they hoped to gain the maximum benefit from the intervention that they should attempt to apply the principles learned. Eight weeks after their initial visit to the lab participants returned to complete the same battery of questionnaires. This follow up assessment took place at the end of the semester during a time of elevated stress generated by the demands of final projects and final exams, thus providing a stringent test for our hypotheses which specify positive change in intrapersonal and interpersonal functioning from baseline to follow up.

INTERVENTIONS

The interventions were individually administered computer–based presentations (comprising written text and pictures, no audio or video material was used), the pace of which was controlled by the participant. For the interventions, examples of how to employ certain skills were provided in vignettes that described couples utilizing the skill in question. In each case, the intervention included a quiz following the presentation of each section of material and this quiz assessed participants' mastery of the information presented. The interventions were intentionally balanced to contain approximately the same amount of content and therefore took approximately the same amount of time to administer. The majority of participants completed the intervention in approximately one hour and all interventions took place in the authors' research laboratory. At the end of the session participants were given a copy of the slides they viewed in their respective presentations and were instructed to implement the skills and information from their presentation in their relationship for maximum benefit. No other coaching or instruction was given to participants beyond the presentations they viewed and the

weekly e-mails which assessed implementation, and served as discriminative stimuli for implementing skills taught.

ePREP

In the relationship focused preventive intervention (ePREP), participants received training in empirically validated methods for improving romantic relationships. ePREP is based on Stanley and Markman's Prevention and Relationship Enhancement program (PREP, Markman, Stanley, & Blumberg, 2001), but slightly modified to make it appropriate for a college dating population and computerized administration. PREP has been shown to be an efficacious intervention for improving relationship quality across a number of different indices in at least seven randomized, controlled studies (for review, see Jakubowski et al., 2004).

Risk factors for relationship dysfunction/divorce can be divided into two categories: static risk factors and dynamic risk factors. Static risk factors represent relatively unchangeable factors that are correlated with poor relationship outcomes (e.g. parental divorce, certain personality characteristics, differing religious backgrounds). Dynamic risk factors are correlates of poor relationship outcomes that can be changed with some determination and effort (e.g. negative patterns of conflict, difficulty communicating well, unrealistic beliefs about marriage, low levels of commitment, Markman, Stanley, & Blumberg, 2001). The ePREP intervention teaches individuals how to recognize and combat dynamic risk factors that lead to relationship distress. Specifically, it teaches communication techniques and problem–solving skills that help couples to effectively deal with conflict. It also teaches couples how to enhance positive aspects of their relationship.

CBASP

Participants in the depression and anxiety focused intervention condition received training in empirically validated method for reducing symptoms of depression and anxiety. This intervention, based on the Cognitive Behavioral Analysis System of Psychotherapy (CBASP) developed by McCullough (2000), teaches techniques for analyzing and changing patterns of maladaptive thinking and behavior. Specifically, it teaches individuals how to analyze problematic situations in their lives and determine why they may not have achieved their desired outcomes, and how they might go about changing their thoughts and behaviors to achieve the outcomes they desire in the future. To do this, participants learn a simple algorithm that they can use to examine and, if needed, remediate their thoughts and behaviors. Specifically, individuals identify a time period that includes an event in which they did not achieve their desired outcome. They then examine their thoughts and behaviors within this slice of time and assess their contribution to the achievement

of the desired outcome. If their thoughts and behaviors did not contribute to their desired outcome, participants generate other possible thoughts and behaviors which are more likely to generate the outcome. A number of studies have demonstrated the efficacy of CBASP (Keller et al., 2000; Klein et al., 2004), and Cukrowicz and Joiner's (in press) computer based version of CBASP significantly reduced symptoms of depression and anxiety relative to controls at an eight week follow–up.

Control

Participants in the control condition (Control) viewed a presentation that was virtually identical to the control presentation used in the Cukrowicz and Joiner (in press) study. Participants in this condition worked through material that provided descriptive information about anxiety, depression, and relationship information such as definitions, prevalence rates, and available forms of treatment. The only modification made to the control presentation in this study was the inclusion of a module that provided descriptive information relevant to relationships and relationship dysfunction. This section was added to the original control presentation developed by Cukrowicz and Joiner (in press) to make it an appropriate control for both the depression focused and relationship focused interventions.

Assessment

At baseline and eight week follow up, participants completed the following questionnaires.

Beck Anxiety Inventory (BAI). The BAI, is a 21–item self–report inventory that assesses the presence of general symptoms of anxiety (Beck, Epstein, Brown, & Steer, 1988). Scores on symptoms of anxiety are rated from 0 to 3 and summed to create a total score. Higher scores on the BAI indicate greater anxiety. The BAI has good psychometric properties (Cronbach's α = .92; test–retest reliability = .75).

Beck Depression Inventory (BDI). The BDI is a 21–item self–report measure that assesses the presence of depressive symptoms over the previous two weeks. For this study we omitted the item that assesses suicidality. Scores on symptoms of depression are rated from 0 to 3 and summed with higher scores indicating greater depression. The BDI has demonstrated adequate reliability estimates, and has been well validated (Beck, Steer, & Garbin, 1988).

Positive and Negative Affect Schedule (PANAS). The PANAS is a 20–item scale that assesses positive and negative affect as two distinct constructs (rather than opposite ends of a single continuum). Higher scores on the positive affect (PA) subscale indicate better functioning whereas higher scores on the negative affect (NA) subscale indicate

lower functioning. The PANAS has evidenced good reliability and validity (Watson, Clark, & Tellegen, 1988).

Revised Conflict Tactics Scale (CTS–2). The CTS–2 is a validated measure that assesses the methods couples use to resolve conflict (Straus, Hamby, Boney–McCoy, & Sugarman, 1996). We used three subscales from the CTS–2, the negotiation scale ("I suggested a compromise to disagreement"), the psychological aggression scale ("My partner called me fat or ugly"), and the physical assault scale ("I twisted my partner's arm or hair"). These subscales were used to assess how frequently these tactics were being used in romantic relationships. The most severe items on these scales were omitted leaving the resultant scale with 38 items. Reliability analyses were conducted and demonstrated acceptable reliability for the modified measure (Alphas ranged from .63 to .95 across scales).

The Perceived Relationship Quality Components Inventory (PRQC). The PRQC is a short self–report measure that assesses the respondent's evaluation of specific components of relationship satisfaction. The specific areas it assesses are: satisfaction, commitment, intimacy, trust, passion, and love. The subscales are summed to provide a total score reflecting overall relationship quality. The PRQC has demonstrated good psychometric properties ($\alpha = .85$), and is generally used to assess global relationship quality (Fletcher, Simpson, & Thomas, 2000).

Communication Patterns Questionnaire—Constructive Communication Subscale (CPQ–CC). The CPQ–CC is a six–item subscale of the Communication Patterns Questionnaire that assesses the interaction patterns during conflict. It assesses three constructive communication factors (mutual discussion, mutual expression, mutual negotiation) and three destructive communication behaviors (mutual blame, mutual threat, and verbal aggression). The total score for the measure is obtained by subtracting the summed value of the destructive communication items from the sum of the constructive communication items, thus higher scores indicate more constructive communication. The CPQ–CC correlates with observed problem solving behavior ($r = .70$, Hahlweg, Kaiser, Christensen, Fahm-Wolfsdorf, & Groth, 2000) and has good internal consistency for females and males, $\alpha = .81$ and $\alpha = .84$ respectively (Heavey, Larson, Zumtobel, & Christensen, 1996).

Trust Scale. The Trust scale is a 17 item self–report measure that assesses three key components of trust in romantic relationships: predictability, dependability, and faith in one's partner. This scale has demonstrated adequate validity and reliability with alphas ranging from .70 to .80 across the subscales (Rempel, Holmes, & Zanna, 1985).

RESULTS

Baseline analyses did not reveal any significant differences between conditions on age, ethnicity, or any of the dependent variables. The data were therefore analyzed using 3 (Condition: ePREP vs. CBASP vs. Control) × 4 (Ethnicity: Caucasian vs. Asian vs. African American vs. Other) × 2 (Gender) univariate and multivariate analyses of covariance with participants' baseline scores serving as covariates. Multivariate analysis of depression (including BDI, PA, and NA scales as per Cukrowicz & Joiner, in press) revealed a significant main effect for condition as can be seen in Table 1. Post hoc analyses indicated that relative to controls, participants in the ePREP condition had reduced BDI scores and NA scores; PA scores did not significantly differ. The CBASP condition also reduced depression scores relative to controls. There were no reliable differences between depression scores for ePREP and CBASP participants as well as no effects invoving gender or ethnicity. These findings were consistent with the hypothesis that ePREP would produce decreases in levels of depression similar to those observed in the depression focused CBASP condition.

Multivariate analyses of BAI and NA scales revealed a significant main effect for Condition (see Table 1) such that participants in the two treatment conditions experienced significantly greater decreases in anxiety than control participants. Compared to controls, ePREP participants had significantly lower NA scores and BAI scores that were marginally lower ($p = .057$). CBASP participants had significantly lower scores on both scales. There were no significant differences on anxiety scores between the ePREP and CBASP groups.

Multivariate analysis of the three subscales of CTS–2 revealed a significant main effect for condition (see Table 1) such that ePREP participants experienced significant reductions in frequency of psychological and physical aggression relative to controls. Contrary to our hypothesis, CBASP participants also experienced reductions in psychological and physical aggression that were not significantly different from the outcomes of the ePREP group. There was a significant main effect for gender ($F = 8.29$, $p < .001$) with males reporting higher rates of psychological ($p < .01$) and physical aggression ($p < .001$).

As shown in Table 1, analysis of the CPQ revealed a main effect for condition where participants in the CBASP condition experienced significant increases in constructive communication. There were no other main effects or significant interactions. The increase in constructive communication among CBASP participants without a superior or even commensurate increase among ePREP participants runs contrary to the

TABLE 1. Estimated F Values and Means for ePREP, CBASP, and Control Participants

Variable	ePREP	CBASP	Control	F
Depression				4.65***
BDI	6.198[a]	8.945[a]	16.811[b]	
Positive Affect	28.346	29.628	30.323	
Negative Affect	20.598[a]	19.995[a]	24.008[b]	
Anxiety				4.86**
BAI	9.929[a]	8.531[a]	14.065[b]	
Negative Affect	20.598[ab]	19.995[a]	24.008[b]	
Intimate Partner Violence				8.30***
CTS–Negotiation	7.533	6.416	6.919	
CTS–Psychological	1.646[a]	1.237[a]	4.043[b]	
CTS–Physical	.359[a]	.701[a]	2.995[b]	
Constructive Communication				3.17*
CPQ	6.686[a]	7.240[b]	6.309[a]	
Trust				6.01**
Trust Scale	78.862[a]	80.744[a]	69.936[b]	
Global Relationship Quality				
PRQC	101.958	102.856	99.731	.256

Note. Means for the same measure with different superscripts differ from one another at least at the .05 level. *$p < .05$, **$p < .01$, ***$p < .001$.

hypothesis that ePREP would produce superior relationship relevant gains.

Trust scores revealed a main effect for condition (see Table 1) with ePREP and CBASP showing significantly higher trust scores than participants in the control condition. There was a significant condition × gender interaction with men in the control condition displaying significantly lower levels of trust ($p < .05$). A main effect for ethnicity was also observed ($F = 4.36, p < .01$) with participants in the "Other" ethnic category showing significantly lower trust scores. To ensure that the impact of ethnicity scores was not moderating the main effect for condition we replicated the original analysis with responses from participants in the "Other" ethnic category censored. With the scores censored, the main effect for condition became marginally significant ($p = .086$) suggesting that ethnicity moderated the main effect to some degree.

Analysis of PRQC did not produce any significant main effects or interactions suggesting that neither ePREP nor CBASP had a significant impact on the global relationship quality of participants.

Finally, Cukrowicz and Joiner (in press) found that participants in their treatment condition who showed greater mastery of the treatment material evidenced better outcomes; we further hypothesized that the

reported level of implementation of skills learned would moderate participants' outcomes. Contrary to our hypothesis, neither reported implementation nor mastery (as measured by quizzes on treatment material) moderated the outcomes of any of the dependent variables we examined.

DISCUSSION

The purpose of this study was to examine the efficacy of a relationship focused computer–based preventive intervention on individuals' levels of anxiety, depression, and relationship functioning. Eight weeks post intervention, ePREP participants experienced significant reductions in symptoms of anxiety and depression, and significant improvements in relationship relevant variables. Consistent with our initial hypothesis, outcomes for depression and anxiety for those who received the relationship focused ePREP treatment were not significantly different from those who received the depression and anxiety focused CBASP treatment. Contrary to our expectations, however, participants in the CBASP condition experienced gains in relationship functioning that were not significantly different from those observed in ePREP participants. Neither participants' levels of mastery nor participants' reported degree of implementation of intervention material moderated outcomes for any condition.

We did not predict the observed improvement in relationship functioning in the CBASP intervention but it appears that application of the situational analysis strategies taught to romantic relationships produced positive outcomes. As noted, the CBASP intervention teaches individuals to analyze situations where the actual outcome differs from their desired outcome. It is likely that the strategies taught in the CBASP intervention, when applied to problematic interactions in romantic relationships, produce improved relationship outcomes as participants remediate relationship focused behaviors and thoughts that do not contribute to desired relationship outcomes.

Previous research has revealed an association between intimate relationship problems and increased risk for mental health problems (e.g., depressive episodes, eating disorders, and partner abuse, see Fincham, & Beach, 1999), and future studies might more fully illuminate this relationship by examining whether one of the chief mechanisms underlying the efficacy of depression and anxiety focused interventions, such as CBASP, is their ability to produce improved interpersonal functioning in intimate relationships. It is well documented that couples therapy can alleviate depression (Beach, Fincham & Katz, 1998) and the present study provides converging support as individuals in the ePREP condi-

tion experienced decreases in depressive symptoms despite the fact that the treatment did not discuss, or provide specific skills for combating, depression.

This study therefore extends previous work on couple therapy as a treatment for depression by demonstrating that preventive interventions delivered to only one member of a college dating relationship dyad can still produce significant reductions in depressive symptoms. Although ePREP produced significant reductions in anxiety symptoms relative to the control condition, this reduction was not significantly different from that produced by the CBASP intervention. The present study therefore demonstrates that computer delivered approaches can influence mental health symptoms by focusing on seemingly very different skill sets.

Future work needs to examine whether practice in multiple skill areas would be more useful than practice in a single area. It is also important to identify mediating processes that give rise to outcomes. It appears that similar outcomes in affective and relationship domains are possible using computer programs with differing foci. However, it may be that this reflects different pathways (i.e. different mediators) yielding the same outcome. In that case one might anticipate additive effects if participants use both training programs. Alternatively, the results may reflect a shared mechanism of change that is not directly assessed in the current study. If so, using both programs would probably not yield additive effects. However, identification of the shared mechanisms would be important theoretically. There are likely to be multiple pathways to better mental health. One pathway, suggested by the current findings for CBASP, and by Cukrowicz and Joiner's (in press) study, is enhancement of cognitive self–management skills. The findings for ePREP, combined with the observed association between marital well being and mental health (see Fincham & Beach, 1999), suggest that another is likely to be enhancement of relationship management skills. Because CBASP and ePREP likely influence distress through different mechanisms, the choice of intervention may depend on whether psychological distress is fueling relationship distress or vice versa. CBASP may be preferred when individual distress is viewed as the primary problem whereas ePREP may be the intervention of choice when relationship distress is the primary problem.

In the present study ePREP participants evidenced significantly better outcomes than control participants on nearly all relationship relevant variables. The one exception was global relationship quality. There are a number of reasons why this pattern of results may have occurred. First, it is possible that eight weeks is too short a time to observe meaningful differences in distal, omnibus constructs such as global relationship sat-

isfaction. Changes in such a complex and multifaceted construct may occur over larger spans of time, and thus our measurements of more proximal constructs such as constructive communication and intimate partner violence were more appropriately suited to this experimental design. Second, given the high degree of idealization and satisfaction in dating relationships, it is possible that ceiling effects precluded positive changes in this variable. Third, the intervention involved only one of the partners in the relationship and change in both partners may be needed to alter overall relationship satisfaction. Future research could profitably examine the efficacy of this intervention as a preventive intervention for couples, specifically those that are already beginning to experience relationship distress that has not yet reached clinical levels.

The findings from this study become more compelling when one considers the population tested and the design of the experiment. Scholars have singled out college students as a prime target for relationship focused preventive interventions (Ooms & Wilson, 2004) because they are in a formative developmental stage with regard to romantic relationships. But dating relationships among college students provide a particularly rigorous test of the efficacy of a preventive relationship focused intervention because college dating relationships are not marked by the same high levels of commitment inherent in engaged or married relationships. Further, emerging adulthood is a distinctive developmental period characterized by volatility and identity formation. It is also a time when many relationships are in their incipient stages and thus more prone to the instability of this developmental period (Arnett, 2000). In addition, our findings were obtained despite the fact that only one member of the dyad received the intervention. Finally, the design of the experiment was such that follow–up measurements were taken during a time of high stress for participants (at the end of the semester). Thus, this population likely provided a more rigorous test for our relationship enhancement intervention than an engaged or married population, and our experimental design contributed to a particularly stringent test for our hypotheses.

There is great potential utility for an efficacious, cost–effective, and flexible intervention for relationship education such as the computer based intervention studied. Two major problems that face relationship education are getting relationship education to the populations that need it most (Sullivan & Bradbury, 1997), and sustaining the gains achieved through relationship education over time (Markman, Renick, Floyd, & Stanley, 1993; Wood, Crane, Schaalje, & Law, 2005). ePREP provides a potential solution to these problems. Specifically, ePREP repre-

sents an empirically informed, empirically refined, and empirically tested program of relationship education that can easily and cost–effectively be delivered to nearly any population. Second, ePREP is also an ideal method for delivering "booster sessions" that supplement more conventional relationship education programs, thus helping participants maintain their gains over time. Further, it represents a potentially attractive alternative for other important populations relationship educators would like to reach including technology savvy adolescents and those who have negative attitudes about face–to–face relationship education or treatment. Finally, our results suggest that CBASP provides a viable alternative for improving relationships for those who are resistant to the idea of relationship intervention.

Our study is not without its limitations. Ethnicity appears to be moderating the observed results to some degree, but our limited sample size was not able to provide a clear picture of just what that role might have been. For instance, it is possible that the verbal nature of the computer–based presentation might have restricted its impact on those with limited reading capabilities or those for whom English is a second language. Delivery of the intervention to only one relationship partner may limit the impact of ePREP thereby restricting its potential to show superior gains on relationship outcomes relative to CBASP. Additionally, the eight–week interval between treatment and follow–up provides only a short–term glimpse at the efficacy of this program. Further research is needed to examine the efficacy of this intervention over longer periods of time and to replicate the findings in more established relationships such as marriage.

This study provides an encouraging first look at the role computer–based interventions can play in preventing relationship instability and relationship distress. The flexibility, cost–effectiveness, and versatility of the computer based interventions such as ePREP infuse them with the potential to overcome many of the barriers that currently block the path to dissemination of empirically supported relationship education interventions. The versatility of computer based interventions remove many of the financial, temporal, and logistic limitations inherent in existing interventions, expanding the boundaries of what is possible for clinicians and researchers. Indeed, as society becomes increasingly influenced by new technologies it is likely that computer–based interventions such as ePREP will become an increasingly attractive alternative to treatment as usual.

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