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MOOD INDUCTION, INTERPERSONAL PERCEPTIONS, AND REJECTION IN THE ROOMMATES OF DEPRESSED, NONDEPRESSED-DISTURBED, AND NORMAL COLLEGE STUDENTS

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The present study used the MMPI to select, based on multidimensional criteria, 51 college students displaying depression alone, depression in conjunction with other psychological disturbance, nondepressive psychological disturbance, or no psychological disturbance. All students selected had been living with randomly assigned roommates for at least 10 weeks. Depressive symptoms, perceptions, and rejection were assessed in the roommates of these students 2–7 days after the initial screening. Roommates of students depressed in conjunction with other psychological disturbance were significantly more depressed themselves on two different measures than were roommates of students in the other three groups. Rejection was suggested by a disproportionately high incidence of roommate breakups involving students with this profile type. Roommates who remained with these students also differed from roommates in the other three conditions in their inability to simulate accurately students' earlier responses to the MMPI depression scale. The severity and/or nature of overall psychological dysfunction, rather than depression per se, may be central to the experiences of significant others.

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Coyne's (1976a, 1976b) interpersonal model of depression has received a great deal of empirical attention. In his seminal study, female introductory psychology students conversed by telephone with depressed or nondepressed mental health center clients, or normal adults. Subjects who conversed with depressed individuals later reported more depression, anxiety, and hostility in themselves (mood induction), and less willingness to engage in future interactions with their partners (rejection), than did subjects who had conversed with normal or nondepressed individuals.

King and Heller (1984) reevaluated Coyne's model and reported results that failed to support Coyne's demonstration of mood induction and rejection. Their review of previous research indicated that the only study to use clinically depressed subjects (Boswell & Murray, 1981) had equivocal results, and that other studies were too divergent methodologically to be conclusive tests of Coyne's model. King and Heller (1984) concluded that the mood induction and rejection effects (Coyne, 1976a) were not robust.

Gurtman (1986) reviewed 10 published studies examining Coyne's model of depression in the laboratory and concluded that while results supporting the mood induction hypothesis were mixed, the rejection factor was robust, since it consistently occurred across variations in the depressive target person (e.g., inpatient, outpatient, student) and method of exposure (e.g., taped interview, transcript, direct conversation). Gurtman disagreed with King and Heller (1984) that the only valid attempt at replicating Coyne's (1976a) findings was by Boswell and Murray (1981), who used clinical depressives, since the many levels of affective disturbance examined in the literature (e.g., clinical symptomatology, subclinical symptomatology, behavioral-affective characteristics) are all intrinsically worthy of study.

King and Heller's (1986) response was that five of the studies Gurtman cited as supporting Coyne's view lacked controls for psychopathology (e.g., Gotlib & Robinson, 1982; Hammen & Peters, 1978; Robins, Strack, & Coyne, 1979; Strack & Coyne, 1983; Winer, Bonner, Blaney, & Murray, 1981). Various forms and levels of psychopathology may elicit negative responses from others, and if control groups for psychopathology other than depression are incorporated into tests of Coyne's model, the hypothesis of a unique social response to depression may be unfounded.

Perhaps a more important issue regarding control for psychopathology concerns the composition of subjects in groups labeled depressed. Coyne (1976a) identified depressed target individuals exclusively on the basis the Zung Depression Scale, which "does not provide for the differential diagnosis of depression as a disorder but rather serves to measure the intensity of depression regardless of the diagnosis" (Coyne, 1976a, p. 187). It is of some interest that Gotlib (1984) found that the Zung Depression

Scale was highly correlated with the Neuroticism scale of the Eysenck Personality Inventory (EPI-N) in a college student sample. Also, given that mood disturbances are key features of both the borderline and schizotypal personality disorders (DSM III-R, APA, 1987), and are accompaniments of other types of disturbance, selection of depressed individuals with a unidimensional measure of depression may lead to groups of individuals displaying a diverse range of psychopathology, albeit all suffering depressed mood. In none of the existing studies, however, is there a control for the degree of other psychopathology present *in conjunction with depression*. For example, investigators who selected their depressed group on the basis of clinical diagnosis, and not simply on a unidimensional measure of depressive symptoms, failed to confirm Coyne's hypothesis (Boswell & Murray, 1981; King & Heller, 1984). In the Boswell and Murray study, moreover, subjects who interacted with schizophrenics *did* show the negative mood induction. This finding casts doubt on the hypothesis that negative mood induction is specific to the interactions of depressed individuals.

Doerfler and Chaplin (1985) criticized studies designed to test Coyne's model on the grounds that the model specifies mood induction and rejection in relations with significant others, and all the studies prior to their review used experimentally contrived relationships of strangers. Coyne (1985) defended analogue studies as conservative tests of the interactive hypothesis since experimentally contrived relationships do not reflect the cumulative influences of previous negative interactions. Of central importance in interactive models, however, is not just the emergence of a new response in a given individual but also the maintenance of this response within the dyad or group. Coyne (1976a) reported little, if any, reciprocal impact of subjects' responses on the depressed patients in his study, perhaps implying that the maintenance of depressive responses may not be fully understood by examining transient, experimentally contrived relationships.

While studies using contrived relationships of strangers have the advantage of showing a linear causal direction of mood induction, such a demonstration is less consistent with Coyne's theory and interactive models more generally than using real-life relationships. Experimentally contrived relationships do not reflect the cumulative influence of past interactions, whereas social learning principles specify that causality is reciprocally determined (Bandura, 1978). That is, both members of a dyad contribute to ongoing psychological problems in the relationship in a highly interactive manner, with each person maintaining to some extent the maladaptive responses of the other. From this perspective, it has been suggested that a circular model of causality is more appropriate than a linear one (Strack & Coyne, 1983). Consequently, research on

interactive hypotheses ideally involves intact (rather than contrived) relationships, and often focuses on the concomitance of specified responses in members of a dyad or group rather than on isolating simple linear relationships. In this approach, the "causes" under investigation are most appropriately thought of as those that *maintain* the maladaptive response rather than instigate it in the first place.

The present study examined the prevalence of specific signs of disorder, interpersonal perceptions, and rejection responses in well-developed relationships formed largely by chance. Following Coyne, we hypothesized that depressive mood and rejection would disproportionately characterize established relationships where at least one member of the dyad is depressed, in comparison to relationships in which one member is currently experiencing another form of psychopathology or no disturbance. To evaluate the specificity of this effect, individuals experiencing depression alone were distinguished from those individuals experiencing depression in conjunction with other psychological disturbance.

The primary screening device used was the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway & McKinley, 1967). While many self-report measures assess depression in terms of highly transparent (i.e., face-valid), unidimensional items, the MMPI represents a more empirical measure of depression (e.g., at the syndrome level: see Boyle, 1985). More importantly, the multidimensional nature of the MMPI allowed the formation of a nondepressed psychopathological control group and facilitated a more detailed analysis of the subjects *within* the group labeled depressed. Finally, selecting subjects on the basis of their responses to a general measure of psychopathology reduced any likelihood that they and their roommates would ascertain the specific focus of this study on depression.

METHOD

SUBJECTS

Subjects were 21 male and 30 female undergraduate (mean age 19.6) roommates of introductory psychology students living on-campus at a large midwestern university.

MATERIALS

The following measures were used in this study: (1) the full length Minnesota Multiphasic Personality Inventory (MMPI) or the MMPI-168

(short form)[1]; (2) the Today Form of the Multiple Affect Adjective Checklist (MAACL) (Zuckerman & Lubin, 1965), which has three scales measuring Anxiety, Depression, and Hostility; (3) the Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971), containing scales for Tension, Depression, Anger, Vigor, Fatigue, and Confusion; (4) the 41 items from the MMPI-168 Depression scale (in isolation); and (5) a short questionnaire (developed for this study) dealing primarily with roommate behavior patterns (e.g., how many nights per week the subject spends in the room, how often he or she eats dinner with the roommate).

PROCEDURE

Students in introductory psychology classes participated in a multipurpose screening procedure entitled "Social/personality/health psychology" to obtain course credit. Of 1,280 students screened, 665 indicated on a cover page that they had been living on campus for at least 10 weeks (not counting quarter breaks and a 2-week Christmas break) with roommates they did not know beforehand.[2] To give students a chance to reestablish their significant-other relationships with roommates, assessments were not conducted until 3 weeks after Christmas break (2 weeks duration), and 2 weeks after spring break (1 week duration). For screenings conducted in the spring of 1986 the MMPI-168 was used, while the full MMPI was used to classify subjects screened from December 1986 through April 1987. The MMPI-168 can be completed in approximately 30 to 45 minutes, while the full length MMPI takes about 1½ to 2 hours to finish.

Only psychology students with valid MMPI profiles were considered.[3] Those selected met the criteria for one of three groups: (1) depressed, (2) "spike-9" (employed as a "disturbed but not depressed" control group), or (3) normal. Those students classified as depressed had *T*-scores on

1. Scores from corresponding scales of the MMPI-168 and the full MMPI correlate substantially (Graham, 1977). For Depression and Hypomania, the two scales of primary interest here, correlations of .94 and .79, respectively, have been reported (Overall & Gomez-Mont, 1974).

2. For students who do not request a specific roommate, the practice of the housing staff is to assign one to them in an essentially random manner, that is, based primarily on the size of their respective hometowns and whether or not they smoke.

3. All subjects included produced MMPI profiles with an F scale score $< 90T$, except one subject who produced an F scale score of $94T$. In the context of some profiles (particularly those produced by the depressed-disturbed group) an F scale score from $70\text{-}100T$ is not unusual, nor does it indicate an invalid profile given the large overlap in items on F, Sc, and the Ma scales.

the MMPI Depression scale greater than 70 (i.e., at least two standard deviations above the standardized mean). Two distinct groups of subjects within the depressed condition, one hypothesized to composed of subjects with "pure" depressive symptomatology and one hypothesized to be composed of subjects with depressive symptomatology mixed with other psychological symptoms, were identified independently by two licensed clinical psychologists prior to examination of the roommate data. "Primary depression" was said to be present when the depression scale was the highest clinical elevation and all other clinical scales $\leq 65T$ (although in two of these cases Hypochondriasis or Hysteria was equal to $70T$). When the Depression scale was over 70 *and* the Psychopathic deviate, Psychasthenia, and/or Schizophrenia scales were more than 75 and all other clinical scales $< 65T$, the condition was labeled "depression in conjunction with other psychological disturbance."

Spike-9 students had T-scores on Scale 9 (Hypomania) above 70, and all other MMPI clinical scales between 40 and 60. For normal subjects the T-scores on all MMPI scales were between 40 and 60, or within one standard deviation of standardized mean.[4] Eighty psychology students were identified in all, and subjects were selected to fill each cell of the design evenly across time to control for seasonal or situational effects of disturbance that might predominate at different times of the school year.

The university housing office provided the names and telephone numbers of the roommates for 70 of these 80 students. Roommates of the remaining students had recently moved out at their own initiative before the end of the contract term, and no one had replaced them, leaving these 10 students with no roommates. The 70 available roommates were contacted by telephone and asked if they were interested in "participating in a survey of the mood and perceptions of different groups of students living on-campus" in exchange for a $5 remuneration. Two of these 70 roommates were never reached by telephone, even with repeated calls. Twelve others declined to participate in the study, while five failed to keep two or more scheduled appointments (the incidence of refusals and no-shows did not differ by condition, χ^2 (2) = 2.23, $p >$ .30). Of the 51 subjects, 19 were roommates of depressed students (five were in the "primary depression" condition and 14 were "depressed in conjunction with other pathology"), 14 were roommates of spike-9 students, and 18 were roommates of normal students.

4. Stringent criteria were used because recent evidence (Graham & McCord, 1985) suggests that college students who produce moderate elevations (i.e., $\leq$ 75T) on the MMPI frequently display characteristics associated with psychological disturbance. Our criteria are thus designed to reduce the false negative rate among normal controls.

Each subject was seen individually 2–7 days following his or her roommate's screening session. An experimenter blind to the subject's condition first administered the MMPI-168, MAACL, and POMS, after which subjects were asked to respond to the MMPI-168 Depression scale items "the way you think your roommate would" with the assurance that all information they gave would be kept confidential. Subjects were also asked to respond to the short questionnaire concerning roommate interaction patterns. The final two items asked the subject to place both him/herself and his/her roommate into one of four groups: "depressed," "a little sad," "not depressed, but has serious problems," or "normal." Subjects were paid $5 at the conclusion of this session, which lasted between 30 and 60 minutes.

Subjects were invited to ask questions at any time, but responses given to questions about the specific nature of the study (i.e., depression) were vague. Subjects were asked not to divulge the specific content of the measures they completed, and were invited to contact us at the end of the term for more specific information about the nature and purpose of the research.

RESULTS

No significant differences were found between subjects in 1986 and in 1987 on age, sex, and lag time between assessments, and so the two samples were pooled.

Following Coyne's (1976a) design, roommates' moods, perceptions, and rejection responses were analyzed across three conditions (depressed, nondepressed but disturbed, and normal). Validity checks were performed and expected differences in MMPI scale scores were confirmed; the "depressed" group was significantly higher in depression than were the two control groups, $F(1, 48) = 191.9$, $p < .001$ (for the planned comparison), while spike-9 students scored significantly higher on Scale 9 than did depressed or normal students, $F(1, 48) = 64.1$, $p < .001$. No differences were found among the roommates of both depressed groups, spike-9, and normal psychology students on the variables age, sex, or lag time between psychology student and roommate assessments.

To control for psychopathology present in conjunction with depression, a second set of analyses was conducted with the depressed group subdivided into "primary depression" and "depression in conjunction with other psychopathology." Analysis of differences between depressed-primary and depressed other using t tests showed that depressed-other students were significantly higher than depressed-primary students on all MMPI scales where the average score for one or both groups exceeded

70T (i.e., F. D. Pd, Pt, and Sc; all p values $< .05$), partly an artifact of selection. There were also no differences among the four groups in age, sex, and the average lag time between assessments.

COYNE'S (1976A) THREE-GROUP DESIGN

Mood differences. Results of a one-way analysis of variance comparing roommate t scores on the depression scale of the MMPI-168 by groups were not significant, F (2, 48) = 2.36, p = .10. However, a planned comparison contrasting depressed with nondepressed roommate subjects (either disturbed or normal; cf. Coyne, 1976a, p. 188) was significant (F (1,48) = 4.32, $p < .05$). No differences were found among roommate scores on any scales from the MAACL or POMS (including planned comparisons). Subjects' ratings of themselves as depressed, not depressed but having serious problems, or normal were not significantly related to the students' actual conditions, χ^2 (4) = 1.96, p = .74.

Perceptions. Since item content on the MMPI-168 depression scale is heterogeneous, an attempt to measure accuracy of roommate perceptions was made by considering the extent to which roommates' item-by-item responses to this scale agreed with those of the students. Analysis of variance of the frequency of item-by-item "hits" between roommate pairs showed that roommates of depressed students were significantly less accurate than roommates of other groups, F (2, 48) = 9.1, $p < .001$. Item-by-item agreement using *kappa* coefficients (Cohen, 1960), which control for agreement expected due to chance, averaged .18 for the depressed group, .32 for spike-9 controls, and .31 for normals.

Rejection. Unidimensional scaling of subjects' responses to six items concerning roommate behavior patterns was initially attempted using all items, and was then reduced item by item on both rational and empirical grounds until the internal consistency of the items that remained was maximized. For three of these items (whether or not the students planned to live together as roommates next year, and two Likert-type ratings of "goodness of roommate as a roommate" and "goodness of roommate as a friend") Cronbach's standardized alpha was .81. Analysis of variance comparing scores on this three-item scale across groups was not significant, F (2,41) = 1.11, p = .34. Responses to the three items excluded from the scale were examined separately, and were also not significantly different across groups.

Rejection at the behavioral level might be inferred from the act of severing one's relationship with a roommate by moving out before the end of the contract term. Roommates for 10 of the 80 students initially selected had moved out prematurely. All 10 of these subjects were in the depressed (roommate) group, χ^2 (2) = 20.01, $p < .001$.

ANALYSIS WITH FOUR CONDITIONS

Mood differences. Analysis of variance showed that MMPI-168 Depression scores for the roommates of students showing depression in conjunction with other pathology were significantly higher than for subjects in the other three groups, $F(3, 47) = 4.74$, $p = .006$ (for Scheffe: $t(18.6) = -3.70$, $p = .002$). In addition, scores on the MAACL Depression scale were marginally higher for roommates of those depressed in conjunction with other pathology than for other subjects, $F(3, 47) = 2.70$, $p = .06$ (for Scheffe: $t(25.1) = -2.97$, $p = .006$). When roommates were asked to classify themselves as "depressed," "not depressed but having serious problems," or "normal," no significant differences were found across the four groups, $\chi^2(6) = 6.44$, $p = .49$.

Perceptions. Accuracy on an item-by-item basis again differed significantly across groups, $F(3, 47) = 7.52$, $p < .001$, with roommates of depressed-other students performing significantly less accurately than those in the other three groups ($p < .01$ for the Scheffe test). *Kappa* coefficients for item-by-item agreement averaged .30 for the depressed-primary group and .14 for the depressed-other group, both significantly different from zero.

Rejection. Responses to the three-item scale of roommate behavior patterns were not significantly different across four groups, $F(3, 40) = 1.06$, $p = .38$. Responses to the three individual items were also not significantly different. Of the 10 students whose roommates had moved out prematurely, one was in the depressed-primary group and nine were depressed in conjunction with other pathology (as noted earlier, none were in the control groups; $\chi^2(3) = 22.8$, $p < .001$). Results from the four-group analysis are summarized in Table 1.

DISCUSSION

Mood induction and rejection were demonstrated somewhat equivocally in the three condition design (Coyne, 1976a, 1976b). More clearly, the results obtained when depressed target individuals were classified into two groups suggest that the severity and/or nature of psychopathology constitutes an important component of the interactive process originally proposed by Coyne. The elevation of MMPI-168 and MAACL Depression scores in roommates of students displaying depression in conjunction with other pathology suggests a relationship of negative mood in these roommate pairs and has at least two possible explanations. The most parsimonious interpretation (cf. King & Heller, 1986) is that mood and rejection effects in a significant other reflect the amount of overall psychopathology an individual displays, not the presence of depression per

TABLE 1
Mean Values on Selected Variables for Four Conditions

		PSYCHOLOGY STUDENT (SUBJECT) MMPI *T*-SCORES							ROOMMATE (SUBJECT) *T*-SCORES		SIMULATION
	n	F	D	Pd	Pa	Pt	Sc	Ma	MMPI-D	MAACL-D	*kappa*
Condition											
Depressed-Other	14	73.6	79.6	80.4	70.7	80.3	88.7	68.0	62.7	51.9	.14
SD		10.8	8.4	8.4	13.3	11.0	11.5	8.7	10.2	8.5	
Depressed-Primary	5	60.0	72.4	63.4	57.0	61.8	55.8	58.2	48.8	38.0	.30
SD		6.7	1.9	12.8	9.3	10.5	10.2	8.3	4.0	6.8	
Spike-9	14	58.1	46.2	53.6	53.7	51.6	58.4	76.4	52.1	45.8	.32
SD		7.3	8.2	7.0	5.9	5.7	4.2	4.9	10.0	10.9	
Normal	18	54.0	48.7	51.9	52.5	49.6	48.8	54.3	53.9	47.1	.31
SD		4.7	5.6	7.5	7.8	6.6	8.7	4.5	8.1	10.1	

se. Since previous studies selected target individuals based only on the single dimension of depression, results from those studies may have been affected by the extent to which depressed samples included subjects experiencing depressive symptomatology secondary to other psychopathology. When controls for the presence of other psychopathology other than depression are not incorporated in the depressed condition, it cannot be assumed that all individuals in a "depressed" group are experiencing depression in the absence of other clinical symptoms.

In addition to the quantitative aspect, the specific nature of psychopathology displayed by an individual may affect a significant other's mood and perceptions. Perhaps it is the particular configuration of depression and other symptoms that induces negative responses from others. Psychology student-subjects in the depressed-other group, although selected on the basis of their MMPI Scale 2 scores, produced various combinations of elevations on Scales, 2, 4, 7, and 8. The 2-4-8 profile is frequently produced by individuals with a borderline personality disorder (Archer, Ball, & Hunter, 1985; Edell, 1987), and the 2-7-8 profile has been associated with schizotypal features (Fujioka & Chapman, 1984). Depressive symptoms experienced by our depressed-other subjects thus appear to be only one part of a constellation of symptoms. The response to significant others may therefore depend on such a qualitative distinction and not be completely dependent on the quantitative amount of psychopathology.

The rarity of an elevated MMPI Depression-scale score in the absence of other MMPI scale elevations among college students suggests that "pure" depression is relatively rare among college students (see Kelley & King, 1979; also, in the present study, the small *n* in the depressed-primary condition attests to this hypothesis). More generally, mood disturbance is a key feature of some DSM-III-R Axis II symptomatology (American Psychiatric Association, 1987). In the case of college students, the relation of anxiety and general distress is well established in the literature (Gotlib, 1984; see also Coyne & Gotlib, 1983; Ganellen, 1988; Nezu, Nezu, & Nezu, 1986; Tanaka-Matsumi & Kameoka, 1986). In studies that rely upon "depressed" college students identified by unidimensional measures of depression, any appreciable sample size is likely to include subjects displaying depression in conjunction with some other psychological disturbance.

On the other hand, King and Heller (1984) not only used the Zung Depression Scale, but also interviewed target subjects to ensure that they met the Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1975) for depression. If psychopathology other than depression is eliminated from the screened subjects through rigorous efforts to select "pure" depression, and the mood induction and rejection effects are

contingent on psychopathology other than (or in addition to) depression, it is not surprising that no effect was found by King & Heller (1984). Perhaps Coyne's theory has received equivocal support because in some studies depressed subjects with other psychological disturbance predominated, while in other studies more "purely" depressed subjects predominated.

Regarding subject's perceptions, King and Heller (1984) reported an awareness of sadness in depressed others. In the present study, the mood induction effect occurred only in subjects who could not accurately simulate the response pattern of their depressed roommates on the MMPI-168 Depression scale.[5] Jones (1986) suggested that the normal process by which mutual perceptions between significant others become more accurate over time breaks down when one or both individuals lack the behavioral resources necessary to correct the other's inaccurate perceptions in a socially adept way. Quantitative and qualitative differences between depressed-other and other students in our study fit with the notion that interpersonal coping resources were lacking in the depressed-other students, thus hampering formation of accurate perceptions of them by their roommates.

This interpretation is consistent with Beckfield's (1985) finding that undergraduates classified as schizotypal are socially less competent than normal undergraduates. Interacting in contrived relationships, subjects in various schizotypal subgroups were less able than controls to recognize competent responses and were more likely to endorse hostile response alternatives. Beckfield's (1985) results echo findings of earlier studies suggesting that social deficits that might elicit negative mood in a significant other are not specific to depression (e.g., Boswell & Murray, 1981; Haberman, Chapman, Numbers & McFall, 1979; Numbers & Chapman, 1982).

Our findings cast doubt on the hypothesis that mood induction and rejection responses are specific to significant others of depressed individuals. Features of psychopathology that often accompany depression, rather than depression per se, may lead to the aversive interactions and negative moods described by interpersonal theories of depression.

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