The study was conducted to assess the effectiveness of a refined sucrose and caffeine free diet in the treatment of depression. Twenty subjects meeting DSM-III-R criteria for a current episode of major depression completed the Beck Depression Inventory (BDI), MMPI-D scale, SCL-90, Interpersonal Style Inventory (ISI), and a 3-day food record prior to, and following, consumption of a caffeine and refined sucrose free diet (experimental group) or a red meat and artificial sweetener free diet (control group). Subjects whose depression ameliorated after eliminating refined sucrose and caffeine completed a 3-month follow-up. The experimental group demonstrated a significantly greater decline in depression on all depression measures and on several measures of general psychopathology at posttest. This amelioration of depression was maintained at a 3-month follow-up.

Although pharmacotherapy and one of several forms of psychotherapy are the typical treatment modalities for depression (Elkin, Morris, Parloff, Hadley, & Autry, 1985), data are accumulating indicating that a relationship also exists between the consumption of various foods and depression. Most studies investigating diet have focused on single amino acids such as tryptophan (e.g., van Praag, 1981) based on knowledge of the metabolic pathways involved in the synthesis of neurotransmitters and the fact that depression has been associated with a functional deficiency in monoamines (Baldessarini, 1984). These studies have produced inconsistent results (Baldessarini, 1984; Spring, Chiodo, & Bowen, 1987). A smaller group of studies suggests that carbohydrates and caffeine may be related to various moods including depression.

Caffeine has typically been considered to be a central nervous system stimulant with the behavioral effect of reducing drowsiness and increasing mental acuity (Rall, 1980). Research also suggests that caffeine affects a variety of moods including depression (Greden, Fontaine, Lubetsky, & Chamberlain, 1978; Neil, Himmelhoch, Mallinger, & Hanin, 1978; Gilliland & Andress, 1981; Veleber & Templer, 1984). However, these studies have not investigated the
effect of eliminating caffeine on the depression experienced by a clinically depressed population.

Carbohydrates may also play a crucial role in mood in selected clinical populations. Individuals suffering from obesity (Hopkinson & Bland, 1982; Wurtman et al., 1985) postpartum depression (Dalton, 1980), and seasonal affective disorder (Rosenthal et al., 1984) selectively crave carbohydrates. In some instances the carbohydrate consumption seems to have a depression reducing effect as noted by Rosenthal et al. (1986) among patients with a seasonal affective disorder. In other instances, the carbohydrate consumption seems to produce a mood disturbance. Christensen, Krietsch, White, & Stagner (1985) found that a mood disturbance remediated following withdrawal of refined sucrose (granulated sugar) and caffeine and returned following reintroduction of these substances. Krietsch, Christensen, & White (1988) have revealed that individuals sensitive to refined sucrose or caffeine not only present with a variety of symptoms indicative of and including depression but also appear depressed based on the MMPI-D scale and the Beck Depression Inventory. The purpose of the present study was to investigate the effectiveness of a dietary change, consisting of elimination of refined sucrose and caffeine, as a treatment of depression.

METHOD
Subjects

Subjects were recruited from a newspaper advertisement requesting subjects for a study investigating “the cause and treatment of individuals who are depressed, often feel tired even though they sleep a lot, suffer from headaches, are very moody, and generally seem to feel bad and unhappy most of the time” and from referrals from the University Psychology Clinic. Subjects inquiring about the study were given a brief description informing them that: 1) the study was investigating the cause and treatment of depression, 2) the focus was on a new treatment intervention that had been identified as being effective in prior research, 3) specific inclusion and exclusion criteria must be met to be admitted into the study, 4) the study would take approximately two months if they responded to the treatment and one month if they did not respond, and 5) a $50.00 deposit, refundable at the end of the study, was required for participation. No mention was made that a dietary intervention was involved to avoid a possibility of selection bias based on this information. Interested subjects were given an appointment during which they were screened for a variety of inclusion and exclusion criteria.

Twenty subjects, 15 female (M age = 32.5; SD = 11.32) and 5 male (M age = 31.2; SD = 7.19), who met the inclusion criteria volunteered to participate and completed the three week dietary intervention. Two experimental subjects dropped out prior to completing the 3-week dietary intervention; one was due to moving out of town, and the other was due to transportation problems and conflicting job duties. These two dropouts were similar to the completers in terms of DSM-III-R diagnosis and degree of depression as measured by the MMPI-D scale and the BDI. As soon as each subject dropped
out, a replacement was randomly assigned to maintain equal n's in the two
groups. Of the 20 subjects completing the study 2 were college students, 10
were employed full-time, 7 were unemployed, and 1 was retired. The average
age at onset of the first episode of depression was 22 and the subjects self-
reported a median of 10 separate depressive episodes.

Measures

The outcome measures used to assess depression and general psycho-
pathology consisted of the BDI, MMPI-D scale and the Symptom Checklist-
90 (SCL-90; Derogatis, 1983). The outpatient version of the Structured Clin-
ical Interview for DSM-III-R (SCID; Spitzer, Williams, & Gibbon, 1987) was
used to obtain a DSM-III-R diagnosis for a current episode of major depres-
sion as well as to exclude subjects meeting specific exclusion criteria such
as bipolar depression. The Christensen Dietary Distress Inventory (CDDI)
(Christensen, Krietsch, & White, 1989) was used to select individuals ex-
periencing a dietary induced depression. This 34-item self-report inventory
includes statements responded to in terms of frequency of occurrence, reac-
tion to, or perceived cause of a physical or psychological condition. Sample
items would include, "How do you feel after getting a good night's sleep for
several nights in a row?" and "What is the most frequent cause of your depres-
sion when you experience it?". A cutoff score of 13 was selected because this
results in a sensitivity of 100% or correct identification of 100% of dietary
responders and a specificity of 67% or a 33% false positive rate (Christensen
et al., 1989).

An Expectancy Questionnaire, developed to assess the perceived credibility
of the two dietary interventions, asked the subject to rate, on a 5-point scale
from "no benefit" to a "tremendous amount of benefit", the benefit expected
from the dietary treatment program they received.

The Interpersonal Style Inventory (ISI; Lorr, 1986) was included as an out-
come measure because the interpersonal context has been demonstrated
(Klerman & Weissman, 1982) to be important to the recovery and prevention
of a depressive episode. This inventory assesses a person's characteristic ways
of relating to other people in five broad areas of personality.

A saliva sample, used to measure dietary adherence, was assayed for caffeine
by high performance liquid chromatography using the method developed by
Haughey (1982). This method yields a sensitivity of 0.1 µg/ml of caffeine in
0.1 ml of saliva. Specificity is indicated by similar concentration values at three
different detection wavelengths.

A food record sheet which instructed subjects to record, in household
measures, all foods and drinks consumed, was prepared to obtain an assess-
ment of dietary intake. A sample food record was provided to illustrate the
recording procedure.

Inclusion and Exclusion Criteria. Inclusion criteria included: a Beck Depres-
sion Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) score
of ≥16; an MMPI-D score (Hathaway & McKinley, 1967) of ≥70; a Christensen
Dietary Distress Inventory (CDDI; Christensen et al., 1989) score of ≥13; and,
a DSM-III-R diagnosis for a current episode of major depression. One week
later a BDI score of $\geq 16$ and an MMPI-D score $\geq 70$ was required to exclude spontaneous remitters. Exclusion criteria, consisted of the presence of bipolar depression, psychotic symptomatology, active substance abuse, organic brain syndrome, concurrent treatment, and the presence of a clinical state (such as current active suicide potential) inconsistent with participation in the research protocol.

**Dietary Intervention.** The experimental subjects were instructed to eliminate refined sucrose and caffeine from their diet and to eat something at each of the three meals to maximize the possibility that subjects would not alter their eating pattern as a result of eliminating these dietary substances. These subjects were given a list of refined sucrose and caffeine free foods as well as a sample meal plan to assist them in adhering to the dietary regime. To create an equivalent control group it was necessary to have control subjects eliminate two dietary substances. These dietary substances could not be related to depression, they must be something the subjects would normally ingest, and they must be something that would sound as plausible as refined sucrose and caffeine. The dietary substances that seemed to meet these criteria were red meat and artificial sweeteners. Control subjects were instructed to eliminate these two dietary substances and were given a list of red meat and artificial sweetener free foods derived from their food records and instructed to select foods from this list for each of their three meals so as not to alter their eating pattern.

**Procedure**

The experimenters, a Ph.D. level psychologist and two advanced clinical psychology graduate students, rehearsed the experimental procedure and participated in the recommended (Spitzer et al., 1987) SCID training program. Subjects interested in participating were given an appointment during which they were given an explanation of the study and asked to read and sign an informed consent form after all questions about the research project were answered.

The CDDI, MMPI-D scale, and the BDI were administered, and if the subject achieved the predetermined inclusion cutoff scores the SCID was administered. If the subject received a SCID diagnosis of a current episode of major depression and, based on the SCID, did not exhibit presence of the exclusion criteria, he/she was tentatively admitted into the study and the $50.00 deposit was obtained. Subjects were then given the three food record sheets, instructed to complete them for three nonconsecutive days of the next week to insure that a weekend day would be included, and given a second appointment.

When subjects returned a week later they turned in their food record sheets and were readministered the MMPI-D scale and BDI to test for spontaneous remission. Those achieving the cutoff scores were administered the SCL-90, and the ISI and randomly assigned to the experimental ($N = 10$) or control ($N = 10$) group. Subjects were given their respective dietary instructions and food lists, instructed to adhere to the diet for three weeks, encouraged to follow the dietary instructions completely because the success of the dietary manip-
ulation was contingent upon their adherence, and instructed to return weekly for a brief interview to have any questions answered and to provide a saliva sample. Subjects then completed the Expectancy Questionnaire, provided a saliva sample, and were told that the saliva sample would be analyzed to assess their adherence to the diet. A sample of the subjects (40%) was requested to maintain 3-day food records during a specified week of the dietary treatment program to provide an additional measure of dietary adherence.

At the end of the 3-week dietary intervention subjects were administered the BDI, MMPI-D scale, SCL-90, ISI, and provided a saliva sample. Subjects in the control group who did not experience an amelioration in their depression were given an opportunity to crossover to the experimental group and try the refined sucrose and caffeine free dietary intervention.

**Follow-up.** Three months following completion of the dietary intervention the subjects who adhered to the experimental diet and demonstrated an amelioration in depression were administered the BDI, MMPI-D scale, SCL-90, and ISI. A food record sheet was maintained for three nonconsecutive days of the following week.

**RESULTS**

*Dietary Adherence*

The saliva samples were assayed for caffeine using High Pressure Liquid Chromatography (Haughey, 1982) to obtain an index of adherence to the dietary instructions. At pretesting caffeine was detected in 9 of the 10 experimental and 8 of the 10 control subjects (one experimental and one control subject failed to provide a saliva sample). At post dietary assessment 7 of the 10 experimental and 2 of 9 control subjects were caffeine free (one control subject failed to provide a saliva sample). A two-way classification repeated measures ANOVA in which the between factor was groups (experimental and control) and the within factor was the pre versus average of the three dietary intervention saliva samples, revealed a nonsignificant groups main effect, $F(1,16) = 2.37$, $p = 0.14$, a nonsignificant saliva samples main effect, $F(1,16) = 0.01$, $p = .93$, and a significant interaction effect, $F(1,16) = 8.40$, $p < .05$. Simple effects analysis revealed a nonsignificant difference, $F(1,16) = 1.80$, $p > .05$, between the experimental ($M = 0.88 \pm 25 \mu g$) and control group's ($M = 0.52 \mu g$) caffeine concentration at pretest and a significant difference, $F(1,16) = 8.24$, $p < .05$ (experimental $M = 0.19 \mu g$, and control $M = 1.25 \mu g$) at posttest. Inspection of the food records obtained from subjects during dietary intervention revealed that, as instructed, subjects followed their prescribed diet with minor transgressions.

*Initial Comparability and Spontaneous Remission*

The MMPI-D scale and BDI first and second week pretest scores were analyzed to determine initial equivalence of the two groups and to test for spontaneous remission. A two-way repeated measures MANOVA where the between factor was group (experimental or control) and the within factor was trials
(first and second week assessment of depression) revealed a nonsignificant
($p > .15$) group, trials, and interaction effect.

The CDDI scores of the experimental ($M = 19.8$) and control ($M = 18.7$)
groups analyzed by an independent samples t-test were nonsignificant, $t < 1.00$,
indicating similarity in the groups on this measure.

**Treatment Credibility**

Analysis of the Expectancy Questionnaire ratings of the two groups revealed
a nonsignificant difference, $t(18) = 2.04, p > 0.05$, between the experimental
($M = 3.9$) and control ($M = 3.2$) groups' rating of expectancy of benefit of
the diet.

**Depression Outcomes**

The three primary measures of depression, MMPI-D scale, BDI, and the
SCL-90 depression scale, analyzed by multivariate analysis of covariance
(MANCOVA) with the pretest scores as covariates revealed a significant post-
test group difference, Wilks' criterion $= 0.4534$, $F(3,13) = 5.22, p < .014$. ANCOVA with the pretest scores as the covariate was then performed on each
depression measure to identify those accounting for the significant multivar-
iate effect. This analysis revealed significant posttest group differences on the
MMPI-D scale, $F(1,15) = 7.05, p < .05$, the BDI, $F(1,15) = 11.67, p < .01$, and the SCL-90 depression scale, $F(1,15) = 17.10, p < .01$. Table 1 reveals that
the experimental group experienced a decline in depression from pre to post-
test and, at posttest, this decline was significantly greater than that experi-
enced by the control group.1

**Outcome on Secondary Measures.** The eight SCL-90 scale posttest scores
(the depression scale was presented in table 1) analyzed by MANCOVA using
the pretest score as the covariate revealed a significant, Wilks criterion $= 0.0385$, $F(8,3) = 9.36, p < .05$, difference between the experimental and control group. ANCOVA, using the pretest score as the covariate was then performed on each
SCL-90 scale to identify the scales producing the significant multivariate differ-
ence. This analysis revealed a significant ($p < .05$) group difference on the
obsessive-compulsive, interpersonal sensitivity, anxiety, phobic anxiety, and
paranoid ideation scales. Table 2 reveals that the significant change on each of these scales represented a decrease in the experimental group's level of pathology over that of the control group.

MANCOVA with the posttest scores as the covariate computed between the
experimental and control groups' posttest scale scores on each of the five areas

---

1 Eight subjects, 7 experimental and 1 crossover control, experiencing an amelioration in depres-
sion from the refined sucrose and caffeine free dietary intervention were challenged double-blind
with caffeine, cellulose, refined sucrose, and aspartame using the procedure described by Krietsch,
Christensen, & White (1988) A criterion of three or more significant changes, using the SC index
(Christensen & Mendoza, 1986), on the BDI and/or SCL-90 scales was used to classify a subject
as having responded to a challenge substance. Using this criterion, three subjects were classified
as refined sucrose responders, one as a refined sucrose and caffeine responder, two as caffeine
responders, and two subjects failed to meet the criterion for responding to any of the challenge
substances.
DIETARY TREATMENT OF DEPRESSION

TABLE 1
MEAN PRETEST AND POSTTEST DEPRESSION SCORES BY GROUPS

<table>
<thead>
<tr>
<th>Depression of Index</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>MMPI-D*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>90.10</td>
<td>6.71</td>
</tr>
<tr>
<td>Control</td>
<td>85.80</td>
<td>11.94</td>
</tr>
<tr>
<td>BDI*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>27.00</td>
<td>8.88</td>
</tr>
<tr>
<td>Control</td>
<td>27.40</td>
<td>8.69</td>
</tr>
<tr>
<td>SCL-90 Depression Scale*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>53.40</td>
<td>4.33</td>
</tr>
<tr>
<td>Control</td>
<td>56.30</td>
<td>4.81</td>
</tr>
</tbody>
</table>

Note. MMPI-D = MMPI Depression Scale; BDI = Beck Depression inventory; SCL-90 = Symptom Checklist-90. The MMPI-D and SCL-90 Depression Scale scores are T-Scores.

* p < .05

measured by the Interpersonal Style Inventory were nonsignificant, p > .05, indicating that this outcome measure was not sensitive to the effect of the dietary intervention.

Follow-up

Follow-up data were collected from 7 (6 experimental and one crossover control) of the 10 subjects who completed the refined sucrose and caffeine-free dietary intervention and demonstrated an amelioration in depression. As displayed in table 3, the follow-up subjects were significantly less depressed, p < .05 using a correlated t-test and a Bonferroni correction of the alpha level to control for type I error, at posttest and this decline in depression persisted at 3-month follow-up. This continued improvement in the subjects' psychological state was also demonstrated at 3-month follow-up on the SCL-90.

DISCUSSION

The present study has revealed that the experimental and control groups exhibited an equivalent level of depression and psychopathology at pretesting with no evidence of 1-week spontaneous remission. The caffeine assays and food records revealed that both groups of subjects adhered to their prescribed dietary intervention with minor transgressions.

Comparison of the postdietary outcome depression measures revealed that the experimental group exhibited a significantly greater reduction in depression than did the control group on all depression measures. This differential effect occurred although both groups expected similar benefit to accrue from their respective diet. At pretesting both control and experimental subjects were moderately to severely depressed. Following dietary intervention, experimental
TABLE 2
MEAN PRETEST AND POSTTEST SCL-90 SCORES BY GROUP

<table>
<thead>
<tr>
<th>SCL-90 Groups</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Somatization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>55.20</td>
<td>6.37</td>
</tr>
<tr>
<td>Control</td>
<td>61.00</td>
<td>9.02</td>
</tr>
<tr>
<td>Obsessive-compulsive*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>55.80</td>
<td>5.67</td>
</tr>
<tr>
<td>Control</td>
<td>57.60</td>
<td>6.35</td>
</tr>
<tr>
<td>Interpersonal Sensitivity*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>52.70</td>
<td>6.24</td>
</tr>
<tr>
<td>Control</td>
<td>57.40</td>
<td>9.54</td>
</tr>
<tr>
<td>Anxiety*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>49.90</td>
<td>5.04</td>
</tr>
<tr>
<td>Control</td>
<td>52.50</td>
<td>7.11</td>
</tr>
<tr>
<td>Hostility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>51.50</td>
<td>5.13</td>
</tr>
<tr>
<td>Control</td>
<td>55.30</td>
<td>12.69</td>
</tr>
<tr>
<td>Phobic anxiety*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>48.30</td>
<td>6.36</td>
</tr>
<tr>
<td>Control</td>
<td>50.40</td>
<td>8.63</td>
</tr>
<tr>
<td>Paranoid ideation*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>47.70</td>
<td>6.83</td>
</tr>
<tr>
<td>Control</td>
<td>55.00</td>
<td>10.37</td>
</tr>
<tr>
<td>Psychoticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>52.20</td>
<td>3.16</td>
</tr>
<tr>
<td>Control</td>
<td>49.60</td>
<td>11.22</td>
</tr>
</tbody>
</table>

Note. SCL-90 = Symptom Checklist 90. The SCL-90 Scale Scores are T-Scores. * p < .05

subjects were normal-to-mildly depressed whereas the control subjects continued to be mildly-to-severely depressed. Additionally, the effectiveness of the experimental diet generalized to areas other than just depression as demonstrated by the significant improvement on most of the SCL-90 scales. This benefit obtained from the experimental diet persisted at 3-month follow-up. However, this is a short-term follow-up of only 7 subjects which limits the generalizability of these data.

The results of the present study have revealed that a dietary treatment program consisting of the elimination of refined sucrose and caffeine is effective in the amelioration of depression of selected clinically depressed individuals. While this treatment program is effective, its utility would be important only if the amelioration in depression was equivalent to or exceeded that of other treatment programs. When comparing the degree of amelioration of depression achieved by the present dietary intervention with that of other treatment programs, e.g., drug therapy and behavior therapy (McLean & Hakstian, 1979;
DIETARY TREATMENT OF DEPRESSION

TABLE 3
THREE-MONTH FOLLOW-UP ON OUTCOME MEASURES

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Pretest M</th>
<th>Pretest SD</th>
<th>Posttest M</th>
<th>Posttest SD</th>
<th>Follow-up M</th>
<th>Follow-up SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression Scales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMPI-D</td>
<td>88.29</td>
<td>9.18</td>
<td>52.20*</td>
<td>9.57</td>
<td>56.43</td>
<td>9.57</td>
</tr>
<tr>
<td>BDI</td>
<td>28.14</td>
<td>9.58</td>
<td>5.77*</td>
<td>6.14</td>
<td>5.18</td>
<td>5.43</td>
</tr>
<tr>
<td>SCL-90 Depression</td>
<td>53.29</td>
<td>5.28</td>
<td>6.28*</td>
<td>5.41</td>
<td>32.71</td>
<td>5.14</td>
</tr>
<tr>
<td>SCL-90 Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatization</td>
<td>54.43</td>
<td>3.87</td>
<td>3.78</td>
<td>41.00</td>
<td>7.39</td>
<td>1.67</td>
</tr>
<tr>
<td>Obsessive-compulsive</td>
<td>55.29</td>
<td>6.18</td>
<td>3.84</td>
<td>39.14</td>
<td>6.36</td>
<td>1.05</td>
</tr>
<tr>
<td>Interpersonal-sensitivity</td>
<td>49.14</td>
<td>4.48</td>
<td>6.48*</td>
<td>37.85</td>
<td>6.07</td>
<td>1.78</td>
</tr>
<tr>
<td>Anxiety</td>
<td>50.00</td>
<td>4.55</td>
<td>9.47*</td>
<td>34.00</td>
<td>4.39</td>
<td>2.07</td>
</tr>
<tr>
<td>Hostility</td>
<td>48.43</td>
<td>6.65</td>
<td>3.56</td>
<td>37.86</td>
<td>4.22</td>
<td>0.82</td>
</tr>
<tr>
<td>Phobic anxiety</td>
<td>45.71</td>
<td>6.05</td>
<td>2.57</td>
<td>41.00</td>
<td>3.87</td>
<td>1.51</td>
</tr>
<tr>
<td>Paranoid Ideation</td>
<td>45.71</td>
<td>7.87</td>
<td>2.53</td>
<td>39.14</td>
<td>4.81</td>
<td>1.92</td>
</tr>
<tr>
<td>Psychoticism</td>
<td>51.29</td>
<td>5.62</td>
<td>7.29*</td>
<td>35.00</td>
<td>5.00</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Note. MMPI-D = MMPI Depression Scale; BDI = Beck Depression Inventory; SCL-90 = Symptom Checklist-90. The MMPI-D and SCL-90 Scores are T-Scores.

* t-ratio compares pretest with posttest scores.

Rehm, Kaslow & Rabin, 1987), a similar degree of amelioration seems to exist. However, such a comparison may be inappropriate because the present study focused on a sample of individuals selected because they were believed to experience a dietary induced depression based on their CDDI scores. The results found in this study might not be obtained in a random sample of individuals with a diagnosis of major depression.

Although the study results may not be generalizable to all individuals with major depression, they seem to have specific relevance to the subtype labeled atypical depression. Although atypical depression is frequently referred to as a diagnostic entity, there is a continuing lack of agreement regarding its definition (Aarons, Frances, & Mann, 1985). Some investigators (e.g., Liebowitz et al., 1984) emphasize the importance of neurovegetative signs of increased sleep, inertia, and overeating, as well as mood reactivity and rejection sensitivity, and others (e.g., Davidson & Pelton, 1986) emphasize the coexistence of anxiety. With the exception of the neurovegetative sign of overeating, these are the type of symptoms measured by the CDDI and the type of symptoms experienced by dietary responders. Dietary responders tend to feel fatigued, moody, and depressed. Many have headaches, sleep more than is typical with no abatement of feelings of fatigue, and are tense and irritable. Therefore, dietary responders and atypical depression have overlapping signs and it is likely that
dietary responders and atypical depression represent a similar subtype of depression.

Although the present study has demonstrated that a caffeine and refined sucrose free diet can effectively ameliorate depression in selected individuals, this finding generates many significant issues that need to be resolved. Perhaps the most obvious is the need to verify the apparent role that refined sucrose plays in depression. Sucrose is a carbohydrate, and elimination of refined sucrose serves the purpose of reducing overall carbohydrate intake and increasing protein intake (Christensen et al., 1985). The beneficial effect observed from refined sucrose elimination may be derived from this dietary alteration instead of representing a specific reaction to refined sucrose. Such questions must be answered before an explanation for the effects observed in this study can be developed.

REFERENCES


