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Positive Affect Stimulation and Sustainment (PASS) Module for Depressed Mood: A preliminary investigation of treatment-related effects

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Abstract

Positive affective functioning (PAF) is critical to the development, course and treatment of depressive symptoms. Targeting key features of PAF during treatment may provide a new angle through which to improve affective functioning and reduce symptoms. The current study was a treatment development trial for the Positive Affect Stimulation and Sustainment (PASS) Module. PASS is conceptualized as a means of capitalizing on positive events (e.g. planned through behavioral activation) by enhancing and sustaining positive affective states through savoring, and establishing positive attributions and expectancies. Participants were 27 female college students with dysphoric symptoms. There was a moderate effect of PASS on depressive symptoms. There was also a significant within session increase in positive affect from pre to post session among the PASS group, relative to active control; and a significant decrease in positive affect from pre (baseline) to post (follow-up) treatment among the control group, relative to PASS. Results provide preliminary evidence for the efficacy of the treatment module among young adults with depressed mood, and lay the foundation for future research.

Introduction

There is increasing emphasis on strengthening and personalizing approaches to treating depressive symptoms in order to prevent the onset of MDD (e.g., Garber et al.), improve remission rates in response to efficacious acute treatments, or reduce residual symptoms following acute treatment (e.g., Tomba & Fava, 2009). Given the pervasiveness of symptoms related to affective functioning--such as depressed mood and anhedonia--in prodromal, acute and partial remission symptom profiles (Cornwall & Scott, 1997; Georgiades, Lewinsohn, Monroe, & Seeley, 2006; Kennard et al., 2006), new approaches to improving affective functioning are indicated. Positive affective functioning (PAF)—defined here as cognitive, behavioral, and subjective aspects of positive emotions—and their neural underpinnings, are promising targets for treatment development. Key features of PAF are related to the development of depressive disorders (Dietz et al., 2008; Forbes, Shaw, & Dahl, 2007), the course and severity of the illness (Kasch, Rottenberg, Arnow, & Gotlib, 2002; Rottenberg, Kasch, Gross, & Gotlib, 2002), and recovery (Rottenberg, et al., 2002). Yet, PAF is not yet a standard or primary target of prevention or intervention efforts. The

current study takes a first step towards the development of a treatment approach that targets PAF as one way to improve affective functioning among individuals with dysphoria--a population at risk for concurrent functional impairment and vulnerable to the onset of MDD (Gotlib, Lewinsohn, & Seeley, 1995; Lewinsohn, Rohde, Klein, & Seeley, 1999). Future research may extend this work to partially remitted MDD populations or those in acute treatment, to determine for whom and when the approach is optimally indicated.

PAF has been shown to play an important role in healthy socio-emotional (Fredrickson, 1998), cognitive (e.g., Isen, 1999) and physical (e.g., Salovey, Detweiler, Steward, & Bedell, 2001) functioning, and may also function to regulate negative affect or mood (e.g., Davidson, 1998; Forbes & Dahl, 2005; Fredrickson, 2000; Joormann, Siemer, & Gotlib, 2007; Tugade & Fredrickson, 2004). Among individuals with dysphoria, disruptions are reported across all major facets of PAF: cognitive (e.g., Beevers & Meyer, 2002; Bergouignan et al., 2008; Cropley & MacLeod, 2003), behavioral (e.g., Langston, 1994; Lewinsohn & Graf, 1973; Sloan, Bradley, Dimoulas, & Lang, 2002), motivational (e.g., Beevers & Meyer, 2002; Kasch, et al., 2002), subjective/experiential (e.g., Bylsma, Morris, & Rottenberg, 2008; Sloan, Strauss, & Wisner, 2001), and neurobiological (e.g., Forbes & Dahl, 2005; Forbes et al., 2009; Henriques & Davidson, 2000). Furthermore, key features of PAF appear critical to the development (Davey, Yucel, & Allen, 2008; Forbes & Dahl, 2005; Pine, Cohen, Cohen, & Brook, 1999) and course (Kasch, et al., 2002; Rottenberg, et al., 2002) of depressive symptoms.

Despite the centrality of PAF to healthy functioning, persistent depressed mood, and the development and maintenance of depressive disorder, there is some evidence that current empirically supported treatments (e.g. cognitive behavioral therapy) do not adequately resolve symptoms of anhedonia and/or depressed mood among youth (Kennard, et al., 2006) and adults (Cornwall & Scott, 1997). Importantly, emerging evidence supports the utility of more explicitly targeting features of PAF to improve treatment response. For example, a recent study using Deep Brain Stimulation indicated that following stimulation of the nucleus accumbens (neural correlate of PAF), otherwise treatment resistant depressed adults (n=3) demonstrated increased metabolism in fronto-striatal circuits and clinical improvement in anhedonic symptoms (Schlaepfer et al., 2008). These findings suggest the promise of developing psychosocial approaches to target PAF.

There are a variety of disruptions in PAF in the context of depressed mood, but one compelling aspect of this literature is the themes of convergence across these studies which suggest some important systemic disruptions. We focus on one of these areas of convergence—disruptions in sustaining positive affective states over time-- deemed consequential for overall affective functioning and mood (Tugade & Fredrickson, 2007), and a promising target for intervention. Following initial affective reactivity to a positive event, positive affect fades more quickly for dysphoric and depressed individuals--as indicated by continuous subjective ratings of affect for minutes following positive film clips among young adults with dysphoria and adults with depression (Horner, Siegle, & Friedman, submitted; McMakin, Santiago, & Shirk, 2009), subjective positive affect recorded at the time of a positive event and several weeks later among young adults with dysphoria (Walker, Skowronski, Gibbons, Vogl, & Thompson, 2003), neurobiological correlates of positive affect responses among adults with clinical depression (Dichter & Tomarken, 2008; Heller et al., 2009), and sustained selective attention to positive information among adults with clinical depression (Kellough, Beevers, Ellis, & Wells, 2008).

Specific regulatory tendencies that serve to maintain or enhance positive affect, and may be modifiable by treatment, are likely related to this shortened time course of positive affect. For example, individuals with low self esteem (Wood, Heimpel, & Michela, 2003) and

dysphoria (Feldman, Joormann, & Johnson, 2008) report a higher likelihood to dampen positive affect in response to positive events, while high self esteem (Wood, et al., 2003) and healthy (Feldman, et al., 2008) college students report savoring or positively ruminating over such events. Over time, these regulatory tendencies may lead to insufficient processing and elaboration of positive information, and contribute to attentional, interpretive, and/or memory biases in affective processing that characterize depression and dysphoria (e.g., Mathews & MacLeod, 2005).

Attributions are also important for the maintenance or enhancement of positive affect. Positive affect may be enhanced when positive events are understood as salient to the self, and under some control of the individual. Individuals who attribute positive events to stable and internal causes experience more positive affect in response to positive events; while individuals with persistent depressed mood frequently fail to make such attributions (e.g., Cropley & MacLeod, 2003). Importantly, there is evidence that it may be possible to alter attributional style for positive events (Layden, 1982), and that individuals who attribute positive events to internal and stable causes may be more likely to recover from depression (Johnson, Han, Douglas, Johannet, & Russell, 1998).

Existing and emerging psychotherapy approaches for depression that may impact aspects of PAF include Behavioral Activation (BA; Jacobson, Martell, & Dimidjian, 2001), Well Being Therapy (Fava & Tomba, 2009), and Positive Psychotherapy (Seligman, Rashid, & Parks, 2006). Strategies that explicitly teach regulatory strategies for sustaining positive affect, however, remain under-developed, and may serve as important complements to these approaches. For example, BA emphasizes re-engagement in pleasant activities, which aims to increase reinforcement in the environment, and frequently elicits related pleasure. However, as already described, positive affective states related to positive events can quickly fade for some individuals with depressed mood. As such, PASS may help individuals to capitalize on planned pleasant events by extending and enhancing affective states. Well-Being Therapy aims to enhance well being by targeting autonomy, personal growth, environmental mastery, purpose in life, positive relations and self-acceptance. These dimensions of well being most certainly elicit positive emotions, but an intervention such as PASS may help to capture and extend the experience of these feelings. Finally, PPT for depression aims to enhance meaning and positive emotion, and this approach includes a savoring component. However, the savoring in PPT focuses on current engagement in daily activities through which individuals often rush (e.g. savoring the walk to work), while the savoring proposed in PASS focuses more on elaborating and rehearsing recent positive events (reminiscent), and relating them to the active anticipation of future events (anticipatory), as a method to extend the temporal impact of positive experiences. Sustaining positive affective states through savoring and attributions, as part of PASS, may over time tip affective resource allocation and biases—as well as underlying neural circuitry--toward positive experiences.

The current study uses the Written Disclosure Paradigm (WDP; e.g., Frattaroli, 2006) as a vehicle for practicing PASS skills. This paradigm has traditionally focused on writing about stressful or traumatic events for several 20-minute sessions, but was adapted for use in the current study to focus on savoring and making positive attributions for positive experiences. The experimental approach of the current study offers an important first step in treatment development in that it aims to demonstrate proof of concept prior to implementation as a psychotherapy component, and the added complication of nonspecific factors. If indicated, future research can develop a manual for employing this type of approach in psychotherapy.

Overview

Dysphoric, young adults were randomly assigned to PASS or a writing condition (active control). We hypothesized pre-post treatment related reduction in depressive symptoms among the PASS group, relative to active control (hypothesis 1). We also hypothesized a treatment related increase in positive affect as measured before and after individual treatment sessions (hypothesis 2); as well as pre-post treatment (measured at baseline and the follow-up assessment at one week post-treatment; hypothesis 3) among the PASS group, relative to active control.

Method

Participants

Classroom screening in psychology courses identified eligible participants. The Creative Exploration Inventory (Kashdan, Rose, & Fincham, 2004) was administered to reduce possible demand characteristics, and the Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) served as a screener for depressive symptoms among a total of 1,122 students over the course of 2 years. Seventy-seven female participants who scored between 13 and 25 on the BDI-II were invited to participate in this follow-up study. We recruited a female sample because women report higher perceived ability to savor (Bryant & Veroff, 2007), suggesting a good starting point for testing the development of the skill set. Also, based on our prior work with dysphoria in this university setting (McMakin, et al., 2009), we expected that approximately 80% of participants who volunteered and met inclusion criteria would be female, such that our anticipated sample size would have been underpowered to detect gender effects. As such, we recruited an all female sample for this early treatment development trial. Invited participants who scored between 16 and 25 on the BDI-II at the first session were classified as dysphoric. A cut score above 16 has been shown to offer the optimal balance of sensitivity and false positive rates for predicting a mood disorder among a college student sample (Sprinkle et al., 2002). Individuals with more elevated symptoms (> 25) were excluded for safety reasons. Exclusion criteria included scoring outside of the selected range on the BDI-II, reporting current psychotherapy or pharmacotherapy for mood disorder, and/or reporting current suicidal ideation for which individuals were referred to therapy, or emergency services. Fifty of the 77 participants did not qualify, of which 6 (12%) were receiving pharmacotherapy and 44 (88%) scored outside of inclusion range at the first session. These individuals received extra credit for their time, and were offered referrals for treatment when appropriate.

Final sample characteristics

The final sample included 27 participants (PASS group, $n=13$). One participant from the active control group only attended one session and is not included here. The majority of participants were 18 or 19 years old (67%) and in their first or second year of college (81%). Ethnicity in the final sample included: 78% ($n=21$) Caucasian, 11% ($n=3$) Latina, 7% ($n=2$) Asian, 4% ($n=1$) African American. The mean BDI-II at session one was 20.07 ($SD=3.17$).

Measures

Beck Depression Inventory, Second Version—(BDI-II; Beck, et al., 1996) is a 21-item self-report measure with well-established psychometric properties that assesses depressive symptoms over 2 weeks. Each item consists of four statements reflecting severity level.

Positive and Negative Affect Scale—(PANAS; Watson, Clark, & Tellegen, 1988) is a self report scale that consists of a Positive Activation Scale and a Negative Activation Scale.

Respondents were asked to indicate the extent to which they felt a number of emotions on a 5-point scale over the last 2 weeks.

Self Assessment Manikin—(SAM; Bradley & Lang, 1994) is a visual analogue scale that was used to obtain participants' subjective ratings of current affective state—including valence (1= very pleasant, 9=very unpleasant) and arousal (1=very aroused, 9=very calm)—at pre and post writing session.

Word Count and Positive Word Classification—Word totals and percentage of positive words were computed by Linguistic Inquiry and Word Count (LIWC) software (Pennebaker, Francis, & Booth, 2001). The software has strong psychometric properties (Pennebaker, et al., 2001), with an average word detection rate in emotion writings of 83%. The average rate in the current study was comparable at 78% (range 72%–85%).

Procedure

Pre and post assessment—All methods and procedures were approved by the University of Denver Institutional Review Board. Following consent procedures, participants were administered questionnaires in random order. Self report scales of savoring and attributions were also included, but were not central to our primary hypotheses and are not included here¹. Approximately two to four days following the writing sessions, the same questionnaires were administered through an encrypted data collection website ($M = 3.59$ days; $SD=1.62$). Participants also completed the SAM before and after each of the three writing sessions. Participants were offered extra credit, as well as a raffle entry to win a \$100 gift certificate in exchange for their time.

Randomization and journaling procedure—Eligible participants were assigned to one of the two writing groups--PASS or active control--using a random numbers table. Participants attended three separate writing sessions within a 2-week period with at least 48 hours between sessions (Mean=9.59 days, $SD=3.35$). At the first session, the experimenter read the standard general instructions used in the Pennebaker protocol (1997) to the participants, and all sessions included daily instructions (below). The participant wrote privately for 20 minutes in a comfortable laboratory room.

Active Control—Daily instructions were identical to the Pennebaker protocol (1997). Participants wrote about how they use their time with as much objectivity as possible.

Positive Affect Stimulation and Sustainment (PASS) Module—Participants in the PASS condition wrote about a positive experience with as much emotion and feeling as possible. Specific savoring strategies were drawn from our data that outlined savoring behaviors and cognitions that individuals with depression fail to use (McMakin & Shirk, 2004). Participants were asked to 1) “replay” the positive event in their mind, while recalling specific details (e.g. sights, smells) of the event, 2) recall and re-experience the feelings associated with the event, and 3) consider how this could lead to other positive events in the future (anticipatory savoring). With regard to attributions, participants were asked to 4) identify their contributions to positive events and to make positive attributions. For example, “Describe the role, no matter how small, that you had in making this event happen.” Participants were asked to write about a *recent* positive event to avoid contrast effects related to recalling distant positive events among dysphoric participants (Joormann, et al., 2007), and to facilitate the goal of sustaining positive affect following recent life events. Given that we expected individuals with depressed mood to have limited exposure to

¹Supplementary information including analyses using these scales is provided at: www.danamcmakin.com.

and low perceptions of events as positive, we did not require the event to be extremely exciting or joyful. Participants were simply asked to recall the most happy, joyful or pleasant event that has occurred over the last week.

Randomization Check

A randomized controlled trial (RCT) design allowed for controlled group analyses of PASS treatment effects. Randomization was assessed using independent t-tests, chi square, and effect sizes. All baseline measures were considered. Tests supported successful randomization as no variable reached significance and effect sizes did not exceed Cohen's $d = .28$.

Missing Data Adjustment

The current study used computer acquisition of questionnaire data which limited the amount of missing data. However, SAM was administered by hand such that experimenter error led to inconsistent administration (missing: 33% at pre-session, 7% at post session). The same approach to imputation was used for pre and post session SAM. First, patterns of missingness were explored to ensure that data were Missing at Random (MAR, Tabachnik & Fidell, 2007). Second, imputation using an EM covariance matrix (in Lisrel 8.8; Joreskog & Sorbom, 2006) was pursued. Given the recommendation that scores be imputed from variables outside of the model (Allison, 2002), 3 to 5 variables were selected from the data set based on correlations with the variables of interest. All cases were successfully imputed. Complete Case Analyses (pair-wise deletion) revealed a similar pattern of results--only imputed data are reported here.

Overview of Procedure for Main Analyses

Unless otherwise indicated, the analyses in this section were 2 X 2 GLM repeated measures analysis of variance (ANOVA) where group (PASS vs. active control) was the between subjects variable, and time of measurement was the within subjects variable. Effect sizes were represented as partial eta squared (η^2_p), interpreted as the proportion of variance uniquely explained by an effect.

Manipulation Checks

Journal completion codes were explored (coded as: 0=failed to complete, 1 = complete; summed across writing sessions). Overall, participants completed an average of 78% of the writing protocol instructions ($M = 9.38$, $SD = 1.89$). There was 100% completion of writing about the details of the event (instruction #1) and writing about feelings related to the event (instruction #2), with more variability for writing about a personal role in the event (instruction #3, $M = 1.85$, $SD = 1.21$; 62%) and writing about how this event might lead to future positive events (instruction #4, $M = 1.54$, $SD = .88$; 52%). Independent t-tests with group as the between subjects variable, suggested that the PASS group used a larger percentage of positive affect words than active control ($t(18.38) = -9.42$, $p = .001$, $d = 3.03$); however, mean word count between the groups was not significantly different ($t(20.89) = -.71$, $p = .49$, $d = .18$). These results suggest that any effects related to the treatment were not due to the effects of writing alone, and that the groups followed instructions.

Results

Hypothesis 1: There will be a decrease in depressive symptoms from pre (baseline) to post (follow-up) treatment in PASS relative to active control

There was a significant group by time interaction ($F(1, 25) = 4.82$, $p = .04$; $\eta^2_p = .162$). Simple main effects analyses revealed that the PASS group showed a reduction in

depressive symptoms from pre to post ($F(1, 25) = 9.29, p = .01; \eta^2_p = .271$) treatment, while the active control group did not ($F(1, 25) = .00, p = 1.00; \eta^2_p = .0001$). See Table 1 for means and standard deviations. Findings suggest a moderate treatment effect on depressive symptoms. The number of participants remaining above the cut-off for dysphoria ($\text{BDI-II} > 16$; see *Participants* section for rationale for cut) following treatment was 7 of 13 (54%) for PASS, and 12 of 14 (86%) for active control ($\eta^2 = 3.28, p = .07$) indicating a trend for participants in the active control to remain above the cut for dysphoria at post assessment, relative to PASS.

As a post hoc analysis, change in depressive symptoms from the BDI-II screener to pre-assessment was compared between groups to rule out the possibility that change was simply a function of different trajectories for each of the two groups. There was no main effect for time ($F(1, 23) = .04, p = .84; \eta^2_p = .002$), or for group ($F(1, 23) = .33, p = .57; \eta^2_p = .014$), and no group by time interaction ($F(1, 23) = 2.35, p = .14; \eta^2_p = .093$) for change in depressive symptoms from the screen to pre-treatment assessment, indicating that the groups did not differ on measures of change in depressive symptoms prior to the introduction of the treatment.

Figure 1 reveals a shift in the trajectory of change for the PASS group upon the introduction of the treatment, while active control maintains a steady trajectory through pre-treatment. To test this among the PASS group, a paired t-test was conducted to examine the magnitude of change in depressive symptoms between screening and pre-treatment ($M = -1.31, SD = 3.25$; a negative number represents an increase in BDI-II score) relative to the magnitude of change between pre-treatment to post-treatment ($M = 4.34, SD = 5.25$). Results revealed a significant difference in the change scores from each of these two time intervals, $t(12) = -2.75, p = .02, d = -1.23$, suggesting a larger change in depressive symptoms (reduction of symptoms) during the course of the treatment, relative to a period of no treatment.

Hypothesis 2: There will be a within-session increase in positive affect (SAM ratings before and after each writing session) in PASS sessions, relative to active control sessions

Valence ratings from before (mean scores of three pre-writing session SAM valence ratings) and after (mean scores of post-writing session SAM valence ratings) the three sessions were compared between groups. See Table 1 for means and standard deviations. The hypothesis that positive affect would increase from pre to post writing sessions in the PASS group was supported. Results revealed a significant group by time interaction ($F(1, 25) = 14.92, p < .001; \eta^2_p = .374$) for valence. Simple main effects analyses indicated that the PASS group showed increased positive affect from pre to post writing sessions ($F(1, 25) = 23.25, p < .001; \eta^2_p = .482$), while the active control group did not ($F(1, 25) = .32, p = .58; \eta^2_p = .013$).

Hypothesis 3: There will be a pre (baseline) to post (follow-up) treatment increase in positive affect (PANAS ratings at pre and post treatment) in the PASS group relative to active control

There was a significant group by time (pre treatment, post treatment) interaction ($F(1, 25) = 5.29, p = .03; \eta^2_p = .175$). Simple main effects analyses revealed that, counter to the hypothesized direction of effects, the active control group showed a reduction in positive affect from pre to post treatment ($F(1, 25) = 5.33, p = .03; \eta^2_p = .176$), while the PASS group showed no significant change ($F(1, 25) = .94, p = .34; \eta^2_p = .036$). Although not significant, mean changes in positive affect among the treatment group were in the expected direction (increasing). See Table 1 for means and standard deviations.

To examine the specificity of these results to positive affect, we conducted a post hoc analysis of change in negative affect (PANAS) from pre to post treatment. The group by time interaction was not significant for negative affect ($F(1, 25) = .54, p = .47; \eta^2_p = .021$). There was no support for a main effect for group ($F(1, 25) = .12, p = .74; \eta^2_p = .005$). There was a significant main effect for time such that there was a reduction in negative affect from pre to post treatment ($F(1, 25) = 10.09, p = .004; \eta^2_p = .29$). See Table 1 for means and standard deviations.

Discussion

The current study included an early stage of treatment development for a new module, Positive Affect Stimulation and Sustainment (PASS), designed to reduce depressive symptoms by targeting deficits in positive affective functioning (PAF) among dysphoric individuals. PASS guides individuals to savor and make positive attributions for recent positive events as a means to sustain positive affective states following positive experiences. Results support the continued development of PASS. From pre to post treatment, depressive symptoms showed a moderate treatment-related reduction in the PASS group, relative to active control. There was also mixed support for treatment related changes in positive affect, which is discussed below.

Treatment Related Effects

The moderate effect ($\eta^2_p = .162$) of PASS on depressive symptoms, relative to the active control, was robust in that the effect was reliable in a small sample. Furthermore, a repeated baseline analysis demonstrated that the trajectory of symptom reduction occurred in the PASS treatment group only *after* the introduction of PASS, ruling out the likelihood of regression to the mean, or other factors related to amelioration of symptoms in the absence of the treatment. The rate of participants who remained within the dysphoric range following PASS treatment (7/13; 54%) showed a trend for being lower than the rate for active control (12/14; 86%). Absolute change in depressive symptoms was modest ($M = 4.34$). This is not surprising given that PASS is intended only as one module of treatment, and it attained these effects in three, 20-minute sessions. Also, these changes occurred without many of the nonspecific contextual factors that accompany traditional psychotherapy, including a supportive relationship with a therapist.

Support for change in positive affect related to the treatment was mixed. First, PASS demonstrated an increase in positive affect following individual writing sessions, and this increase occurred among dysphoric individuals—a population with diminished capacity to initially respond and/or sustain positive affect elicitation (McMakin, et al., 2009; Sloan, Strauss, Quirk, & Sajatovic, 1997). These findings begin to support proof of concept. That is, the treatment targeted PAF, and there is support for an increase in self-reported experience of positive affect in the context of the PASS protocol. Although there was also a group difference from pre to post treatment with regard to change in positive affect (measured by PANAS), this finding was driven by a reduction in positive affect among the active control group, and there was no support for pre to post treatment change in positive affect among the PASS group (though means were in the expected direction). It may be that session related increases in positive affect did not generalize to the experience of positive affect outside of sessions. It is also possible that individuals experiencing depressed mood have a difficult time revising their recollection of their own positive affective experience in such a short period of time (e.g. the 2 week duration of the protocol). This interpretation is in line with data suggesting poor recollection of positive autobiographical memories among individuals with depressed mood (e.g. Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998). The session-related affect measure (SAM) assessed current affective state, such that it may have suffered fewer reporting biases.

The decrease in positive affect from pre to post treatment in the active control group was unexpected. It is possible that writing “objectively and without emotion” leads to the suppression of affect which, as an affective style, has been shown to be related to the reduced experience and expression of positive affect (Gross & John, 2003). It may also be that the reduction of positive affect over time was related to ongoing dysphoria, and the PASS condition served a protective effect among the treatment group. There was no support for treatment-related change in negative affect (PANAS), suggesting specificity of these effects on positive affect. Considering these findings regarding positive and negative affect together, perhaps flattened affect (positive and negative) was increasing over time for these dysphoric young adults which led to reduced negative affect for both groups; while positive affect reduced among active control, but not among PASS because of the focus on enhancing positive affect. These findings and interpretations are speculative and require further investigation in future studies with larger sample sizes.

Limitations and Future Directions

Like most early treatment development studies, there are several limitations to the study. First, the sample size was small (though consistent with other early treatment development studies). Second, participants in the study were dysphoric, female college students. This sample limits generalizability to this population. However, given that this population of dysphoric young adults is at risk for concurrent functional impairment and future depression (Gotlib, et al., 1995), the evaluation of intervention within this population is important. The inclusion of additional populations (e.g., males, partially remitted MDD etc.) will be important to consider in future PASS studies. A third limitation was that multiple imputation was used for one scale (SAM) on which nearly a third of the data were missing. This approach is known to reduce standard errors. Complete case analyses replicated the imputed data set in patterns of results, suggesting the imputed data were an accurate representation of the sample.

Finally, although several neurocognitive processes (e.g. memories, neural underpinnings of PAF) were advanced as part of an underlying rationale for PASS strategies, they were not measured in the current study. Observational reports, experimental paradigms, or neurobiological assessments of outcome such as fMRI could be employed in the future to assess change in targeted mechanisms (e.g. neural circuitry, temporal course of affect), and further refine the approach. Future research may also apply these findings to the development of a psychotherapy manual that ultimately can be tested as an augmentation to existing approaches.

It is also important for future work to consider the ideal developmental period for this type of intervention. Around puberty, there is substantial remodeling of neural circuitry related to PAF (e.g. fronto-mesolimbic reward-related circuitry); and an emerging literature suggests that this remodeling may be related to the development of depression among youth (Davey, et al., 2008; Forbes & Dahl, 2005). Importantly, this period of brain plasticity may also signal a window of opportunity for interventions targeting features of PAF to exert a strong impact, and alter long-term trajectories of brain-behavior mechanisms of depression (Dahl & Spear, 2004).

In conclusion, this early treatment development study demonstrated preliminary support for improving depressed mood by targeting key features of PAF. These data offer a foundation for continued refinement and evaluation of this approach, particularly as an adjunct to existing treatment and prevention strategies for depressed mood.

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Figure 1.

Beck Depression Inventory-II scores at screen, pre-treatment, and post-treatment for the PASS Group and active control. The figure depicts that there was no significant change in depressive symptoms for either group from screener to pre-treatment. However, there was a mean reduction in depressive symptoms among the PASS group after the introduction of the treatment (following pre-treatment assessment), while the active control group maintained a steady trajectory of reported symptoms from screener through post-treatment.

Table I

Means and Standard Deviations for Participant Self Reports of Affect and Symptoms

Variables	PASS Mean (n=13)	PASS Standard Deviation	Active Control Mean (n=14)	Active Control Standard Deviation
SAM ^a Pre Session Valence	3.64	.35	4.10	.53
SAM Post Session Valence	2.80	.50	4.19	.62
BDI-II ^b pre-treatment	20.77	2.92	19.43	3.37
BDI-II post-treatment	16.62	5.21	19.43	5.52
BDI-II Screener	19.46	2.99	20.08	2.54
BDI-II Screen to pre-treatment Change ^c	−.85	3.63	.93	3.93
PANAS-PA ^d pre-treatment	2.65	.59	2.69	.57
PANAS-PA post-treatment	2.78	.46	2.43	.66
PANAS-NA ^e pre-treatment	2.66	.59	2.79	.53
PANAS-NA post-treatment	2.43	.40	2.41	.38

^aSAM = Self Assessment Manikin^bBDI-II=Beck Depression Inventory-II^cChange scores were computed for BDI-II by subtracting screener from pre-treatment such that a positive number indicates a reduction in total scores^dPANAS-PA=Positive and Negative Affect Schedule—Positive Affect^ePANAS-NA=Positive and Negative Affect Schedule—Negative Affect