

Creativity and Bipolar Diathesis: Common Behavioural and Cognitive Components

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An association between creativity and bipolar disorders has been noted among eminent creative individuals, and in clinical probands and their first degree relatives (e.g. Andreasen, 1987; Jamison, 1989; Richards, 1994). Those studies propose that a genetic liability for bipolar disorder carries with it an increased propensity for creative thought and action. The present study applied strict quantitative criteria to establish bipolar diathesis in order to determine whether the association between bipolarity and creativity would generalise to creative individuals beyond the circle of eminence in a non-clinical population. The Adjective Checklist Creative Personality Scale (ACL-CPS) and the revised General Behavior Inventory (GBI) were completed by 72 undergraduates. ACL-CPS scores were significantly elevated for students displaying periods of hypomania with no depression (hyperthymic), but not for those with alternating periods of hypomania and depression (cyclothymic) or predominantly depressed (dysthymic) mood patterns, as compared with people with predominantly neutral (euthymic) mood patterns ($P < .05$). GBI scores accounted for 38% of the variance in ACL-CPS scores ($P < .001$). Further analysis identified six behavioural symptoms underlying this association ($P < .001$). These six "symptoms" may represent nonpathological affective and motivational correlates of creative activity which are aetiologically distinct from similar outward manifestations of bipolarity.

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Special thanks to Wayne Whitehouse for statistical consultation, and to Wayne Whitehouse and Nora Newcombe for insightful comments on an earlier draft. We are indebted to Lauren B. Alloy for contributing the data of 20 criterial cyclothymes. Part of this research was supported by NIMH Grant MH 48216 to Lauren B. Alloy.

*Much Madness is divinest Sense—
To a discerning Eye—*

Emily Dickinson¹

INTRODUCTION

The association between creativity and psychopathology is firmly planted in popular mythology. We are all familiar with the stereotypes of suicidal poets, raving artists, and mad scientists. Historically, investigators have attempted to document this association through retrospective diagnoses of eminent creative individuals. Based on anecdotal and biographical evidence, these diagnoses have included a broad range of disorders, including schizophrenia and assorted neuroses (for reviews, see Prentky, 1980, 1989). More recent research using retrospective diagnosis, employing the modern diagnostic systems DSM-III-R (American Psychiatric Association, 1987) and Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1978), has reported a strong association between outstanding creativity and bipolar disorder, more commonly known as manic-depressive illness (Jamison, 1993). A number of empirical studies, conducted with eminent creative samples (Andreasen & Canter, 1974; Andreasen, 1987; Jamison, 1989) and clinical bipolar samples (Richards, Kinney, Lunde, Benet, & Merzel, 1988a), lend converging evidence to the apparent creativity/bipolarity association.

Bipolar disorder is more accurately a spectrum of disorders, ranging from soft or subsyndromal expressions to full-blown manic-depressive illness (Akiskal & Mallya, 1987; Akiskal, 1988). The spectrum includes bipolar I, bipolar II, bipolar III, cyclothymia, and hyperthymia. Bipolar I is full-blown manic-depressive illness, and is characterised by recurring episodes of mania and major depression. In bipolar II, the individual experiences recurrent episodes of severe depression, but only the milder and less impairing mood elevations of hypomania. Bipolar III is a predominantly depressive disorder in which hypomanic episodes appear only after treatment with antidepressant medication. Cyclothymia (literally "cycling mind") is characterised by alternating mild depressions and hypomania. In hyperthymia, individuals experience repeated mild hypomanic elevations but no depressive episodes at all (Akiskal, 1988; Richards, 1994). Of these disorders, cyclothymia is the least severe clinical manifestation of a bipolar disorder, while hyperthymia is a nonclinical, essentially positive, expression of a genetic predisposition to bipolarity.

¹ Dickinson, E. (1890). Poem 435. In R. Ellman & R. O'Clair (Eds.), *The Norton anthology of poetry* (1988, 2nd ed.). New York: Norton.

The relatively mild mood swings of subsyndromal expressions often appear as personality traits or characteristics of temperament, and rarely cause the individual to seek treatment. In the absence of subjective discomfort and life impairment, such “disorders” are likely to remain undiagnosed and untreated, although they may significantly affect mood, behaviour, and motivation. Research in support of a bipolar/creativity association has emphasised the strong genetic component of bipolar disorder and proposes that liability for a bipolar disorder carries with it an increased propensity for creative thought and action which is best expressed in the milder or subsyndromal manifestations of the spectrum (e.g. Andreasen, 1987; Richards et al., 1988a). However, it is not clear at what point one should distinguish low level expressions of an underlying mood disorder from the normal affective variability which accompanies creative activity. That is, it might be the case that affective states reported by creative individuals are the *result* of their creative activity, rather than symptoms of an underlying diathesis which positively affects the creative process. This potential confusion makes it necessary to establish that a given creative individual, who reports affective symptoms, is indeed liable for bipolar disorder. It is this distinction that seems essential if one is to demonstrate a clear relationship between creativity and bipolar diathesis. How then, does one establish criteria for a bipolar diathesis?

In a study of eminent British writers and visual artists, 38% of the writers and artists had been treated for an affective disorder, 30% reported that they experienced severe mood swings, and 26% reported having extended, elated mood states (Jamison, 1989). However, only 6.5% had actually been treated for bipolar illness. The substantial difference between bipolar treatment rates and self-reported mood swings in this sample is consistent with the conceptualisation of bipolar illness as a spectrum of disorders (Akiskal, 1988; Akiskal & Mallya, 1987). It is possible that the writers and artists in Jamison’s (1989) study who reported having mood swings, but who had not been treated for bipolar disorder, were actually experiencing mild or subsyndromal episodes. However, without more stringent diagnostic evaluation, it is difficult to determine whether those writers and artists would have actually met criteria for a bipolar disorder, or would even have demonstrated an inherited tendency toward bipolar illness through family history. It is possible that the untreated writers and artists in Jamison’s sample were “normal” individuals reporting moods stimulated by their emersion in the creative process. Although Jamison’s data clearly support an association between affect and creativity, the extent to which bipolar disorders contribute to this association remains unclear.

Many authors have noted the similarity between hypomanic episodes and intense periods of creative activity (Andreasen, 1984; Fieve, 1975; Goodwin & Jamison, 1990; Whybrow, Akiskal, & Mckinney, 1984).

Jamison (1989) was the first to systematically investigate the relationship of specific symptoms of affective disorders to creative productivity. She found that 89% of the 47 artists and writers in her sample reported "intense, highly productive and creative episodes . . . characterised by increases in enthusiasm, energy, self-confidence, speed of mental association, fluency of thoughts, elevated mood, and a strong sense of well being" (p. 128). These cognitive, motivational, and affective changes are very similar to the DSM-IV (American Psychiatric Association, 1994) and RDC (Spitzer et al., 1978) criterial symptoms for hypomania. However, several of the more extreme behavioural symptoms characteristic of hypomanic episodes were reported less frequently in Jamison's sample. For example, hypersexuality and talkativeness were reported by less than 30% of the respondents, and excessive or impulsive spending was reported by only 10% of the respondents. Typically, it is these behavioural symptoms that result in undesirable consequences and lead to the subjective experience of impaired life functioning which is now required for a DSM-IV (American Psychiatric Association, 1994) or RDC (Spitzer et al., 1978) diagnosis of a manic or hypomanic episode. As Jamison (1989, p. 132) points out, it remains uncertain whether the apparent overlap in cognitive, motivational, and affective states, reported by the eminent creatives in her sample "represents etiologically related syndromes or phenomenologically similar but causally unrelated patterns of expression". That is, it might be the case that these reported affective and behavioural changes which have been interpreted as symptoms of bipolarity, are in actuality a normal part of the creative process, and have nothing to do with bipolarity at any level.

It is not necessary to hypothesise a direct causal relationship or genetic linkage between bipolar disorder and creativity to explain the apparent association between creativity and bipolar disorders. In much the same way that very different physiological disorders often manifest similar symptoms, it is possible that creativity and bipolar diathesis share common components and mimic each other in expressive and productive manifestations. For example, severe headache can be an early symptom of an oncoming flu, the primary symptom of migraines, or a symptom of brain tumour. In each case, the aetiology and prognosis of the disorder is very different, despite the similarity of the patients' presenting symptoms. The mere presence of the common symptom, headache, is not sufficient to posit a causal relationship between the flu and brain tumours.

Similarly, the simple presence of decreased need for sleep, elevated mood, and/or increased ideational fluency, "symptoms" commonly associated with both the manic phase of bipolar disorder and creative activity, is not sufficient to posit a causal relationship between bipolar disorder and creativity. Creative individuals who are engrossed in an exciting project, or faced with a deadline, may work continuously without sleep, oblivious to

their body's normal habits and current signs of fatigue. Sleep deprivation is known to alleviate depression, and, in susceptible individuals (those with a bipolar diathesis), it may even induce mania (Whybrow et al., 1984). In this case, it is the individual's involvement in the creative process that induces an elevated mood state, rather than vice versa. In the same way, creative activity may lead to enhanced ideational fluency as one becomes more deeply involved with a creative project and acquires new information regarding its possibilities and limitations. Certainly, this sort of purposive fluency, arising from immersion in a project and driven by motivation to complete it, differs from the flight of ideas associated with the manic phase of bipolar disorder. Individuals who, like the writers and artists in Jamison's (1989) sample, report a decreased need for sleep, coupled with elevated mood and increased ideational fluency, while engaged in creative work, are not necessarily experiencing hypomania.

Symptoms of depression may also occur independent of psychopathology. We have all experienced transient feelings of depression in the face of personal loss, disappointment, and stress. For creative individuals, rejection and/or criticism of one's work could be a proximal cause of depressed mood. If such rejection were experienced immediately after a positive, high-energy creative episode, the contrast between the two affective experiences may magnify the intensity of each. Individuals might then report having significant mood swings, but in this case the presence of those mood swings would not be indicative of an underlying clinically significant affective disorder. The question of whether these behavioural, affective, and cognitive correlates of creativity are manifestations of subsyndromal bipolar disorder thus remains unanswered.

Another source of support for an association between creativity and bipolar diathesis comes from research with the first degree relatives of accomplished individuals and clinical bipolar patients (Andreasen, 1987; Andreasen & Canter, 1974; Richards et al., 1988a). Andreasen (1987) found a higher prevalence of affective disorders, particularly the spectrum of bipolar disorders, among creative writers and their first degree relatives than in a control group matched for age, sex, and level of education. Richards et al. (1988a) found that cyclothymes and their normal relatives demonstrated significantly higher overall creativity than either the manic-depressives or normal controls in their sample. The authors (Richards et al., 1988a, p. 281) suggest that there may be a genetic "compensatory advantage to bipolar illness involving creativity". Andreasen (1987, p. 1292) expressed a similar point of view calling bipolar disorder "both a hereditary taint and a hereditary gift".

These conclusions assume that the correlation between bipolar disorder and creativity is the result of a bipolar diathesis leading to creativity. Richards (1994) suggests that mild mood elevations associated with

bipolar diathesis may be responsible for enhanced creativity in cyclothymes and the normal relatives of bipolar probands. She cites research with nonclinical samples that has demonstrated a facilitative effect of positive affect on task performance associated with creativity. For example, positive affect enhances creative problem solving and increases the unusualness of word associations (Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985). However, it is not clear how, or if, positive affect found in normal populations differs from the mild mood elevations presumed to be present in the normal relatives of bipolars.

In order to examine the relationship between subsyndromal expressions of bipolar disorder and creativity, it is necessary to directly measure bipolar diathesis and creativity in a sample unselected for either (Schuldberg, 1990). Family history alone is insufficient to identify individuals exhibiting subclinical manifestations of bipolar disorder. Systematic evaluation using current diagnostic criteria is essential. The General Behavior Inventory (Depue, Krauss, Spont, & Arbisi, 1989; Depue et al., 1981) was designed specifically for research purposes to identify subclinical manifestations of bipolar disorder indicative of a bipolar diathesis. This measure facilitates simple and reliable identification of individuals at risk for developing a bipolar spectrum disorder.

The primary goal of the present study was to determine whether the association between creativity and bipolar disorders found in accomplished creative individuals, in cyclothymes, and in relatives of bipolar probands (Andreasen, 1987; Andreasen & Canter, 1974; Jamison, 1989; Richards et al., 1988a) would generalise to a nonclinical and noneminent sample. Because previous studies have only inferred the presence of a bipolar diathesis in their samples, we were particularly interested in the relationship between strict criterial bipolar diathesis and a general disposition towards creativity.

The Revised General Behavior Inventory (GBI; Depue et al., 1989) was used to measure bipolar diathesis, and the Creative Personality Scale of the Adjective Checklist (ACL-CPS; Gough, 1979) was used as a measure of general creativity. Based on previous research suggesting enhanced creativity in individuals with cyclothymia and subsyndromal affective symptoms (Andreasen, 1987; Jamison, 1989; Richards et al., 1988a; Schuldberg, 1990), it was hypothesized that individuals with cyclothymia or demonstrating a bipolar diathesis, as assessed by the GBI, would have higher creativity scores on the ACL-CPS.

Because previous research suggests that both creativity and bipolarity may be viewed as occurring on a continuum (Akiskal, 1983; Richards et al., 1988a; Schuldberg, 1990), we were also interested in the full scale of affective experience measured by the GBI and its relationship to ACL-CPS scores. Specifically, would GBI scores predict creativity scores?

A second goal of this study was to evaluate the contribution of specific “symptoms” to this association. As descriptions of creative experience bear a striking resemblance to descriptions of hypomanic episodes, we were particularly interested in a subset of GBI items which seemed to describe some aspect of creative activity but were not necessarily pathological. It was expected that stepwise multiple regression analyses would identify a small cluster of GBI items which would account for a large proportion of the variance in ACL-CPS scores.

In addition, we were interested in the relationship between the ACL-CPS scores and individuals’ perceptions of their own creative ability and activity. A self-report creativity questionnaire (CREA-Q) was developed as an exploratory measure of one’s self-image as a creative person and of one’s involvement in creative work.

METHOD

Participants

A total of 72 undergraduate students at Temple University volunteered to participate. Fifty-two students were enrolled in an introductory psychology course and participated in partial fulfillment of a course requirement. An additional 20 students, who met General Behavior Inventory (GBI) screening criteria for cyclothymia or manic-depression (Depue et al., 1989), were drawn from a previous university-wide screening for students at high risk for bipolar syndromes. These 20 students were each paid \$5.00 for their participation during the initial screening procedure.

Measures

The following self-report measures were used in this study: GBI, ACL-CPS, Crea-Q, and a demographic questionnaire. Each measure will be discussed separately.

General Behavior Inventory (GBI). Diathesis for bipolar illness was assessed with the revised GBI (Depue et al., 1989), a 73-item inventory of symptomatic behaviours typically associated with depression and mania or hypomania. The content of individual items covers mood, motivational, cognitive, and somatic changes specific to affective disorders. There are 45 depression items (e.g. “Have you become sad, depressed, or irritable for several days or more without really understanding why?”) and 28 hypomania/mania and biphasic items. The hypomania/mania items describe known behavioural manifestations of mania (e.g. “Have there been times

of several days or more when you felt you *must* have lots of excitement and actually did a lot of new and different things?"). The biphasic items describe cyclicality or fluctuations between depressive and hypomanic behaviours (e.g. "Has your mood or energy shifted rapidly back and forth from happy to sad or high to low?"). Each item is rated on a four point Likert-type scale according to frequency of occurrence (never or hardly ever to very often or almost constantly). Many items require that a specific behaviour occur for a period of several days or more, in order to ensure that the items are only endorsed for enduring mood states and behavioural changes, rather than normal daily fluctuations in mood and behaviour. In addition to the 73 symptom items, three exclusionary items are included to rule out bereavement, chronic physical illness, and endocrine or hormonal imbalance.

The GBI is scored using a two-dimensional system, reflecting the frequency of depressive symptomatology relative to hypomanic-plus-biphasic symptomatology. In this way, the measure not only identifies subjects with a diathesis for bipolar syndromes, but is sensitive to the particular affective profile of the individual. An individual may be classed as unipolar dysthymic, bipolar predominately depressed, bipolar balanced, or bipolar hyperthymic (Depue et al., 1989).

The GBI was specifically designed as a screening tool to assess a full range of affective lability, subsyndromal to full syndromal, in a nonclinical population. In previous studies, the GBI has identified both clinical and nonclinical bipolar subjects with family histories of bipolar disorder (Depue et al., 1981; Klein, Depue, & Slater, 1985, 1986). With respect to diagnostic validity, the GBI was compared to clinician ratings based on structured diagnostic interviews using criteria more stringent than either Research Diagnostic Criteria (RDC) or DSM-III (Depue et al., 1989). The GBI demonstrated high positive (.94) and negative (.99) predictive power, moderate sensitivity (.78), and high specificity (.99) for affective disorders.

Adjective Checklist-Creative-Personality Scale (ACL-CPS). Trait creativity was assessed with the ACL-CPS (Gough, 1979), a 30-item adjective checklist consisting of 18 positive items (e.g. inventive, original), and 12 negative items (e.g. submissive, commonplace). Scoring is by endorsement only, with each positive item receiving +1 point and each negative item receiving -1 point. Total trait creativity scores thus range from +18 (endorsing all of the positive items and no negative items) to -12 (endorsing all of the negative items and no positive items).

The ACL-CPS was developed as a separate scale of the Adjective Checklist through item analyses. The scale correlates ($P < .01$) with ratings of creativity on the Barron-Welsh Art Scales and the adjective scales developed by Domino and by Schaefer (1975; as cited in Gough, 1979).

The ACL-CPS exceeded these measures in its correlations with criterion evaluations for seven diverse samples ($N = 1,701$; Gough, 1979). Median coefficients between the CPS and criterion ratings of creativity by expert judges, faculty members, and life history interviewers range between .28 and .40 and are significant at the .05 level and beyond (Gough, 1979).

Creativity Questionnaire (CREA-Q). Seven open-ended items, addressing career goals, special interests and talents, commitment and involvement in areas of interest, achievement, and self-image as creative, were composed by the first author, in order to obtain specific information about the students' creative activity. The word "creativity" did not appear on the CREA-Q until the last question regarding self-image. Participants were asked to include as much detail as necessary to answer these questions clearly and completely.

Demographic Questionnaire. This was obtained concerning the students' major area of study, grade point average, high school class rank, parents' education and occupation; as well as basic information such as sex, age, ethnic group, and marital status.

Procedure

The subsample of 20 participants who met criteria for a bipolar spectrum disorder were part of a limited university-wide screening procedure. During the screening, students were addressed at either the beginning or end of their scheduled class meeting. All students were told that a study was being conducted to evaluate behaviours and attitudes among college undergraduates, and they were asked to complete a packet comprised of several questionnaires. The students were informed that their participation was completely voluntary, and that if they chose to participate they would be paid \$5.00 upon completion of the packet. The GBI and the demographic questionnaire were included in the initial packet.

Students who met the criterial GBI cut-off scores of 13 or above for hypomania/biphasic items and 11 or above for depression items (Depue et al., 1989) were contacted and invited to return for an interview. The 20 students who returned were given the ACL-CPS and CREA-Q along with several other questionnaires just prior to their interview. Participants were naive to the purpose of the study; at no time were they informed that the researcher was interested in creativity, or the relationship between creativity and mood.

The subsample of 52 introductory psychology students volunteered to participate in this study, based on its descriptive title, "Goals and Behaviors". Before completing the questionnaires, students were told that we

were conducting a study of the relationship between personality, behaviour, and goals. In order to ensure that participants remained naive to the researcher's interest in creativity, students completed the questionnaires in the following order: the demographic questionnaire, the GBI, the ACL-CPS, and, lastly, the CREA-Q.

All participants received instructions directing them to consider frequency and duration when responding to GBI items. For the ACL-CPS, students were directed to check only those adjectives that describe them as they are "most of the time". The researcher explained that we were interested in identifying personality traits or characteristics, and that they should not endorse adjectives that only described them in very specific circumstances or isolated incidents. As an example, students were told not to endorse the adjective "cautious" if they were cautious only once, while driving their mother to the hospital during a snowstorm. For the CREA-Q, students were asked to answer each question thoughtfully and honestly, and were asked to be very specific in their self-descriptions.

Questionnaires were collected and checked for missing and/or ambiguous responses, and such items were corrected before participants left.

Scoring

The GBI was scored using the two-dimensional scoring system developed by Depue et al. (1989). Each participant received two scores: one for the total of depression items, and another for the combined total of the hypomania and biphasic items. To maximise separation between criterial cases and noncases and to eliminate false positives, only those items rated "3" or "4" contributed one point to a participant's total GBI score. That is, only those symptoms which occurred "often" and/or "very often or almost constantly" were included in the scoring. Symptoms which were rated as occurring "sometimes" were not included. This is the case-scoring method recommended by Depue et al. (1981, 1989) for use with nonclinical samples.

The ACL-CPS was scored by adding one point for each indicative item endorsed and subtracting a point for each endorsed contraindicative item.

The open-ended questions of the CREA-Q provided complex data which proved difficult to quantify. For the present study, only question 7, "Are you a creative person? Please explain", was scored. Participants who answered yes with supportive explanations received a score of 1. Participants who responded no, or failed to provide supportive explanations, were given a score of 0. Supportive explanations varied from descriptions of creative endeavours to simple statements about enjoying new ideas and activities. For example, one student responded: "Yes. I have spun tales in black and white, and have breathed life into about thirty literary characters.

I hope to do this for many years to come". Another responded: "I enjoy thinking of something new that no one has thought of".

RESULTS

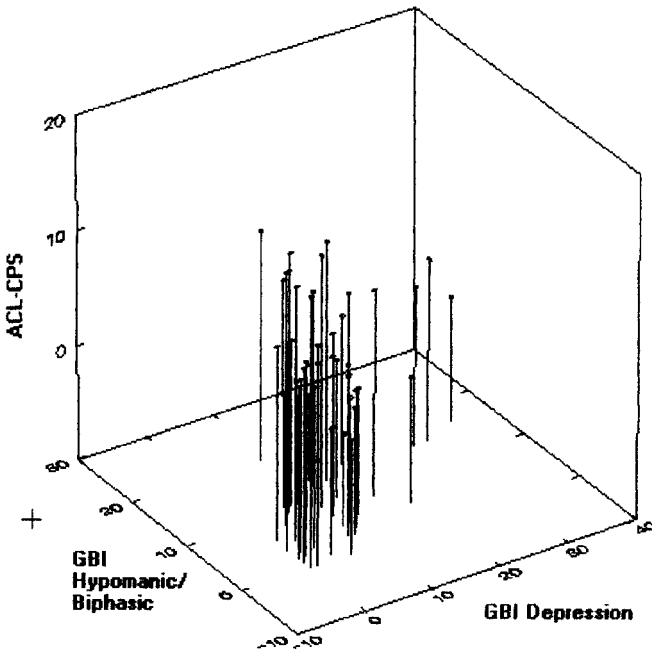
Bipolar Diathesis/Creativity Association

Cyclothymes versus Normals. As a group, the 20 participants who met screening criteria for cyclothymia had the highest level of bipolar symptomatology as measured by the GBI. A subset of the 20 lowest scoring introductory psychology students were identified and served as nonaffective controls. The mean ACL-CPS scores and mean GBI C and D scores of these two groups are presented in Table 1. An independent *t*-test was performed to compare the mean ACL-CPS scores of cyclothymes and normals. The results [$t(38) = .40$, n.s.] indicated that there was no significant difference in creativity scores between these groups.

Continuous Affective Patterns. Multiple regression was performed on the data provided by the subsample of 52 introductory psychology students, with GBI depression scores and hypomania-plus-biphasic scores as the predictor variables, and ACL-CPS scores as the dependent measure. The GBI depression scores were not predictive alone ($R^2 = .02$, $F < 1$, n.s.). However, the GBI hypomania-plus-biphasic scores alone were a small but significant predictor of ACL-CPS scores [$R^2 = .11$, $F(1,50) = 6.28$, $P = .015$]. The full model, achieved by the addition of hypomania-plus-biphasic scores to the depression scores, resulted in a .36 R^2 change. This model accounted for 38% of the variance in ACL-CPS scores [$F(2,49) = 14.92$, $P < .001$]. These results suggest that there is a strong relationship between GBI assessed affectivity and creativity. The relationship between the three variables, GBI depression scores, GBI hypomanic-plus-biphasic scores, and ACL-CPS scores, is represented graphically in Fig. 1. Creativity

TABLE 1
Mean GBI Depression, GBI Hypomanic/Biphasic, and
ACL-CPS Scores, for Cyclothymes and Normals

Measure	Cyclothymes		Normals	
	M	(SD)	M	(SD)
GBI Depression	24.25	(8.69)	1.30	(1.59)
GBI Hypomanic/Biphasic	15.95	(2.95)	1.05	(0.89)
ACL-CPS	3.90	(4.63)	4.40	(3.20)



Squared Multiple R=.38, F(2,49)=14.92, $p < .001$.

FIG. 1. Multiple Regression: Adjective Checklist-Creative-Personality Scale (ACL-CPS) scores on General Behavior Inventory (GBI) depressive symptoms, and GBI hypomanic/biphasic symptoms.

scores, as measured by the ACL-CPS, are highest when hypomania-plus-biphasic scores are high and depression scores are low.

Criterion Affective Patterns. The results of the multiple regression analysis suggested that there might be some optimal combination or pattern of GBI hypomanic-plus-biphasic symptoms and GBI depression symptoms associated with higher creativity scores. In order to explore this possibility, a criterial split on the two GBI dimensions was performed on the data provided by the subsample of 52 introductory psychology students. This allowed us to assign participants' scores to one of four affective patterns: cyclothymic, hyperthymic, dysthymic, and euthymic. The 20 participants who met screening criteria for cyclothymia were not included in this analysis, because these subjects were drawn from a separate large university-wide sample and comprise a homogenous group of high scorers.

Scores for hypomania-plus-biphasic items (C) were split at the non-affective-pathology cut-off of 9, and scores for depression items (D) were cut at 11, the cutting scores recommended by Depue et al. (1989) for identifying nonaffective-control subjects. Eight participants with scores at or above the 9C/11D criterion comprised the cyclothymic pattern group. Of these eight, only six (11.5% of the total sample) met the recommended 13C/11D criterial cut-off for cyclothymia. Seven participants with scores at or above 9C and below 11D comprised the hyperthymic pattern group. Of these, only one (2% of the total sample) had a GBI hypomania-plus-biphasic score above 13. Three participants (6% of the total sample) with scores at or above 11D and below 9C comprised the dysthymic pattern group. Thus, 35% of our sample met screening criteria for high risk status, and 19% met criteria for a probable affective disorder. This is consistent with the Depue et al. (1989) observation that 80% of GBI respondents are nonaffective cases. The remaining 34 participants were euthymic with GBI scores below the 9C/11D cut-off. The mean ACL-CPS scores for each affective pattern group are presented in Table 2.

A 2(C-score) \times 2(D-score) ANOVA was carried out to determine if mean ACL-CPS scores varied as a function of affective pattern. There was a main effect of hypomanic-plus-biphasic symptoms (C-scores), [$F(1,48) = 7.84, P = .007$], and a main effect of depression symptoms (D-scores), [$F(1,48) = 4.62, P = .037$]. There was no interaction ($F < 1, n.s.$). A *post hoc* analysis was performed to determine which groups differed significantly. Tukey's HSD test revealed that ACL-CPS scores for the hyperthymic pattern group were significantly higher than those for the dysthymic patter group ($P = .03$), the cyclothymic pattern group ($P = .05$), and the euthymic group ($P = .002$). The ACL-CPS scores for the latter three groups did not significantly differ from each other. Individuals displaying a hyperthymic pattern measure significantly higher on ACL-CPS creativity scores than those at risk for either cyclothymia or depression. These results are compatible with the results of the multiple regression

TABLE 2
Mean ACL-CPS Scores for
Hyperthymic, Cyclothymic,
Dysthymic, and Euthymic Affective
Patterns

<i>Affective Pattern</i>	<i>M</i>	<i>(SD)</i>	<i>n</i>
Hyperthymic	9.71	(2.75)	7
Cyclothymic	5.25	(3.37)	8
Dysthymic	3.33	(4.04)	3
Euthymic	4.41	(3.24)	34

analysis, but go further by identifying the specific criterial pattern of affect associated with higher ACL-CPS creativity scores.

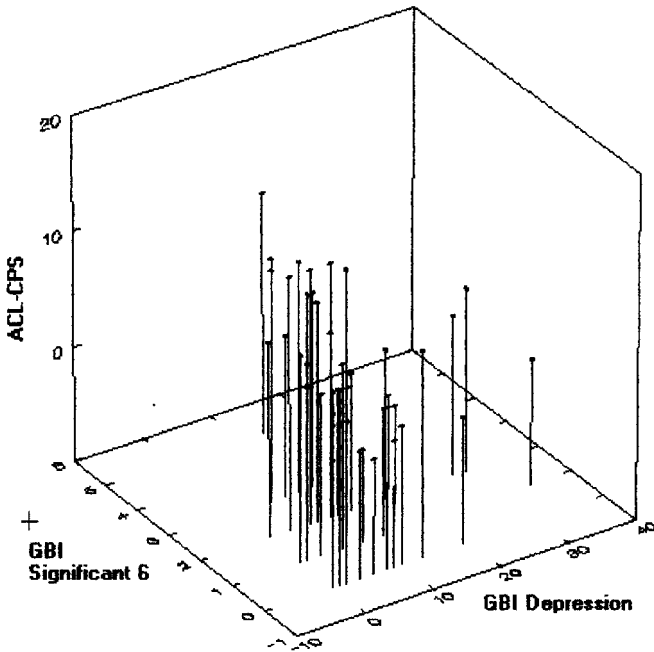
Specific Symptoms

The second goal of this study was to evaluate the contribution of particular GBI behavioural and affective symptoms to the association between creativity and the spectrum of bipolar disorders. A stepwise multiple regression analysis was performed, which identified a predictor set of six GBI hypomania-plus-biphasic items. The significant six items (GBI items 7, 15, 30, 48, 57, and 64) are presented in Table 3. When this predictor set was substituted for the total C-scores in the full model (depression items and hypomania-plus-biphasic items), the model accounted for 50% of the variance in ACL-CPS scores [R^2 change = .48, $F(7,44) = 6.34$, $P < .001$]. When combined with the D scores, these six symptoms were a stronger predictor of ACL-CPS scores than was the entire constellation of 28 hypomania-plus-biphasic symptoms. This new full model accounted for an additional 12% of the variance in ACL-CPS scores (see Fig. 2).

Of the six significant predictor items, five are hypomania items and only one is a biphasic item. This is consistent with the previous finding that a hyperthymic pattern is associated with higher ACL-CPS creativity scores than is a cyclothymic pattern. Prior to data analyses, 10 GBI hypomania-

TABLE 3
The Significant Six: GBI Hypomanic and Biphasic Symptom Subset for the Multiple Regression Model

<i>GBI item number</i>	<i>Item text</i>
7	Have there been periods of several days or more when you were almost constantly active such that others told you they couldn't keep up with you or that you wore them out?
15	Have there been times of several days or more when you did not feel the need for sleep and were able to stay awake and alert for much longer than usual because you were full of energy?
30	Have there been times lasting several days or more when you felt you must have lots of excitement, and you actually did a lot of new or different things?
48	Have you found that your thinking changes greatly—that there are periods of several days or more when you think better than most people, and other periods when your mind doesn't work well at all?
57	Have there been times when you had blank spells in which your activities were interrupted, and you did not know what was going on around you?
64	Have you had times when your thoughts and ideas came so fast that you couldn't get them all out, or they came so quickly others complained that they couldn't keep up with you?



Squared Multiple $R=.50$, $F(7,44)=6.34$, $p<.001$.

FIG. 2. Multiple Regression: Adjective Checklist-Creative-Personality Scale (ACL-CPS) scores on General Behavior Inventory (GBI) depressive symptoms, and GBI "Significant Six" hypomanic/biphasic symptom cluster.

plus-biphasic symptoms were identified, by the authors and a third judge, as items which described some aspect of creative activity, but were not necessarily indicative of affective pathology. Four of the six subsequently identified predictor symptoms (7, 15, 30, and 57) were included in this group. The other two predictor symptoms (48 and 64) were initially considered for inclusion in the group, but were eliminated due to lack of unanimous agreement among the three judges. Each of the six predictor items represents a behaviour or trait associated with creativity. There are two high energy items (7 and 15), an item indicative of sensation seeking and risk taking (30), an item indicative of cognitive changes (48), an item reflecting intense task absorption (57), and an item indicative of ideational fluency and accelerated processing speed (64). These symptoms and their relationship to creativity will be considered in more detail in the Discussion.

Self-concept

A simple regression analysis was carried out to examine whether students' self-image as a creative individual predicted their creativity scores on the ACL-CPS. Self-image accounted for 11% of the variance in ACL-CPS scores [$F(1,50) = 6.38, P = .015$]. To some extent, then, individuals' self-image-as-creative is related to their choice of self-descriptive trait adjectives on the ACL-CPS.

DISCUSSION

Bipolar Diathesis/Creativity Association

The primary goal of the present study was to determine whether the relationship between creativity and bipolarity found in studies of accomplished creatives and clinical populations, would generalise to a nonclinical and noneminent sample. We were particularly interested in applying strict and uniform criteria for selecting individuals with a bipolar diathesis. Individuals meeting the GBI criteria for cyclothymia or cyclothymic pattern did not demonstrate higher creativity scores on the ACL-CPS. Nor were the creativity scores of the larger independent sample of cyclothymes (GBI scores > 13C/11D) significantly different from those of the lowest scoring (least symptomatic) euthymic individuals. This result differs from the Richards et al. (1988a) study, in which clinically identified cyclothymes demonstrated higher levels of every day creativity than normals with no bipolar diathesis.

However, the ACL-CPS creativity scores of individuals meeting GBI criteria for hyperthymic pattern were significantly higher than those of the cyclothymic, dysthymic, or euthymic pattern group. These individuals were characterised by subsyndromal elevated mood, with few or no symptoms of depression. Because only one person in this group had a hypomanic/biphasic score above 13 (the hypomanic cutting score for cyclothymia), it is unclear whether this group represents a true bipolar diathesis, or just very happy, energetic normals. Hyperthymia is not considered a disorder by either DSM-IV or RDC diagnostic criteria (American Psychiatric Association, 1994; Spitzer, et al., 1978), but a seemingly "unipolar" hypomania is considered an indication of bipolarity. Clearly, a much larger sample of individuals meeting criteria for a hyperthymic pattern is required to determine if there are subtle differences between elevated mood in "normals" and elevated mood in those with a family history of bipolar disorder. Whether this pattern represents subsyndromal bipolar symptomatology is equivocal.

The results of the multiple regression analyses suggest that it is the presence of hypomanic or euphoric symptomatology that is related to creativity. The GBI depression dimension alone did not predict creativity, but the hypomanic-plus-biphasic dimension did. However, it was the combination of the two dimensions which accounted for the greatest proportion of the variance in ACL-CPS scores, suggesting that depressive symptomatology has a suppressive effect on creativity. This is consistent with recent work by Schuldberg (1990), who found that hypomanic personality traits and impulsivity in university students were positively correlated with creativity scores on the Alternate Uses Test (Guilford, Christensen, Merrifield, & Wilson, 1978), the How Do you Think Test (Davis, 1975; Davis & Subkoviak, 1975), and ACL-CPS (Gough, 1979). It is also consistent with evidence that positive affect enhances creative problem solving and increases the unusualness of word associations (Isen et al., 1987, 1985).

Other studies addressing the role of affect in creativity have found that positive affect, and not depression, is associated with creative process. In a comprehensive investigation of the emotions that occur during creative writing, Brand (1989) found that writers did not report great mood swings or feelings of distress, depression, or rage while writing. Similarly, in a pilot study with a small sample of graduate creative writing students, Shapiro and Weisberg (1991) found a significant positive correlation between positive affect and creative ideation, but no association between negative affective states and any part of the creative writing process. Also, Weisberg (1994) performed a retrospective analysis of the relationship between mood and creative production in the career of Robert Schumann and found no relation between depression and subsequent creative production.

If we accept that both affect and creativity occur on a continuum (Akiskal, 1988; Richards et al., 1988a; Schuldberg, 1990), then it is tempting to speculate that the elevated affect of clinical hypomania enhances creativity. When asked to describe their subjective experience of mood disorder, bipolar patients reported that hypomanic episodes facilitated creativity and increased productivity (Jamison, Gerner, Hammen, & Padesky, 1980). However, without direct, controlled comparisons, it is impossible to know whether the effects of clinical hypomania on creativity are analogous to those of laboratory-induced and naturally occurring positive affect in normals, or if they are qualitatively different.

Bipolar patients also reported that their depressions contributed to an overall heightened psychological sensitivity which they felt influenced their creativity (Jamison, et al., 1980). Richards (1981, p. 311) also proposed a facilitative role for depression in the creative process, suggesting that the stress, physical symptoms, and psychological disturbance of depression may lead to a tendency toward introspection, resulting in a "heightened sensitivity to diverse inner content". This introspective

material presumably contributes to the content of creative work, emerging later, during the periods of increased clarity and improved functioning associated with hypomania, as a product of creative process.

There are certainly many possible explanations for the occurrence of depressed affect in creative individuals. For example, Shapiro and Weisberg (1991) found that the positive affective states associated with creative ideation and actualisation in their study disappeared when the writers were prevented from writing by external demands such as school, family, and employment. They suggested that creative individuals may become more susceptible to dysphoric mood when unable to pursue creative endeavours. Clearly, there is a need for further studies to assess the role of specific mood states in the creative process.

Specific Symptoms

A second goal of the present study was to identify a subset of GBI symptoms which would account for a large proportion of the variance in creativity scores. We predicted that the items responsible for this effect would overlap with descriptions of creative experience and traits associated with creative individuals, but would not necessarily be indicative of psychopathology. The results of the stepwise multiple regression analysis isolated six GBI hypomanic-biphasic items which, when combined with the depression items, were the strongest predictors of creativity scores. As expected, these symptoms all represent behavioural, cognitive, and motivational aspects of creative activity, but are not sufficient on their own to warrant a diagnosis of bipolar illness. These symptoms provide a starting point for investigating the noted overlap between descriptions of hypomanic and creative episodes (Jamison, 1989; Schulberg, 1990).

Five of the six GBI symptoms associated with increased creativity scores were hypomanic rather than biphasic. Of these, two directly reflect periods of increased energy (GBI items 7 and 15), one reflects increased ideational fluency (GBI item 64), one reflects sensation-seeking and impulsivity (GBI item 30), and one is indicative of extreme task absorption (GBI item 57). These are remarkably similar to the symptoms reported most often by Jamison's (1989) artists and creative writers as occurring during intense creative episodes. A notable distinction, however, is that very few of the students in the present study would qualify for a diagnosis of mood disorder.

All of these "symptoms" can easily be recast as "traits" associated with creativity. For example, ideational fluency, the ability to produce multiple ideas in limited time, was considered the most useful of the four fluencies which Guilford (1959) named as primary traits of creativity. Interestingly, Guilford noted that individuals who scored high on measures of ideational

fluency also tended to be more impulsive. Impulsivity is another of the “significant six” GBI symptoms identified in our analysis. Shuldberg (1990) also found that impulsivity in university students was positively correlated with creativity scores on several measures.

Cropley (1990) described the healthy creative personality as open to new and unusual experiences and willing to take risks, both of which are traits compatible with the sensation-seeking of GBI symptom 30. Task-absorption or intense concentration has also been described as an integral component of creative work. Csikszentmihalyi (1990) describes creative work as autotelic experience, in which concentration is so focused and intense, and task involvement so complete, that one is unaware of passing time and surrounding activities. Framed in this way, the seemingly very dysfunctional GBI symptom 57, “Have there been times when you had blank spells in which your activities were interrupted, and you did not know what was going on around you”, could be seen as an outcome of intense creative involvement.

The problem of distinguishing pathological behaviours from behaviours normally associated with creative activity may be an artefact of single session, self-report, pencil and paper psychological research. This is clearly a limitation of the present study. Adding structured diagnostic interviews (e.g. SADS; Endicott & Spitzer, 1978) to the research protocol to assess current states as well as personal and familial history of mood disorders and other psychopathology would help to eliminate this ambiguity.

The ACL-CPS is a very general self-report measure of traits associated with creativity and does not directly assess creative activity or accomplishment. Although this measure is promising as a preliminary screening measure when used with the GBI, its use as the sole creativity measure is another limitation of the present study.

In addition, use of repeated measures and longitudinal designs would provide an opportunity to observe the interactions of cognitive, affective, and motivational changes, and their relation to creative activity. The salient feature of bipolar spectrum disorders is the shift from one affective state to another. Evaluating symptoms and administering a variety of performance based creativity measures to individuals during depressed, hypomanic, and euthymic states could aid our understanding of the complex relationship between affect and creativity.

Of course, changing moods are not unique to affective disorders, we are all subject to fluctuations in affect, concentration, and energy. Nonclinical samples as well could be observed and tested during positive, neutral, and negative affective states, with comparisons made between them and the mood-disordered individuals.

Self-concept

In the present study, creativity scores were assessed using the ACL-CPS (Gough, 1979), a self-report, adjective checklist, personality scale. Such instruments only measure the individual's belief that he/she possesses a particular trait, and not the presence of the trait (Weisberg, 1993). To a great extent, then, self-report personality measures reflect self-image and not personality. Therefore, it is not at all surprising that, in this study, the students' self-image as creative accounted for a significant proportion of the variance in ACL-CPS creativity scores.

However, the relationship between self-image, creativity, and hypomania symptoms, may be more complex. Ekblad and Chapman (1986) found that hypomanic personality traits were associated with a confident, individualistic, and creative self-image. The adjectives "confident", "self-confident", and "individualistic" actually appear on the ACL-CPS and are scored as positive creativity items. As increases in confidence and inflated self-esteem are common symptoms of hypomania, it is possible that scores on the ACL-CPS may reflect, to some extent, the individual's affective state. The use of a comprehensive, objective, behaviour-based creativity scale, such as The Lifetime Creativity Scales (Richards, Kinney, Lunde, Benet, & Merzel, 1988b), would allow creativity to be measured as an independent construct, separate from affect and self-image.

In conclusion, the present study and results have several important implications. A method for applying consistent, quantifiable criteria to identify individuals with a bipolar diathesis in investigations of the relationship between creativity and bipolar disorder, was used for the first time with promising results. These results suggest that if a bipolar/creativity relationship exists, it is related to a hyperthymic affective pattern. Most importantly, these results identify a specific set of bipolar symptoms that contribute to this relationship, and which may not be pathological at all, but rather normal affective components of the creative process. The present design thus opens the way for a large-scale systematic assessment of the role of affect in creativity and creative process.

Manuscript received 10 August 1998

Revised manuscript received 1 March 1999

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