PREMENSTRUAL DEPRESSION: A DISTINCT ENTITY?

by

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Ph.D. PSYCHOLOGY

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ABSTRACT

The validity of the Premenstrual Assessment Form (PAF) typological category "Major Depressive Syndrome", as a distinct subtype of premenstrual change, was assessed. The nature of the depression associated with the premenstrual phase was investigated with standardized measures of depression and a test of dysphoric attentional bias derived from Beck's cognitive model of depression. Three subject groups were delineated based on prospective daily ratings: PMD (depression only premenstrually), controls (no depression), and INTD (intermittent depression throughout cycle). The control group did not exhibit a dysphoric attentional bias. The INTD group demonstrated a dysphoric attentional bias both pre- and postmenstrually. The PMD group, despite clinically elevated premenstrual depression levels, failed to show an associated dsyphoric attentional bias. These findings suggest that although PMD and clinical depression share an affective component, they may differ with regard to other features of depression (i.e. cognitive/information processing). As well, phenomenological differences between PMD and clinical depression were suggested by subjects' prospective daily ratings. For confirmed PMD subjects, depressive mood was only one facet of a multidimensional symptom picture which included signs of water retention, breast pain, fatigue, irritability, anxiety, and associated dysmenorrhea. These findings raise questions concerning the construct validity of premenstrual depression (specifically PAF Major Depressive Syndrome) as a distinctive subtype of premenstrual change.

Ph.D. Psychologie

La dépression prémenstruelle: une entité distincte?

Résumé

La présente étude a évalué la validité de la catégorie typologique de "syndrome dépressif majeur" du questionnaire 'Premenstrual Assessment Form' (PAF), comme sous-type distinct de changement prémenstruel. Les caractéristiques de la dépression associée à la phase prémenstruelle ont été examinées à partir de mesures standardisées de dépression et d'une épreuve d'attention sélective dérivée du modèle cognitif de la dépression de Beck. Des évaluations quotidiennes (prospectives) déterminèrent trois groupes de sujets: un premier groupe de femmes qui rapportaient de la dépression seulement durant leur phase prémenstruelle (PMD), un second groupe témoin de sujets qui ne présentaient pas de dépression, et un troisième groupe de sujets qui démontraient une dépression intermittente tout au long de leur cycle (INTD). On observait, aux épreuves d'attention sélective, que 1) le groupe témoin ne présentait aucun biais d'attention pour les stimuli 'dysphoriques', 2) le groupe INTD démontrait une attention sélective aux contenus dépressifs durant les phases pré- et postmenstruelles, et 3) le groupe PMD, bien qu'obtenant des cotes élevées de dépression clinique au cours de la phase prémenstruelle, ne révélait aucune attention sélective pour les stimuli 'dysphoriques'. Ces résultats suggèrent donc que si la dépression prémenstruelle et la dépression clinique ont en commun une composante affective, les deux diffèrent cependant à l'égard d'autres caractéristiques (i.e. cognitives et relatives au traitement de l'information). De plus les évaluations quotidiennes suggéraient l'existence de différences phénoménologiques importantes entre la dépression prémenstruelle et clinique. En effet l'humeur dépressive ne semblait être chez les sujets ayant une dépresion véritablement prémenstruelle qu'une facette d'un large tableau multidimensionnel de symptômes qui incluaient généralement la rétention d'eau, les seins douloureux, la fatigue, l'irritabilité, l'anxiété et la dysménorrhée. Ces résultats soulèvent donc de nombreuses questions quant à la validité du concept de dépression prémenstruelle (spécifiquement de "syndrome dépressif majeur" du PAF) comme sous-type distinct de changement prémenstruel.

STATEMENT OF ORIGINAL CONTRIBUTION

The fact that some women experience certain signs and symptoms in tandem with the premenstrual phase of the menstrual cycle has been recognized for years. It is only recently, however, that "premenstrual syndrome" has become widely recognized by the medical, legal and scientific communities. Some would argue that the extent to which premenstrual changes are now endorsed as a "disorder" has outstripped a sound basis of empirical support.

Research progress in this field has been laborious and the findings generally equivocal, partly due to methodological inadequacies in, and inconsistencies between studies but also due to the sheer complexity of the phenomenon. Additionally, many diverse theoretical positions have been brought to bear on the phenomenon (e.g. biological, social learning, analytic).

The Premenstrual Assessment Form (PAF), developed by Halbreich, Endicott and colleagues, is basically designed around an atheoretical, phenomenological classification scheme, much like the DSM-III. This instrument holds much promise for the facilitation of more consistent classification of subjects and greater replicability across studies. The PAF is relatively new, however, and lacks extensive validity and normative data. This thesis partially addresses these needs, and contributes valuable information regarding the reliability, validity and utility of the instrument.

The current investigation also specifically focuses on one of the more common premenstrual complaints -- dysphoric mood change or depression. A decision was recently taken to include "Periluteal Phase Dysphoric Disorder" in the revised edition of the DSM-III, despite the fact that there is scant evidence to suggest that premenstrual dysphoric mood

represents a specific subtype of premenstrual change. This thesis specifically examines the construct of premenstrual dysphoric mood -- as defined by the PAF category "Major Depressive Syndrome". The co-occurence of depression with the premenstrual phase of the menstrual cycle was assessed with standardized measures of depression and a test of selective attention derived from information processing theory and Beck's cognitive model of depression.

Several methodological steps taken in the current investigation address certain basic weaknesses characteristic of previous research in the area: (a) subjects were selected for study on the basis of PAF classifications, allowing for ease of replicability and comparability across studies; (b) subjects' retrospective symptom reports were confirmed with prospective daily ratings prior to their inclusion in analyses. This represents an important methodological consideration, as retrospective report has been found to be quite unreliable; (c) an information processing task was employed which apparently circumvents conscious awareness and hence avoids reliance on self-report and the oft-mentioned influence of stereotypic beliefs.

More recent studies with confirmed premenstrual sufferers have addressed mainly phenomenological and epidemiological issues. The current investigation represents one of the few direct tests of a tenet derived from a theory of depression, and the only one, to the author's knowledge, that investigates information processing in a confirmed group of premenstrually depressed women.

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INTRODUCTION

The menstruating woman has, throughout history, been the subject of myth, superstition, and fear. The Roman historian Pliny, in the 1st century A.D., described the powers of menstrual blood according to the popular imagination as follows:

> Contact with it turns new wine sour, crops touched by it become barren, grafts die, seed in gardens are dried up, the fruit of trees falls off, the edge of steel and the gleam of ivory are dulled, hives of bees die, even bronze and iron are at one seized by rust, and a horrible smell fills the air; to taste it drives dogs mad and infects their bites with an incurable poison.

(cited in Toth, Delaney & Lupton, 1981, p. 105)

The menstrual taboo is universal: many tribal cultures, from all corners of the world, consider the dangers of contact and contagion so great that women are secluded in separate huts during their monthly flow. In less restrictive cultures menstruating women may still be forbidden to cook the family's meals or touch men's utensils and tools for fear of illness or bad luck. They are often prevented from working in the fields lest they harm crops (Hays, 1972).

The origins of many modern day attitudes and beliefs can be traced to primitive menstrual taboos. Toth et al. (1981) state that the origins of the superstition that one shouldn't walk under a ladder, "comes from a primitive belief that one should not pass under bridges, clotheslines, trees, or the like if a menstruating woman is around, lest some of the blood fall on one's unsuspecting head" (p. 106). A commonly used euphemism for menstruation -- "the curse" -- reflects the belief that the menstrual flow was inflicted on women by God as a punishment for her sin in the Garden of Eden (Weideger, 1976).

Although the primitive origins of such attitudes are rarely consciously acknowledged in our culture today, their remnants can be detected within the guise of religious tradition and aesthetic values. The menstrual taboo remains strong within the Jewish tradition. The Talmud predicts that disorders such as epilepsy, drunkenness and insanity will be the fate of children conceived during menstruation. Orthodox Judaism prohibits sexual activity during and for seven days following menstruation, and Jewish women are not allowed to pray in the temple during their menstruation. Christian sects which adhere to a literal interpretation of the Bible are governed by similar restrictions, as outlined in the book of Leviticus:

> And if a woman have an issue, and her issue in her flesh be blood, she shall be put apart seven days and whosoever toucheth her shall be

unclean until the even. ...

But even if she be cleansed of her issue, then she shall number to herself seven days, and after that she shall be clean.

Leviticus XV;19;24;28

Although both the women's movement and the sexual liberation of the last several decades has served to debunk many of the myths associated with female sexuality (including menstruation) a recent survey indicated that over 50% of American couples abstain from sexual intercourse during menstruation. A commonly cited reason for abstinence, aside from religious prohibitions, involved aesthetic preference -- i.e. avoidance of the "mess, worry and fuss" (Paige, 1973).

In tandem with this tradition of menstrual superstition and taboo, was a parallel history of medical observations linking various mood and behavioral disorders to menstruation. Hippocrates' Diseases of Women attributed hysterical diseases, delusions and suicidal thoughts to "the agitated blood seeking a channel of escape from the womb" (cited in Simon, 1978). Pinel, in 1799, described a case of mania commencing at menarche with subsequent hysterical crises occurring repeatedly during 3 or 4 days of each menstruation; the remainder of the month was characterized by normal functioning (cited in Stone, 1982). Pinel noted that pregnancy relieved such menstrual disturbances, and recommended it as a treatment. In the 19th century Icard

attributed a vast array of disturbances to disorders of menstruation, including kleptomania, pyromania, dipsomania, homocidal mania, suicidal mania, erotomania, nymphomania, delirious insanity, morbid jealousy, lying, illusions, hallucinations and melancholia (cited in Rubinow, Hoban, Roy-Byrne, Grover & Post, 1985).

Evidence of ingrained attitudes regarding the reduced capacities of women menstrually and premenstrually remains prevalent today. The most spectacular example in recent times involves the use of premenstrual syndrome as a legal defence. Two well-publicized trials in England employed pleas of diminished responsibility due to premenstrual syndrome as a successful defence in reducing charges of murder to manslaughter (Brahams, 1981). The women involved were put on probation and ordered to report to Dr. K. Dalton for progesterone treatment in lieu of jail terms. These decisions have stirred considerable controversy. In addition to the objection of feminist groups that such a defence will foster pejorative attitudes towards women, there is the very concrete issue that premenstrual syndrome lacks a firm foundation of scientific evidence characterizing it as a medical disorder. Furthermore, there is no scientific evidence for the efficacy of progesterone treatment in relieving the symptoms of premenstrual syndrome.

A recent decision by the American Psychiatric Association to include "Periluteal Phase Dysphoric Disorder"

in its upcoming revision of the Diagnostic and Statistical Manual of Mental Disorders has stimulated controversy as well (Holden, 1986). The most common objection to characterizing premenstrual psychological changes as a mental disorder is that it seems precipitant given our current state of knowledge: The etiology has not been established, a consistent constellation of symptoms has not been objectively defined, and no reliable response to treatment has been demonstrated.

The widespread and perhaps premature recognition of premenstrual syndrome by legal and medical communities has lent urgency to the need for an increased understanding of this phenomenon. Mood changes which occur premenstrually have recently been cited as holding a key to a greater understanding of psychiatric illness -- particularly affective illness. Numerous factors coalesce to suggest a relationship between affective psychiatric illness and the menstrual cycle: (a) high concordance rates for premenstrual mood change and current or past affective illness, (b) clinical reports of manic episodes which recur premenstrually, (c) disproportionately higher rates of attempted suicides and psychiatric admissions during the premenstruum and menstruum, and (d) the association between disorders of mood and periods of endocrine change (i.e. menarche, menstruation, pregnancy, menopause, oral contraceptive use).

The fairly consistent finding, in epidemiological

surveys and hospital treatment statistics, of twice the incidence of depression in women compared to men has led to speculation concerning the role of gonadal hormones in depression. Weissman and Klerman, in their classic 1977 paper on sex differences in depression concluded that reproductive-related events exert little influence on depression rates in women. Since that time, however, there have been substantial advances in knowledge concerning the interactions between steroid hormones and neurotransmitter and receptor physiology (Hamilton & Parry, 1983; McEwen et al., 1984), leading to a renewed interest in the role of hormones in depression. Rogers (1982), for example, has recently proposed that neurotransmitter functioning and estrogen levels in females interact to cause depression.

The purpose of this thesis is to investigate the phenomenon of premenstrual dysphoric mood change from a theoretical perspective derived from depression research. In the process, the construct validity of premenstrual depression specifically, and premenstrual syndrome generally, will be assessed.

Mood changes occurring premenstrually have generally been considered as part of a broader "premenstrual syndrome". The subsequent historical review will refer to premenstrual syndrome unless otherwise stated.

Definition

Although the definition of premenstrual syndrome has evolved over the years, the evolution has by no means been

in the direction of increased clarity. To the contrary, the delineation of the syndrome has grown more complex, even convoluted, but this may simply reflect the inherent complexity of the phenomenon. The progression in definition will be reviewed with a focus on the symptomatology involved and its temporal occurence.

Premenstrual tension syndrome was first characterized as a medical disorder by Frank in 1931. He described a constellation of symptoms -- both physical and emotional -- which began from 7 to 10 days preceding menstruation and continued until the menstrual flow began. The most common complaints of Frank's patients were restlessness, irritability, "a feeling of indescribable tension" and "a desire to find relief by foolish and ill considered actions" (Frank, 1931, p.1054). In one case, tension was accompanied by edema and a marked decrease in urinary secretion. Frank also noted cases in which the recurrence of epilepsy and bronchial asthma were confined to the premenstrual phase. Frank attributed these symptoms to an exess of circulating estrogen and treated the most severe cases by irradiation of the ovaries, resulting in temporary or permanent amenorrhea (and hence sterility).

Israel (1938) reported that premenstrual tension could occur as many as 14 days prior to the onset of menses, and give rise to marked changes in personality. He estimated that while up to 40% of normal women suffer minor symptoms of fatigue, irritability and physical discomfort

premenstrually, in some the symptoms are "sufficiently intense and delineated to deserve recognition as a morbid entity" (p.1721). Israel also depicted feelings of tension, irritability and restlessness as central to the disorder, and noted that crying spells, insomnia, breast swelling and pain, headache and vertigo were frequently accompanying symptoms. He observed that premenstrual tension could mimic oncoming mental disease when, for example, extreme agitation was followed by brief periods of depression.

Green and Dalton (1953) coined the term "premenstrual syndrome" (PMS) to reflect their view that tension represented only one of the many possible symptoms occuring premenstrually. They also believed that by emphasizing the psychological dimension (tension) a psychological etiology was implied, whereas Dalton represents one of the strongest proponents of a purely physiological basis for the syndrome. In reviewing the literature of the day, Green and Dalton gleaned reports of a broad range of symptoms which either appeared or showed exacerbations premenstrually, including: headache, edema, weight gain, breast tenderness, abdominal bloating and pain, epileptiform seizures, asthmatic attacks, fever, lumbar pain, psychosexual disorders, emotional instability, depression, irritability, increased appetite, nausea and vomiting, vertigo, as well as crimes of violence. They also noted that such symptoms could occur at ovulation or in the first few days of menstruation.

Dalton (1964) later introduced the term "paramenstruum"

to refer to the four days prior to menses plus the first four days of menses, the period during which she considered symptoms to be at their peak; many of her survey studies have employed this time period. Dalton currently (1977) recognizes several other temporal patterns of premenstrual change: (a) symptoms occur during the late premenstruum, (b) symptoms occur at ovulation for a day or two and reappear during the premenstruum (7 days prior to menses), and (c) symptoms appear at ovulation and gradually increase in severity throughout the luteal phase. Within each pattern, symptoms may end abruptly with the onset of menstruation, or a day earlier, or continue into the first few days of flow.

By the late 1960's more than 150 different symptoms had been identified as fluctuating with the menstrual cycle (Moos, 1969), from every conceivable field (e.g. dermatological, neurological, autonomic, psychosexual, behavioral, cognitive, affective). Dalton (1977) noted that, "the premenstrual syndrome is probably the only disease which, for diagnosis, does not depend upon the type of symptoms. It is the time relationship of symptoms to menstruation that provides the diagnosis" (p.6). Dalton does, in fact, employ several other diagnostic criteria, including consistency of symptoms (must occur in each of the last three cycles) as well as an inferred judgement of severity (bad enough to seek medical advice or demand analgesics).

Dalton's formulation certainly represents the broadest

definitional criteria for PMS. It is questionable, however, whether such an amorphous and variable construct can properly be considered a "syndrome". Brooks-Gunn (1986) has stressed the necessity of differentiating between premenstrual symptoms and syndromes. She suggests that the term "syndrome" be reserved for specific clusters of symptoms experienced at severe levels, which occur relatively regularly and significantly affect a woman's life.

Although the bulk of PMS research to date has failed to fulfill these guidelines, a consensus can be gleaned from the literature as to which symptoms are most commonly present in women seeking help for PMS. The central features tend to include irritability, tension, depression, fatigue, abdominal bloating, water retention and breast tenderness. While the timing criteria which defines the premenstrual phase varies tremendously from study to study, a modal criterion of between four to seven days prior to the onset of menses can be identified among major researchers in the area (Backstrom et al., 1983; Golub, 1976a; Halbreich, Endicott, Schacht, & Nee, 1982; Moos, 1968; Rubinow, Roy-Byrne, Hoban, Gold & Post, 1984). There are differences in opinion regarding whether patients must be completely asymptomatic during a particular phase of the cycle (Dalton, 1984), or whether significant premenstrual exacerbations of symptoms, regardless of baseline values, should be construed as premenstrual syndrome (Halbreich & Endicott, 1985a).

Prevalence

Most estimates of the prevalence of PMS tend to be quite inconsistent from study to study as they stem from wide variations in definitional criteria. Additional sources of variation arise from the particular population studied (college students, mature women, psychiatric patients, PMS clinic patients) and the nature of the survey conducted (retrospective versus prospective investigation, menstrual focus of the study is known versus concealed). In recent years, however, there has been some concurrence regarding prevalence estimates among retrospective, epidemiological surveys.

Woods, Most and Dery (1982) conducted a survey of 18-35 year old women (n=179) selected to reflect the racial composition and socioeconomic status of 5 American city neighbourhoods. Approximately 30-50% of the sample reported common premenstrual symptoms (i.e. irritability, depression, tension, swelling, painful breasts, headache) at mild to moderate levels. A much lower percentage (5-8%) rated these symptoms as severe or disabling, although 12% did rate their premenstrual irritability as severe.

A large Swedish epidemiological study conducted by Andersch in 1980 (reported in Bancroft & Backstrom, 1985) revealed that 2-3% of women reported severe premenstrual symptoms, whereas 10% said they would welcome treatment for their premenstrual changes.

Reid (1985) based his approximation of the prevalence

and severity of PMS on the results of five published studies. The symptoms he considered pathognomonic for PMS included anxiety, tension, irritability, fatigue, depression and headache; his rationale was that these are the symptoms women are most likely to find disruptive. Reid estimated that whereas 10-15% of women are symptom free, 50% report mild, 30% report moderate and 5-10% report severe or disabling premenstrual symptoms. Reid considers the experience of moderate symptoms sufficiently distressing to be classified alongside severe symptoms as a premenstrual "syndrome".

To summarize, there is a rather broad consensus among retrospective surveys that approximately 2-10% of women in the general population report severe or disabling premenstrual symptoms. Prevalence estimates must be regarded with caution, however, for recent studies have found that retrospective premenstrual symptom report (specifically mood symptoms) is confirmed by prospective ratings in only 40-59% of cases (Endicott & Halbreich, 1982; Rubinow et al., 1984). Severity of symptom report, however, was found to be positively related to the liklihood of confirmation (Endicott & Halbreich, 1982), suggesting that the estimate of 2-10% for severe symptoms may approximate their actual incidence.

Classification/Diagnosis of Premenstrual Symptoms

Despite the lack of any one universally accepted definition of PMS, several research groups have formulated

diagnostic inventories and criteria which have generated a moderate following. The most frequently used questionnaire to date has been the Menstrual Distress Questionnaire (MDQ) (Moos, 1968). Although originally constructed to measure menstrual difficulties (e.g. dysmenorrhea), it has frequently been employed in studies of PMS. The questionnaire consists of 47 items which are rated on a 6-point scale. The original format was retrospective and asked respondents to rate their symptomatology during the premenstrual, menstrual and intermenstrual phases of their most recent cycle, as well as during their worst cycle. Subsequently a "Today" form of the MDQ was developed to allow for prospective rating of symptoms.

Moos originally administered his questionnaire to 839 young women recruited from among the wives of graduate students. A factor analysis of this data yielded eight factors which were consistent across cycle phase: pain, concentration, behavioral change, autonomic reactions, water retention, negative affect, arousal, and a group of control symptoms (e.g. tingling, chest pains). Moos noted that while the negative affect factor was almost definitional of premenstrual tension, women generally suffered various combinations of several factors, suggesting that subtypes of change were relevant to both menstrual and premenstrual experience. Moos also emphasized the importance of distinguishing between women who reported both premenstrual tension and dysmenorrhea (most common profile), and those

who reported either alone, in seeking to identify etiological substrates and develop effective treatments. "Endocrine factors may be more important in certain types of menstrual symptoms than in others" (Moos, 1969, p.401).

The MDQ has several limitations when applied to the investigation of PMS: (a) the focus on menstrual distress or dysmenorrhea results in insufficient descriptive specificity for premenstrual symptomatology, and (b) retrospective recall of premenstrual symptoms in general has been shown to be unreliable; the MDQ requirement that symptoms be recalled for three specific phases is particularly unrealistic and likely to introduce a stereotypic response bias.

Haskett, Steiner, Osmun and Carroll (1980), who employed rigorous criteria in an effort to isolate a "pure" sample of severe premenstrual tension (PMT) sufferers, elected to study only 42 of the 254 volunteers seeking treatment for PMT. Despite initial screening for psychiatric disorder, 16 of these 42 subjects had to be subsequently excluded from analysis because of elevated follicular phase (i.e. pre-ovulatory) complaint. Those symptoms most characteristic of the remaining severe sufferers (n=26) were used to establish research diagnostic criteria and to guide the design of both observer- and self-rating scales for a "Premenstrual Tension Syndrome" (Steiner, Haskett & Carroll, 1980). The syndrome is designated by a minimum number of symptoms, experienced only during the premenstrual phase (one week prior to menses),

for at least six preceeding cycles, and of sufficient severity to cause impairments in functioning.

Steiner, Haskett and colleagues have contributed the most rigorous diagnostic system available -- one which is likely to result in the selection of the most clearcut cases of severe PMT syndrome. Their conceptualization has been criticized however, mainly on the grounds that it is too narrow: (a) the emphasis is on dysphoric mood change while physical and behavioral changes are largely ignored, (b) PMT is conceptualized as a psychiatric diagnosis, which conveys implicit assumptions regarding etiology and psychological adjustment, (c) the restriction of symptoms only to the premenstrual week and the requirement that they occur during every one of the last 6 cycles, may inflate the false negative diagnostic rate, and (d) PMT is considered a single entity, with no allowance for distinguishing among various subtypes of premenstrual change.

The research team of Halbreich, Endicott and colleagues have been the most vociferous advocates of the need to examine subtypes of premenstrual change. They suggest that viewing PMS as a single syndrome precludes the selection of homogeneous subject groups and obscures the outcome of both etiological and treatment studies. They also recommend a change in terminology, suggesting that "premenstrual changes" better reflects the great diversity of change that can occur premenstrually, and acknowledges the fact that such changes are not always negative or perceived as

"symptoms". A specific cluster of changes may be referred to as a syndrome, but with the understanding that a variety of "syndromes" exist. Halbreich et al. (1982) developed the Premenstrual Assessment Form (PAF) to adequately assess the diversity of premenstrual changes, as well as to address a number of other methodological issues in the area. Their 95-item retrospective questionnaire reflects a broad range of psychological, physiological and behavioral changes which have been found to occur premenstrually.

Despite the rather overwhelming array of items represented, the PAF does improve on previous instruments in a number of ways: (a) it elicits ratings of the degree of change experienced in the premenstrual period compared to one's usual state, (b) the premenstrual phase is self-defined by each woman, and can vary from 1 to 14 days, (c) 18 subtypes of premenstrual change can be assessed along dimensional scales of severity, (d) both positive and negative changes are represented, and the possibility of them occurring jointly (bipolar changes) can also be analyzed, and (e) typological categories of change, which require a specific number of symptoms at specific severity levels are defined. Clearly the PAF allows for the measurement of a great diversity of premenstrual experience while it also provides for precision and replicability in the classification of premenstrual changes.

Several other researchers have proposed typologies of premenstrual change (Abraham, 1983; Cullberg, 1972) and

there now seems to be widespread agreement that the concept of symptom subtypes is a valid one. There is less agreement, however, concerning the specific subtypes of premenstrual change, their individual item content, and to what extent they co-occur. The rationale for the subtype hypothesis appears increasingly compelling as one examines the many and varied attempts (basically unsuccessful) to identify an etiological substrate for PMS.

Etiological Theories of Premenstrual Symptoms

A myriad of etiological theories have been advanced to account for the premenstrual syndrome, ranging from the strictly biological to the strictly psychological. A sampling of these theories is presented in Table 1 (p. 17a-17b); references are provided therein for theoretical or empirical papers relevant to each position. Although a few theories purport to explain the entire gamut of premenstrual changes, many restrict themselves to specific subsets of premenstrual symptomatology, reflecting a widespread recognition of the multidimensional nature of the phenomenon. Each one of the theories listed has garnered no better than equivocal support for its tenets. This can, in part, be attributed to methodological inconsistencies between studies but the cummulative confusion in the literature may also serve to underline the inherent complexity of the phenomenon under investigation. Clare articulated this point well in his 1985 review of the premenstrual syndrome:

TABLE 1 - Proposed Etiologies for Premenstrual Syndrome

Hypothesis	Premenstrual Symptoms	Reference
Ovarian Hormones		
excess circulating estrogen	psychological & physical	Frank (1931)
unantagonized estrogen	psychological & physical	Israel (1938)
high estrogen / progesterone ratio	water retention, painful breasts, migraine, rheumatism, asthma, acne, irritability	Greene & Dalton (1953)
progesterone withdrawal	dysphoric mood	Rausch & Janowsky (1982)
estrogen withdrawal	mood / behavioral change	Steiner & Carroll (1977)
endogenous estrogen dominance	irritability	Ullberg (1972)
high estrogen / progesterone ratio	irritability, anxiety, hostility	Steiner & Carroll (1977)
low estrogen / progesterone ratio	depression	Steiner & Carroll (1977)
high estrogen / progesterone ratio	anxiety	Backstrom & Mattsson (1975)
Hormones influencing Fluid Retention		
excess aldosterone	water retention	Dalton (1964)
renin / angiotensin / aldosterone axis (increased aldosterone secretion)	fluid retention, weight gain, negative affect	Janowsky, Berens & Davis (1973)
excess prolactin	breast tenderness	Horrobin et al. (1971)
excess prolactin	depression	Carroll & Steiner (1978)
Other Hormones		
endogenous opiate withdrawal	psychological and physical	Reid & Yen (1981) Halbreich & Endicott (1982a)
fluctuations of androgens	psychological, water retention, acne	Rees (1953) Steiner & Carroll (1977)
glucocorticoids (excess cortisol, ACTH)	emotional upsets	Walker & McGilp (1978)
insulin (hypoglycemia)	anxiety, irritability, headache, fatigue, craving for sweets	Morton et al., (1953) Abraham (1983)
elevated melatonin	mood disturbances, sleep changes	Wetterberg et al. (1976) Parry, Rosenthal & Wehr, (1985)

Neurotransmitters		
norepinephrine/dopamine (increased urinary secretion)	depression	Wiener & Elmadjian (1962) Rausch & Janowsky (1982)
decreased serotonin uptake	depression	Rausch & Janowsky (1982)
acetylcholine (predominance of cholinergic activity)	emotional upset	Rausch & Janowsky (1982)
Other Biological Factors		
pyridoxine deficiency	anxiety, irritability, tension	Biskind (1943) Abraham (1983)
prostaglandin metabolism	psychological and physiological	Craig (1980)
prostaglandin excess / imbalance (PGE_1, PGE_2)	psychological and physiological	Budoff (1983)
prostaglandin deficiency (PGE_1)	headache, sweet cravings, fatigue, dizziness	Abraham (1983)
prostaglandin imbalance (excess PGE_1 & deficient PGE_2)	psychological and physical – except breast symptoms	Jakubowicz, Godard & Dewhurst (1984)
Sociobiology		
survival function	hostility	Rosseinsky & Hall (1974)
Social Psychological		
social learning (stereotypic beliefs, experimental demand)	psychological and physical	Parlee (1974) Ruble (1977)
cognitive labelling	psychological and physical	Ruble & Brooks-Gunn (1979)
attribution theory	psychological	Koeske & Koeske (1975)
stress	psychological and physical	Siegel, Johnson & Sarason (1979)
Psychological		
intrapsychic conflicts concerning female identity	psychological and sexual	Deutsch (1944) Benedek (1950)
neuroticism	psychological and physical	Coppen & Kessel (1963)
cognitive processes (e.g. learned helplessness, state dependent learning)	depression	Hamilton, Alagna & Sharpe (1985b)
Psychiatric		
vulnerability to affective disorder	depression, labile mood	Halbreich & Endicott (1985b) Rubinow & Roy-Byrne (1984)
Biopsychosocial		
interaction of endocrine disturbances, psychiatric health, attitudes towards menstruation, social adjustment and the symptoms themselves	psychological, physiological, & behavioral	Clare (1983)

> In the years since Frank first provided a systematic description of the syndrome, biological research has only served to reveal how complicated the underlying neuroendocrinological framework of the menstrual cycle is. In consequence, theories based on a single hormonal abnormality look increasingly frail. (Clare, 1985, p.228)

In fact, theories based on a purely biological substrate -- no matter how complex -- face a challenge from multifactorial, systemic models which recognize that social and psychological factors are likely to interact with biological ones in the experience of PMS (Bancroft & Backstrom, 1985; Clare, 1983; Logue & Moos, 1986).

Biological Theories of Premenstrual Symptoms

Not one of the biological hypotheses presented in Table 1 has received substantial support. Certain of them derive limited support from uncontrolled treatment trials designed to correct a hypothesized deficit. For example, Katerina Dalton (1984) and other practitioners working in premenstrual syndrome clinics (Norris, 1983; Lauersen & Stukane, 1983) swear by the efficacy of natural progesterone as a treatment for severe PMS. However, double-blind controlled studies of progesterone have failed to find a superiority of this treatment over the placebo response Sampson, 1979; Smith, 1976).

The purely biological theories of PMS will not be dealt with further as they are not central to this thesis..

Comprehensive reviews and critiques of these theories are available in Bancroft and Backstrom (1985), Rausch and Janowsky (1982), and Reid and Yen (1981). Despite the prospect that advances in methodology and technology may eventually reveal cylic ovarian endocrine activity to be an integral component of PMS, this does not preclude the importance of psychological and social factors as either mediators of symptomatic expression or as mutually interactive components in a systemic model of PMS.

Psychological Theories of Premenstrual Symptoms

A number of factors, when considered together, suggest a potential psychogenic contribution to the etiology of PMS: (a) the failure to isolate a biological substrate for PMS, (b) the high placebo response rate detected in most controlled treatment studies, (c) the similarity between premenstrual mood disturbances and certain psychiatric disorders, and (d) the ubiquitous negative stereotypes held concerning the debilitating effects of the premenstrual and menstrual phases.

Implicit in many psychological explanations of PMS has been the notion that the primary pathology lies in a woman's reaction to or interpretation of her essentially normal cyclic biologic changes. The root of this pathology has been variously conceived of as originating in social learning, intrapsychic conflict, personality disturbances or psychiatric vulnerability. The literature pertinent to each of these areas will be reviewed.

Social Learning Theory

As previously mentioned, the prevailing stereotypes which exist in our culture tend to depict menstruation as a time of emotional and behavioral incapacity for women. Several researchers purport that women have internalized these attitudes and therefore expect menstruation to be accompanied by physical discomfort, emotional lability and impaired functioning.

Survey studies have revealed that adolescent boys and premenarcheal girls hold similar beliefs, as do postmenarcheal girls (Clarke & Ruble, 1978), college women (Brooks, Ruble & Clarke, 1977), and even college men (Parlee, 1974), regarding the negative symptomatology and behavioral impairments associated with menstruation.

These beliefs apparently influence judgements: male and female college students were more inclined to attribute negative moods occuring premenstrually in a hypothetical subject to her biology (cycle phase) even though situational factors were present that could equally have accounted for her mood (Koeske & Koeske, 1975). Positive premenstrual emotions, however, were more likely to be attributed to situational or personality factors. Granted the ubiquity of shared beliefs, it has been argued that studies which inquire about negative symptomatology premenstrually are likely to elicit just such stereotypes because of the demand characteristics of the inquiry.

Support for this argument can be derived from a number

of studies which concealed the investigator's interest in the menstrual cycle and failed to detect cyclical shifts in psychological and physical well-being (Parlee, 1982; Swandby, 1981). In fact, Parlee (1982) found the opposite to what might be expected -- she noted the occurence of a "premenstrual elation syndrome" in the daily ratings of her experimentally naive subjects (Parlee, 1982, p. 130). Several similar investigations reported that although psychological symptoms failed to demonstrate cyclicity when the purpose of the investigation was concealed, physical symptoms (e.g. pain, water retention) continued to peak in the premenstrual and menstrual phases (Englander-Golden, Whitmore & Dienstbier, 1978; Slade, 1984).

A study which employed an experimental demand condition as the independent variable found that women who were informed as to the menstrual cycle focus of the study reported greater psychological and physical symptoms during the premenstrual and menstrual phases than did women and men who were unaware of the focus (Auburchon & Calhoun, 1985). However, a very similar study (Rogers & Harding, 1981) found exactly the opposite: Women who were aware of the menstrual focus of the investigation actually reported significantly lower overall distress on the MDQ than did men and women who thought they were participating in a study of life events and health. In another study (Markum, 1976), subjects told that the MDQ was a menstrual questionnaire failed to report different levels of symptomatology than those who were

unaware of its purpose. More recently, Van Den Akker and Steptoe (1985) demonstrated a similar negative finding with respect to prospective ratings of premenstrual and menstrual symptomatology: level of knowledge regarding the purpose of the study had no effect on the severity or pattern of symptoms reported throughout one month of daily ratings.

Support for the hypothesis that expectation influences symptom report has also been derived from studies which compared women's retrospective symptom ratings with those generated by prospective daily recording. In general, retrospective reports tend to overestimate the presence and severity of premenstrual symptoms (Abplanalp, Donnelly & Rose, 1979; Englander-Golden et al., 1978; Parlee, 1982). There is also evidence that women attribute symptoms to the premenstruum which are actually more widespread (Clare, 1983; Halbreich & Kas, 1977; Moos et al., 1969). Ruble and Brooks-Gunn (1979) hypothesized that the tendency to attribute negative symptoms to the menstrual cycle arises from and is maintained by biases in information processing. For example, illusory correlations between negative moods and menstruation may arise because both represent infrequent yet distinctive events.

Sommer (1973), in a comprehensive review of the effects of menstruation on cognitive and perceptual-motor behavior, concluded that the self-report and social behaviors (e.g. crime, accidents, suicide) of women tend to reflect impairment premenstrually and menstrually. Objective

measures of cognitive and physical performance, however, generally fail to indicate fluctuations over the course of the menstrual cycle. Sommer suggested that the discrepancy between objective performance measures versus self-report and social behaviors (regarded as more amenable to mediation by social and psychological factors) indicated the influence of socially-mediated expectations. Golub (1976b) found that despite significant increases in anxiety and depression during the premenstruum, as well as complaints of difficulty concentrating and performing, her sample of women experienced no premenstrual decline in performance across a battery of cognitive tests. Although the depression and anxiety scores of Golub's sample were very mild in comparison to psychiatric norms, and perhaps not of sufficient magnitude to affect cognitive functioning, what is of note is the subjects' self-report (i.e. expectation?) of cognitive and performance deficits premenstrually.

A study frequently cited to indicate the salience of expectation in symptom reporting was conducted by Ruble (1977). She led college females to believe they were either in the premenstrual (1-2 days premenstrual) or intermenstrual (7-10 days premenstrual) phase of their cycles when they were all actually within 6-7 days of menses; a third group (controls) was told nothing. All groups filled out the Menstrual Distress Questionnaire based on symptoms experienced during the several preceding days. The group convinced they were premenstrual reported

significantly more pain, water retention and changes in eating habits than those convinced they were intermenstrual; there were, however, no differences in the reporting of negative affect. Ruble concluded that learned beliefs and the demand implicit in studies on the menstrual cycle seriously compromise the validity of self-report measures. She suggested that women are inclined to overstate their experience of physical changes when they believe they are premenstrual. However the results of her study do not specifically support this conclusion. No statistical analyses comparing the experimental groups to the control group were presented. All the subjects were, in reality, 6-7 days premenstrual; this has often been reported as the period of peak cyclic change. Hence, a comparison of the premenstrual group and the control group would have yielded evidence of the impact of demand over and above baseline symptom report. In fact, for the three significant findings reported, the scores of the control group were always closer to those of the premenstrual group than to the intermenstrual group. An alternate interpretation of Ruble's results, then, could be that women convinced they are intermenstrual tend to downplay their physiological complaints or attribute them to something other than the menstrual cycle -- a conclusion which clearly has different ramifications.

Critique of the social learning literature. The social learning perspective clearly did fill a gap in the early

literature on PMS. It is now widely recognized that in any experience of illness or physical distress there are accompanying psychological and social dimensions which interact to determine the illness experience; PMS is a prime candidate for such a biopsychosocial conceptualization. As a result of research findings arising from the social learning perspective, investigations of PMS now pay greater heed to the influence of demand characteristics, prospective ratings of symptomatology are considered standard practice and efforts have been made to seek methods other than self-report to assess and validate symptom experience.

There may be limitations, however, to the generalizability of much of the social learning literature. Almost the entire body of findings concerning the influence of beliefs, cultural stereotypes and demand characteristics on reports of premenstrual symptoms are based on relatively asymptomatic groups of healthy young women or those reporting very mild levels of change. The premenstrual MDQ scores of college students and young, normal women (Gruba & Rohrbaugh, 1975 and Moos, 1968 respectively) tend to be approximately half those reported by a severe PMT group (Haskett et al., 1980), suggesting that the two populations may not be comparable.

Recent evidence indicates that the prospective ratings of women with severe symptomatology are more likely to confirm their retrospective symptoms accounts (Abplanalp, 1983; Endicott & Halbreich, 1982), suggesting that for more

severely affected women, the influence of expectation and belief may be less salient.

Psychoanalytic Theory

Freud (1933) expounded on the psychic development of women from a basically phallocentric position, hence his ideas concerning the symbolic significance of the menstrual cycle. According to Freud, women believe they originally possessed a penis and lost it; this results in penis envy as well as recurrent states of rage during menstruation when the flow of blood serves to remind them of their castration. A woman's compensation for her deficient status is provided by the bearing of children, symbolizing a substitute for the lost penis. Each menstrual period, then, takes on a further meaning of loss as it represents a failure to conceive. Women purportedly repress all this rage and disappointment only to have it resurface again during reproductive crises such as menarche, menstruation, childbirth and menopause, when evidence of their deficient status is most salient.

Helene Deutsch (1944) suggested that the approach of menstruation stimulates conflicts (both conscious and unconscious) related to feminine identity -- including pregnancy, childbirth, castration, penis envy and aggression. Therese Benedek (1950) proposed that the manifestations of severe premenstrual tension reflect particularly intense conflicts concerning feminine identity.

The pioneer effort to investigate the relationship between psychodynamic processes and menstrual cycle phase

was carried out by Benedek and Rubenstein (1939a, 1939b). A longitudinal study of 15 women who were in psychoanalytic therapy was conducted; Benedek recorded and analyzed content of the analytic sessions while Rubenstein tracked the patients' hormonal changes with vaginal smears and basal body temperature recordings. Assessments of cycle phase made independently by the two authors were strikingly similar and revealed consistent relationships between variations in hormone production and the dynamic content of free association and dream material.

Estrogen production was related to active, extroverted strivings and heterosexual libido. At ovulation, as estrogen peaked and progestin production began, passive-receptive tendencies emerged as women prepared biologically and emotionally for conception. If frustrated in their desire to receive a mate, emotional tension could increase in this phase. After ovulation and until the premenstrual phase, feelings of relaxation and well-being generally continued. As progestin levels peaked in the midluteal phase, wishes for impregnation and motherhood become more conscious, but a woman's conflicts with her own mother could result in fears of motherhood or a hostile defensiveness against it. The decline of estrogen and progesterone in the premenstrual phase, often perceived as a relative deficiency by women, could result in partial regression to pregenital concerns. Symptoms varied greatly across women but the ego seemed to regress and frustrations

became unbearable leading to crankiness, fatigue, anger, and crying spells - in general an overall reduction in the control of emotion. The onset of menses brought with it a decline in irritability but depression often continued until estrogen began to rise again in the next cycle; depression was often correlated with regret over the failure of pregnancy.

Benedek and Rubenstein's work contributed many astute perceptions regarding the relationship between mind and body processes, perceptions that were consistent with the analytic framework within which the investigators worked. They presented a model which integrated a woman's sexual cycle and sexual feelings with her emotional life, yet retained an appreciation of the inherent complexity of the phenomenon. One of the major criticisms of their work concerns the reliability and validity of psychoanalytic interpretations of dream and free association material, which tend to be considered "soft measures" by today's standards. Given the biological determinism inplicit in some of Benedek's writings (e.g. "the cyclic fluctuation of hormones forces the emotional processes of the adult woman into certain regulated channels" (Benedek, 1950, p. 232), and the difficulty of remaining completely blind to a patient's menstrual cycle phase, one cannot assume that experimenter bias did not color Benedek's interpretations of analytic material. There is also some ambiguity concerning the psychological health of Benedek and Rubenstein's sample,

and the generalizability of their findings.

Analytic theorists which followed Freud tended to be somewhat less literal in their conceptualization of penis envy (Horney, 1967). Discontent with the female role became associated more with envy regarding man's power and social prestige than any anatomical advantage. The application of revisions in analytic thought to menstrual cycle research led to the hypothesis that women who rejected their feminine identity and resented their traditional female roles would be more at odds with their physiology and suffer more menstrual and premenstrual distress.

Research based on this notion has yielded inconsistent findings. Several studies (Fortin, Wittkower & Kalz, 1958; May, 1976) have concluded that women who suffer from PMT are less content with traditional feminine roles. May, however, based his conclusion on marginally significant findings, and Fortin based his on impressions gathered rather unsystematically from analytically oriented interviews. More recent and empirically convincing studies have found either no correlation between premenstrual distress and acceptance of the female role (Berry & McGuire, 1972; Watts, Dennerstein & Horne, 1980) or have found that premenstrual complaints are more common in traditional women who score high on standardized femininity scales (Gough, 1975; Stout & Steege, 1985) and who endorse stereotypic sex roles (Beck, 1971). Regardless of any correlation between these variables, there is no support for a causal relationship.

It is equally plausible that the experience of severe premenstrual symptoms could result in negative attitudes towards femininity, or that another variable could influence both the experience of symptoms and the acceptance of one's gender identity.

Critique of the Psychoanalytic Literature. The major criticisms of analytically-oriented investigations of the menstrual cycle involve their lack of empirical rigor and their relative imperviousness to alternative interpretations of observed relationships. The validity and reliability of psychoanalytic interpretations of dream and free-association material can be questioned, as can the relevance of intrapsychic events for actual behavior. In their favor, analytic studies do provide alternative measures to self-report which has been demonstrated to be biased by memory, demand and stereotyped beliefs. When viewed within the context of analytic theory, granted its clearly stated assumptions, such investigations provide subtle insights and potential clues which may be helpful in achieving an integrative understanding of premenstrual phenomena. For instance, the "subjective" interpretation of a premenstrual decline in ego strength was subsequently demonstrated with an objective measure (Hammond & Keye, 1985). The careful observation of phenomena, which is the hallmark of analytic studies, is of inherent value in the delineation of relationships which can be followed up empirically.

Personality Research

Numerous studies have reported significant correlations between complaints of menstrual distress and poor adjustment or neuroticism; fewer studies have focused specifically on premenstrual complaint and adjustment. Positive correlations between premenstrual complaints and neuroticism have been detected in studies employing the Neuroticism scales of both the Maudsley Personality Inventory (Coppen & Kessel, 1963) and the Eysenck Personality Inventory (Taylor, 1979; Watts et al., 1980), as well as the Minnesota Multiphasic Personality Inventory (Gruba & Rohrbaugh, 1975). Several studies have noted that the association between neuroticism or poor psychological adjustment and premenstrual complaint was due to premenstrual variations in psychological symptoms while physical symptoms did not covary with adjustment (Clare, 1983; Gruba & Rorbaugh, 1975).

Several investigators found significant differences in trait anxiety between women complaining of premenstrual symptoms and controls (Halbreich & Kas, 1977; Mira, Vizzard, & Abraham, 1985). Premenstrual sufferers reported higher levels of trait anxiety in general -- in the follicular as well as luteal phase -- but, unexpectedly, their "trait" anxiety scores increased significantly in the luteal phase. In both studies the authors concluded that their instruments (Taylor Manifest Anxiety Scale, Spielberger Trait Anxiety Inventory) may reflect an "anxiety proneness" which can be exacerbated premenstrually. The detection of cyclic

variation in a presumed trait variable suggests that the cycle phase during which subjects are assessed should be taken into account.

Further support for this notion was demonstrated by Hammond and Keye (1985), who reported that Minnesota Multiphasic Personality Inventory (MMPI) results are also susceptible to marked fluctuations across menstrual cycle phase. Test sessions conducted in the luteal phase revealed statistically significant elevations on MMPI scales 1,2,3,4,6,7,8, and 0 as well as on a composite index of conscious anxiety in comparison to sessions conducted with the same subjects in the follicular phase of the cycle. Scale scores reflecting ego strength, derived from the MMPI, were significantly reduced in the luteal phase. The authors emphasized the significant impact of cycle phase on any measure of personal adjustment -- even those assumed to represent stable personality traits.

Few studies investigating personality variables have drawn a distinction between neuroticism and neurosis, although there tends to be an implicit consensus that they lie along a continuum of personal stability from the normal stable individual, to those with neurotic personality traits, to the severely neurotic maladjusted patient. Rees (1953), in his investigation of neuroticism, neurosis, and PMT, devised a systematic although idiosyncratic method of assessing degree of neurosis. His composite index was based on family history, childhood neurosis, adjustment at school,

work and marriage, clinical assessment of general stability and diagnostic type, as well as several psychometric measures of neuroticism. Premenstrual tension was more frequently reported among neurotic subjects, in whom the intensity of premenstrual symptoms was positively correlated with the severity of neurosis. However, Rees also noted the presence of PMT in normal women with no evidence of neuroticism. Within the normal group, a comparison of women reporting PMT with those who did not, showed no significant differences in any index of personality instability or neuroticism. Rees also reported that psychiatric therapy could improve neuroses without affecting women's PMT while PMT was alleviated in some patients by pharmacologic treatment without affecting their neuroses.

Rees proposed an interactive model of PMT to account for his findings: bodily changes occuring premenstrually (and varying in the degree of underlying hormonal abnormality) are reacted to in various ways depending on factors such as personality type, existing neuroses, attitudes or environmental stress. Women with abnormal endocrine functions who are otherwise well-adjusted may experience changes equivalent to those that a more neurotic woman would in relation to relatively normal endocrine events. Rees' formulation foreshadowed recent trends to conceptualize premenstrual complaint within an interactive framework. Rees' attention to the distinction between neuroses and neuroticism, and his careful assessment of

each, led to the first evidence that perfectly normal women, free from neuroticism, also complained of premenstrual tension.

Support for the presence of premenstrual complaint in women without evidence of personality problems has been sporadic but consistent. Cullberg (1972), in a sample of women deemed to suffer premenstrual syndrome, noted that only 26% had high neuroticism scores on the Eysenck Personality Inventory; these women tended to rate their premenstrual symptoms as more severe than did the 74% of PMS sufferers with low neuroticism scores. Clare (1977), assessed both non-psychotic psychiatric morbidity -- measured with the General Health Questionnaire (GHQ) -- and premenstrual symptoms in patients presenting to general practice and to a PMS clinic. What was striking was the very high proportion of women scoring GHQ+ (i.e. psychiatric ill-health) who also complained of PMS (87%); among GHQ- women (psychiatrically healthy), 67% reported PMS. On the other hand, women scoring positive for PMS were equally likely to be classified as psychiatrically ill or healthy. A more thorough analysis of these samples' reports (Clare, 1983) revealed that psychiatrically ill PMS sufferers complained of significantly more symptoms and of greater severity than did psychiatrically healthy PMS sufferers. This was mainly accounted for by their greater endorsement of psychological symptoms (particularly negative affect), while the two groups did not differ in their report of

physical symptoms.

Van Den Akker and Steptoe (1985), in their prospective study of premenstrual complaint, also assessed psychiatric health with the General Health Questionnaire (GHQ) and utilized the daily form of the MDQ for prospective symptom recording. Although women rated GHQ+ (i.e. psychiatric ill-health) did report greater premenstrual distress than women rated GHQ- (psychiatrically healthy), they showed tonically elevated symptom levels throughout the entire cycle. Contrary to Clare (1983), Van Den Akker and Steptoe concluded that there was little evidence to suggest a relationship between psychiatric ill-health and menstrually-linked symptom fluctuation. In fact, Clare's conclusions had been based mainly on retrospective symptom report; his GHQ+ sample may also have experienced tonic symptom elevations. As well, Van Den Akker and Steptoe had disguised the focus of their study, which may have reduced the tendency for psychiatrically ill women to attribute their symptoms to the menstrual cycle.

Critique of the Personality Literature. Implicit in much of the research reporting correlations between personality variables and PMS was the notion that poor personal adjustment caused PMS. A number of methodological shortcomings in this literature compromise the validity of many of the findings reviewed, and particularly preclude drawing any such causal links.

1. Rarely have investigators controlled for the fact that

personality inventories and measures of premenstrual distress tend to share items in common (e.g. depression, emotional lability) which could spuriously inflate their relationship to one another.

2. Researchers have often employed large samples so that correlations accounting for as little as 9% of the variance in PMS symptoms (Coppen & Kessel,1963) are reported as significant findings.

3. The phase of the menstrual cycle during which testing is carried out has rarely been attended to although cyclic fluctuations in personality measurements have been detected (Hammond & Keye, 1985).

4. Most of the research on personality factors and PMS is based on retrospective report of premenstrual symptomatology. Recent studies have shown retrospective report to be unreliable; subjects are often found to have more diffuse and widespread symptoms. Without careful screening for psychiatric morbidity and/or prospective ratings to confirm cyclicity of symptoms, psychiatric ill-health could represent a confound in the observed association between poor adjustment and PMS.

5. Even if a relationship exists between personality adjustment and PMS, no causality can be inferred; repeated premenstrual difficulties for prolonged periods of a woman's life could well result in a deterioration in personal adjustment or a third variable could be responsible for both PMS and personality difficulties.

Despite the above-mentioned caveats, the weight of the cummulative evidence within personality research to data suggests that whereas normal women apparently experience significant premenstrual symptoms, the risk for PMS (or at least for complaints of PMS) is higher within less well-adjusted populations and may, within these groups, vary in proportion to the intensity of their disturbance. This relationship is supported, and further elucidated, by the literature concerning PMS in psychiatric populations.

Empirical Findings Within Psychiatric Research

A large and varied body of literature suggests a relationship between menstrual cycle phase and psychotic conditions, whether affective (bipolar or unipolar) or schizophrenic in nature. This literature has been comprehensively reviewed by Smith (1975), and will be mentioned only briefly here. Numerous reports of proportionately more admissions to psychiatric wards during the premenstruum and menstruum, in comparison to the remainder of the cycle, have been published (Dalton, 1959; Diamond, Rubinstein, Dunner, & Fieve, 1976; Janowsky, Gorney, Castenuovo-Tedesco, & Stone, 1969; Kramp, 1968; Luggin, Bernsted, Petersson, & Jacobsen, 1984). Similarly, appearances at emergency rooms and walk-in clinics tend to peak during these two phases of the cycle (Glass, Heninger, Lansky, & Talan, 1971; Jacobs & Charles, 1970).

Such reports, however, generally rest on gross, retrospective approximation of cycle phase. No follow-up

data are reported to ensure that the cycle phase was accurately estimated, or that menstruation occurred when regularly scheduled. Reports that stress can alter menstrual function and ovulation (Russell, 1972) suggest caution in assuming that cycle phase represents a fixed factor which can be used as an a priori independent variable. Questions can also be raised concerning what the day of admission represents -- the onset of a crisis in tandem with a specific menstrual cycle phase or the final stressor in an already deteriorating condition?

Zola, Meyerson, Reznikoff, Thornton, & Concool (1979) conducted one of the few studies which addressed the relationship between cycle phase and psychiatric admission. The authors collected Menstrual Distress Questionnaire responses, involving the last cycle prior to admission, from women admitted to a psychiatric facility. They compared the responses of women admitted premenstrually or menstrually with those admitted during the remainder of the cycle. There were no differences between groups, suggesting that premenstrual syndrome makes no specific contribution to premenstrual or menstrual admissions, but seems rather to exert an additive effect on the psychotic process, much as an environmental stressor might. Unfortunately, this study failed to distinguish between types of psychoses (affective versus schizophrenic) which, as will be demonstrated shortly, has been revealed to be an important variable.

There have been frequent case reports describing the

recurrence of psychosis in the premenstrual phase with a rapid resolution of symptoms following menstruation (Berlin, Berger, & Money, 1982; Endo, Daiguji, Asano, Yamashita, & Takahashi, 1978; Felthous, Robinson, & Conroy, 1980). These cases, which have been referred to as "periodic psychosis" or "recurrent menstrual psychosis", appear to be relatively rare, although survey data are not available.

Several treatment studies using lithium -- which has generally proven ineffective for PMS -- point to an interesting link between PMS and psychiatric illness. Fries (1969) reported that lithium provided relief to two of five patients who complained of severe PMS. Both these women were thought to have "affective personality disorders". Deleon-Jones, Val, and Herts (1982) reported a good reponse to lithium in a woman with a 10-year history of severe, recurrent premenstrual irritability and hostility which was accompanied by marked premenstrual elevations in MHPG excretion. Manic-depressive illness was suspected in this woman's father. Lithium effectively reduced MHPG levels to normal and the patient's affective symptoms showed a complete remission. The authors concluded that there may be a subgroup of women with subsyndromal affective disorders whose symptoms are triggered during the premenstrual phase. This hypothesis gains some support from a treatment study conducted by Steiner, Haskett, Osmun and Carroll (1980), who administered lithium to 15 women with severe dysphoric premenstrual symptoms, but no history of major psychiatric

disorder. The treatment proved beneficial (and tolerable) to only three women, and it was subsequently determined that they all met diagnostic criteria for "subsyndromal" affective disorder (i.e. cyclothymia). Two of the three had a family history of affective illness. Steiner and colleagues noted that while lithium seemed to alleviate cyclothymic features, it may not have directly affected the women's PMT (physical symptoms were unchanged), but just made them more able to cope with it by lowering overall distress.

This notion of an additive relationship between PMS and psychiatric disorder is similar to the conclusion drawn by Zola et al. (1979). There is increasing evidence, however, to suggest an interactive relationship between premenstrual mood changes -- variously referred to as "premenstrual affective syndrome" or "premenstrual depression" -- and psychiatric illness of an affective nature. With respect to hospital admissions, for instance, Abramowitz, Baker, & Fleischer (1982) found that while admissions for both schizophrenic and depressed patients were disproportionately high during the paramenstruum (4 days premenstrual plus first 4 days of menses), this phenomenon held much more strongly for depressed patients (69%) than for schizophrenic patients (37%). In fact, 40% of all depression admissions were confined to the last premenstrual day and the first day of menses. In attempting to explain this striking finding, the authors noted that estrogen levels are very low on these

days; low estrogen has been linked to elevated monoamine oxidase, which could cause catecholamine depletion and result in a depressive episode in predisposed individuals (Schildkraut, 1965).

Although an association between premenstrual dysphoric mood changes and affective disorder has been noted in many studies over the years (Clare, 1983; Coppen, 1965; Cullberg, 1972; McClure, Reich & Wetzel, 1971; Stout & Steege, 1985), it often represented an extraneous finding and was rarely the direct focus of interest. More recently, research has been designed to specifically address this question. The investigation has proceeded along several lines of inquiry:

1. The incidence of both premenstrual mood change and various psychiatric diagnoses has been assessed in unselected samples.

2. Women reporting premenstrual mood change have been followed up to assess incidence of subsequent psychiatric illness.

3. Incidence of premenstrual mood change has been assessed in patients with various current or lifetime psychiatric diagnoses.

4. Lifetime history of psychiatric illness has been assessed in patients seeking treatment for premenstrual syndrome.

The basic findings of each of these avenues of investigation will be reviewed.

1. Premenstrual mood change and affective illness in unselected samples

Kashiwagi, McClure and Wetzel (1976) studied 81 women with chief complaints of headache, who sought evaluation at a neurology clinic. History of psychiatric illness was diagnosed according to the Feighner criteria (Feighner et al., 1972), but the symptom duration required to diagnose depressive syndrome was reduced to two weeks from four. Premenstrual affective syndrome (PAS) was defined as moderate or severe experience of at least one psychological and one somatic symptom. A significant relationship was detected between the incidence of affective disorder and reports of PAS: 65% of subjects with a history of affective disorder (28 of 43) reported PAS, while only 18% of all remaining subjects with no history of depression (14% with other psychiatric illness, 21% with no psychiatric illness) experienced it. The fact that PAS was not just a function of psychiatric illness was evidenced by the following statistics: 92% of hysterics with a concurrent depressive disorder reported PAS, while none of the hysterics without related depression did so. The authors concluded that an increased frequency of premenstrual affective change is associated with a history of depressive disorder; they speculated that physiological and/or psychological stress associated with the changes of the menstrual cycle may make manifest a predisposition for affective disorder.

Endicott, Halbreich, Schacht and Nee (1981) further

pursued this line of inquiry but were much more rigorous in their delineation of premenstrual symptomatology. Their subjects, however, represented a very heterogeneous group including patients who had been treated for depression or panic disorder but were currently euthymic, relatives of these and other patients, as well as a small number of community controls. Women reporting a constellation of symptoms which met the authors' Premenstrual Assessment Form (PAF) typological category of "major depressive syndrome" were assessed for lifetime history of psychiatric disorder according to Research Diagnostic Criteria (RDC) (Spitzer, Endicott and Robins, 1978). The symptom duration required by the RDC for a diagnosis of major affective disorder is only one week. The PAF typological categories were modelled after the RDC in content, but do not demand a minimum duration. Of those women reporting a major depressive syndrome premenstrually: 62% evidenced a history of major affective disorder, 50% of another affective disorder (e.g. intermittent depression), 33% of a nonaffective disorder (e.g. anxiety disorder), and 7% had no history of mental disorder. The overrepresentation of a history of depression in women complaining of depressive symptoms premenstrually led the authors to suggest that premenstrual depressive syndrome may represent a mild or subclinical manifestation of affective disorder.

In a subsequent publication, Halbreich and Endicott (1985b) presented data gathered from five different sources,

including some of the subjects from the 1981 study cited above. Their groups included: previous inpatients who had been depressed, relatives of patients, controls for these relatives, and two samples who responded to posted notices seeking subjects for menstrual cycle research -- one of which consisted only of subjects who had completed daily ratings and were confirmed to experience either significant premenstrual changes or little change premenstrually. Subjects assigned a lifetime history of major depressive disorder according to the RDC were compared to those with no history of mental illness regarding the degree to which they complained of depression premenstrually. The data for all five samples, when combined, indicated that women with a history of depression (57%) were more likely than those without (14%) to complain of premenstrual depression.

There are several questions which arise from the data presented in the papers mentioned above. Firstly, their figures for lifetime history of affective illness are quite high in relation to epidemiological survey rates (Robins et al., 1984). For example, Halbreich and Endicott (1985b) found rates of 42%, 61%, and 71% in their control group, relatives of patients, and first posted notice sample respectively. This might suggest that their criteria for diagnosing lifetime history are too lenient, or that the groups surveyed are somewhat idiosyncratic. In support of the latter explanation, a comparison of the first posted notice group which was selected retrospectively, with the

second whose symptoms were prospectively confirmed, reveals more than twice the incidence of affective illness in the retrospectively chosen sample (71% versus 32%). The figure of 32% for prospectively confirmed subjects, however, is very close to that reported by DeJong et al. (1985) in the only other published analysis of a confirmed sample (to be reviewed in section 4). This suggests that the other four groups which are represented in Halbreich and Endicott's surveys may have a higher than average history of affective illness, perhaps due to the manner in which they were selected (i.e. ex-patients, their relatives, notices posted in medical centers). The same might be true of the subjects studied by Kashiwagi et al. (1976) -- that is, women with functional headache who presented at a neurology clinic for evaluation.

Halbreich and Endicott's figures can be quite misleading when, for instance, they invert their data and report that of those women with premenstrual depression, 84% had a history of affective illness, while only 9% were never mentally ill. It is important to keep in mind that this data likely has limited generalizability beyond the idiosyncratic composite sample assessed by Halbreich and Endicott (1985b).

The majority of findings discussed in the previous section did rest on retrospective report of premenstrual symptoms and, granted the potential for distortion in such reports, their validity could be questioned. Nevertheless,

some manner of relationship between premenstrual mood changes and affective disorder is suggested. Further support for such a relationship was generated by two longitudinal studies designed to assess psychiatric morbidity in women reporting premenstrual affective changes.

2. Longitudinal studies of premenstrual affective syndrome

Wetzel, Reich, McClure and Wald (1975) conducted a four-year prospective study of female college students. They found that those who initially reported a premenstrual affective syndrome (PAS) were significantly more likely than those who did not, to seek psychiatric help and to be diagnosed with an affective disorder within the next four years. Although these data are suggestive of an association between PAS and affective illness, they have often been interpreted to suggest that PAS is a risk factor for the development of affective illness. This conclusion goes somewhat beyond the data: because the students were not initially assessed for affective illness (either current or past) when they entered the study, it is impossible to conclude which disorder they experienced first -- PAS or clinical depression.

Schuckit, Daly, Herrman and Hineman (1975) found that college students reporting a premenstrual affective syndrome, when compared to those who did not, had a higher incidence of both previous depressions (11% vs. 5% respectively) and family histories of affective illness (18% vs. 10% respectively). They were also more likely to

develop a clinically significant depression during the ensuing twelve months (7% vs. 0% respectively). Although these comparisons all failed to attain significance, they are very suggestive. The authors attributed the lack of significance to the very small numbers of student who became psychiatrically ill during the course of the study.

3. Premenstrual mood change in psychiatric patients

Diamond et al. (1976) assessed the incidence of premenstrual depressive complaint (PMD) in patients diagnosed with primary affective disorder (both bipolar and unipolar) according to the Feighner criteria (Feighner et al., 1972). They reported that 65% of these patients complained of depression premenstrually, which is very similar to the figure reported by Endicott et al. (1981) and Kashiwagi et al. (1976) for women with a history of affective disorder. However, 57% of their control group, which was made up of social workers and wives of male lithium patients, also reported depression premenstrually. The authors provide little information that would aid in integrating these findings. It is not clear, for example, whether their patient group was euthymic at the time of assessment, nor during which phase of the menstrual cycle assessment took place. Although the authors ruled out current psychiatric disorder in the control subjects, they did not assess lifetime history. As well, their control sample was small (n=25) compared to the patient sample (n=63) due to the fact that over two-thirds of the healthy

women refused to participate in the study. This may indicate that those controls who did volunteer had a particular problem with premenstrual symptoms.

An alternative, although purely speculative possibility, is that Diamond's sample was unquestionably an affective disorder group (diagnosed with Feighner's original criteria, which requires symptom duration of one month), while those studies employing a more lenient duration criteria (1-2 weeks) may be diagnosing as affective disorder women who merely experience premenstrual depression for one to two weeks of every month. In fact, Diamond's affective disorder group consisted of a high percentage of bipolar patients, in contrast to the unipolar patients involved in most other investigations of PMS. Another possible explanation for the high rate of PMD reported by the control subjects, and the comparable rate reported by the bipolar patients, is that the criteria for PMD was simply too lenient with the result that both groups had similarly inflated rates for PMD. In fact, the reliability of the manner in which affective symptoms were assessed by Diamond and colleagues is questionable: The presence or absence of premenstrual affective symptoms was assessed clinically on the basis of retrospective symptom report obtained from subjects during interviews.

Hurt, Friedman, Clarkin, Corn & Aronoff (1982) detected the highest incidence of premenstrual affective syndrome in women who met DSM-III criteria for <u>both</u> major depression and

borderline personality disorder (8.3%), the lowest incidence in women with borderline personality alone (11%) and an intermediate rate in women diagnosed as schizophrenic (62%) or with major depression alone (64%). These findings suggest an interaction between affective illness and character pathology, which the authors speculate may be mediated by premenstrual deficits in ego functioning. It is interesting to note that sex differences have been detected in the prevalence of the "borderline" diagnosis which are identical (i.e. 2:1) to those found for major depression (Stone, 1980). Stone (1982), writing mainly from clinical experience, conceptualizes premenstrual tension (PMT) as arising from an interaction between biological and psychological forces. He suggests that neurotic or borderline functioning exaggerates the endocrine-related mood changes which occur paramenstrually. Stone (1982) cites cases of women who appear neurotic during most of the cycle but regress to borderline functioning premenstrually.

A preliminary but very provocative finding that psychiatric inpatients who complain of premenstrual affective syndrome (PAS) (Friedman, Stephen, Clarkin, Corn & Aronoff, 1982) have extremely abnormal sexual histories suggests that psychogenic factors may play a mediating role in PAS. Of 28 inpatients (mixed diagnoses) reporting PAS, 57% had abnormal sexual histories compared to an incidence of 5% in those not reporting PAS. Of those patients with joint diagnoses of depression and borderline personality

disorder, 75% suffered from PAS and had sexual histories which included rape, childhood molestation or incest. Although these data readily lend themselves to psychoanalytic interpretation, Hurt and colleagues (1982) are quite cautious in drawing inferences, concluding only that in patients with severe affective disturbance and a low level of ego integration, unresolved sexual conflicts induced by severe sexual trauma may have etiologic significance for premenstrual affective syndrome.

Roy-Byrne et al., (1986) failed to find a significant increase in the incidence of premenstrual depressive syndrome in either bipolar or seasonal affective disorder patients (assessed while euthymic) in comparison to controls who had no history of either cyclic mood change or psychiatric disorder. With the exception of significantly higher premenstrual anxiety levels, both affective patient groups were indistinguishable from controls on all psychological, behavioral and physical symptoms. When compared to a group complaining of PMS, the affective patient groups were significantly less likely to report almost all symptoms (even anxiety). Estimates of a premenstrual depressive syndrome (defined as substantial change in 4 out of 7 symptoms consistent with the DSM-III diagnosis of major depressive episode) in bipolar and seasonal affective disorder patients (25%) were markedly less than those reported by prospectively confirmed PMS sufferers (84%), and less than half those reported in prior

studies (Diamond et al., 1976; Kashiwagi et al., 1976; Endicott et al., 1981; Hurt et al., 1982).

The authors suggest a number of explanations for these discrepancies, including the fact that the majority of patients in other surveys have been unipolar depressives, and that the criteria used to diagnose premenstrual mood change in these samples was quite lenient. Of interest here is the similar failure of Diamond et al. (1976) to detect a difference between his largely bipolar group and controls in their reports of PMD. Rather, equivalently high rates of depression were reported by both groups, suggesting either that the criteria Diamond and colleagues used for PMD was too lenient or that subjects' retrospective reports were inflated. Roy-Byrne and colleagues also acknowledge that their sample may contain some false negatives, as they did not follow the two affective disorder groups prospectively to ensure that they did not actually experience premenstrual mood changes. Another possibility for the much lower concordance rates detected by Roy-Byrne and colleagues is that the diagnosis of bipolar and seasonal affective disorder was fairly rigorous in their study and perhaps unconfounded by women suffering from prolonged premenstrual depression.

4. Lifetime psychiatric history in women with premenstrual complaint

Stout, Steege, Blazer and George (1986) compared rates of lifetime psychiatric diagnoses of women attending a

premenstrual syndrome clinic to those obtained in a large epidemiological survey of comparable women. The NIMH Diagnostic Interview Schedule (DIS) (Robins, Helzer, Crougham & Ratcliff, 1981) was administered during the follicular phase to women seeking treatment for PMS, to assess lifetime incidence of DSM-III disorders. PMS women met criteria for dysthymia, somatization disorder, phobia, obsessive-compulsive disorder, alcohol abuse/dependence and drug abuse/dependence to a greater extent than did the community sample. A rather unexpected finding was that the incidence of major depressive episode (0.9%) in the PMS sample was significantly lower than that found in the community sample (7.2%), and not at all comparable to previous reports of a 62-65% lifetime incidence of depression in women complaining of premenstrual syndrome (Endicott et al., 1981; Haskett, Steiner & Carroll, 1984). Stout et al. (1986) attribute the discrepancy to differences in the duration criteria employed across studies in the diagnosis of major depressive disorder: Both Endicott et al. (1981) and Haskett et al. (1984) used Research Diagnostic Criteria which demand a one week duration of symptoms in comparison to the 2 weeks used in the current study. Supporting this explanation is evidence that a high proportion of the PMS patients studied by Stout and colleagues did report suicidal ideation (63%) and suicide attempts (15%), implying that depressive symptoms associated with the premenstrual phase may be very severe, yet

short-lived.

The incidence of dysthymia detected by Stout and colleagues, however, was considerably higher in women seeking treatment for PMS (21%) than in the community (3.6%). The depression characteristic of dysthymia may be "either relatively persistent or intermittent and separated by periods of normal mood, interest, and pleasure ..... normal periods may last a few days to a few weeks" (DSM-III, p. 221). It is quite feasible that women who had been suffering recurrent premenstrual depression from 1 - 14 days of each month, for more than several years, might be diagnosed with dysthymic disorder.

The issue of depressive diagnosis aside, the incidence of any lifetime psychiatric diagnosis in Stout et al.'s sample was considerably higher in PMS patients (81%) than in the community (35%). This could be attributed to the fact that the sample surveyed had not been screened for psychiatric disorder, nor had they been screened with prospective ratings to verify that their complaints were confined to the premenstrual phase of the cycle. Clinicians have consistently noted that among those women seeking treatment for PMS, there is a proportion whose psychological difficulties are more widespread or noncyclic, and suggested that psychiatric disorder is an important differential diagnostic indicator (Hamilton et al., 1985a; Haskett & Abplanalp, 1983).

An investigation somewhat similar to that of Stout et

al. (1986), conducted by Mackenzie, Wilcox and Baron (1986) with an unselected sample, will be reported in this section for ease of comparison. The authors solicited volunteers to participate in a study of daily changes in health and behavior; the menstrual cycle focus of the study was disguised. Subjects were classified according to their global retrospective report of none/mild or moderate/severe perimenstrual (i.e. premenstrual and menstrual) difficulties. Subsequent reports of premenstrual symptoms on the Premenstrual Assessment Form (PAF) confirmed that these classifications were also valid for premenstrual difficulties alone. Lifetime DSM-III psychiatric diagnoses were assessed with the DIS (Robins et al, 1981). The moderate/severe PMS group exhibited significantly higher rates of affective disorder (unipolar, bipolar and dysthymia) (45% vs. 21%) and drug abuse (21% vs. 0%) in comparison to the none/mild group, but did not differ from them in terms of overall psychiatric disorder (66% vs. 45%). Mackenzie and colleagues concluded that premenstrual difficulties are associated with a twofold risk of affective disorder and suggested that the two disorders may share a common set of factors which raise an individual's vulnerability to both.

Several interesting points can be made by comparing the last two studies which assessed psychiatric history in an identical manner in women reporting PMS and either seeking treatment or not. Firstly it is important to note that

although Mackenzie et al.'s sample was classified as moderate or severe PMS sufferers, their PAF cutoff point of 11 or more symptoms (of a possible 95) rated moderate to extreme suggests they may represent a relatively mildly affected group. The present author found that confirmed premenstrual depression sufferers reported a mean of 42 symptoms (sd=13) at similar severity levels. The apparently mildly affected sample, then, of Mackenzie et al. (1986), in comparison to the women studied by Stout et al. (1986) who were seeking treatment for PMS, appears more psychologically healthy overall (66% vs. 81% respectively) but reports a greater history of affective disorder (45% vs 24% respectively). Hypotheses suggested by the discrepancies between the findings of Stout et al. (1986) and Mackenzie et al. (1986) include: (a) statistics concerning women seeking treatment for PMS are confounded by the influence of pathological subgroups, (b) many women with a history of depression complain of premenstrual mood changes but may not seek treatment for them (perhaps they regard them as relatively manageable in relation to full-blown affective episodes), or (c) severe PMS sufferers are relatively healthy psychologically (as per Haskett et al., 1980) but include a subgroup of women vulnerable to depression.

It is becoming increasingly apparent that the nature of the population sampled, and the assessment instrument used, play a critical role in determining the degree of relationship between PMS complaint and psychiatric history.

Yet another decidedly problematic issue in all the studies just discussed is the failure to screen subjects, either with psychiatric interviews or prospective daily diaries, to ensure that they are a true premenstrual syndrome sample, unconfounded by more pervasive psychiatric disturbance.

One of the few studies to incorporate this critical methodological step was conducted by DeJong et al. (1985). Fifty-seven subjects complaining of mood and physical changes premenstrually were assigned psychiatric diagnoses based on the Schedule for Affective Disorders and Schizophrenia - Lifetime Version (SADS-L) (Spitzer & Endicott, 1975). They were divided into three groups: no psychiatric diagnosis (n=21), history of at least one major depressive episode (n=24), and other psychiatric diagnoses (n=12). On the basis of daily ratings carried out over three menstrual cycles, the authors confirmed a specific premenstrual increase in dysphoric mood in 58% of their sample. Of those confirmed in their report of premenstrual mood change, 30% had a history of major depressive disorder, 15% of another psychiatric disorder, and 55% had no psychiatric history. What was most striking, however, was the remarkably high proportion of nonconfirmed subjects who had a history of psychiatric disorder (88%), particularly of affective disorder (58%). Although the 30% incidence for history of affective illness in confirmed PMS subjects may be quite high, it represents half of what has commonly been reported in studies based on retrospective PMS assessment.

DeJong and colleagues conclude that such estimates are in all probability inaccurate, reflecting the high degree of affective pathology characteristic of subjects who fail to prospectively confirm their reports of PMS.

In summary, the two studies concerning the incidence of past episodes of affective illness in confirmed premenstrual sufferers (DeJong et al., 1985; Halbreich & Endicott, 1985b) report rates of 30-32%. Apparently, previously reported rates in the region of 62-100% were inflated by the tendency for women with a history of psychiatric illness, particularly affective illness, to complain of depressive changes in the premenstrual phase that could not be substantiated by daily ratings. Reasons for this lack of confirmation are rarely quantified, but typically include the presence of more pervasive depression, the lack of depressive changes at all, or changes which fail to meet the criteria for significant premenstrual increase (i.e. 30% greater premenstrually compared to postmenstually). The high incidence of disconfirmed premenstrual report among women with past affective illness suggests several reasons why they may erroneously attribute their mood changes to the menstrual cycle: (a) they have a history of premenstrual mood changes in addition to actual depressive episodes, (b) their depressive episodes typically appeared or became worse premenstrually, or (c) women consciously or unconsciously seek to attribute negative moods to biological sources rather than to psychological or social factors. The latter

explanation, although commonly invoked, is not well supported by the data: There is no ready explanation of why women with depression, but not those with schizophrenia or anxiety, would confine their report of symptoms to one phase of the menstrual cycle. Little empirical evidence concerning the long-term course of PMS exists, but clinicians often report that the severity and the actual presence of symptoms tends to vary from cycle to cycle and can be exacerbated by life stress (Rose & Abplanalp, 1983). It is quite possible, then, that nonconfirmed subjects do experience premenstrual depression during cycles other than those surveyed, or that it has been a common enough experience in their past that they have noted the association.

Premenstrual Depression as a Model for Affective Illness?

The evidence reviewed is quite convincing of some manner of association between premenstrual mood change and affective illness in at least a portion of PMS sufferers. Several research groups have proposed that premenstrual mood change might have potential as a model for the study of clinical depression (Halbreich & Endicott, 1985b; Rubinow & Roy-Byrne, 1984). Other researchers, notably Haskett, Steiner and colleagues, caution against this notion. In a carefully screened sample of severe premenstrual tension (PMT) sufferers, Haskett et al. (1980) noted that the core emotional features of severe PMT were irritability, tension and emotional lability. Sadness and dysphoria were more

commonly reported by a subset of their sample who exhibited elevated symptomatology during the follicular, as well as the luteal phase. The authors suggested that premenstrual depression represented a worsening of underlying psychopathology, and did not represent a "pure" premenstrual syndrome.

Cullberg (1972) also drew a distinction between premenstrual irritability and depression. He noted trends in the data of women with premenstrual irritability suggestive of specific hormonal responsivity: they reacted adversely to an estrogen dominant preparation but showed some relief with a gestagen dominant preparation. Hormonal responsivity in subjects with premenstrual depression was ambiguous; as well, they showed a stronger association with neuroticism, leading the authors to conclude that subjects with premenstrual depression were less clearly influenced by hormonal factors.

Haskett, Steiner and Carroll (1984) further investigated the clinical and endocrine functioning of their severe PMT sample in an effort to detect potential commonalities with depressive disorder. The PMT subjects failed to meet RCD criteria for major depression during the premenstrual phase, mainly because they did not achieve the duration criteria. The authors also pointed out that their clinical features did not resemble those of endogenous depression. Additionally, two measures of adrenocortical funcioning -- urinary free cortisol and the Dexamethasone

Suppression Test -- which are abnormal in many patients with endogenous depression, yielded normal values and no significant differences between premenstrual and follicular measurements. Haskett and colleagues concluded that premenstrual tension syndrome did not appear useful as a model for endogenous depression.

This conclusion is supported by Premenstrual Assessment Form (PAF) questionnaire results indicating that endogenous depressive features are rarely reported premenstrually (Halbreich et al., 1982). Halbreich, Endicott and Nee (1983) note, however, that severe clinical depression often lacks endogenous features. They suggest that commonly reported premenstrual dysphoric changes, including atypical, anxious and hostile depressive features, resemble nonendogenous depressive conditions and may have relevance for an increased understanding of such conditions.

Overview of Premenstrual Syndrome Literature

Despite the vast growth in the number of published studies concerning the premenstrual syndrome within the past 10 years, in many ways this research field can be regarded as still in an early phase of development. The fact that much of the research to date has been conducted using heterogeneous definitions of PMS, divergent populations (e.g. college students, psychiatric patients, severe PMS sufferers), and a variety of assessment instruments precludes a truly integrative summary of the literature. Several conclusions seem warranted, however, from the sheer

cummulative weight of the available findings.

A proportion of women clearly do experience fluctuations in symptoms in tandem with the phases of the menstrual cycle. Complaints of dysphoric mood and physical symptoms are most common during the premenstrual and menstrual phases of the cycle. In terms of prevalence, a distinction must be drawn between the premenstrual symptoms which many women experience to a mild degree, and a "syndrome" of premenstrual changes which seems restricted to a much smaller proportion of women (2-10%). Although there is little consensus as to the content, severity or timing criteria for a premenstrual "syndrome", its diagnosis is usually dependent upon behavioral sequellae such as impairments in functioning, treatment seeking, or the use of medications to provide relief.

There is evidence of substantial individual variation among women with premenstrual complaint -- in regard to symptoms experienced, their timing and duration, as well as the extent to which they are perceived as problematic -- suggesting that PMS represents a heterogeneous phenomenon. Although there now seems to be a general consensus regarding the importance of differentiating among subtypes of premenstrual change, there is less agreement as to the nature of these subtypes.

Attempts to identify a single etiological substrate for PMS -- whether physiological or psychological -- have been unsuccessful. Etiological theorizing is generally moving

towards a multifactorial perspective, which recognizes that biological, social, cultural and personality factors are likely to contribute in an interactive manner to the report of premenstrual symptoms. At this stage, research generated from such diverse disciplines can serve to illuminate parts of the whole, but it must be noted that the findings from each field may have limited generalizability due either to idiosyncracies in the populations studied or the methodology used.

Social psychological investigations of PMS have revealed that premenstrual symptom reports are subject to the influence of stereotyped beliefs, negative expectations, as well as to the demand characteristics of the investigation. As a result, the validity and reliability of self-reports of premenstrual symptoms -- particularly retrospective reports -- have been called into question.

The findings from personality research suggest that although perfectly normal women do complain of PMS, there seems to be an increased risk of premenstrual complaint in less well-adjusted individuals (e.g. those scoring high on neuroticism).

Investigations of the relationship between PMS and psychiatric disorder lend some support to the personality findings. The premenstrual and menstrual phases appear to impose an additional stress on the functioning of psychiatric patients in general, resulting in an increased vulnerability to decompensation and hospitalization. There

seems to be an interactive relationship, however, between a particular dimension of premenstrual syndrome and affective psychiatric illness. Psychiatric patients with current or past affective illness are more likely to complain of premenstrual affective symptoms than are patients who have received other psychiatric diagnoses or non-patient controls. As well, PMS patients seeking treatment are reliably found to have an increased rate of lifetime history of affective disorder in comparison to the general female population, while the concordance rates for PMS and other psychiatric disorders are less striking. These findings have generally been derived from retrospective report of premenstrual symptoms, and therefore may be confounded by women with affective disorder who erroneously attribute their symptoms to the premenstrual phase or those who actually experience exacerbations of their illness during the premenstrual phase. Regardless of the true nature and extent of the overlap between affective disorder and premenstrual affective change, that there is a relationship between the two, at least phenomenologically, now seems incontrovertible.

Fundamental questions concerning this relationship remain to be answered:

1. Does premenstrual depression represent a distinctive subtype of premenstrual change which can occur in the complete absence of affective pathology?

2. Do premenstrual depression and affective psychiatric

illness represent points on the same continuum, differing only in severity and duration of symptoms?

3. Are women who experience premenstrual depression vulnerable or predisposed to the development of affective illness?

Although the phenomenological similarities between premenstrual depression and affective illness have received substantial attention, few studies have investigated the relationship between these entities from a theoretical standpoint specific to depression. Cognitive theories of depression, which have dominated the field of depression research for the past 20 years, provide a potentially fruitful perspective from which to examine this relationship. Aaron Beck (1967, 1976) has delineated a cognitive model of depression which has substantially influenced theoretical and empirical investigations of depression. This model will be briefly outlined and its potential to illuminate the current understanding of premenstrual mood changes, and their relationship to clinical depression, will be discussed.

Beck's Cognitive Theory of Depression

Beck (1967, 1976) proposed that disordered cognitive processing is central to the experience of depression. Depressed people characteristically exhibit a "cognitive triad" of negative thoughts concerning the self, the world, and the future. Depressive "schemas" or cognitive structures which reflect the dysphoric themes of the

cognitive triad become prepotent during depression, influencing the processing of information from the environment. The processes of selection, interpretation and evaluation of stimuli are all then applied to information in an idiosyncratic manner which yields support for the depressive cognitive structures.

Beck proposed that the pervasive content of loss, self-blame, low self-esteem, deprivation, helplessness and hopelessness, characteristic of the thoughts of depressed individuals, reflect underlying cognitive schemata. These schemata are conceptualized as representing "a structure for screening, coding and evaluating the stimuli that impinge on the organism" (Beck, 1967, p.283). Under normal circumstances, a schema evoked by external stimuli is congruent with it and "the cognition resulting from the interaction of the schema with the stimuli may be expected to be a reasonably accurate .... representation of reality" (Beck, 1967, pp.285-286). In depression, however, idiosyncratic schemata become activated and "..the resulting interpretations deviate from reality to a degree corresponding with the incongruity of the schema to the stimulus situation" (ibid.). A reciprocal relationship is posited between schemata and stimuli in the enviroment. As idiosyncratic schemata become more prevalent, they can be evoked by less congruent stimuli: ..." instead of a schema being selected to fit the external details, the details are selectively extracted and modeled to fit the schema" (Beck,

1967, p. 286). The more that idiosyncratic schemata come to dominate cognitive activity, the more out of touch with reality the depressive will be.

The activation of depressive schemata was purported to influence not only the content but also the processing of information from the environment. Beck, Rush, Shaw and Emery (1979) outlined six logical errors in reasoning which depressed individuals make and which serve to distort reality in such a way as to confirm the themes of the cognitive triad: arbitrary inference, selective abstraction, overgeneralization, magnification and minimization, personalization and dichotomous thinking. Beck viewed disturbed cognitive processing as primary to depression, while the other affective, motivational, and behavioral symptoms characteristic of depression were held to follow from the way the individual structured his reality. He did allow for an interaction between cognition and affect, however, wherein depressive affect, stimulated by the activation of schemata, could further activate schemata and lead to increasingly depressive affect and distortions in reality.

Beck was more thorough in outlining how depression proceeded and was maintained than in explaining its origins -- for example where schemata came from and how they became activated. He did state that scemata represent the end product of concepts about the self, world and future which are developed early in life. For example, negative

self-concepts "derived from personal experiences, other's judgements of him, and his identifications with key figures" (Beck, 1967, p.275), may gain strength by influencing the interpretation of experience; as they gain strenth they become structuralized. Although such depressive schemata may remain dormant when the individual is not depressed, they are regarded as increasing the vulnerability of the individual, making him "depression-prone". According to Beck, depression ensues when predisposed individuals experience precipitating events (e.g. loss, thwarted goals, decline in self-esteem, stress) which activate depressive schemata.

Beck's model has been extensively tested and there is strong support for the tenet that the thought content of depressives is more negatively toned than that of nondepressed individuals. Such evidence, however, does not necessarily indicate that depressed individuals process information any differently than others. It may simply be an accurate reflection of the life experiences of depressed people who are typically perceived as less socially competent (Lewinsohn, Mischel, Chaplin & Barton, 1980) and who tend to provoke rejecting responses from others (Coyne, 1976).

Evidence for the tenet that depressed individuals actually process information in a distorted manner has generally been inferential and provided equivocal support. For example, studies designed to demonstrate distortions in

the way depressed subjects interpret feedback have often employed dependent measures subject to influence by memory: DeMonbreun and Craighead (1977) found accuracy in the immediate perceptions of feedback in depressed subjects but a subsequent negative distortion in their recall of feedback. This finding demonstrates the possible confound of memory within self-report measures used to draw inferences about processing, and emphasizes the importance of differentiating among different stages of information processing.

In a thorough review of research relevant to Beck's theoretical tenets, Coyne & Gotlib (1983) concluded that experimental findings (generally self-report) concerning how depressed individuals evaluate themselves and attribute success or failure experiences could be confounded with self-presentational strategies. In other words, as opposed to drawing negative, illogical conclusions about themselves, depressives may just present themselves in a self-denigrating manner for interpersonal reasons. Additionally, several studies have found that depressives are acually more accurate than normals in processing negative feedback (Lewinsohn et al., 1980; Nelson & Craighead, 1977), suggesting that nondepressed individuals, protected by illusory self-perceptions, distort environmental stimuli in ways which serve to enhance self-esteem.

In summary, one of the fundamental tenets of Beck's

theory -- that depressed individuals process information in an idiosyncratic manner when depressed -- has rarely been assessed directly. General models of information processing are helpful in conceptualizing an approach to this research issue.

Information Processing Theory

The information processing models proposed by cognitive scientists have generally represented consciousness as a linear, sequential process of limited capacity, wherein a few bits of information are passed on from one stage to another. One of the first stages in the processing of information involves attention. Multiple stimuli impinge on perceptual receptors, but only a limited number of these can be attended to and subjected to further processing. The process of selective attention has been conceptualized as a screening or filtering process during which information is analyzed for its significance to the organism (Broadbent, 1958; Deutsch & Deutsch, 1963).

Kahneman (1973) proposed a comprehensive model of information processing consisting of six sequential stages of perceptual analysis. His stage of "figural analysis", whereby certain units of the stumulus field become salient and are processed more fully, is equivalent to the concept of selective attention. The attended units provide input to the next stage wherein "recognition units" are activated which match features of the input. These recognition units are comparable to the cognitive schemata which Beck (1967)

refers to, and are likely represented in long-term memory. It is at this stage that a match between incoming stimuli and schemata results in a percept. It is during this stage that Beck suggests information processing in depressed individuals goes awry, in that depressive schemata, which are prepotent, become activated by inappropriate stimuli. Thus starts a cycle whereby the perception of stimuli becomes distorted by the schemata, thus strengthing the schemata and ensuring further distortion of information; such distortions continue into later stages of processing wherein meanings and interpretations are also assigned to information in an idiosyncratic manner, resulting in "a continuous, reciprocal causal relationship between cognitive schemata and affective structures, producing the downward spiral often seen once a depressive episode becomes established" (Beck, 1967, p.239).

However, it is conceivable that distortions in processing could occur at an even earlier stage: what is originally selected for attention could be idiosyncratic, allowing for the possibility that subsequent stages of processing are performed accurately, but on biased input. Kahneman (1973) suggests that selective attention is guided by an individual's "allocation policy" which can be formed on the basis of immediate need or reflect an enduring disposition -- either learned or innate -- to focus on certain aspects of incoming information and ignore others. Might depressed individuals have idiosyncratic allocation

policies? Beck's theory does incorporate the notion of selective attention, but almost as an aside. "Selective abstraction", listed as one of the processing errors which leads to distortions in the interpretation of information, is defined as, "focusing on a detail taken out of context, ignoring other more salient features of the situation and conceptualizing the whole experience on the basis of this fragment" (Beck et al., 1979, p.14). According to Beck's model, it could also be predicted that depressed individuals would allocate more attention to information consistent with their negative views of the self, the world and the future.[1]

The stage of selective attention has aroused little interest within depression research, in comparison to later stages of processing such as the interpretation and recall of events. Recently, however, selective attention has been proposed as a potential bridge between cognition and emotion research (Nielsen & Sarason, 1981). Leaders in the study of information processing have recognized the important impact that emotional and motivational factors play in interaction with cognition (Norman, 1980). Broadbent (1977) suggested that "hidden preattentive processes" including moods, biases and motives, be given credence in cognitive theory. The

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[1] This prediction is also consistent with other cognitive behavioral theories of depression. For example, Rehm (1977) posited "selective attention to negative events" as one of the self-control deficits which result in depression. Beck's model is considered to provide a more useful conceptual background for the current investigation mainly because of its greater focus on information processing.

potential heuristic value of selective attention paradigms has been recognized and incorporated within investigations of emotional disorders, with productive results.

Selective Attention - Empirical Findings

Anxiety Research

Nielsen and Sarason (1981) employed a dichotic listening task with shadowing, a commonly used measure in selective attention paradigms, to investigate the influence of personality factors and emotional stimuli on attention. Undergraduate students were required to shadow (i.e. repeat aloud while listening) neutral words heard in one channel or ear while mixtures of neutral and specifically-toned words were presented simultaneously in the other channel. Sets of stimulus tapes were constructed in which the words embedded in the ignored channel were either sexually explicit, aggressive, related to test anxiety or to college life; a control tape was constructed in which all words were neutral. Errors made in shadowing were judged to be indicative of a disruptive effect of the content of the unattended channel on processing. Subjects also completed several psychological inventories prior to and after shadowing, including the Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, 1965).

Significant increases in shadowing errors were detected only during the presentation of sexually explicit words in the unattended channel. The likelihood of detecting the sexual words was positively related to subjects' state

anxiety scores. Over half of the subjects exposed to the sexually explicit words experienced conscious intrusions of these words; it was the subjects who experienced intrusions who accounted for the increases in shadowing errors. The authors noted that semantic analysis seemed to take place preattentively, analogous to a filtering process; level of anxiety appeared instrumental in determining whether the sexual information passed through the filter into conscious awareness.

Similar paradigms employed with clinical populations have revealed that both obsessive-compulsive (Foa & McNally, 1986) and phobic patients (Burgess, Jones, Robertson, Radcliffe, & Emerson, 1981) exhibit a vigilance for emotionally-relevant stimuli embedded in the distracter channel of a dichotic listening task. Foa and McNally (1986) found that obsessive-compulsive subjects exhibited an increased physiological responsivity to, as well as a more sensitive detection of fear-relevant stimuli as opposed to neutral stimuli. Following 15 treatment sessions (based on exposure and response prevention), however, there were no differences in response to fear-relevant and neutral words delivered in the unattended channel. The authors concluded that the previously observed vigilance had been due to the emotional relevance of the stimuli -- i.e. their associations with fear -- and not simply their greater familiarity to the subjects.

Mathews and MacLeod (1986) found that subjects

complaining of generalized anxiety states responded more slowly on a reaction time task when threat cues as opposed to non-threat cues were delivered in the unattended channel of a dichotic listening task. The reaction times of nonanxious subjects were unaffected by the nature of the cues. The results suggested that in anxious subjects, processing resources had been disproportionately diverted away from the task at hand when threat cues were present in the unattended channel, even though the subjects apparently remained consciously unaware of these cues. The authors concluded that anxious subjects exhibit a bias in preattentive mechanisms that selectively allocates processing resources to threat cues.

Depression Research

Shenker (1980) designed an experimental task, based on the tenets of Beck's cognitive theory of depression, to specifically investigate selective attention processes in depressed individuals. In order to assess the presence of a dysphoric attentional bias in depressed college students, Shenker employed a dichotic shadowing task which required that subjects shadow the messages received at one ear (targets) while attempting to ignore a different set of messages received in the other ear (distracters). Both types of stimuli consisted of passages of meaningful prose. The target stimuli were all neutral in content, but the distracter stimuli alternated between common depressive themes and neutral themes. The measure of a selective

allocation of attention to dysphoric material was the relative increase in errors made while shadowing in the presence of the dysphoric distracters as compared to neutral distracters. Shenker found that depressed students were significantly more inclined than were nondepressed controls or test-anxious subjects, to selectively attend to stimuli representing depressive ideational themes. He interpreted this finding as support for the hypothesis, derived from Beck's formulations, of a depressive information processing disturbance at stimulus selection.

The dysphoric distracter stimuli developed by Shenker (1980) were employed in a slightly different paradigm by Young, Smith, Pihl and Ervin (1985) in a psychopharmacological study designed to assess the effects of tryptophan depletion. Subjects were required to complete a proofreading task while dysphoric or non-dysphoric distracter stimuli were delivered to them via headphones. An attentional bias for dysphoric stimuli would be suggested by a decreased efficiency in detecting errors in the written work during dysphoric distraction.

Subjects who had been exposed to tryptophan depletion performed less efficiently only during the presence of dysphoric distraction, in contrast to controls whose performance was unaffected by type of distraction. Tryptophan depletion also resulted in a significant lowering of mood in the experimental group, to a level suggestive of mild depression. Young and colleagues interpreted these

data as support for the prediction that depressive affect and selective attention for dysphoric themes co-occur, but raised questions about the direction of the effect. While cognitive theory tends to view cognition as the primary cause of other depressive symptoms, the data of Young et al. (1985) suggest that biochemical factors may be involved in the activation of depressive cognitive functioning.

Gotlib and McCann (1984) have studied the cognitive constructs (schemata), which are hypothesized to co-occur with depression, within a somewhat different paradigm. They employed the Stroop color word task, which requires subjects to name the color of ink in which a word is printed, to draw inferences about the relative accessibility of depressed-content, neutral-content and manic-content constructs in depression. Depressed college students (BDI scores $\geq$ 9) displayed longer latencies in naming the color of depressed-content adjectives compared to positive or neutral adjectives. Nondepressed college students did not demonstrate similar differential reaction times.

A second study by the same authors (Gotlib & McCann, 1984) addressed the issue of whether negative construct accessibility was due to mood differences between depressed and nondepressed subjects or reflected more stable cognitive differences associated with depression. The Velten Mood Induction procedure was employed to induce mood states in nondepressed students and the first study was replicated with induced-depression, induced-elation and neutral mood

groups. All subject groups failed to demonstrate differential response latencies for the 3 categories of stimuli, even though mood inventory data indicated that significant levels of depressed affect had been experienced by the induced-depression subjects.

The authors concluded that depression-associated differences in construct accessibility do not seem to be a factor of mood or affect alone, but may reflect more stable tendencies: that is, depressed individuals may be characterized by highly accessible negative cognitive constructs. The notion of construct accessibility and selective attention have a great deal in common, representing different approaches to a similar end: they provide a way to draw inferences about the cognitive constructs which are hypothesized to guide information processing -- constructs which may have important significance for disorders of mood.

The Current Investigation

Rationale

The application of a cognitive theory of depression to premenstrual dysphoric mood change seems appropriate for both clinical and empirical reasons. Clinically, premenstrually depressed women often present with low self-esteem, self-deprecatory statements, negative attitudes and even suicidal ideation during the premenstrual phase yet can appear happy and well-adjusted a week later. They report feeling "not myself" premenstrually, and say that

"it's as though I'm viewing the world through different glasses". These women frequently feel remorse upon looking back on how they felt and acted during the premenstrual week but say that at the time they felt incapable of thinking or feeling differently. Such reports seem consistent with Beck's description of the activation of depressive schemata and the emergence of negative thoughts consistent with the cognitive triad.

From an empirical standpoint, there is substantial evidence of high concordance rates for premenstrual depression and affective illness. Several prospective studies conducted with college students have suggested that premenstrual affective symptoms may indicate a vulnerability for the development of depressive disorder (Wetzel et al., 1975; Schuckit et al., 1975). Although these studies are neither methodologically nor statistically strong, their findings are highly suggestive and deserve further investigation.

Beck's cognitive model of depression provides one perspective from which to investigate the nature of the depression associated with the premenstrual phase of the menstrual cycle, and to assess its potential relevance as a risk factor for clinical depression. According to Beck, "depression-prone" individuals are characterized by dormant depressive cognitive schemata which, when activated by various stimuli, lead to depression. One could speculate that such is the case for women who experience depression

premenstrually; that is, these women may have latent depressive schemata which, for some reason (perhaps hormonal) are more active premenstrually. The inferred presence of such schemata, whether just premenstrually or as a more stable trait, would suggest a cognitive vulnerability for depression. The investigation of the phenomenon of premenstrual depression, from an information processing perspective, is expected to provide a degree of insight into the similarity and/or continuity between premenstrual depression and clinical depression.

The Experimental Task

The use of a dichotic listening task to assess selective attention for dysphoric material was considered to be well-suited to an investigation of premenstrual depression for several reasons:

1. Subjects are very unlikely to detect the purpose of the task, therefore conscious biasing of results is not an issue. This task successfully circumvents some of the problems inherent in self-report measures of mood yet allows one to draw inferences about mood state.

2. The task is suitable for use as a repeated measure; even if subjects improve in shadowing performance from pre to post-menstrual test sessions, this should not differentially effect their performance during neutral versus dysphoric distraction.

3. The selective attention task allows for a fairly direct measurement of one specific stage of information

processing. If an attentional bias is detected, one can draw conclusions about differences in active processing as well as make inferences concerning the schematic organization underlying the focus of attention.

4. The fact that the same task has been administered to depressed individuals will allow for normative comparison of the data generated in the current study.

Working from the assumption that a dysphoric attentional bias is concomitant with clinical levels of depression, the performance of premenstrually depressed subjects on the dichotic shadowing task premenstrually and postmenstrually -- in tandem with their scores on standardized inventories of depression -- is expected to elucidate the nature of the relationship between premenstrual depression and depressive disorder.

OVERVIEW OF PARTS I, II, AND III

A questionnaire survey of premenstrual symptomatology, employing the Premenstrual Assessment Form (PAF), was conducted with women drawn from various community groups. An analysis of the findings from this retrospective survey will be presented in Part I. The purpose of this presentation is threefold: to provide descriptive data concerning the sample surveyed and to compare it with the PAF's developmental sample; to examine several indices of the PAF's reliability and internal validity; to assess the relationship between dysmenorrhea and premenstrual symptoms.

On the basis of this retrospective report of symptoms, two groups of subjects were selected for further study: women reporting premenstrual depression (PMD) and those reporting no psychological changes premenstrually (controls). The data of these two groups will also be examined in Part I, in an attempt to delineate factors associated with tendency to complain of premenstrual depression, as well as to establish the characteristics of subject pools from which women will be drawn for the experimental phase of research.

Women comprising the two groups of interest (i.e. PMD and controls) were asked to participate in the experimental phase of the study, which is detailed in Part II. The purpose of the experimental phase of research is to assess the co-occurrence of depression with the premenstrual phase of the menstrual cycle as indicated by standardized measures

of depression and an index of selective attention. PMD and control subjects were asked to keep daily diary ratings during the course of one complete menstrual cycle and to take part in two experimental test sessions during this same cycle. The test sessions, which were scheduled pre- and postmenstrually, consisted of the administration of two standardized measures of depression as well as the dichotic shadowing task. Within the dichotic task, the commission of relatively more errors while shadowing in the presence of dysphoric distraction as compared to non-dysphoric distraction is suggestive of an attentional bias for dysphorically-toned material.

Prior to the analysis of the psychometric and shadowing data, however, subjects' daily diaries were examined in order to obtain confirmation of their retrospective report of premenstrual depressive symptoms, or lack thereof. In addition to providing a way to screen out the data of those subjects whose prospective report fails to substantiate their group membership, the daily diary ratings also convey important phenomenological data concerning premenstrual changes in general. These data will be summarized in Part III in a descriptive manner in an attempt to identify meaningful patterns of premenstrual change (PMC). The primary questions of interest which will guide this inquiry include:

1. Can separate subtypes of PMC be identified?
2. Does premenstrual depression, in particular, have

validity as a separate subtype of PMC?

3. What factors are associated with the likelihood of confirmation of retrospective report?

PART I - PREMENSTRUAL ASSESSMENT FORM RETROSPECTIVE SURVEY

Introduction

The Premenstrual Assessment Form (PAF)(Halbreich et al., 1982), which was employed in the current retrospective survey of premenstrual changes, is a relatively new instrument which lacks extensive normative data as well as data adressing its reliability and validity. The inquiry conducted in Part I is designed to partially address these needs.

The PAF responses of the sample surveyed, scored according to the guidelines developed for the instrument, will be compared to those of the questionnaire's developmental sample. The reliability or internal consistency of the current sample's responses within each of the instrument's 18 unipolar summary scales will be evaluated. A second index of reliability to be assessed is whether the cycle phase during which respondents were surveyed influenced their PAF symptom report. Halbreich et al.(1982), in their developmental analysis of the PAF, detected no relationship between cycle phase and response tendency.

Several indices of the internal validity of the PAF will be evaluated. For example, the relationship between severity of premenstrual symptom report and behaviors that would be expected to vary with symptom severity (e.g. treatment seeking) will be assessed. As well, a summary index of symptom report, derived from individual PAF items,

will be compared with subjects' global assessment of the severity of premenstrual changes and with their perceived degree of disruptiveness.

Another issue which addresses the specificity of the PAF, and could have implications for the etiology and treatment of premenstrual syndrome (PMS), is the relationship between dysmenorrhea and premenstrual complaint. While some authors have concluded that dysmenorrhea and PMS are distinctly separate entities (Dalton, 1964; Coppen & Kessel, 1963), more recent studies have detected a significant overlap in subjects' complaints of these two phenomena (Clare, 1983; Steege, Stout & Rupp, 1985; Taylor, 1979). As well, recent treatment studies with antiprostaglandin agents, an effective treatment for dysmenorrhea, have reported relief of certain premenstrual complaints (Mira, McNeil, Fraser, Vizzard, & Abraham, 1986; Wood & Jakubowicz, 1980). However, the subjects in both of these studies apparently suffered from dysmenorrhea as well as PMS, therefore relief may have been secondary to the fact that subjects felt generally better (i.e. dysmenorrhea was relieved), and not to a specific action of the antiprostaglandin agent for PMS symptoms. Moos, in 1969, suggested that women with dysmenorrhea and premenstrual tension should be differentiated from those with premenstrual tension alone, and speculated that hormonal factors may be more relevant when dysmenorrhea is involved. The responses of the current sample will be examined to

determine whether certain dimensions of premenstrual complaint are useful in differentiating between subjects with or without accompanying dysmenorrhea.

Method

Subjects

Subjects for the retrospective questionnaire survey of premenstrual changes were solicited from among a variety of predominantly female, English-speaking groups: graduate nursing and education classes, continuing education classes, school teachers and community service groups. The experimenter (E) arranged to address these groups near the end of their meetings or classes. After being introduced, E delivered a standard explanation of the phenomenon of interest and the purpose of the survey:

> "To begin with, let me clarify just what the premenstrual syndrome is usually defined as. Basically it involves the recurrence of certain physical, emotional or behavioral symptoms in approximately the week preceeding the onset of menstruation. Important to the definition is that the symptoms stop at or near the onset of menses and are relatively absent for the rest of the cycle. Premenstrual syndrome is often differentiated from dysmenorrhea, which refers to the abdominal discomfort or cramps which tend to occur within a day or so of menstruation. Symptoms commonly reported premenstrually include irritability, depression, water retention and breast tenderness.
>
> Although many women seem to experience some detectable change premenstrually, the incidence

of severe premenstrual syndrome has been estimated at about 5%. These are women who report being incapacitated by such cyclic fluctuations; premenstrual symptoms interfere with their work, social relationships and family life. A number of treatments have been recommended for severely afflicted women, but their effectiveness has not been supported by evidence from controlled treatment studies. What has been revealed by such studies is the broad range of individual differences in response to treatment: some women may get better, others worse, and others have no response to the same treatment. This may imply that premenstrual changes do not represent one syndrome but rather several separate subtypes of change.

Just recently a questionnaire has been devised which allows for the recording of a broad range of premenstrual symptoms and their classification into different subtypes of change. It is hoped that a more precise description of subtypes of change, provided for by this questionnaire, will contribute to a better understanding of premenstrual syndrome.

I am interested in looking at how a large number of women respond to this questionnaire. I am as interested in women who experience little or no change premenstrually as those who have more distinct changes. This survey is specifically aimed at women between the ages of 30 and 45 who are not using oral contraceptives. The questionnaire takes about 30 minutes to fill out. If you are interested in participating, please stop by and pick up one of these envelopes; you can take it home with you and return it by mail.

Since my whole study consists of a number of

phases it is difficult to predict when the results will all be in. I do hope to have at least a preliminary report of my findings this spring and I'll forward a copy to your instructor (coordinator, etc.) Thank you for your time and your interest. Are there any questions?"

After answering questions, E passed out questionnaires to interested women. They were accompanied by stamped, self-addressed envelopes and by a cover letter which can be found in Appendix A. The letter outlined further inclusion criteria for the study and women were asked to peruse it to determine their eligibility. The criteria were as follows:

1) fluent in English
2) 30 - 45 years of age
3) no oral contraceptive use currently nor for 3 months prior to study
4) not currently pregnant
5) cycle length between 23 - 35 days
6) not taking any prescribed medication on a regular basis
7) not currently in treatment for a diagnosed psychiatric illness

The rationale for these criteria will be discussed briefly.

The demands of the dichotic listening task are such that fluency in the English language is integral to its proper administration. The subjects must be sensitive to the nuances of meaning of stimuli embedded in the unattended channel; since this channel is not the object of focused

attention, such stimuli will only be perceived peripherally, if at all. Therefore, only those subjects who claimed English as their first language were included in the dichotic listening study.

There is some evidence that age bears a relationship to premenstrual complaint. The peak period for premenstrual symptom report has been noted as falling in the mid to late thirties, according to both clinical and empirical accounts (Dalton, 1964; Gough, 1975; Kramp, 1968; Moos, 1969). Although the evidence for an age factor is still equivocal, it was deemed prudent to sample a population most likely to exhibit the phenomenon of interest, hence the lower age limit of 30 years. The upper limit of 45 years was intended to exclude women who might be experiencing hormonal irregularities related to the approach of menopause.

Pregnancy (as well as breast feeding) and oral contraceptive use both represent exclusion criteria because of their interference with normal cyclic hormone fluctuations, represent exclusion criteria. Although menstrual cycles continue with oral contraceptive use, hormonal variation is markedly reduced and several studies have found that premenstrual symptomatology is less pronounced in pill users (Paige, 1971; Silbergeld, Brast & Nobel, 1971).

Similarly, the influence of prescribed medications and current psychiatric illness on symptom experience were

regarded as important influences to be ruled out. A decision was made, however, not to screen subjects with a psychiatric interview. It was felt that the basically well-functioning sample of women surveyed might be offended by the implication that we were looking for a psychiatric underpinning for their premenstrual complaint. Women had commented to E that they were pleased that the scientific and medical communities were finally taking premenstrual symptoms seriously. Many had also related tales of unsympathetic gynecologists and psychiatrists who had told them their symptoms were "all in your head", or who had prescribed psychotropic drugs to no avail. It was decided, therefore, to list the psychiatric illness criterion alongside the six others and allow women to determine their own eligibility. There were questions on the retrospective PAF questionnaire, concerning each of the seven criteria listed, which allowed for some degree of confirmation of eligibility. For example, if a woman reported use of psychotropic drugs in response to the inquiry concerning current medications, her data was excluded from further analysis.

The cover letter, which accompanied the questionnaire packages, informed women that they might be contacted for a more indepth investigation; if they were willing to be involved further, they were asked to record their name and phone number on the questionnaires. The questionnaire packages consisted of three items: a menstrual calendar on

which women were asked to circle their days of menstrual bleeding for several previous cycles (see Appendix B), the Menstrual History Form which inquires about characteristics of the menstrual cycle, and elicits a general assessment of dysmenorrhea and premenstrual change (see Appendix C), and the Premenstrual Assessment Form which elicits ratings of the degree of change experienced premenstrually, in comparison to a woman's usual state, for each of 95 items (see Appendix D). These three instruments will be described in more detail in the Measures section (to follow).

Of those questionnaires returned, 130 were deemed appropriate for analysis, representing approximately 70% of those originally distributed. Reasons for excluding a small proportion of returned questionnaires (<10%) included the following: failure to fulfill the inclusion criteria (women had filled them out despite being pregnant, on medication, amenorrheic, using oral contraceptives), existence of a concurrent medical disorder (endometriosis, thyroid condition), and incomplete data.

Responses to the Premenstrual Assessment Form (PAF) (Halbreich et al., 1982) were used to screen subjects for participation in the experimental phase of the study. PAF responses were scored according to guidelines provided by Halbreich and Endicott (1982b) to determine both unipolar summary scale scores and typological category membership. The unipolar summary method of scoring reflects a dimensional approach to classifying individuals. Halbreich

and Endicott have identified 18 summary scales of premenstrual change which consist of highly intercorrelated subsets of items (see Appendix E). The dimensional approach is useful in establishing the degree of symptom severity. The typological category approach, similar to that used in the DSM-III (APA, 1980) and Research Diagnostic Criteria (Spitzer et al., 1978), classifies individuals as either belonging or not belonging within a group on the basis of a minimum number of clinical features experienced at specified levels of severity. Again the authors have delineated 18 typological categories of premenstrual change (see Appendix F), which are very similar (but not identical) in item content to the unipolar summary scales. The categorical approach, which requires that all the members of a group report at least a minimum number of similar symptoms, is useful for ensuring homogeneity of subject groups. Both the dimensional and typological systems for scoring the PAF were utilized in selecting subject groups.

A premenstrually depressed group (n=45; 35% of total sample) was delineated on the basis of the following criteria: they met the PAF typological category of "major depressive syndrome" and obtained unipolar summary scores of at least 3 on Scale 1 - Low mood/loss of pleasure. The unipolar scale criterion was added to ensure that the affective component of depression was also present, for subjects can meet the typological category of major depressive syndrome because of predominantly somatic

symptoms. A control group (n=49; 38% of total sample) was delineated on the basis of the following criteria: no significant premenstrual change (i.e. failure to meet any typological category) or met only physical typological categories (e.g. water retention syndrome, fatigue syndrome, etc.) and no significant psychological changes on unipolar summary scales -- operationally defined as scores of less than 3 on psychological summary scales (e.g. low mood/loss of pleasure, anxiety, atypical depression, hostility/anger, etc.).

The decision to include women with premenstrual physical complaints in the control group was born of necessity. The PAF typological scoring system has one category labeled "no significant change" which virtually no subject qualified within. There is also a default category labeled "no suitable category", which represents subjects who failed to meet any of the other 16 syndromal categories. This category encompassed approximately 26% of the sample, all of whom had minimal symptom complaint. Control subjects were drawn mainly from this category but it was necessary to include subjects with physical complaint alone (12% of total sample) in order to attain the desired control group size. As well, women reporting no symptoms demonstrated somewhat less interest in participating in further research -- either by not supplying their phone numbers on the original questionnaire or by declining when contacted by phone.

It is important to note that the PAF typological

categories are, for the most part, not mutually exclusive. That is, women reporting major depressive syndrome may also report physical and behavioral syndromes (and usually do). The two groups selected for investigation can, therefore, most accurately be described as women who report depression premenstrually (PMD) and those who do not report depression premenstrually (controls). An additional stipulation was that the controls not report any psychological change premenstrually (e.g. anxiety, irritability, anger), for various negative mood symptoms are associated with premenstrual complaint and the divergent validity of these symptoms has not been established.

Measures

Menstrual Calendar

A chart consisting of six calendar months was included in the questionnaire package. Subjects were asked to circle their days of menstrual bleeding for current and past cycles. Directions were included as to how to calculate menstrual cycle length. The menstrual calendar is displayed in Appendix B.

Menstrual History Form (MHF)

A short questionnaire, modelled basically after the Menstrual History Form[2] developed by Halbreich and Endicott was also included in the questionnaire package. This form elicits data concerning menstrual cycle characteristics,

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[2] The Menstrual History Form is an unpublished instrument. It is available from the Research Assessment and Training Unit, 722 West 168th Street, Room 341, New York, NY 10032.

dysmenorrhea, and global assessments of premenstrual change. The current investigator added a section which asked women to rate how disruptive their premenstrual changes were with respect to family and social relationships, and work. A copy of the modified MHF is included in Appendix C.

Premenstrual Assessment Form (PAF) (Halbreich et al., 1982).

This retrospective, self-report questionnaire consists of 95 items which represent a broad range of physical, psychological and behavioral symptoms commonly associated with the premenstrual phase of the menstrual cycle (see Appendix D). The items are rated on a scale from 1 to 6, providing an index of degree of change from the usual non-premenstrual state (no change to extreme change), experienced during the past three premenstrual periods. The PAF not only provides comprehensive coverage of premenstrual symptoms, but also a flexible and relevant scoring system. Based on the premise that premenstrual syndrome is not a unitary phenomenon, the PAF can be scored according to 18 typological categories representing homogeneous subtypes of premenstrual change. Category membership requires the joint occurrence of specific clusters of items at specified levels of change severity. A decision tree outlining these various typological clasifications (Halbreich & Endicott, 1982b, p.249) is presented in Appendix F. The PAF can also be scored according to 18 unipolar subscales, yielding average change scores based on highly intercorrelated subsets of items. The item content of these unipolar summary scales,

outlined in a table by Halbreich and colleagues (1982, pp.52-53) can be seen in Appendix E.

The PAF, although a relatively new instrument which lacks extensive validation, was nevertheless considered the best available instrument for the assessment of premenstrual changes. The superiority of the PAF in comparison to other available measures, as mentioned in the introduction (pp. 16-17), include its extensive coverage of items specific to premenstrual change (including both negative and positive changes), its recognition of the multidimensional nature of premenstrual change, and its provision for standardized scoring methods based on both item content and severity.

The PAF unipolar summary scales demonstrate high internal consistency (.61 to .91) and correlate highly with global clinical ratings made on the basis of women's narrative descriptions of the changes they experience premenstrually. As well, reports of premenstrual change were found to be unaffected by the phase of the cycle during which the PAF was completed (Halbreich et al., 1982). Concerns are common regarding the accuracy of recall involved in retrospective premenstrual symptom reporting. The reported rate for prospective confirmation of PAF reports of major depressive syndrome, for example, is 59% (Endicott & Halbreich, 1982). This resembles rates detected by researchers using other instruments (e.g. 43% - Rubinow et al., 1985; 58% - DeJong et al., 1985), however, and is likely more a function of the phenomenon under study than

the instrument per se.

Data Analysis

Data from the retrospective PAF was analyzed in two stages: firstly, the data from the whole sample (N=130) were examined and secondly, the data of the two groups of interest to the investigator -- PMD (n=45) and controls (n=49) -- were compared.

Two primary measures of interest are those developed by Halbreich, Endicott and colleagues: the 18 typological categories and 18 unipolar summary scales which represent categorical and dimensional approaches (respectively) to scoring the 95 PAF items. Also of interest are the individual items most frequently endorsed at moderate to severe levels of change.

A summary variable was used to provide a single index of overall severity of premenstrual complaint. This variable, labelled "Number", represents an index of the number of unipolar scales which were endorsed by subjects at greater than 50% of their maximum possible value[3]. There are a total of 18 unipolar scales representing various dimensions of premenstrual change. Each scale contains different numbers of items, which can be rated from 1 to 6 (6 representing the most extreme change from normal). For a scale containing 10 items, a maximum score of 60 can be attained. A subject scoring 40 on this scale, therefore,

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[3] an approach adopted from Steege, Stout and Rupp (1985)

would have endorsed the scale at 67% of its maximum value. An index of the number of scales endorsed at greater than 50% of their maximum value is considered to represent a reasonable index of overall severity of premenstrual complaint.

Demographic data, menstrual cycle characteristics and general-indices of premenstrual change, gleaned from the Menstrual History Form (MHF) will be examined. Four variables are available within the MHF which can contribute to an assessment of the internal validity of the PAF: a global assessment of severity of premenstrual change (PMC), whether women have sought treatment for their PMC, whether they have used medications or home remedies to treat their PMC, and an assessment of how disruptive they consider their PMC. The relationship between these variables and the summary dependent variable Number will be assessed with t-tests and analyses of variance where appropriate.

The internal consistency of the unipolar summary scales devised by Halbreich et al. (1982) to score the PAF will be assessed with Cronbach's alpha -- an index of reliability. The potential influence of cycle phase on premenstrual report will be assessed with an analysis of variance of cycle phase using Number as the dependent variable. As well, a discriminant function analysis will be performed to investigate the relationship between cycle phase during response and various dimensions of premenstrual complaint.

The relationship between dysmenorrhea and premenstrual

symptom report will be explored with analysis of variance and discriminant function techniques.

Results

Stage 1 - Data based on the full sample (N=130)

Demographic and Menstrual History Form Data

Demographic, menstrual cycle characteristics and general indices of premenstrual changes (PMC) for the full sample of 130 women are presented in Table 2. The sample can be described as a fairly mature group of women (average age 37) who are, on average, well-educated (50% have college educations), and tend to work outside the home (58% hold white collar or professional positions).

Moderate PMC are reported by 38% of the sample, while 16% regard their PMC as severe. Despite the rather high proportion of women reporting severe PMC, only 1.6% of the sample judged their PMC to be severely disruptive of their family, work or social life while 21% reported their PMC to be moderately disruptive. However, approximately 20% of women had either sought treatment for their PMC or used medications or home remedies to treat themselves. The reported onset of PMC was quite variable, and showed a slight bimodal distribution with PMC more likely to begin either 1-2 days or 5-7 days prior to menses. PMC rarely ceased prior to the onset of menses, but more often was reported to continue into the first day, or first few days of menses.

TABLE 2. Demographic and Menstrual Cycle Characteristics (N=130)

Variable	Mean	(SD)
Age	36.89	(3.93)
Age at menarche	12.45	(1.39)
Age periods became regular	14.33	(4.19)
Length of cycle	28.44	(2.56)
Number of children	1.71	(1.16)
Education:		% of sample
7-9 years		.8
10-12 years		27.3
12-14 years		18.0
15 years		5.5
more than 15 years		48.4
Occupation:		
unemployed		.8
student		9.4
homemaker		31.5
white collar		51.2
professional		7.1
Duration of blood flow:		
2 days or less		.8
3 to 5 days		57.4
6 days or more		41.9
Intensity of blood flow:		
light		1.6
average		70.6
heavy		27.8
Severity of dysmenorrhea:		
no pain/minimal		54.7
moderate		30.6
severe		14.8
Severity of premenstrual changes:		
none/slight		45.7
moderate		37.8
severe		16.5
Onset of premenstrual changes:		
1-2 days prior to menses		25.4
3-4 days " " "		19.5
5-7 days " " "		28.8
more than a week		11.0
onset varies from month to month		15.3
Cessation of premenstrual changes:		
prior to first day of menses		14.6
during first day of menses		42.3
during first few days of menses		43.1
Disruptiveness of PMC:		
not at all/ mildly		77.6
moderately		20.8
severely		1.6
Sought treatment for PMS:		
No		78.5
Yes		21.5
Use medication/home remedies to treat PMC:		
No		81.3
Yes		18.8

Typological Category and Unipolar Scale Data

The PAF responses of the full sample of women, scored according to typological category, are presented in Table 3. Based on the figure of 26% for those whose report could not be classified, it can be inferred that the remaining 74% of women surveyed complained of at least mild levels of premenstrual change. Of interest is the fact that approximately one third of the sample reported major depressive syndrome with the most common depressive profiles encompassing atypical, hostile and anxious-agitated features. Endogenous features, on the other hand, were virtually nonexistent in the sample's complaint. Also extremely rare were reports of anxiety or irritability alone, that is without accompanying depression.

Also listed in Table 3 is the data from Halbreich et al.'s developmental PAF sample (1982). Their sample consisted of 69 medical center staff (average age 34) and 85 student nurses (average age 24), who, akin to the current sample, were using neither birth control pills nor any other medication which might influence their symptom report. As can be seen in Table 3, the two data sets are highly comparable, with the exception that more subjects met typological categories overall, and somewhat more met categories of major depressive syndrome and water retention syndrome, in the developmental sample than in the current sample.

Scores obtained by the current sample on unipolar

TABLE 3. Frequencies (%) With Which Subjects Met PAF Typological Categories: Current Sample and Developmental Sample (Halbreich & Endicott, 1982b)

	Current Sample (N=130)	Halbreich & Endicott (1982b)
Change in mood and behavior		
Major depressive syndrome	35	45
Minor depressive syndrome	19	19
with: Endogenous features	0	0
Atypical features	35	35
Hysteroid features	12	5
Anxious-Agitated features	21	20
Hostile features	28	29
Withdrawn features	16	17
Anxious syndrome (not depressed)	2	1
Irritable syndrome (not depressed)	2	1
Impulsive syndrome	27	27
Increased well-being syndrome	18	17
Change in physical condition		
General discomfort syndrome	61	68
Water retention syndrome	46	62
Fatigue syndrome	31	35
Autonomic physical syndrome	19	22
Change in functioning		
Impaired social functioning	36	34
"Organic" mental features	14	12
No significant change	0	3
No suitable PAF subtype	26 *	12

* result of numerous ratings of 2 (minimal change), precluding categorization as "no significant change", but of insufficient severity to meet a specific typological category

summary scales, expressed as percentages of the maximum possible value per scale, are presented in Table 4. The scales are ranked in descending order according to mean severity level. Scales representing physical changes and anxiety are prominent. Scales representing dysphoric mood, atypical depressive features and fluctuations in affect are also frequently endorsed.

Individual Item Analysis

The PAF items most frequently endorsed at moderate, severe, or extreme levels (i.e. change scores of 4, 5, 6) by the full sample are outlined in Table 5. The items are rank-ordered according to the percentage of the sample endorsing the items at the three highest severity levels; only those items endorsed by at least 25% of the sample have been listed. For the sake of comparison, the items rated at moderate to extreme levels by Halbreich et al.'s developmental sample are also listed in Table 5. Symptoms of sadness, irritability, fatigue, as well as breast swelling or tenderness, bloating and edema were commonly endorsed by both samples at relatively severe levels. Two signs of water retention -- breast swelling and bloating -- were much more frequently endorsed by the developmental sample, while sadness and tearfulness were also somewhat more common in this sample.

Relationship of Age to Premenstrual Complaint

The current sample was somewhat older (mean age 37, range 30-45) in comparison to the two groups which comprised

TABLE 4. PAF Unipolar Summary Scales: Rank Order of Mean Scale Scores (expressed as % of maximum possible) N=130

Summary scale (#)	Mean	(SD)
General Physical Discomfort (13)	40.84	(19.43)
Fatigue (15)	38.81	(18.95)
Water Retention (12)	38.51	(14.68)
Anxiety (8)	38.43	(20.29)
Low mood/loss of pleasure (1)	36.42	(18.95)
Atypical depressive features (4)	36.33	(15.85)
Lability (3)	36.13	(21.19)
Hysteroid features (5)	34.69	(17.86)
Hostility/anger (6)	33.72	(19.48)
Impulsivity (10)	32.19	(17.86)
Social withdrawal (7)	31.32	(18.08)
Impaired social functioning (16)	30.10	(13.80)
Miscellaneous mood/behavior changes (17)	28.59	(12.39)
Endogenous depressive features (2)	28.26	(13.52)
Miscellaneous physical changes (18)	28.15	(11.81)
Organic mental features (11)	27.89	(15.44)
Autonomic physical changes (14)	27.58	(11.17)
Increased well-being (9)	23.80	(11.74)

TABLE 5. PAF Individual Items: Rank Order Based on Proportion of Sample Endorsing Items at Moderate to Extreme Levels (i.e. 4, 5, or 6)

PAF Item (#)	% of sample
Current Sample (N=130)	
* decreased energy/fatigue easily	33.8
have headaches or migraines	32.3
* outbursts of irritability or bad temper	30.8
* feel sad or blue	30.0
feel anxious	30.0
* breast swelling/tenderness/pain	27.7
* are tearful, weep or cry	27.7
feel under stress	27.7
dissatisfied with personal appearance	27.7
intolerant/impatient with others	26.9
* edema/puffiness	26.9
* feel bloated	26.9
* nag or quarrel over unimportant issues	26.9
backaches, joint and muscle pain	26.9
Halbreich et al. (1982) (N=154)	
* breast swelling/tenderness/pain	48
* feel bloated	40
weight gain	39
* are tearful, weep or cry	37
* feel sad or blue	36
skin problems	35
* decreased energy/fatigue easily	34
increased sexual interest	33
abdominal discomfort/pain	32
feeling of malaise	31
* nag or quarrel over unimportant issues	31
* outbursts of irritability or bad temper	31
mood swings	30
* edema/puffiness	29

* Items common to both samples

the developmental sample: medical center staff (mean age 34, range 23-53) and student nurses (mean age 24, range 20-32). The main differences noted between the two samples in retrospective premenstrual complaint (see Table 5) involved signs of water retention and depression; such signs were more pronounced in the developmental sample. To determine whether age had any bearing on symptom report in the current sample, a correlation was calculated between age and the devised index of overall premenstrual complaint - Number (refer to p. 97). A small but significant negative correlation was obtained, ($r = -.17$, $N = 130$, $p < .05$), indicating that with increasing age premenstrual complaint, in general, decreased.

To further investigate the relationship between age and premenstrual changes, correlations were calculated between age and each of the 18 unipolar scale scores. The obtained Pearson correlation coefficients are presented in Appendix G. Although six of the correlations were significant, (marked with asterisks in Appendix G), all six involving a negative relationship between age and either psychological or behavioral scales, they are relatively small granted the large sample size. What is most striking in the response of this relatively older sample is the consistently negative relationship between age and premenstrual complaint (16 of the 18 correlations were negative), particularly for psychological and behavioral dimensions of change.

Internal Validity of the PAF

Four separate analyses were performed to assess the internal validity of the PAF. Two separate t-test analyses were performed using Number (of unipolar scales endorsed at > 50% maximum value) as the dependent variable. Subjects who had sought treatment for their PMC evidenced higher Number scores (M = 5.96) than did those who had not (M = 2.68), $t(40) = 3.17$, $p < .005$. Subjects who had used medication or home remedies to treat their PMC attained higher scores on Number (M = 6.21) than did those who did not (M = 2.7), $t(32) = 3.12$, $p < .005$. A one-way analysis of variance (ANOVA) conducted with reported global severity of PMC as the grouping variable and Number as the dependent variable, yielded a significant effect, $F(2,117) = 33.89$, $p < .001$. Post hoc multiple comparisons, as summarized in Appendix H, revealed that as the reported severity of premenstrual changes increased from slight to moderate to severe, Number increased by significant increments. A fourth group of subjects -- those reporting no PMC (n=10) -- were excluded from this ANOVA as their score on the dependent variable was 0, precluding meaningful comparison. Finally, a one-way ANOVA performed using perceived disruptiveness of PMC as the grouping variable and Number as the dependent variable, was also significant, $F(3,121) = 17.89$, $p < .001$. As indicated in Appendix H, those subjects who rated their PMC as not at all or mildly disruptive obtained significantly lower scores on Number than did those

who rated their PMC as moderately or severly disruptive.

In summary, treatment seeking, attempts at self-help, global ratings of PMC severity, and perceived disruptiveness of PMC were all significantly related to the index of overall severity of premenstrual change derived from the 95 PAF items.

Reliability of the PAF

Two facets of the reliability of the PAF were assessed. Firstly, the internal consistency of the 18 unipolar summary scales was assessed with Cronbach's alpha. The alpha coefficients, listed in Appendix I, reflect the consistency of the items comprising each dimension of change within the current sample. The obtained coefficients were all relatively high, ranging from .70 to .93, with the exception of Scale 2 - Endogenous depressive features which had an alpha of .60. The alpha values generated with the current sample are very similar to those attained in the developmental sample. Halbreich et al. (1982) also reported a low alpha value (.61) for Scale 2.

A one-way ANOVA was performed using cycle phase during which subjects responded to the PAF as the grouping variable and Number as the dependent variable. This analysis yielded a significant effect, $F(2,85) = 4.27$, $p < .01$. Post hoc comparisons, as illustrated in Appendix J, showed that subjects who responded to the PAF during their premenstrual phase achieved significantly higher scores on Number than did those responding during either the postmenstrual week or

any other week. The scores of subjects responding during the menstrual phase, however, did not differ from those of the other three groups. The demonstrated tendency for subjects responding in the premenstrual phase to report significantly greater levels of symptomatology is at variance with results reported by Halbreich et al.(1982) who noted the absence of such an effect. The influence of cycle phase within this retrospective instrument, which ostensibly elicits reports regarding the past three menstrual cycles, represents a challenge to the reliability of the PAF.

A discriminant analysis was performed to further examine the relationship between responding during the premenstrual phase (versus during the remainder of the cycle) and the various dimensions of premenstrual complaint encompassed by the 18 unipolar summary scales. A stepwise discriminant analysis was conducted to facilitate the identification of those summary scales with the most power to differentiate subjects responding premenstrually from those responding during other cycle phases. The results of this analysis are summarized in Table 6.

A linear combination of five summary scales adequately distinguished subjects who responded premenstrually from non-premenstrual respondents, $F(5,108) = 5.15$, $p < .001$. Univariate F tests conducted for each of the 18 summary scales, however, revealed significance for 16 of them. A considerable degree of correlation apparently exists between most of the unipolar summary scales. After the hysteroid

TABLE 6. Stepwise Discriminant Fucntion Analysis: Unipolar Summary Scales Which Best Discriminate Between Subjects Completing The PAF During the Premenstrual Phase (n=25) Versus Any Other Phase (n=87)

Step	Scale Entered (#)	Multivariate F	Univariate F	df	probability level	Correlation of scales to the discriminant function [2]
		[1] $F(5,108) = 5.15$ ***				
1	Hysteroid features (5)		13.00	1,110	.0005	.70 ***
2	Increased well-being (9)		.19	1,110	.66	-.08 ns
3	Autonomic physical changes (14)		8.90	1,110	.0035	.58 ***
4	Low mood/loss of pleasure (1)		4.69	1,110	.03	.42 ***
5	General physical discomfort (13)		2.66	1,110	.11	.32 ***

[1] the F value when all five variables are entered into the analysis together; based on Wilks' lambda

[2] pooled within-groups correlation coefficients between discriminating variables and canonical discriminant function

*** $p < .001$

scale had entered the equation, the only signficant source of independent variation which remained was accounted for by the scale representing increased well-being. This scale appears to be a suppressor variable. Subjects who respond to the PAF premenstrually, then, score significantly higher on the majority of unipolar summary scale -- many of which are highly intercorrelated. Following removal of these sources of variation, subjects who respond premenstrually score lower on the scale representing increased well-being than do those who respond during any other phase. The specific item content of these scales can be seen in Appendix E.

Dysmenorrhea and Premenstrual Complaint

The relationship between dysmenorrhea and premenstrual complaint was investigated with an ANOVA employing the severity of dysmenorrhea as the grouping variable and Number as an overall index of premenstrual complaint. The results of this analysis were significant, $F(3,125) = 3.94$, $p < .01$. As summarized in Appendix K, subjects reporting severe dysmenorrhea attained significantly higher scores on Number than did those reporting minimal or moderate dysmenorrhea. Subjects reporting severe dysmenorrhea, however, did not significantly differ from those reporting no dysmenorrhea at all -- largely because of the extreme variability within the premenstrual report of the latter group.

A stepwise discriminant analysis was conducted to investigate the relationship between the joint report of

dysmenorrhea and premenstrual symptoms (versus premenstrual symptoms alone) and various dimensions of PMC represented by the unipolar summary scales. Subjects were classified into two groups on the basis of the following criteria: subjects with dysmenorrhea (i.e. global report of moderate or severe dysmenorrhea on the Menstrual History Form (MHF)) and premenstrual complaint (i.e. moderate or severe PMC on the MHF) versus subjects without dysmenorrhea (i.e. none or minimal on the MHF) but with premenstrual complaint (i.e. moderate or severe PMC on the MHF). As summarized in Table 7, a linear combination of five unipolar scales adequately distinguished between premenstrual sufferers with and without dysmenorrhea, $F(5,52) = 2.41$, $p < .05$. Univariate F tests with the 18 summary scales found significance only for scales representing general physical discomfort, miscellaneous physical changes, and fatigue, indicating that these three variables account for significant independent sources of variation in the discrimination between PMC with and without dysmenorrhea. After the scale representing general physical discomfort had entered the equation, however, the significance of fatigue was greatly reduced, suggesting shared variation between these two variables.

The two major sources of independent variation, then, are scales representing general physical discomfort and miscellaneous physical changes. Pooled within-groups correlations calculated on standard scores between the discriminant function and the discriminating variables

TABLE 7. Stepwise Discriminant Function Analysis: Unipolar Summary Scales Which Best Discriminate Between Subjects With Joint Complaints of Dysmenorrhea and Premenstrual Changes (n=32) Versus Premenstrual Changes Alone (n=26)

Step	Scale entered (#)	Multivariate F	Univariate F	df	prob. level	Correlation of scales to the discriminant function [2]
		[1] F(5,52) = 2.41 *				
1	General physical discomfort (13)		5.47	(1,56)	.023	.61 ***
2	Miscellaneous physical changes (18)		4.94	(1,56)	.03	.58 ***
3	Impulsivity (10)		.02	(1,56)	.90	.03 ns
4	Low mood/loss of pleasure (1)		2.02	(1,56)	.16	.37 **
5	Social withdrawal (7)		1.40	(1,56)	.24	.31 *

[1] the F value when all five variables are entered into the analysis together; based on Wilks' lambda

[2] pooled within-groups correlation coefficients between discriminating variables and canonical discriminant function

* $p < .05$
** $p < .01$
*** $p < .001$

support this interpretation. Scales representing general physical discomfort and miscellaneous physical changes were the most highly related (.61 and .58 respectively) to the discriminant function. Dysmenorrhea, in conjunction with premenstrual symptoms, is associated with higher scores on unipolar scales representing general physical discomfort and miscellaneous physical changes. The specific item content of these scales can be seen in Appendix E.

Stage 2 - Data from PMD (N=45) and Control Groups (N=49)

Preliminary Analyses

As was demonstrated in the results section of Stage 1 (pp. 104-106), the cycle phase during which subjects responded to the PAF was related to increased reporting of certain symptom dimensions. Prior to the analysis of PMD and control subjects' retrospective data, therefore, it was deemed prudent to determine whether cycle phase of response was equivalent for the two groups. A chi-square analysis, conducted with PMD and control subjects for the four possible phases of response, yielded a nonsignificant finding, X^2 (3, n=90) = 7.04, $p < .07$. Although the X^2 analysis just failed to reach significance, it is noteworthy that relatively more PMD subjects (35%) did respond to the PAF during their premenstrual phase in comparison to control subjects (15%). The following results should therefore be considered in light of this potential response bias: Control subjects may slightly underrepresent or PMD subjects may somewhat overrepresent their premenstrual changes due to

the imbalance (albeit nonsignificant) in cycle phase of response between groups.

A second issue to be addressed prior to undertaking a comparison of PMD and control subjects is the degree of consistency which characterized the responses within the control group. It will be recalled that approximately 30% of the control subjects reported premenstrual physical symptoms while the remainder of the control group was relatively asymptomatic. There is a possibility that the subjects with physical complaint may report relatively higher levels of premenstrual change in general, thereby inflating the mean group data, as well as the variance within the control group as a whole. To investigate this issue, the control group (n=49) was separated into asymptomatic subjects (n=34) and those with physical complaints (n=15) and the unipolar summary scale data of these subgroups as well as the PMD group was examined. These data are presented in Appendix L.

The majority of the scale score means (i.e. 13 out of 18) ranged from 18% to 23% for both control subgroups; for these 13 scales the subgroups rarely deviated more than four percentage points from one another. Four of the remaining five scales varied only five or six percentage points between groups, while only the general physical discomfort scale varied a notable amount (i.e. 12 points). The five scales which diverged more than five percentage points are marked with an asterisk in Appendix L. What is noteworthy

is that of these five scales, four (i.e. fatigue, general physical discomfort, water retention and atypical depressive features) represent the highest ranked scales for both control subgroups. The unipolar mean scores and standard deviations of the PMD group, on the other hand, are markedly greater than those of either control subgroup. The rank order of summary scales for the PMD group is also less similar to either control subgroup than the latter are to one another.

In summary, these data indicate that the symptom reports of the two control subgroups are highly comparable, and that both diverge markedly from that of the PMD group. The decision to treat the two subgroups as one control group and to draw comparsions between control and PMD subjects, therefore seems warranted.

Demographic and Menstrual History Form Data

Demographic characteristics of the PMD and control subjects, delineated on the basis of retrospective report, are presented in Table 8. There were no significant differences between these two groups in age, educational level, or number of children. There was, however, a significant difference found within categories of occupation: a higher proportion of controls (45%) were homemakers in comparison to PMD subjects (18%).

Menstrual cycle characteristics and general indices of premenstrual change (PMC) gleaned from the Menstrual History Form are presented for the two subject groups of interest in

TABLE 8. Demographic Characteristics of PMD and Control Subjects

Variable	PMD (N=45) Mean	(SD)	Control (N=49) Mean	(SD)	2-tailed t-test
Age	36.36	(3.99)	37.10	(3.61)	ns
Age at menarche	12.42	(1.43)	12.47	(1.12)	ns
Age periods became regular	14.56	(4.44)	15.13	(5.12)	ns
Length of cycle	28.11	(2.18)	28.72	(2.74)	ns
Number of children	1.51	(1.20)	1.78	(1.07)	ns
	% of sample		% of sample		X^2 test
Parous	83.7		70.0		ns
Education:					ns
6-9 years			2.1		
10-12 years	28.9		29.1		
12-14 years	11.1		18.8		
15 years	8.9		2.1		
more than 15 years	51.1		47.9		
Occupation:					
student	15.6		6.4		ns
homemaker	17.8		44.7		$X^2=5.30$*
white collar	60.0		40.4		ns
professional	6.7		8.5		ns

* $p < .05$, df = 1

Table 9. PMD and control subjects were indistinguishable on the majority of menstrual cycle variables surveyed (e.g. age at menarche, length of cycle, length and intensity of blood flow). They did, however, differ in their reported severity of dysmenorrhea: PMD subjects were more likely to report severe pain accompanying menses (34%) than were control subjects (7%).

Regarding the measures of premenstrual complaint (refer to Table 9), control subjects were more likely than PMD subjects to report no PMC (12.5% vs. 0% respectively) or slight PMC (70.8% vs. 11.4% respectively), while PMD subjects were more likely than controls to report moderate (47.7% vs. 16.7% respectively) or severe PMC (40.9% vs. 0% respectively). Control subjects were more likly than PMD subjects to regard their PMC as not at all disruptive (70.5% vs. 11.1% respectively), and less likely to regard their PMC as moderately disruptive (0% vs. 46.7% respectively). Control subjects were also less likely to have sought treatment or attempted self-treatment for their PMC than were the PMD subjects. These findings are represented statistically in Table 9.

Typological Category and Unipolar Scale Data

By definition, the control subjects met only physical typological categories or experienced no significant changes premenstrually. The extent to which they met typological categories was, therefore, very limited (general discomfort syndrome - 25%, water retention syndrome - 14%) and

TABLE 9. Menstrual History Form Data for PMD AND Control Subjects

Variable	PMD (N=45) % of sample	Control (N=49) % of sample	X^2 test [1]
Duration of blood flow:			ns
2 days or less	-	2.0	
3 to 5 days	68.2	55.1	
6 days or more	31.8	42.9	
Intensity of blood flow:			ns
light	2.4	2.0	
average	54.3	71.4	
heavy	33.3	26.5	
Severity of dysmenorrhea:			
no pain/minimal	28.6	69.0	ns
moderate	37.1	23.8	ns
severe	34.3	7.1	$X^2=6.42$*
Severity of premenstrual changes:			
none	-	12.5	$X^2=5.61$*
slight	11.4	70.8	$X^2=19.29$**
moderate	47.7	16.7	$X^2=6.97$*
severe	40.9	-	$X^2=19.57$**
Onset of premenstrual changes:			ns
1-2 days prior to menses	17.8	31.6	
3-4 days " " "	11.1	21.1	
5-7 days " " "	31.1	36.8	
more than a week	15.6	2.6	
varies from month to month	24.4	7.9	
Cessation of premenstrual changes:			ns
prior to first day of menses	8.9	21.4	
during first day of menses	42.2	50.8	
during first few days of menses	48.9	28.6	
Disruptiveness of PMC:			
not at all	11.1	70.5	$X^2=19.36$**
mildly	37.8	29.5	ns
moderately	46.7	-	$X^2=20.6$ **
severely	4.4	-	ns
Sought treatment for PMS:			
No	60	98	
Yes	40	2	[2] $X^2=18.67$**
Use medication/home remedies to treat PMC:			
No	63.6	93.9	
Yes	36.4	6.1	[2] $X^2=11.25$**

[1] all final X^2 analyses performed with df=1
[2] value after Yates correction
* $p < .05$
** $p < .001$

precludes any meaningful comparison with the PMD group. As was mentioned earlier, most of the typological categories are not mutually exclusive. The degree to which the PMD sample met other categories of premenstrual change is indicated in Table 10. Of note is the high incidence of physical complaint in the report of PMD subjects, as well as the considerable overlap among most of the typological categories.

The scores obtained by the PMD and control groups for the 18 unipolar summary scales are presented in Table 11. The scales are rank-ordered according to the highest mean scores obtained by each group (expressed as percentage of maximum possible scale value). In addition to the fact that the mean scores of the PMD group are approximately double those of the control group for most scales, the rank order of scales is different for the two groups. Psychological symptoms including anxiety and low mood rank higher in the report of PMD subjects, while physical symptoms such as general physical discomfort and water retention rank higher among controls. Atypical depressive features are the highest ranked psychological dimension endorsed by the control group. A glance back at Table 4 (p. 101a), which represents the unipolar scale data of the full sample (N=130) will reveal that the PMD group means from Table 11 consistently fall above the full sample means, while the control group means consistently fall below them.

TABLE 10. Degree of Overlap Between Premenstrual Depressive Syndrome (PMD) and Other Typological Categories (N=45)

Typological category	% of PMD subjects who meet categories
Minor depressive syndrome	0 *
Subtypes of depressive syndrome:	
Endogenous features	0
Atypical features	76
Hysteroid features	33
Agitated/anxious features	58
Hostile features	69
Withdrawn features	44
Anxious syndrome	0 *
Irritable syndrome	0 *
Impulsive syndrome	60
Increased well-being	29
Changes in physical condition:	
General discomfort syndrome	89
Water retention syndrome	71
Fatigue syndrome	73
Autonomic physical syndrome	51
Changes in functioning:	
Impaired social functioning	84
Organic mental features	38
No significant changes	0 *
No suitable PAF subtype	0 *

* mutually exclusive with major depressive syndrome

TABLE 11. PAF Unipolar Summary Scales: Rank Order of Mean Scale Scores (% of maximum possible value) for PMD AND Control Groups

	PMD (N=45)			Control (N=49)		
	Mean	(SD)	Rank	Mean	(SD)	Rank
Summary scale (#)						
Anxiety (8)	58.61	(18.30)	1	22.65	(7.38)	5
Fatigue (15)	57.50	(17.47)	2	25.18	(7.00)	3
General Physical Discomfort (13)	56.44	(19.43)	3	26.97	(9.24)	2
Low mood / loss of pleasure (1)	54.85	(17.89)	4	20.69	(3.83)	9
Lability (3)	53.92	(24.98)	5	22.11	(7.38)	6
Atypical depressive features (4)	51.52	(14.51)	6	23.50	(5.34)	4
Hysteroid features (5)	50.82	(18.23)	7	20.97	(5.24)	8
Hostility / Anger (6)	50.25	(21.91)	8	20.26	(3.93)	10
Water Retention (12)	49.16	(15.17)	9	29.17	(8.06)	1
Social Withdrawal (7)	48.80	(18.43)	10	18.92	(4.78)	16
Impulsivity (10)	45.93	(20.82)	11	20.14	(4.66)	12
Impaired Social Functioning (16)	44.66	(13.81)	12	20.15	(3.50)	11
Organic mental features (11)	41.91	(18.3)	13	18.23	(2.8)	17
Endogenous depressive features (2)	40.07	(14.64)	14	19.51	(4.61)	15
Misc. mood/behavior changes (17)	40.00	(13.87)	15	19.69	(2.48)	14
Misc. physical changes (18)	37.69	(13.95)	16	21.00	(3.84)	7
Autonomic physical changes (14)	37.55	(12.4)	17	19.79	(3.58)	13
Increased well-being (9)	27.32	(15.17)	18	18.14	(3.27)	18

Individual Item Analysis

The PAF individual items on which PMD and control subjects obtained the highest mean scores are presented in Table 12. The mean scores were derived from a scale which ranges from 1 - 6, representing no change to extreme change. The items common to both groups, within this array of the 12 highest mean item scores per group, are marked by asterisks in Table 12. Complaints common to both groups include decreased energy, outbursts of irritability, as well as a tendency to quarrel. An inspection of the means relevant to these three items reveals that those of the PMD group are more than double those of the control group suggesting that these symptoms may lie on a common continuum for the two groups surveyed but are much more pronounced in the report of PMD subjects. Aside from this similarity, the items profiles diverge, with PMD subjects reporting mainly dysphoric mood symptoms (i.e. feel under stress, feel anxious, feel sad or blue), and controls reporting primarily physical symptoms (i.e. breast swelling/pain, feel bloated, weight gain).

TABLE 12. PAF Individual Items: Rank Order of Highest Mean Item Scores for PMD and Control Groups

PAF Item	Mean	(SD)
PMD (N=45)		
feel under stress	4.02	(1.2)
feel anxious	4.00	(1.3)
feel sad or blue	3.98	(1.3)
* decreased energy/fatigue easily	3.96	(1.3)
* outbursts of irritability or bad temper	3.93	(1.5)
are tearful, weep or cry	3.87	(1.5)
intolerant/impatient with others	3.80	(1.4)
feel depressed	3.76	(1.4)
* nag or quarrel over unimportant issues	3.76	(1.4)
feel overwhelmed by ordinary demands	3.73	(1.3)
dissatisfied with personal appearance	3.64	(1.5)
feeling of malaise	3.58	(1.4)
Controls (N=49)		
breast pain/tenderness/swelling	2.21	(1.1)
feel bloated	2.02	(. 8)
weight gain	1.86	(.6)
* decreased energy/fatigue easily	1.83	(.8)
backaches/joint and muscle pains	1.80	(.9)
* nag or quarrel over unimportant issues	1.79	(.8)
edema/puffiness	1.73	(.8)
increased appetite	1.65	(.8)
skin problems	1.63	(.7)
* outbursts of irritability or bad temper	1.60	(.7)
abdominal discomfort/steady pain	1.58	(.6)
abdominal cramps/intermittent pain	1.57	(.9)

* items common to both groups

Discussion

Summary of Findings

Full Sample (N=130)

The sample of women surveyed with the retrospective version of the Premenstrual Assessment Form can be described as a relatively mature group of women, who are well-educated and more than half of whom work outside the home. Although many of these women reported mild premenstrual changes (PMC) in a variety of psychological, physical and behavioral variables, fewer classified their PMC as severe (16%) and even fewer rated their PMC as severely disruptive of their family, work or social life (1.6%). However, approximately 20% of women surveyed had sought treatment to relieve their premenstrual symptoms.

The most frequently reported symptom clusters, endorsed at the greatest severity levels, involved general physical discomfort, fatigue, signs of water retention, anxiety and depressive mood. Atypical depressive features represented the most common mood change reported premenstrually. Endogenous depressive features were rarely endorsed by the current sample.

An examination of the individual items most frequently endorsed as most severe by the full sample yielded a mixture of dysphoric mood descriptors (e.g. irritability, sadness, anxiety) and physical symptoms (e.g. fatigue, breast swelling, bloating, headaches), with approximately one-third of the sample indicating that these items represented

moderate to extreme changes from their nonpremenstrual state.

A comparison between the data derived from the current sample and that derived from the developmental sample of Halbreich et al. (1982), which was somewhat younger, revealed many commonalities both in terms of the typological categories and the individual items endorsed. Two signs of water retention (breast swelling and bloating), as well as sadness and weepiness, were somewhat more prevalent in the developmental sample. A core group of symptoms, however, was common to both samples and included fatigue, irritability, sadness, and water retention.

Age was found to be negatively related to the severity of overall premenstrual complaint, and particularly to the experience of certain psychological changes.

Validity and reliability. The PAF was demonstrated to be internally consistent: indices derived from individual item ratings showed high agreement with more global assessments of PMC and were highly related to relevant behavioral tendencies (e.g. treatment seeking). As well, the internal consistency of each of the 18 unipolar summary scales was demonstrated to be very high with the exception of the scale representing endogenous depressive features.

The cycle phase during which subjects answered the PAF was found to affect their symptoms ratings - posing a challenge to the reliability of the instrument. Subjects who responded to the retrospective PAF in the premenstrual

phase tended to report higher levels of complaint on the majority of unipolar summary scales.

The experience of severe dysmenorrhea was found to be related to an increased severity of PMC in general, but this was shown to be due mainly to elevations in certain physical symptom scales.

PMD versus Control Group

The PAF responses of the two component subgroups which made up the control group (i.e. physical changes vs. no changes premenstrually) were found to be similar enough to warrant treating them as one relatively homogeneous control group -- particularly with regard to their lack of psychological complaint.

PMD and control subjects failed to differ in any of the demographic variables studied with the exception that a higher proportion of controls were homemakers. The two subject groups were also indistinguishable with regard to most of the menstrual cycle characteristics surveyed. PMD subjects were, however, more likely to report severe dysmenorrhea accompanying menses than were controls. As might be expected, control subjects were less likely than PMD subjects to report severe levels of PMC, to regard their PMC as disruptive, or to seek treatment for their PMC.

The PAF profile of PMD subjects suggested a multidimensional symptom experience. Most subjects who complained of premenstrual depressive changes also reported general physical discomfort, water retention, fatigue and

impairments in social functioning. The unipolar summary scores of the control group were generally less than half of those of the PMD group -- even for scales representing physical complaint. As well, the order of scales, ranked according to severity level, differed between groups suggesting qualitative as well as quantitative differences in their respective experience premenstrually. An examination of the highest mean individual items scores obtained by each group supports this observation. The PMD group reported predominantly psychological symptoms, while controls reported mainly physical symptoms. Only three items were common to both groups, apparently reflecting quantitative differences between PMD and control subjects: decreased energy and fatigue, irritability and a tendency to quarrel.

Interpretation of Findings

The retrospective survey of premenstrual changes (PMC) suggested that many of the 30-45 year old women sampled detected at least mild changes in either their psychological, physical or behavioral functioning premenstrually. The fact that close to 80% of those surveyed reported that such changes had little impact on their lives suggests that for the most part, mild PMC can be regarded as a normal facet of a woman's experience during her reproductive years.

Less than 2% of the sample found their PMC to be incapacitating. This figure is similar to the estimate for

severe or disabling PMC found by Andersch in a Swedish epidemiological study (cited in Bancroft & Backstrom, 1985) and suggests that the incidence of PMS as a disabling disorder, although relatively rare, is by no means inconsequential. Between the two poles just mentioned, however, lie a proportion of women (16-20%) who report their PMC to be severe and moderately disruptive of their lives, and who have sought treatment for their symptoms. Although the incidence of severe PMC in the current sample is somewhat higher than that reported in prior surveys (e.g. 10% - Andersch) there appears to be a substantial group of women for whom PMC -- while not disabling -- still represents a serious health concern.

The most common PMC experienced by the sample as a whole involved a mixture of psychological and physical symptoms, similar to the central features of PMS commonly reported in the literature (i.e. dysphoric mood, fatigue, water retention and physical discomfort). The most commonly reported category of mood change involved atypical depressive features (i.e. hypersomnia, mood swings, increased appetite), which supports the findings of Halbreich et al. (1983). If severity of symptom report is taken into account, however, the anxiety scale (i.e. anxiety, restlessness, physical agitation, stress) was somewhat more prominent.

In general, the current survey produced findings highly comparable to those of the developmental sample of Halbreich

et al. (1982), suggesting that the PAF has high content validity across samples of normal women. The only notable discrepancy was the somewhat lower report of signs of water retention and depression in the current sample. Although a lack of information concerning the comparability of these samples precludes drawing any inferences about the observed discrepancies, this finding raises interesting questions concerning the relationship between age and premenstrual symptom experience. More than half of the developmental sample consisted of women whose ages fell below the lower limit of the age range for the current sample (i.e. 30 years). There have been several reports in the literature that the peak period for premenstrual difficulties falls in the mid to late thirties (Gough, 1975; Kramp, 1968, Moos, 1969). The correlation between age and an index of overall severity of PMC in the current sample was negative, suggesting that PMC decline in severity with increasing age in an older sample. The possibility exists that certain PMC are age related, or related to some other variable that covaries with age (e.g. parity) and investigations designed to directly investigate this relationship are needed.

Although the PAF appears to have good internal validity, its reliability is challenged by the finding that the cycle phase during which the PAF was completed was related to the severity of symptom complaint. Subjects asked to rate the general level of changes eperienced during the premenstrual phase of their past three menstrual cycles

produced higher ratings if they answered during their premenstrual phase. This finding suggests several possible explanations:

1. Subjects may report more accurate severity ratings during the premenstrual phase because of the immediacy of their experience or they may inflate their symptom report for much the same reason. These alternatives will be addressed further in Part III, in light of the data concerning confirmation of retrospective report.

2. The PAF definitions for the premenstrual, menstrual and intermenstrual phases are all flexible, while only the postmenstrual phase is clearly stipulated to be a week in length. That is, women may define their own premenstrual phase as 1 or 3 or 14 days. The following two findings are suggestive, although they both represent only trends in the data: (a) PMD subjects report a somewhat earlier onset of symptoms than controls (see Table 8, p. 110a) and (b) women reporting PMD were somewhat more likely to have answered the PAF during their premenstrual phase (see p. 108). Therefore, symptomatic women may have longer premenstrual phases, increasing the odds that more symptomatic women will answer the PAF premenstrually. The increased severity of reporting may therefore be an accurate reflection of symptom experience but be confounded by the menstrual cycle logistics of the sample surveyed.

The influence of cycle phase on symptom report demonstrated by the current investigation has not been

reported elsewhere, and may also represent a spurious finding related to some idiosyncracy in the methodology or sample employed. However, this finding, in addition to the demonstrated influence of cycle phase on presumed trait variables (Hammond & Keye, 1985; Mira et al., 1985) suggests that researchers should be cognizant of the potential influence of cycle phase on symptom report.

An investigation of the relationship between dysmenorrhea and PMC indicated that, contrary to Dalton's (1964) claim, these two phenomena do co-occur. Of those subjects reporting moderate or severe PMC, 46% also reported moderate or severe dysmenorrhea, while 38% reported little or no dysmenorrhea. The unipolar scales which best discriminated these two subgroups of PMC sufferers were physiological in nature, suggesting that dysmenorrhea adds an increased component of physical discomfort to PMC. Studies reporting that antiprostaglandin agents relieve premenstrual psychological symptoms in women with additional dysmenorrhea (Mira et al., 1986; Wood & Jakubowicz, 1980) require replication with subjects who suffer PMC alone to determine whether the effect on psychological symptoms is direct or secondary to the relief of physiological discomfort associated with dysmenorrhea.

The control group in the current investigation was made up of subjects with minimal complaint of any type, as well as subjects with only physical complaints. A preliminary analysis was conducted to ensure that these groups were

similar enough to warrant combining their data. In the course of this assessment it was found that the two subgroups were remarkably alike, save the greater degree of physical complaint in the physical symptom subgroup. The close similarity in the rank order of the unipolar scales endorsed by the two subgroups suggests that they lie along the same continuum, with physical premenstrual complaint representing an exacerbation of the cyclic fluctuations common to most women. The symptom profile of the PMD group, on the other hand, appears qualitatively as well as quantitatively different from that of the controls. Subjects reporting PMD reveal a multidimensional symptom profile -- with depression occurring along with a myriad of other symptoms premenstrually. Whether or not depression is indeed the predominant symptom and whether PMD can therefore be considered a distinctive subtype of PMC will be assessed in Part III through an examination of the prospective symptom ratings.

The only demographic variable which significantly differentiated between the PMD and control subjects was occupational status: control subjects were more likely to be homemakers than were PMD. Although this may represent a spurious finding which could be due to a variety of uncontrolled variables, it is nevertheless interesting and worthy of further investigation. Does it suggest, as analytic investigators might predict, that homemakers are more accepting of their feminine identities and therefore

experience less distress in relation to their reproductive cycles? A more concrete explanation is that working women have an added source of stress which may interact with some predisposition to result in PMD. Premenstrual changes may not be as noticeable or disruptive for a woman at home who has a degree of flexibility in her schedule, as opposed to a working woman who must meet the demands of her job. Yet another possibility is the existence of a variable that is related to both the experience of PMD and to working women (e.g. need for achievement). This finding has interesting implications and merits further study. To the present author's knowledge, similar data has not been previously reported. This could be due to the fact that many investigations of PMC have either been based on symptomatic samples, or on student populations or populations of working women. A survey study based on random stratified sampling of households would be necessary to investigate the reliability of the relationship between occupational status and premenstrual complaint.

PART II - EXPERIMENTAL PHASE

Introduction

Rationale

Research suggests that a particular relationship exists between the experience of premenstrual affective symptoms and affective psychiatric illness. The nature of this relationship is, as yet, unclear but it has been postulated that premenstrual depression may signal a vulnerability for the development of affective illness.

Descriptions of the dsyphoric or depressive mood associated with the premenstrual phase closely resemble the subjective feeling state which typically occurs in clinical depressive illness. The subjective feeling component, however, is only one aspect of the complex, multidimensional phenomenon of clinical depression (Plutchik, 1980). Features typically associated with depressive illness include disturbances in sleep and appetite, motivational deficits, psychomotor retardation or agitation, hypochondriasis, and excessive guilt and self-reproach (Weckowicz et al., 1967). Furthermore, there are no symptoms of depression which are unique to this condition; features resembling depression occur in patients diagnosed with schizophrenic (Carroll, 1972) and anxiety disorders (Mendels, Weinstein, & Cochrane, 1972). Depressive symptoms are also associated with certain medical disorders (e.g. thyroid dysfunction) and appear as side effets of certain medications (e.g. hypertension medication).

Although a concordance has been established between the experience of premenstrual depression and current or past episodes of clinical depression, and the two phenomena apparently share a common subjective mood component, few investigations have assessed their relationship with respect to other sequellae of depression. Clinical experience with premenstrually depressed women suggests that a cognitive approach to depression may have relevance for premenstrual affective changes. The marked onset of negative cognitions in the premenstrual phase and their apparent dissipation following menses seems particularly amenable to explanation by Beck's cognitive theory of depression. Beck (1967, 1976) posits that the symptoms of depression follow from the activation of depressive schemata which structure the individual's perception of her world. Information is then processed in an idiosyncratic manner to yield support for the negative views the individual hold about the self, the world and the future. A prediction derived from Beck's model is that depressed individuals attend to information in a selective manner -- that is, in a manner consistent with their negative outlook.

Information processing theory states that attention is guided by an individual's allocation policies, which may reflect either immediate needs or enduring dispositions to focus on certain aspects of information and ignore others. Recent empirical findings within selective attention research suggest that affective disorders are associated

with idiosyncratic allocation policies.

The demonstration of idiosyncratic information processing in premenstrually depressed women would provide preliminary evidence that this phenomenon shares a cognitive component with clinical depression, in addition to the recognized phenomenological component (i.e. feeling state). Evidence of idiosyncratic information processing in premenstrual depression would, by extension, suggest a potential cognitive vulnerability factor for the development of depressive illness.

The Current Investigation

The current investigation is designed to assess the co-occurrence of depression with the premenstrual phase of the menstrual cycle as indicated by both self-report and behavioral indices. The administration of standardized inventories of depression will allow for an assessment of the degree of the depression experienced premenstrually relative to available norms. The dichotic shadowing task will provide a behavioral index of dysphoric attentional bias, which is considered to be a concomitant of depression. The selective attention findings, in tandem with the depression inventory data, are expected to elucidate the nature of the relationship between premenstrual depression and affective illness and the potential relevance of a cognitive vulnerability factor in premenstrual depression.

Women reporting premenstrual depression (PMD) and those reporting no psychological changes premenstrually (controls)

were asked to keep daily ratings of a number of commonly reported premenstrual symptoms during the course of one complete menstrual cycle. During this same cycle, they took part in two test sessions -- one premenstrually and one postmenstrually -- each of which involved the administration of two standardized measures of depression as well as a dichotic shadowing task. Within the dichotic shadowing task, the commission of relatively more errors while shadowing in the presence of dysphoric distraction as compared to non-dysphoric distraction is indicative of an attentional bias for dysphorically-toned material.

Prior to the analysis of the psychometric and shadowing data, subjects' daily ratings were examined in order to obtain confirmation of their retrospective report of premenstrual depressive symptoms or lack thereof.

Hypotheses

1. (a) PMD subjects will report significant increases in depression (indicated by scores on standardized measures of depression) premenstrually as compared to postmenstrually.

(b) Depression scores of PMD subjects will be significantly greater than those of control subjects premenstrually, but will not differ from the scores of controls postmenstrually.

2. (a) PMD subjects will demonstrate an attentional bias for dysphoric material (i.e. commit more errors in the presence of dysphoric versus non-dysphoric distracters) premenstrually but will not do so postmenstrually.

(b) Control subjects will fail to demonstrate such a bias during either premenstrual or postmenstrual testing.

Method

Subjects

Women classified on the basis of their responses to the retrospective survey, as outlined in Part I, represented the subjects pools from which the PMD and controls subjects were solicited for participation in the experimental phase of research. A premenstrually depressed group (n=45) had been delineated on the basis of the following criteria: they met the PAF typological category of major depressive syndrome and obtained unipolar summary scores of at least 3 on Scale 1 - Low mood/loss of pleasure. A control group (n=49) had been delineated according to the following criteria: no significant premenstrual change (i.e. failure to meet any typological category) or met only physical typological categories (e.g. water retention syndrome, fatigue syndrome, etc.) and no significant psychological changes on unipolar summary scales -- operationally defined as scores of less than 3 on psychological summary scales (e.g. low mood/loss of pleasure, anxiety, atypical depression, etc.).

Women thus selected, and who had signalled interest in further research by supplying their phone numbers, were contacted. After introducing herself, E invited subjects to participate in the experimental phase of research in the following manner:

"We have analyzed the responses to the questionnaire

study you participated in, and found that your responses are representative of one of the groups we are interested in looking at further.[4] May I tell you about the study we have planned and see if you might like to be involved?

We are interested in the relationship between mood, attentional processes and the menstrual cycle. We would like to follow you for one menstrual cycle with daily diary ratings, and see you at two points during that same cycle to administer a listening task. We will supply you with a diary of rating sheets; one is to be filled in each evening and it takes about 2 minutes to complete. Then we would like to visit you twice and have you listen to some messages over headphones. Your task will simply be to repeat what you hear out loud.[5] These visits will last about 30-40 minutes each. Do you think you might be interested in participating?

Women who agreed to participate were asked whether they had any hearing difficulties; several responded positively and were excluded from further participation on this basis. The majority of those contacted expressed interest in the research and were very willing to be involved. The principal investigator, who was aided by three research

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[4] To lessen the influence of expectation on symptom report, subjects were not told which group they represented. Those who asked were told they would be informed of their classification upon completion of the study.

[5] A minimum of information was provided regarding the task itself. Subjects who inquired about the purpose of the task were told that further information at this stage might affect their performance, but that a complete explanation would be available to them after the study.

assistants, offered to meet with the women in their homes and to conduct the two test sessions there as well. Virtually all of the subjects opted to be seen at home as opposed to coming in to the laboratory. The convenience for the subjects of this gesture may have improved compliance.

Of those women who agreed to participate, 28 PMD and 20 control subjects completed the entire investigation. Another 7 subjects completed daily diary ratings but did not complete the experimental test sessions; six of these women were too busy to be involved in the test sessions but agreed to complete ratings; one other was tested, but due to her irregular cycle an accurately timed premenstrual test was not obtained.

Measures

Daily Diary

The diary consisted of approximately 30 individual diary sheets modeled after the Daily Rating Form developed by Endicott and Halbreich.[6] In order to reduce the influence of expectancy set on symptom report, the format was altered so that each day's ratings encompassed a separate page. Ratings were contained in double-pocket folders, and subjects were instructed to file each day's ratings face down in the opposite side of the folder upon completion. The 20 items included in the diary sheets were representative of the major categories of change assessed in

[6] The Daily Rating Form is an unpublished instrument, available from the Research Assessment and Training Unit, 722 West 168th Street, Room 341, New York, NY 10032.

the retrospective PAF, and very similar to those included in the Daily Rating Form designed by Endicott and Halbreich. Several items (e.g. alcohol and drug use), however, were replaced with others more directly relevant to depresion. Severity of symptoms experience is rated on a scale of 1 to 6 (not at all to extreme). An item concerning life events (negative or positive) was included to detect potential environmental influences on subjects' ratings. A sample daily rating form is presented in Appendix M. A Menstrual Calendar (see Appendix B) was also included in the daily diary package and was used to confirm, after the fact, the appropriate timing of premenstrual test sessions.

Measures of Depression and Mood

The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961) was employed as a self-report measure of the syndrome of depression. It contains 21 items that sample affective, cognitive, motivational, and physical manifestations of depression (see Appendix N). Four response options per item represent increasing symptom severity and receive scores from Ø to 3. The BDI is an extensively validated measure of depression which has been used frequently in general depression research (Rehm, 1981). A split-half reliability coefficient of .93 has been demonstrated for the BDI (Beck et al., 1961) and scores on this instrument have been shown to correlate satisfactorily with observer ratings of depression (Williams, Barlow & Agras, 1972). The success of the BDI in

distinguishing between anxiety and depression (Beck, 1967) and its ability to reflect clinical changes in depth of depression (Beck et al., 1961) support the validity of the instrument.

The BDI has been used extensively and normative data is available for both clinical and normal (mainly college student) populations. It has been noted that the factor structure of the BDI differs in these two populations: hospitalized depressives are more likely to express guilt, a sense of deserving punishment, as well as somatic and vegetative symptoms, while student samples commonly endorse more cognitive and affective symptoms (Weckowicz, Muir & Cropley, 1967 and Golin & Hartz, 1979 respectively). The diagnostic significance of BDI scores also varies across populations. BDI scores of 10 are considered indicative of depression in non-clinical populations (Beck, 1967) and have been shown to correspond to clinically significant depression in a college student population (Bumberry, Oliver, & McClure, 1978). Beck originally suggested that scores of 10-15 correspond to psychiatric ratings of mildly depressed, 16-23 moderately depressed and 24-63 severely depressed. In 1967, however, he recommended that cutting scores of 13 or 14 be used with clinical populations for a more accurate differentiation from nondepressed patients. Despite the fact that the BDI may reflect potential differences in the construct or severity of depression in different populations, it is still considered the best

available self-report inventory of depression for the purposes of this investigation.

The Multiple Affect Adjective Checklist - Today Form (MAACL) (Zuckerman & Lubin, 1965) was employed as a measure of mood state. The MAACL, a 132-item checklist of adjectives describing emotional states (see Appendix O), can be scored for indices of depression, anxiety and hostility. The simple and brief checklist format provides for the relatively subtle and nonthreatening measurement of negative mood state in a nonclinical population.

The MAACL Depression scale (MAACL-D), however, provides little information regarding clinical condition. Although the MAACL-D scale does correlate well with other measures of depression (Marsella, Sanborn, Kameoka, Shizuru & Brennan, 1975) and successfully discriminates between depressed and non-depressed individuals (Lubin, 1966; Bloom & Brady, 1968), it measures only the subjective feeling component, but not the somatic and behavioral symptoms associated with depression. As well, it provides no indication of either the severity or duration of the feeling state. In fact, the "Today" form of the MAACL has been suggested as an appropriate instrument for repeated measurement of changes in affect over time (Masterson, 1975) precisely because of its very low test-retest reliability over brief periods (.21 over 1 week in college students; Zuckerman & Lubin, 1965). The original evaluations of the MAACL-D scale suggest that scores of 14 and over can be considered depressive, and

those 13 or less "normal" (Zuckerman, Lubin, Vogel, & Valerius, 1964). This criterion has been shown to successfully differentiate depressed from normal individuals (Bloom & Brady, 1968). Normative data from clinical groups suggest the following cutoff scores for the diagnosis of depression: 15 and over (50th percentile) for mild depression, 25 and over (65th percentile) for moderate depression and 32 and over (75th percentile) for severe depression (Marsella et al., 1975). In summary, the MAACL is considered appropriate for use as a repeated measure of subjective feeling state only.

Attentional Bias for Dysphoric Stimuli

A dichotic listening task which requires subjects to shadow (i.e. repeat aloud while listening) messages received at one ear (targets) while ignoring those received at the other (distracters) was utilized to measure selective attention for dsyphoric stimuli. Each target and distracter stimulus consists of approximately one minute of meaningful prose and pairs are presented simultaneously through separate channels of stero headphones. Half the distracter stimuli represent depressive themes (dysphoric distracters) frequently described in the clinical literature while the other half are affectively neutral in tone (non-dysphoric distracters). All target stimuli are neutral in affective tone. A dysphoric attentional bias is suggested by relatively greater error rates in target shadowing performance during the presence of dsyphoric as opposed to

non-dysphoric distracters. The basic reasoning underlying this assumption is that because the task of shadowing demands a focused attentive effort by the subjects and limits the extent to which they can attend to the distracters, any consistent pattern of interference from the unattended channel suggests a salience of the semantic content of that channel (all other features of the content being equal).

The actual stimuli used in the present investigation were developed by Shenker (1980) to investigate attentional bias in depressed college students. The manner in which Shenker selected and validated appropriate scripts to represent dysphoric and non-dysphoric stimuli, and the organization and construction of test tapes incorporating these stimuli are extensively described in Appendix P and Appendix Q respectively. Only the major characteristics of the stimuli will be described here.

Dysphoric distracter stimuli. The dysphoric distracter stimuli were developed to depict ideational themes which have been consistently described in the clinical literature as central to the concerns, preoccupations and beliefs of depressed individuals. The stimuli focus on themes of helplessness, loss, rejection, hopelessness, escape, personal deficiency, failure, deprivation, loneliness, and a negative view of the world. Each stimulus describes events, ideas and images which typify and support two or more of these themes.

The dysphoric distracters were also composed to reflect a dysphoric affective quality or tone. The words, phrases and images used are such that nondepressed individuals would be apt to describe each stimulus as sad, gloomy or discouraging. The content of the stimuli vary from interpersonal relationships to ecological problems to personal achievement. One representative dysphoric distracter stimulus is presented below; all others are included in Appendix R.

DYSPHORIC DISTRACTER STIMULUS D-1

> A dominant characteristic of modern societies is the helplessness and impotence of the individual. In simpler societies, people could direct their own lives, their efforts could make a difference. Now, individuals are helpless. Like passive blades of grass, they are blown this way and that, powerless to influence the forces that determine their lives. In many respects, people's lives are governed by faceless bureaucracies, important decisions about them made by computers. A terrible sense of impotence pervades modern life, as people bow to the sure knowledge that they are powerless to affect their own lives, much less make an impression on the society around them.

Non-dysphoric distracter stimuli. These stimuli differ from the dysphoric distracters only in content: they do not deal with depressive themes and are not dysphoric in affective quality. They would not be described by nondepressed individuals with negative adjectives, but they would also not be described as particularly positive in

theme or mood tone. The non-dysphoric distracters basically deal with nondepressive ideational themes and are neutral in affective tone. The content of these stimuli is varied, including passages dealing with the virtues of clear writing, teaching children to read, and underwater plant life. One representative non-dysphoric distracter stimulus is presented below; all others are included in Appendix S.

NON-DYSPHORIC DISTRACTER STIMULUS ND-2

> Wine must be stored properly to avoid spoiling. There are several general principles for storage of wines. Corked bottles should lay on their sides. The wine keeps the cork moist and prevents it from shrinking and admitting air. The safest storage is in a rack that gives each bottle a compartment to itself, allowing you to withdraw any bottle without jogging the others. Screw-top bottles should be stored upright. Maintain an even temperature. A few degree difference between summer and winter won't do harm, provided the change occurs slowly and steadily. What damages wine is rapid and frequent heating and cooling.

Target stimuli. These stimuli are approximately ten words longer than both types of distracter stimuli. With the exception of differences in content, they are identical in nature to the non-dysphoric distracters, that is, the target simuli also deal with nondepressive ideational themes and are neutral in mood or affective tone. All target stimuli are presented in Appendix T.

Stimulus Tape Organization. The stimulus tapes used in the dichotic task are each composed of 10 experimental stimulus pairs: ten targets recorded on one channel, in tandem with ten distracters on the other channel, of a stereo audio cassette tape. The 10 target stimuli are alternately paired with dysphoric and non-dysphoric distracters (5 of each). Both members of each pair are approximately one minute in length and are separated from other pairs by a 10 second interstimulus interval. A tone signals the onset of each target simulus which preceeds its mutual distracter by about 10 words. All target and distracter stimuli are recorded at equal amplitudes and rate of speech in the same male voice.

Two equivalently constructed tapes containing different stimulus content (i.e. two sets of 10 stimulus pairs) are available so that subjects can be tested twice with limited practice effects. These tapes are designated Tape A and Tape B of Series X. A duplicate set of these two tapes was also constructed -- Tapes A and B of Series Y -- in which each target stimulus which was paired with a dsyphoric distracter in Series X is paired with a non-dysphoric distracter in Series Y. Similarly, each target stimulus which was paired with a non-dysphoric distracter in Series X is paired with a dysphoric distracter in Series Y. In addition, the order in which targets and distracters occur was altered so that the order of presentation of stimuli on Series Y differs from that on Series X. Finally, Series X

begins with a non-dysphoric distraction trial and Series Y begins with a dsyphoric distraction trial. Further details concerning the organization and technical characteristics of stimulus tapes can be found in Appendix Q.

The purpose of constructing two different stimulus series was to determine the effects of type of distraction on shadowing performance, unconfounded by target characteristics or by potential interactive effects of particular targets and distracters. Half of the subjects in each experimental group (PMD and controls) will be randomly assigned to Series X and Y, so that any differential influence due to particular target/type of distraction pairing or order of presentation of stimuli, will be equated across experimental groups. Additionally, half of the subjects in each group will receive Part A premenstrually and Part B postmenstually, while the other half will receive Part B premenstrually and Part A postmenstrually. This is expected to control for the possibility that particular target/distracter pairings might interact with menstrual cycle phase in some undetermined manner.

A third tape set, consisting of three sets of stimulus pairs, all with non-dysphoric distraction, was constructed to provide two practice trials and a baseline measure of shadowing.

Considerable effort was made by Shenker (1980) to establish the content validity of the stimuli he developed (see Appendix P), and the significant outcome of his study

lends support to their differential salience for depressed and nondepressed subjects. Additional content validation is provided by a psychopharmacological study (Young et al., 1985), which employed the same distracter stimuli in tandem with a proofreading task. In this study normal subjects exposed to tryptophan depletion committed more proofreading errors in the presence of dysphoric distraction than non-dysphoric distraction, while controls did not. The implication was that the negative mood state induced by tryptophan depletion was accompanied by a selective attention bias for dysphoric stimuli.

Procedure

As mentioned previously, PMD and control subjects were selected for participation in the study on the basis of their retrospective PAF responses. There was a lag of approximately three months between subjects' completion of the retrospective questionnaire and their actual entry into the study. During these months, efforts were made to update the menstrual calendars of selected individuals in order to accurately predict the next onset of menses. The original intention was to have subjects enter into the study during their intermenstrual phase, to complete premenstrual testing first and finally to complete postmenstrual testing. The degree to which this was accomplished will be discussed in the results section.

Subjects were visited in their own homes on four occasions during the course of the study: daily diaries

were delivered and informed consent obtained during the first visit, pre- and postmenstrual testing was conducted during the next two visits, and daily diaries were collected and subjects debriefed during the last visit.

The purpose of the first visit was to review the requirements of the study and obtain subjects' informed consent, deliver and instruct subjects regarding daily diary packages, and update menstrual cycle calendars in order to reconfirm menstrual cycle phase. Subjects were provided only with a brief and somewhat vague explanation of the purpose of the study: i.e. that it involved an investigation of the relationship between the menstrual cycle, mood and attentional processes. If pressed for more information, E explained that a more detailed explanation might interfere with their performance, and that a complete debriefing would be forthcoming upon completion of the study. The requirements of the study were reviewed, confidentiality was ensured, and subjects were informed of their rights as per the Consent Form which is displayed in Appendix U. After obtaining informed consent, instructions were given concerning daily diary ratings, which were to be completed over the course of one menstrual cycle (i.e. approximately one month). A summary of these instructions was also displayed prominently on the cover of the diary folder; basically they suggested that diary ratings be made each evening before retiring, and that they be moved to the opposite folder pocket upon completion. Subjects were also

asked to record their days of menstrual bleeding on a menstrual calendar enclosed in the diary. E verbally reinforced the notion of regarding the ratings as a learning experience. That is, women were encouraged not to look back over ratings or to consider the phase of the cycle they were in while making them, but rather to try to record their day-to-day state with no predetermined notion of how they "should" feel.

The next two visits, scheduled to coincide with subjects' pre- and postmenstrual phases consisted of test sessions. For testing purposes, the premenstrual phase was defined to include the 7 days prior to onset of bleeding and the postmenstrual phase to include the 7 days following cessation of bleeding. This somewhat broad definition of phase length was deemed necessary, given the irregularity characteristic of many subjects' cycles, to ensure that premenstrual testing could be completed within the appropriate time interval. If subjects' menses occurred earlier than expected, thus precluding the premenstrual test, they were asked to continue ratings for an additional period of time sufficient to encompass both test sessions.[7] If subjects' menses occurred later than expected, thus

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[7] The premature occurrence of menstruation, in addition to mistimed entry into the study (i.e. too close to menses to allow for pretesting and the collection of 5 days of premenstrual phase ratings), resulted in a number of subjects being tested postmenstrually first, and then premenstrually. Order of testing will be discussed in the Results section.

rendering the premenstrual test invalid, these test session data were excluded from further analysis.[8]

Subjects were contacted prior to each of their two test sessions and asked to complete a Beck Depression Inventory (BDI) the night before they were to be tested. Two BDI forms were available in subjects' diary packages. This step was taken to guard against a possible mood induction effect, consequent to completing the BDI, that might influence subjects' dichotic shadowing performance. The BDI contains rather powerful negative descriptors which could stimulate dysphoric thoughts and reactions. As well, the dichotic shadowing task could potentially induce dysphoric reactions, depending on the degree to which the dysphoric distracters were processed. The MAACL, however, which contains both positive and negative mood adjectives, was judged as representing a milder, less intrusive measure than the BDI. For these reasons, then, the BDI was completed the evening prior to testing, the MAACL was administered first during the test session, and the dichotic listening task was administered last.

Arrangements were made to test subjects in a quiet room in their homes where there would be no distractions. They were initially requested to complete the MAACL; E delivered the following instructions:

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[8] This was determined to have occurred with only one subject, whose data was subsequently discarded from the analyses.

"On this sheet you will find words which describe different kinds of moods and feelings. Mark an X in the boxes beside the words which describe how you feel now, today. Some of the words may sound alike, but we want you to check all the words that describe your feelings. Work rapidly."

While subjects completed the MAACL, E set up the equipment required to administer the dichotic task. This consisted of one stereo cassette tape recorder on which stimulus tapes were played, two sets of stereo headphones connected with a Y jack to this tape recorder, and two smaller tape recorders on which subjects' shadowing performances were recorded. The extra set of headphones allowed E to hear exactly what the subjects heard in order to ensure proper stimulus presentation. The extra tape recorder provided a copy of all shadowing performances as a precautionary measure.

The stimulus tapes to be administered, as well as the ear in which target stimuli would be delivered, was predetermined by a process of random assignment. Half of the subjects in each group (i.e. PMD and controls) received the target stimuli at the right ear and the distracters at the left; this was reversed for the remaining subjects in each group.[9] As well, half of each group received stimulus

[9] Ear of target presentation was counterbalanced to control for the well documented right ear effect; for most people, shadowing performance for verbal material presented to the right ear tends to be better than for similar material presented to the left ear (Neisser, 1976). Since ear of target presentation does not change for individual subjects, however, it should effect only overall shadowing performance and not the data relevant to the hypotheses under investigation -- i.e. the difference between shadowing performance with dysphoric versus non-dysphoric distraction.

Series X and the other half received Series Y. Among subjects receiving the X (or Y) series, half received part A premenstrually and part B postmenstrually, while the other half received part B premenstrually and part A postmenstrually.

After subjects had completed the MAACL, the following instructions were given for the dichotic listening task:

> "Let me explain what the task is. When you put these earphones on, I'll play some tapes. The tapes contain short passages of about 1 minute each. There are different passages coming through the left and right ears, so you'll hear two different passages at the same time. What I'd like you to do is pay attention to the right (left) ear. Your task is to repeat what you hear in the right (left) ear while you're hearing it, so you're listening and repeating at the same time.
>
> On each passage, the right (left) ear starts first, and the left (right) ear comes on a few seconds later. There's a short tone just before each passage starts, so you know when it's coming, and another one at the end, so you know when it's over. After each passage, there's about a 10-second pause before the next one begins. At any point if you feel you need a break, just signal me during one of these pauses.
>
> I'll be recording your responses on these two tape recorders.
>
> Do you have any questions?
>
> We'll start out with a couple of practice passages so you can get used to the task. These

won't be recorded. Remember, repeat what you hear in the right (left) ear while you're hearing it."

The earphones were donned by the subjects and adjusted for comfort. The first cassette, containing the practice and baseline stimuli was begun. All subjects performed at least two practice trials. During these trials, a volume was established which the subject was most comfortable with (equivalent for both channels). Although two practice trials were sufficient for most subjects to adequately perform the task, some required extra practice. When E estimated that each subject could correctly shadow at least half the words accurately, the baseline trial was administered and recorded. The experimental stimuli were then administered and shadowing performances were recorded.

The procedure described above was repeated twice for each subject, once during the premenstrual week and once during the postmenstrual week. Each subject, then, received a different set of 10 test stimuli, with target stimuli delivered in the same ear, on two occasions. The practice and baseline stimuli, however, were identical for the two test sessions.

The purpose of the fourth and last visit was to pick up the daily diary packages and to debrief subjects. In the process of debriefing, it was determined that not one of the subjects tested had correctly surmised the purpose of the task. They were informally asked whether they recalled any of the content presented in the other ear; the majority of

subjects could remember nothing. Subjects were then completely informed about the structure and content of the dichotic task and how it addressed our hypotheses. Finally, subjects were thanked for their participation in the study and told that we would mail them a summary of our research findings.

Results

Confirmation of Retrospective Report

The diary ratings of subjects were assessed prior to the analysis of their dichotic shadowing and depression inventory data. The purpose of this assessment was to eliminate from analysis the data of those subjects whose prospective diary ratings failed to confirm what they had reported retrospectively. The criteria for confirmation of retrospective symptom report in PMD subjects required that depression ratings be at least 30% greater during the premenstrual phase than during the postmenstrual phase, and that they show few other significant symptom peaks during the remainder of the cycle (i.e. scores of 4, 5, or 6) unless these could be accounted for by reported life stressors. The 30% criterion for significant change has been suggested by leading researchers in the area (Endicott & Halbreich, 1982; Rubinow et al., 1984), and was proposed and endorsed by a National Institute of Mental Health premenstrual syndrome research workshop (Rubinow, Roy-Byrne, Hoban, Grover & Post, 1985). The criterion used to confirm an absence of depression in the control subjects required that subjects report no more than occasional mild depression (i.e. scores of 3) throughout the cycle unless such scores could be accounted for by reported life stressors.

The premenstrual phase was defined as the five days

prior to the onset of menses while the postmenstrual phase included the five days following the cessation of menstrual bleeding. These days are considered to include the most clearly encapsulated report of symptomatic and asymptomatic experience respectively (Backstrom et al., 1983). To assure an even more sensitive contrast between these two periods, the confirmation criterion suggested by Endicott, Nee, Cohen & Halbreich (1986) was employed: the mean score of the highest 3 consecutive days during the 5 premenstrual days was contrasted with the mean score of the 5 postmenstrual days. The rationale for delineating a relatively brief and flexible premenstrual phase is that both the timing and peak of premenstrual changes are highly variable, and apt to be diluted by averaging over 5 or more days.

Confirmation constrasts were calculated on the basis of the diary item (i.e. feel depressed, sad, low, blue or lonely) considered most representative of Summary Scale 1 - Low mood/loss of pleasure. Daily rating forms were not extensive enough to allow for confirmation of the syndrome of major depression, either as represented by the PAF typological category of major depressive syndrome or by DSM-III criteria for major depressive episode (disregarding the duration criteria).

On the basis of the confirmation criteria, 10 subjects were completely excluded from the experimental analysis: 6 subjects retrospectively classified as

experiencing PMD were found to report no depressed affect during this cycle, one retrospectively classed control reported PMD, and two other control subjects were apparently depressed throughout their cycles. One PMD subject's data were also lost because of inappropriate test scheduling.

An additional group of retrospectively classed PMD subjects (n=10) who failed to confirm were found to report noncyclic, intermittent depression throughout the month. The basic homogeneity of these subjects' ratings and their disproportionate representation in the sample made it feasible to examine their data as representative of a separate subject group. As well, nonconfirmed subjects who exhibit more pervasive depression are of considerable theoretical interest granted the many questions which remain concerning the relationship between PMD and affective illness.

The subjects of interest now comprise the following three groups: 17 controls (no depression throughout the cycle) representing 85% of the controls studied; 11 PMD (at least a 30% increase in depressed affect only premenstrually) representing 39% of the PMD subjects studied; and 10 intermittently depressed (INTD) (depressed affect throughout the cycle) representing 36% of the PMD subjects studied. These three subject groups are included in the following data analyses.

Although the hypotheses outlined in the Introduction

(p. 127-128) were formulated with only two subject groups in mind, they are still germane to the following analyses. The major difference with respect to data analysis is that the data of all 3 subject groups will be examined within the same analysis (i.e. mixed design repeated measures ANOVA) for each measure administered (i.e. BDI, MAACL, shadowing task). In lieu of planned comparisons relevant to the original hypotheses, then, tests of simple main effects and, where appropriate, post-hoc multiple comparison tests, will effectively address the questions relevant to the original hypotheses and those involving the third group of interest (INTD).

Beck Depression Inventory (BDI)

A two-way mixed design ANOVA was performed on the BDI scores obtained from the three subject groups at pre- and postmenstrual test sessions. The means and standard deviations for the BDI data are displayed in Table 13. Significant main effects were found for group, $F(2,35) = 11.98$, $p < .001$, and phase of test, $F(1,35) = 16.41$, $p < .001$. The Group X Phase interaction was significant, $F(2,35) = 6.52$, $p < .005$, suggesting that phase differences in BDI scores varied as a function of subject group.

Tests of simple main effects conducted to compare pre- and post scores within each subject group revealed differences only within the PMD group: BDI scores were significantly higher pre- than postmenstrually, $F(1,35)$

TABLE 13. Beck Depression Inventory Data

Means and Standard Deviations

	PMD (n=11)		INTD (n=10)		CONTROL (n=17)	
Phase	M	(SD)	M	(SD)	M	(SD)
Pre	12.64	(6.8)	13.00	(8.6)	1.82	(2.2)
Post	4.55	(5.1)	9.80	(10.6)	1.65	(2.0)

Analysis of Variance

Source	SS	df	MS	F	p
Group (G)	1344.00	2	672.00	11.98	.0001
S (G)	1963.74	35	56.11		
Phase	263.28	1	263.28	16.41	.0003
Phase X Group	209.19	2	104.60	6.52	.004
Phase X S (G)	561.49	35	16.04		
Tests of Simple Main Effects:					
Phase (PMD)		1	361.83	22.56	.001
Phase (INTD)		1	51.20	3.19	ns
Phase (control)		1	.38	.02	ns
Error		35	16.04		
Group (premenstrual)		2	569.10	15.78	.001
Group (postmenstrual)		2	209.91	5.82	.01
Error		53 *	36.07 **		

* degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971)

** represents pooled mean square error term

= 22.56, $p < .001$. Neither the INTD nor the control group exhibited any significant differences in BDI scores as a function of phase of test (see Table 13).

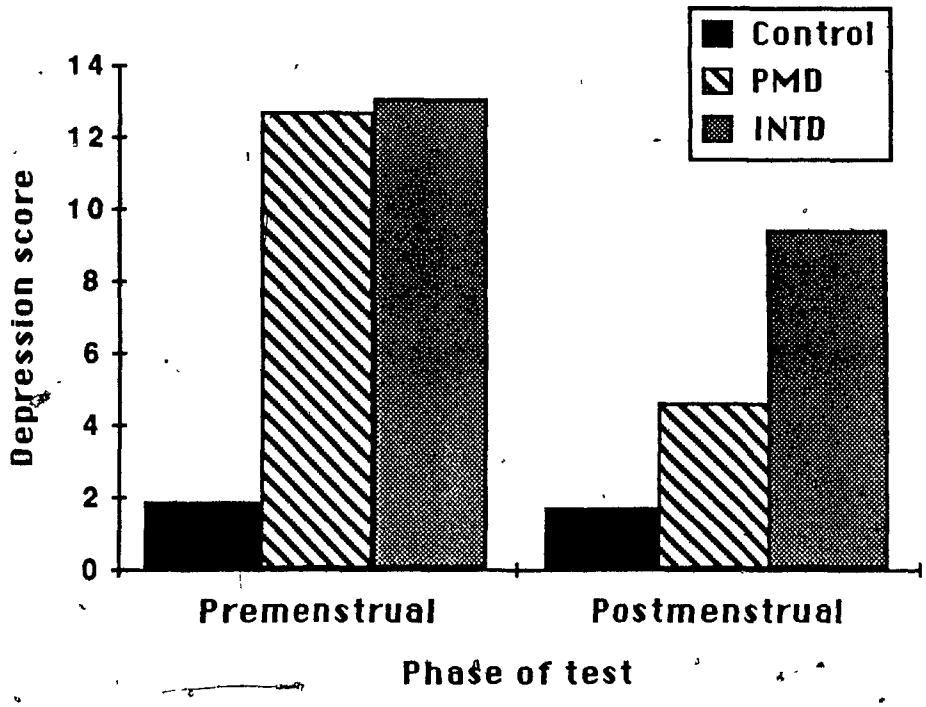
Tests of simple main effects conducted to assess differences between groups within each test phase revealed a significant group effect both for the premenstrual phase, $F(2,53) = 15.78$, $p < .001$, and the postmenstrual phase, $F(2,53) = 5.82$, $p < .01$. To clarify the group differences within each phase, post-hoc tests were performed using Tukey's honestly significant difference method. Premenstrually, the BDI scores of the PMD and INTD groups did not differ from one another but were both significantly higher than that of the control group, $Q = 6.24$, $p < .01$; $Q = 6.45$, $p < .01$ respectively; $K = 3$, $df = 53$ (df estimated with the Satterthwaite approximation[10]). Postmenstrually, only the INTD and control groups differed, $Q = 4.71$, $p < .01$, $K = 3$, $df = 53$. Thus, BDI findings reveal a consistently high level of depression for the INTD group, a consistently low level of depression for the control group and a significant decline from pre- to postmenstrual phase for the PMD group. These data are represented in Figure 1.

Multiple Affect Adjective Checklist (MAACL)

The MAACL data yielded separate indices of depression (MAACL-D), anxiety (MAACL-A) and hostility

[10] Degrees of freedom for tests of significance within the interaction were estimated with the Satterthwaite approximation (Winer, 1971).

Figure 1. Mean Beck Depression Inventory Scores as a Function of Subject Group and Phase of Test (PMD = premenstrually depressed; INTD = intermittently depressed)



(MAACL-H). The means and standard deviations for each of the three scales are summarized in Table 14. A two-way mixed design ANOVA, involving the scores of the three groups pre- and post-menstrually, was performed for each of the MAACL scales.

MAACL-D

The MAACL-D analysis revealed significant main effects for group, $F(2,35) = 9.35$, $p < .001$ and phase of test, $F(1,35) = 8.36$, $p < .01$. The Group X Phase interaction was significant $F(2,35) = 4.29$, $p < .05$, suggesting that phase differences in MAACL-D scores varied as a function of subject group. Tests of simple main effects performed to compare pre- and postmenstrual scores within each group found differences only within the PMD group: MAACL-D scores were significantly higher pre- than postmenstrually, $F(1,35) = 15.22$, $p < .001$. Neither the INTD nor the control group showed significant phase differences in MAACL-D scores (see Table 15-a).

Tests of simple main effects conducted for groups within each test phase revealed a significant group effect only within the premenstrual phase, $F(2,69) = 11.08$, $p < .001$. Postmenstrually, however, there were no differences between the groups' MAACL-D scores. Assessment of differences between the groups premenstrually, based on the Tukey test, indicated that the MAACL-D scores of the PMD and INTD groups did not differ from one another but were both significantly

TABLE 14. Multiple Affect Adjective Checklist Data: Means, T-Score Equivalents[1], and Standard Deviations

MAACL-Depression Scale

	PMD (n=11)			INTD (n=10)			CONTROL (n=17)		
Phase	M	(SD)	T	M	(SD)	T	M	(SD)	T
Pre	23.9	(3.7)	75	19.3	(4.9)	67	13.2	(4.9)	55
Post	14.1	(7.7)	56	18.0	(8.0)	64	12.2	(6.3)	53

MAACL-Anxiety Scale

	PMD			INTD			CONTROL		
Phase	M	(SD)	T	M	(SD)	T	M	(SD)	T
Pre	12.1	(3.1)	66	9.2	(3.5)	59	6.2	(3.0)	50
Post	8.2	(5.8)	56	8.8	(3.9)	57	5.0	(2.9)	47

MAACL - Hostility Scale

	PMD			INTD			CONTROL		
Phase	M	(SD)	T	M	(SD)	T	M	(SD)	T
Pre	12.9	(2.7)	70	10.0	(2.9)	61	7.6	(3.4)	55
Post	7.6	(4.8)	54	9.6	(5.5)	60	5.8	(3.2)	47

[1] T-score equivalents, derived from job applicant sample (Zuckerman & Lubin, 1965), have a mean of 50 and standard deviation of 10

TABLE 15-a. Analysis of Variance of MAACL-D Data

MAACL - Depression Scale

Source	SS	df	MS	F	p
Group (G)	706.75	2	353.37	9.35	.001
S (G)	1322.11	35	37.77		
Phase	291.17	1	291.17	8.36	.01
Phase X Group	299.20	2	149.60	4.29	.05
Phase X S (G)	1219.34	35	34.84		
Tests of Simple Main Effects:					
Phase (PMD)		1	530.42	15.22	.001
Phase (INTD)		1	8.45	.24	ns
Phase (control)		1	7.50	.22	ns
Error		35	34.84		
Group (premenstrual)		2	402.30	11.08	.001
Group (postmenstrual)		2	105.48	2.90	ns
Error		69 *	36.31 **		

* degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971)

** represents pooled mean square error

higher than that of the control group, Q = 6.17, p < .01 and Q = 3.52, p < .05 respectively; K = 3, df = 69. Thus relatively consistent levels of depressive affect across phase were reported by both INTD and control groups whereas the MAACL-D scores of the PMD group declined significantly from pre- to postmenstrual phase. These data are represented in Figure 2.

MAACL-A

The MAACL-A analysis yielded a significant main effect only for group, F (2,35) = 15.65, p < .001. The main effect for phase, however, did approach significance, F (1,35) = 3.54, p < .068 (see Table 15-b). Follow-up tests conducted with the Tukey procedure to explore the group effect revealed that the MAACL-A scores of the PMD and INTD groups did not differ from one another (Q = 1.77, K = 3, df = 35, ns), but were both significantly higher than that of the control group, (Q = 7.03, p < .01 and Q = 5.26, p < .01 respectively; each with K = 3 and df = 35). As can be seen from the means in Table 14, there was a trend, although nonsignificant, for MAACL-A scores to be higher premenstrually than postmenstrually -- particularly for the PMD group. In summary, the PMD and INTD groups reported higher levels of anxiety in general in comparison to the control group.

MAACL-H

The MAACL-H analysis found significant main effects for both group, F (2,35) = 8.88, p < .001, and phase of

Figure 2. Mean MAACL-Depression Scores as a Function of Subject Group and Phase of Test (PMD = premenstrually depressed; INTD = intermittently depressed).

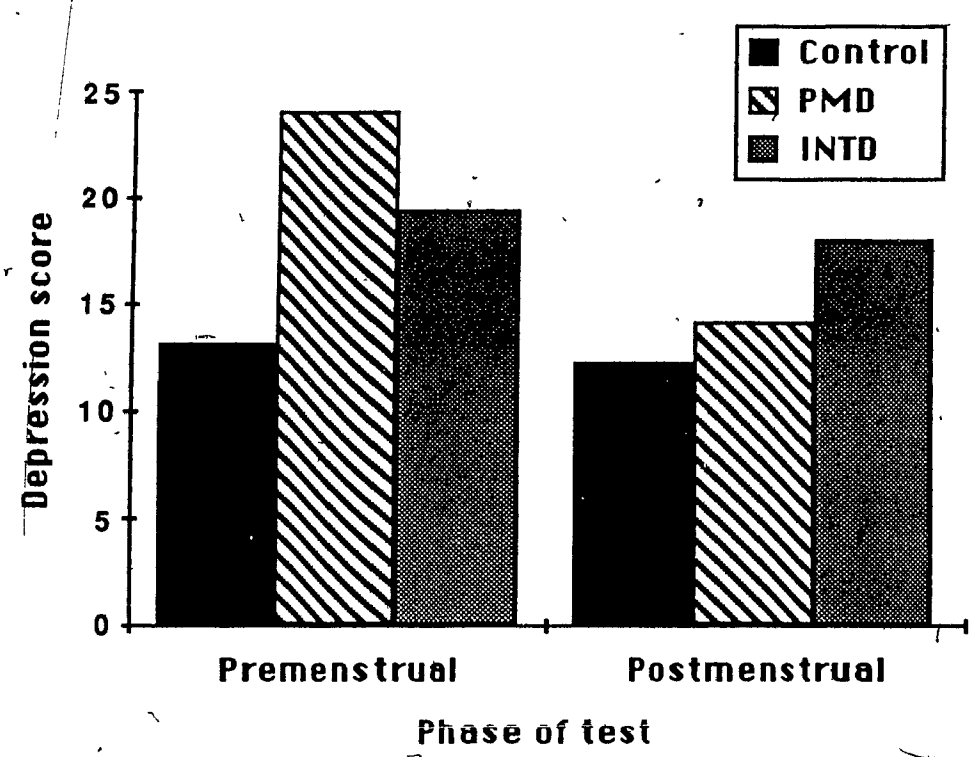


TABLE 15-b. Analysis of Variance for MAACL - Anxiety and MAACL - Hostility Data

MAACL - Anxiety Scale

Source	SS	df	MS	F	p
Group (G)	310.80	2	155.40	15.65	.001
S (G)	347.62	35	9.93		
Phase	61.55	1	61.55	3.54	.068
Phase X Group	36.97	2	18.49	1.06	ns
Phase X S (G)	609.18	35	17.41		

MAACL - Hostility Scale

Source	SS	df	MS	F	p
Group (G)	215.88	2	107.94	8.88	.001
S (G)	425.51	35	12.16		
Phase	112.51	1	112.51	6.84	.01
Phase X Group	68.17	2	34.09	2.07	ns
Phase X S (G)	575.53	35	16.44		

test, $F(1,35) = 6.84$, $p < .01$ (see Table 15-b). Follow-up Tukey tests conducted among the three groups revealed that PMD and INTD groups did not differ from one another ($Q = .66$, $K = 3$, $df = 35$, ns), but both obtained significantly higher MAACL-H scores than did the control group ($Q = 5.06$, $p < .01$ and $Q = 4.39$, $p < .05$ respectively; each with $K = 3$ and $df = 35$). The significant phase effect indicated that premenstrual MAACL-H scores were higher than postmenstrual scores in general. In summary, PMD and INTD subjects reported higher levels of hostility in general than did the control subjects, and hostility scores tended to be higher premenstrually than postmenstrually, regardless of group.

All three MAACL scales were found to differentiate the control group from both the PMD and INTD groups. The MAACL-D scale, however, was the only affective index to show an interaction effect between group and phase of test, and this interaction effect was attributable solely to the PMD group. That is, the depression scores of the PMD group alone declined significantly from the pre- to postmenstrual phase and only the MAACL-D (but not the MAACL-H or MAACL-A) scores of the PMD group declined significantly from pre- to postmenstrual phase. This suggests that the depression index had greater specificity for the premenstrually depressed subjects than did indices of anxiety or hostility. An examination

of the T-score equivalents for the three MAACL scales (displayed in Table 14) supports this observation. The normative T-scores have a mean of 50 and a standard deviation of 10, and allow one to make comparisons between scales whereas the raw scores do not. The PMD group's depression T-scores are near the mean postmenstrually (T=54) but are elevated more than two standard deviations above the mean during the premenstrual phase (T=75). The hostility index shows a similar but slightly less marked trend, while the change in the anxiety index is less pronounced. In summary, depressive mood showed a marked increase premenstrually only in the PMD subjects.

Dichotic Shadowing Task

Preliminary Analyses

Scoring shadowing performances. The data of interest from the dichotic listening task are the number of errors made while shadowing the targets in the presence of the two types of distraction. Shadowing errors represent any words not spoken correctly and were scored according to a key developed by Shenker (1980), which is displayed in Appendix V. Two raters were trained in the scoring of shadowing responses until they reached unanimity in their error decisions. One rater then scored all subject response tapes (2 per subject). A second rater randomly sampled equal proportions of

response tapes from the experimental groups and rescored approximately 20% (17) of the total number of tapes. Both raters were blind as to subjects' group membership, phase of testing, as well as order of distracter pairings. Interrater reliability, assessed on the basis of the pooled within-groups correlation yielded a reliability coefficient of .95 (n=170). Given this high level of agreement, a decision was made to use the raw data of the original rater, whose efforts had been demonstrated to be consistent and reliable.

Baseline analysis. Each subject had performed a baseline trial both pre- and postmenstrually prior to the administration of the actual test stimuli. The baseline trial involved shadowing in the presence of non-dysphoric distraction and provided an index of subjects' general shadowing ability, as well as an indication of their performance prior to the experimental manipulation. A two-way mixed design ANOVA conducted with the three groups (PMD, INTD, control) for the two test sessions (pre and post) yielded no significant differences for either group or phase of test. The results of this analysis, in addition to the means and standard deviations of the baseline trials are presented in Appendix W. The baseline data suggest that the three groups did not differ in their original shadowing ability prior to the administration of the experimental trials.

Counterbalanced conditions. The fact that counterbalancing was, to some degree, performed blind[11] creates the potential for inequalities between groups in terms of counterbalancing conditions relevant to the dichotic task. The conditions which were counterbalanced included the following: (a) series of stimulus tape delivered (X vs Y) -- to control for the influence of type of distracter/target pairings, (b) target stimulus content delivered premenstrually and postmenstrually (A vs B) -- to detect any possible interaction between target content and phase of test, and (c) ear of target presentation (right vs left) -- to control for any possible ear dominance effects on overall performance. An additional, albeit unplanned, condition which requires evaluation is the order in which subjects were tested (i.e. pre then post vs post then pre).

The three subject groups (PMD, INTD, control) were assessed for their comparability with respect to each of these four conditions. The number of subjects from each group which met each of the relevant conditions is illustrated in Appendix X. These data indicate that there were no gross violations of counterbalancing within any of the four conditions. That is, the proportion of

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[11] Counterbalancing was performed for the original subject groups delineated retrospectively. Subjects who failed to confirm were subsequently excluded from the analysis or became part of the INTD group, hence the original counterbalancing was no longer relevant.

subjects in each group receiving alternate conditions was roughly equivalent.

As an added precaution, three separate three-way mixed design ANOVAS were conducted with the dichotic listening data, employing series type (X or Y), test order (pre/post or post/pre), and ear of target presentation (right or left) as the grouping variable (i.e. group). A confounding influence of the counterbalancing conditions (group) within the dichotic data would be suggested by a significant main effect for distraction, or by a significant effect involving distraction: either the Distraction X Group, Distraction X Phase, or the Distraction X Phase X Group interaction. None of these terms attained significance for any of the three analyses, suggesting that these three conditions actually exerted little impact on the data of interest -- that is the differential influence of the two types of distracter stimuli (D vs ND) on shadowing performance.

The fourth condition of counterbalancing involved the particular target content delivered per phase of testing. Since there were four possible options (CYA, CYB, CXA, CXB) which could be received premenstrually (and correspondingly four postmenstrually), the small numbers of subjects receiving each stimulus order precluded analysis. If there was a strong effect attributable to a particular target in interaction with phase of test, the data in Appendix X suggest that it

would be spread somewhat equivalently over all groups.

Premenstrual test timing: comparability among groups. Although the criterion for the premenstrual session stipulated that testing should be conducted within seven days of the onset of menses, this allows for a fair degree of latitude in when subjects might have been tested. To ensure that the subject groups were basically comparable in this regard, premenstrual test dates in relation to the actual onset of menses were examined for each group. These data are presented in Appendix Y. As indicated by the means, ranges and modal values, the time of testing for all three groups was very similar; subjects in all three groups were most frequently tested 2-3 days prior to the onset of menses.

Shadowing Performance - Experimental Trials

For each subject's shadowing performance on the 10 experimental trials, 4 mean error scores were calculated: mean error rate during the 5 dysphoric (D-error) and 5 non-dysphoric (ND-error) distracters, both pre- and postmenstrually. The subject group means and standard deviations for each of these four error scores are presented in Table 16. A three-way, 3 X 2 X 2 ANOVA, with repeated measures on two factors, was performed on the mean errors committed by the three groups under the two distraction conditions (D and ND), during the two test phases (pre and post).

TABLE 16. Dichotic Shadowing Data: Means and Standard Deviations of D-Errors and ND-Errors for Subject Groups by Test Phase

Groups	Test Phase	D-Errors		ND-Errors	
		M	(SD)	M	(SD)
PMD	Pre	7.58	(3.8)	6.98	(4.5)
	Post	8.02	(5.7)	7.30	(5.1)
INTD	Pre	10.82	(5.6)	9.02	(3.5)
	Post	10.33	(5.9)	8.36	(4.5)
CONTROL	Pre	6.02	(4.3)	6.49	(4.8)
	Post	6.04	(4.9)	6.67	(4.4)

There were no significant main effects for either group or phase of test. There was, however, a significant distraction effect, $F(1,35) = 5.69$, $p < .05$ and a Distraction X Group interaction, $F(2,35) = 6.8$, $p < .005$. Tests of simple main effects conducted for type of distraction within each group indicated that only the INTD group committed significantly more D-errors than ND-errors, $F(1,35) = 14.19$, $p < .001$ (see Table 17). Because phase of cycle did not differentially influence the distraction effect, the obtained simple main effect indicates that the INTD group committed significantly more D-errors than ND-errors both premenstrually and postmenstrually. Tests of simple main effects revealed no significant differences between D- and ND-errors for either the PMD group, $F(1,35) = 2.75$, ns, or the control group, $F(1,35) = 3.40$, ns.

Group effects within each distraction condition were assessed with tests of simple main effects. Groups performed differently only within the dysphoric distraction condition, $F(2,37) = 3.58$, $p < .05$. Within the non-dysphoric distraction condition, groups did not significantly differ (see Table 17). Between group differences in shadowing errors were analyzed within the dsyphoric distraction condition with the Tukey test: the INTD group committed significantly more errors than the control group, $Q = 3.69$, $p < .05$, $K = 3$, $df = 37$. The PMD group's D-error rate did not differ from either that of

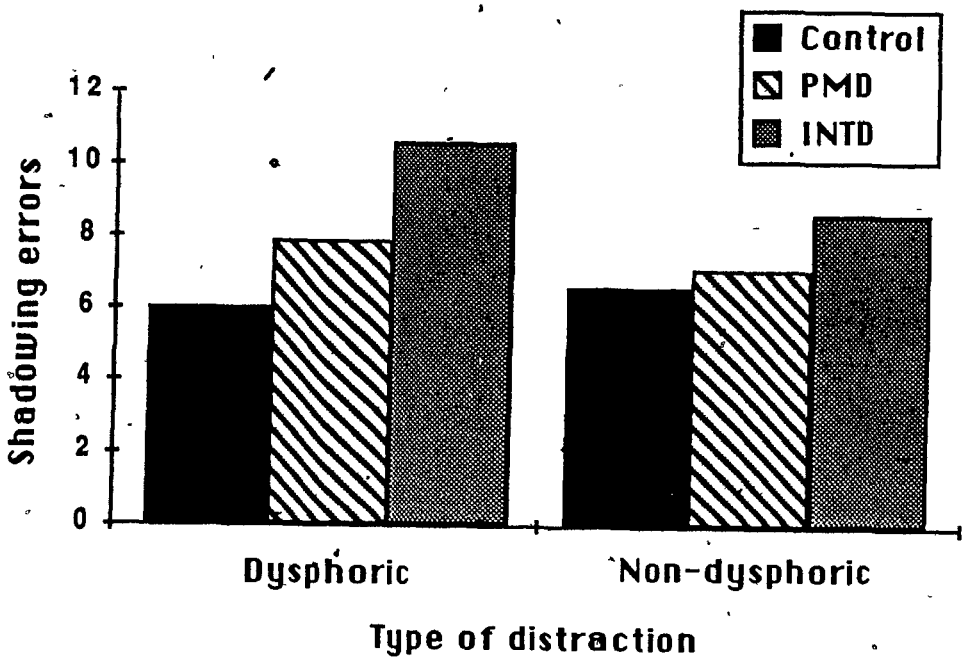
TABLE 17. Analysis of Variance for Dichotic Shadowing Data: 3 Groups X 2 Test Phases X 2 Distraction Conditions

Source	SS	df	MS	F	p
Group (G)	278.94	2	139.47	1.99	ns
S (G)	2450.18	35	70.00		
Phase (P)	.04	1	.04	.00	ns
Phase X Group	5.02	2	2.51	.17	ns
P X S (G)	508.14	35	14.52		
Distraction (D)	15.94	1	15.94	5.69	.05
D X G	38.10	2	19.05	6.80	.005
D X S (G)	98.10	35	2.80		
D X P	.02	1	.02	.00	ns
D X P X G	.24	2	.12	.03	ns
D X P X S (G)	123.96	35	3.54		
Tests of Simple Main Effects:					
Distraction (PMD)		1	7.7	2.75	ns
Distraction (INTD)		1	39.72	14.19	.001
Distraction (control)		1	9.52	3.40	ns
Error		35	2.80		
Group (dysphoric distraction)		2	130.25	3.58	.05
Group (non-dysphoric distraction)		2	26.96	.74	ns
Error		37 *	36.40 **		

* degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971)
** represents pooled mean square error

the INTD or control group, but fell between the two. These data are represented in Figure 3.

Figure 3. Mean Shadowing Errors made with Dysphoric and Non-Dysphoric Distraction as a Function of Subject Group (PMD = premenstrually depressed; INTD = intermittently depressed)



Discussion

Summary of Results

Prospective daily ratings were highly likely to confirm the retrospective report of control subjects. Approximately 85% of the control group was found to experience no significant psychological changes throughout the cycle of study; the data of the remaining 15% of control subjects was excluded from further analysis. The retrospective report of the PMD group, however, was seriously challenged by the daily rating data. Only 39% of the original PMD group was confirmed to report significant increases in depressive mood only premenstrually. A significant proportion of subjects from the original PMD group were noted to report noncyclic depression throughout the cycle (36%). Because of the potential theoretical relevance of these more chronically depressed subjects, they were included in the analyses of the experimental data as a separate subject group (INTD). The data of the remaining 25% of PMD subjects was excluded from further analysis.

BDI and MAACL-D data revealed consistently high levels of depression within the INTD group, consistently low levels of depression within the control group, and a significant decline in depression from pre- to postmenstrual phase within the PMD group. Postmenstrually, the depression of the PMD group did not significantly differ from that of the control group.

Normative data for both the BDI and MAACL-D scales indicated a mild degree of depression in the PMD group premenstrually, and no depression postmenstrually. The INTD group appeared mildly depressed at both test phases, whereas the control group was consistently nondepressed.

MAACL-A and MAACL-H scales appeared to represent less specific components of affective change for the confirmed PMD group in comparison to the MAACL-D scale. PMD and INTD groups both reported higher levels of anxiety and hostility in general in comparison to controls, and hostility was elevated premenstrually as compared to postmenstrually, but there were no interactions between group and cycle phase for indices of anxiety and hostility.

An examination of the counterbalancing conditions revealed that no gross violations in counterbalancing had occurred as a result of the reformation of subject groups. No differences in subjects' baseline shadowing abilities were detected prior to the onset of the experimental shadowing trials.

Analysis of the shadowing data revealed that type of distraction differentially affected the shadowing performance of the INTD group alone. Premenstrually and postmenstrually, the INTD group mnade significantly more errors during dysphoric distraction than during non-dysphoric distraction. Neither the PMD nor the control group revealed significant performance

differences based on type of distraction. The performance of the INTD group during non-dysphoric distraction did not significantly differ from that of either PMD or control groups; during dysphoric distraction, the INTD group performed significantly more poorly than did the control group.

Interpretation of Results

Confirmation of Retrospective Report

Retrospective PAF report of premenstrual depression was confirmed by daily ratings in only 39% of subjects. This figure represents the low end of the range of confirmation rates reported by other research groups. Rubinow, Roy-Byrne, Hoban, Grover & Post (1985) reported a rate of 43% for confirmed premenstrual mood disorder in a group of 160 women who were seeking evaluation and treatment for menstrually related mood disorder. Confirmation was determined on the basis of three months of daily ratings of two symptoms (depression and anxiety) on 100mm visual analogue scales. A menstrually related mood syndrome was defined as at least a 30% increase in mean negative mood ratings scores during the week prior to menstruation compared with the week following menstruation.

DeJong et al., (1985) reported a confirmation rate of 58% in a sample of 57 women who gave histories of premenstrual mood and physical fluctuations. These women also completed three months of daily ratings on a 100mm

visual analogue scale and a similar 30% increase in severity was required. However, these women rated irritability in addition to anxiety and depression and it was not clear which symptoms were essential to the authors' definition of a "mood syndrome".

Endicott and Halbreich (1982) reported a confirmation rate of 59% for a premenstrual depressive syndrome in 48 women, many of whom were seeking treatment for PMS. This figure is based on one month of daily ratings made on a 6-point interval scale. It is not clear exactly how a depressive "syndrome" was confirmed or the exact days considered to represent pre- and postmenstrual phases, although in a later study, these authors recommended the phase criteria used in the current investigation: the consecutive highest 3 days within the 5 days premenstrual versus the 5 days postmenstrual.

Although all the aforementioned studies do require a 30% premenstrual symptom elevation for confirmation of premenstrual mood change, this is where their consistency ends. The manner in which subjects were recruited, which mood items were rated and on what scale, the cycle phase definitions, as well as the length of the confirmation period are quite variable. There is clearly a need for a consistent set of confirmation criteria which would allow for greater ease of comparison across studies.

The somewhat low confirmation rate of the current

investigation may be due to the fact that subjects were volunteers who were actively solicited while many of the aforementioned studies involved women seeking treatment for PMS. As well, only the depression item was assessed; as will be illustrated in Part III, the inclusion of the irritability rating may have increased the confirmation rate. On the other hand, a flexible 3-day premenstrual period was employed rather than a full week, which likely increased the probability of confirmation.

Several authors have recommended two to three months of daily ratings to confirm the presence of premenstrual changes (Halbreich & Endicott, 1985; Hamilton et al., 1985a). While this does not seem an unreasonable request when evaluating women seeking treatment, it may considerably reduce the compliance of normal samples, particularly of control subjects for whom the exercise has little relevance. The fact that the current investigation was based on subjects who completed only one month of ratings does raise questions about the stability of the subject groups thus identified, and this issue will be duly noted in the final discussion.

With respect to the current investigation, it was actually fortuitous that experimental data was collected prior to the screening of subjects, for the data of subjects who failed to confirm was enlightening in its own right and quite relevant to the issue of the relationship between PMD and affective illness. The INTD

subjects represented a significant and influential confound within the retrospectively selected PMD group. Similar subjects may have spuriously inflated the concordance rates between PMD and affective disorder in studies wherein subjects were selected on the basis of retrospective report alone.

Depression and Mood Inventory Data

High agreement was found between the daily diary ratings of depression, the BDI data and the MAACL-D data. The three subject groups delineated on the basis of prospective recordings of depressive mood (PMD, INTD, control) exhibited scores on standardized measures of depression (reflecting both syndrome and mood state) consistent with their daily report. PMD subjects showed elevations in depression only premenstrually. INTD subjects demonstrated significantly elevated levels of depression both pre- and postmenstrually and controls exhibited minimal depression at either test phase. This concordance of daily ratings with standardized measures of depression suggests that the confirmation criteria employed were effective in isolating relatively homogeneous subject groups. As well, a degree of concurrent validity is demonstrated for the daily rating format used.

The mean level of depression recorded premenstrually for PMD subjects suggests mild depression in comparison to normative data. Nonetheless, this degree of

depression can be considered clinically elevated, particularly in a nonclinical population. The MAACL-D scores of the PMD subjects premenstrually approach the lower limit of moderate depression. The depression scores of the INTD group are indicative of mild levels of depression both pre- and postmenstrually. Greater variability was noted within the BDI data of PMD and INTD groups than within their MAACL-D data, suggesting that each group responded with more consistency to the MAACL. This could be attributable to the relatively innocuous nature of the MAACL, which may be a more appropriate instrument for use with nonclinical populations. It may also suggest that the subjective feeling state of depression, as measured by the MAACL, was more relevant for the premenstrual experience of the sample studied than a syndromal measure such as the BDI.

The MAACL-A and MAACL-H scales did not seem as specifically relevant to the experience of PMD subjects as was the MAACL-D scale. This is likely attributable to the fact that subject groups were delineated on the basis of a depression item (feel depressed, sad, low, blue or lonely) as opposed to the anxiety item or the irritability item. The current results, then are relevant to groups identified on the basis of <u>depression</u> and may not have relevance for more general premenstrual dysphoric mood change.

Selective Attention Data

The data from the dichotic listening task indicate that subjects characterized as chronically but mildly depressed (according to self-report) commit more shadowing errors in the presence of dysphoric distraction than in the presence of non-dysphoric distraction. The shadowing performances of PMD and control subjects, however, was not differentially affected by the nature of the distraction. In the interests of the current discussion, these data will be interpreted as support for the presence of an attentional bias for dysphorically-toned material in mildly depressed subjects. Alternative explanations will be considered at a later point.

The presence of a dysphoric attentional bias is consistent with the INTD subjects' daily ratings of frequently occurring depressive mood and with their depression inventory data which indicates mild depression at pre- and postmenstrual test phases. Similar women appear to represent a ubiquitous and confounding presence in many studies of premenstrual syndrome wherein subjects are selected on the basis of retrospective report. Numerous authors have noted the presence of women characterized by "chronic depression" or "subclinical psychiatric illness" (Clare, 1983; Cullberg, 1972; Endicott & Halbreich, 1982; Haskett et al., 1980; Rubinow et al., 1984; Steege et al., 1985) within samples

reporting premenstrual symptoms.

The failure to detect a similar attentional bias in the PMD group premenstrually, despite the fact that their premenstrual depression scores reached clinical levels and were equivalent to those reported by the INTD group, suggests a number of possible explanations. Firstly, the depression reported by PMD subjects might simply represent sadness, dsyphoria or negative affect as opposed to actual depression (i.e. mood state vs syndrome). A dysphoric attentional bias may be associated with depressive illness but not with a depressive mood state. Relevant to this point is the data of Gotlib and McCann (1984) who detected differences in construct accessibility in depressed subjects but not in nondepressed subjects in whom depressed mood had been temporarily induced. The authors suggested that negative construct accessibility may represent a stable tendency of depressed individuals but not be associated with the mere presence of dysphoric mood. The findings of this study, conducted with college students labelled depressed on the basis of BDI scores, may not be generalizable to the syndrome of depression. Eaves and Rush (1984), assessed the dysfunctional attitudes (DAS, Weissman & Beck, 1978) of clinically diagnosed unipolar depressives, remitted depressives and controls. Although Eaves and Rush noted a significant decline in the dysfunctional attititudes of remitted depressives, they still

demonstrated significantly elevated scores on the DAS relative to controls. Perhaps depression-prone individuals, who are susceptible to clinical depressive episodes, are characterized by an idiosyncratic cognitive substrate -- manifest in a variety of cognitive measures: negative construct accessibility (Gotlib & McCann), dysfunctional attitudes (Eaves and Rush, 1984) as well as selective attention for depressive material (Shenker, 1980). Premenstrually depressed women may not be characterized by a similar cognitive substrate.

It must be noted that there is little evidence to support the validity of premenstrual depression as a syndrome per se. Although many studies have detected the occurrence of depressive mood premenstrually, by definition the depression which occurrs premenstrually has not been diagnosed as a clinical syndrome. Halbreich and Endicott (1985b) claim that depressive syndromes occur premenstrually which fulfill all but the duration and impairment criteria of clinical depression. This observation, however, doesn't adequately acknowledge the many other symptoms which co-occur with depressive mood premenstrually (see Part III) or the fact that duration and impairment criteria represent critical (i.e. definitional) components of clinical depression.

Depression as a symptom or mood state and depression as a syndrome or disorder are considered to represent different phenomena (Plutchik, 1980). The concordance

between self-report measures of depression severity (as used in the current investigation) and diagnosed depression is moderate at best (Depue & Monroe, 1978) and many authors emphasize that self-ratings do not allow for the diagnosis of depressive illness (Prusoff, Klerman & Paykel, 1972; Carroll, Fielding & Blashki, 1973). Even Hamilton (1960) insisted that his observer rating scale for depression not serve as a diagnostic instrument but merely as a measure of severity in patients already diagnosed clinically as depressed. The lack of clinical interview data represents a limitation of the current investigation, for the possibility cannot be ruled out that the PMD and INTD groups differed with respect to the syndromal nature of their depression.

A related explanation of the absence of an attentional bias in the PMD group is that there may be factors associated with the brief duration of the depression experienced premenstrually that make it inherently different from a more prolonged depressive state, regardless of severity level. The diagnosis of major depressive episode, according to DSM-III criteria, requires a duration of 2 weeks (APA, 1980, p. 213). Perhaps transient depression is not associated with the activation of depressive schemata, hence the lack of an associated attentional bias.

Secondly, premenstrual depression may be linked to particular hormonal or neurotransmitter fluctuations

which mediate mood state centrally with little influence on cognitive processes. This notion derives from recent evidence suggesting that the cognitive sequellae of depression may be less pronounced in endogenous depressions. Zimmerman and Coryell (1986) investigated the relationship between scores on the Dysfunctional Attitude Scales (DAS) (Weissman & Beck, 1978) -- an index of dsyfunctional thinking which is associated with depression -- and endogenous depression. Endogenous depression was determined on the basis of abnormal response to the dexamethasone suppression test (DST). Endogenous depressives scored significantly lower on the DAS than did nonendogenous depressives, suggesting that cognitive factors may be less relevant for depressions with clear biological correlates (e.g. response to antidepressants and ECT) or biological abnormalities (response to DST, cortisol hypersecretion). Haskett et al. (1984) failed to find abnormal cortisol or DST results in subjects complaining of severe premenstrual tension, suggesting that premenstrual depression is not a form of endogenous depression, but it does not follow that premenstrual depression is therefore psychologically based (e.g. as in neurotic depression). Hormonal correlates may yet be identified which contribute to the dysphoric mood women experience premenstrually.

A phenomenon with relevance to PMD is that of postpartum depression. O'hara, Neunaber & Zekoski (1984)

have noted that estimates of depression during the puerperium that have been based on cutoff scores on depression inventories appear inflated relative to those based on diagnostic criteria. They attribute this to the fact that many of the normal physiological changes of the puerperium are similar to symptoms of depression (e.g. decrease in sexual interest, appetite change, fatigue). In a study of women assessed on six occasions, from the second trimester of pregnancy to 6 months postpartum, Ohara and colleagues found that somatic BDI items (i.e. items 15-21) were consistently rated higher than cognitive/affective items (i.e. items 1-14). It is equally plausible, then, that the physiological changes associated with the premenstrual phase may be reflected as depression on the BDI. Data presented in Part III will serve to illustrate that many physical symptoms were confirmed prospectively in the PMD group.

O'hara and colleagues (1984) also found, as did Manly, McMahon, Bradley and Davidson (1982), that attributional style for negative events was unrelated to the severity of postpartum depression. Attributional style in both these studies was measured with the Attributional Style Questionnaire (ASQ; Petersen et al, 1982); one element of the ASQ -- locus of causality -- has proven to be systematically associated with depression (Coyne & Gotlib, 1983). These data add support to the notion that there may be types of

depression for which cognitive factors have less relevance.

A third explanation for the failure to detect an attentional bias in PMD subjects which must be considered involves the possibility that the PMD group was not really depressed at all premenstrually, but their self-report data simply reflected a stereotypical response induced by the obvious premenstrual focus of the investigation (Parlee, 1982). This explanation is deemed unlikely for several reasons. Steps were purposely taken to reduce the demand characteristics of the current investigation (or to introduce different ones). Women were encouraged to set aside any preconceived notions about how they should feel and to treat the daily ratings as a learning experience. They were asked to file each day's ratings out of sight and to avoid looking back over them. The fact that of the original 28 PMD subjects, 6 subsequently reported no depression on daily ratings while 10 were willing to admit to more pervasive depression, suggests that the women took E's suggestion seriously and responded in a basically unbiased manner. As well, the high degree of intersubject variation in daily ratings (phase length, symptom co-occurrence) and the fact that few PMD subjects were completely aysmptomatic postmenstrually strongly suggested that daily ratings did not reflect a consistently held stereotype.

Implications for Beck's Cognitive Theory of Depression

The detection of a dysphoric attentional bias in INTD subjects is consistent with Beck's (1967, 1976) prediction of idiosyncratic information processing in depressed individuals. The dichotic shadowing data directly demonstrated a disturbance in the active processing of information from the environment in mildly depressed women. Furthermore, the dichotic shadowing paradigm allowed for an isolated assessment of one of the earliest stages of information processing -- the stage of "figural analysis" (Kahneman, 1973) -- in a manner which is independent of memory processes, experimental demand, or self-presentational style.

According to Beck's theory, the current findings suggest that depressive cognitive schemata were activated in the INTD subjects but neither in the PMD nor the control subjects. A conclusion consistent with Beck's theory would be that the PMD and control subjects were simply not depressed. If the PMD group actually were depressed, this creates a problem in interpretation, for Beck posits not only that active depressive schemata and depressive affect are concomitant, but that the affective, physiological and motivational symptoms of depression follow from the activation of depressive schemata. Hence if the schemata are active, the depressive symptoms should ensue, and if the symptoms are present, active schmata are implied.

Preliminary data based on a replication of the experimental phase of research outlined in Part II with a clinical sample has relevance for this issue. A sample of patients with a primary psychiatric diagnosis of affective illness, who also had a history of premenstrual mood fluctuations, were assessed with daily diary ratings, standardized depression inventories and the dichotic shadowing task. A brief summary of the patient characteristics and the results of this investigation are presented in Appendix Z. Patients confirmed to show a premenstrual increase in depression, but who were basically euthymic during the remainder of the month, demonstrated a dysphoric attentional bias both pre- and postmenstrually. Certain methodological limitations of this study preclude drawing any more than tentative conclusions from these data. The subjects represented a mixture of depressive diagnoses, their medication status varied, and the study lacked another psychiatric control group to demonstrate that the demonstrated results were specific to depression and not simply to psychopathology in general. Despite these caveats, the clinical findings are suggestive of certain hypotheses.

Although standardized depression measures (HRS, BDI, MAACL-D) indicated that patients with confirmed PMD exhibited mildly elevated depression levels premenstrually and basically no depression postmenstrually, they demonstrated a comparable dysphoric

attentional bias at both test phases. This raises questions concerning the stability of "allocation of attention policies" and, in turn, the stability of depressive cognitive schemata. Kahneman (1973) proposed that the manner in which individuals allocate attention to particular information was based either on enduring dispositions or on immediate needs. There may be individuals who, perhaps because of early formative experiences, have relatively stable predispositions to attend to the negative aspects of their environment. Such dispositions may, of course, become more pronounced during severe depressive episodes. Conversely, allocation of attention to depressive stimuli may represent temporary dispositions in less vulnerable individuals, detectable only during acute reactive depressions or mourning states.

Consistent with this line of reasoning, one could posit that PMD women appear not to demonstrate this cognitive vulnerability or predisposition, even in the presence of mild premenstrual depression. A comparison of symptomatic and remitted depressives in terms of selective attention processes as well as the investigation of selective attention processes in various subtypes of depression (e.g. dysthymia, acute depression in a well-adjusted individual, bipolar depression) would fruitfully address the issue of the stability of allocation of attention processes and have implications

for Beck's notion of cognitive schemata.

It must be noted that no sound research evidence exists to support Beck's contention of the primacy of cognition in the etiology of depression. Rather depressive cognitions have been found simply to covary with the other components of depression. More recent circular models of mood disorder (Butler & Mathews, 1983; Teasdale, 1983), which acknowledge that affect and cognition (as well as other factors) may interact to initiate, exacerbate or maintain anxiety or depression, appear to be a more reasonable representation of the reality of affective illness. In such models, cognitive tendencies (e.g. selective attention) could be present without necessarily presaging depression, and depression could be present without associated cognitive sequellae. Circular models would also be consistent with the observation that various therapeutic avenues (e.g. pharmacological, cognitive, behavioral, interpersonal) have been demonstrated to display comparable efficacy for the treatment of depression (Weissman, 1979).

Alternate Interpretations of the Dichotic Shadowing Data

Certain questions can be raised concerning the interpretation of the dichotic shadowing data as indicative of a dysphoric attentional bias. All that is clearly suggested by decrements in shadowing performance, in the presence of dysphoric distraction as compared to non-dysphoric distraction, is that more processing

resources seem to be redirected towards the channel delivering the dysphoric material and away from the assigned task. The conclusion drawn was that this indicates a vigilance or selective attentional bias for mood-congruent material. Another possible explanation is that extra processing is required to inhibit awareness of the dsyphoric material -- that is, preattentive processing of dysphoric or upsetting material may mobilize a defensive avoidance reaction. The subjects in the current investigation were asked about their recall for the unattended channel only after completion of the entire study to avoid potential task interference. However, a study could be specifically designed to assess the vigilance versus avoidance question: Some form of recognition test could be administered directly following experimental trials to determine whether depressives are more or less likely to recognize unattended dysphoric content than controls.

Yet another possibility is that preattentive processing induces an emotional reaction which interferes with performance. This is considered an unlikely explanation, mainly because the performance of the INTD subjects did not significantly deteriorate over time, nor was it worse overall than the performance of the control subjects. It seems unlikely that emotional reactions would be stimulated only during every alternate stimulus (1 minute in length) with no carry-over effect to the

following non-dysphoric trial. These two questions could both be partially addressed by administering a measure of affect sensitive to brief fluctuations in emotion (e.g. MAACL) both prior to and following the dichotic shadowing trials.

A final question concerns the assumption that it was the dysphoric quality of the distraction that influenced depressed subjects' shadowing performance. Without additional controls for type of distraction content -- for example, anxious, joyful or angry themes -- one cannot rule out the possibility that sheer emotionality is the element which depressives respond to.

Concluding Remarks

Perhaps the most intriguing finding in Part II was the failure to detect a selective attention bias in the confirmed PMD subjects premenstrually despite their significant levels of reported depression. The dichotic shadowing task (and stimuli) used in the current investigation has, to date, yielded consistent evidence suggesting a dysphoric attentional bias in three different depressed samples: depressed college students (Shenker, 1980), patients with past or current diagnoses of affective disorder who report premenstrual mood change (see Appendix Z), and the INTD group in the current investigation (i.e. women who reported PMD but exhibited more pervasive, noncyclic depression). As well, Young et al. (1985), who employed the dysphoric and neutral

distracters developed by Shenker (1980) in tandem with a proofreading task, found a dysphoric attentional bias in normal males who had been exposed to tryptophan depletion. Three of the four studies mentioned above were controlled investigations, wherein nondepressed control subjects failed to demonstrate differential shadowing performance as a function of type of distraction.

These findings lend credence to the assumption that the dichotic task effectively measured something that depressed individuals do differently. Exactly what an idiosyncratic performance on this task signifies is a question requiring further investigation. The stability of the effect is also uncertain: does it co-occur with a depressive episode or is it characteristic of depression-prone individuals regardless of their clinical status? An additional research question involves the specificity of the effect: is it associated with psychopathology in general (e.g. anxiety disorder, schizophrenia) or is it specific to depression? The investigation of such research questions and the further exploration of the links between cognition and emotion is expected to contribute to a greater understanding of both normal and pathological processes of emotion.

PART III - PROSPECTIVE DIARY RATINGS

Introduction

Rationale

Prospective recording of symptoms across one or more menstrual cycles has been recommended as the most valid available method of screening premenstrual symptom sufferers for both clinical trials and empirical investigations (Halbreich & Endicott, 1985a; Rubinow et al., 1984). This methodological imperative stems from research revealing marked discrepancies between subjects' retrospective and prospective reports of premenstrual symptomatology (Abplanalp et al., 1979; Endicott & Halbreich, 1982; Rubinow et al., 1985). In general, subjects have been found either to overestimate their symptom severity or to attribute to the premenstrual phase symptoms that are actually more widespread.

Within the current investigation, daily ratings served two purposes. While they were employed as a screening device to ensure homogeneous subject groups prior to the analysis of experimental data, they were also considered to provide the most unbiased picture of what women actually experience premenstrually. Granted, daily ratings suffer the limitations inherent in any self-report measure; it could be argued, for example, that they are equally vulnerable to the influence of stereotypes and demand characteristics. However, since no biological marker has been identified for premenstrual symptoms and many are not

amenable to observer-ratings, daily ratings represent the most valid method currently available to establish women's subjective premenstrual experience. The fact that significant reductions occur in the percentages of women reporting premenstrual changes on daily ratings as compared to their retrospective report suggests that daily ratings do considerably improve the validity and reliability of premenstrual symptom reporting.

One of the major issues within the field of premenstrual research is whether subtypes of premenstrual change exist and how they should be characterized (Bancroft & Backstrom, 1985; Logue & Moos, 1986). Abraham (1980), on the basis of "clinical observation" delineated four subtypes of PMS, based on core symptoms of depression, anxiety, water retention and food cravings accompanied by autonomic symptoms. Hargrove and Abraham (1982) reported that the depression subgroup was the least commonly endorsed by a sample of 1395 women. Cullberg (1972) drew a distinction between women with and without premenstrual irritability on the basis of their differential response to hormonal preparations. He noted that the presence of premenstrual depression was not as clearly associated with hormonal responsivity. The Premenstrual Assessment Form (PAF) of Halbreich et al. (1982) allows for the differentiation of 18 categories of premenstrual change. Halbreich, Endicott and Nee (1983), in contrast to Abraham, report PAF results indicating that depression is one of the most commonly

endorsed subtypes of premenstrual change. Retrospective surveys with the PAF suggest that there is a considerable degree of overlap between the 18 categories of premenstrual change, but questions remain regarding how these numerous categories may combine to represent various subtypes of change. There remains a need for the delineation of consistent homogeneous subtypes of premenstrual change -- particularly those derived from subjects' prospective ratings of symptom experience.

Relevant Research

There was a tendency for earlier investigations which employed daily ratings to study a few select symptoms -- often psychological in nature -- and to analyse the data of the sample studied as one group. Such studies generally drew conclusions supporting either the presence (Backstrom, Boyle & Baird, 1981; Sanders, Warner, Backstrom & Bancroft, 1983) or the absence (Abplanalp et al., 1979; Parlee, 1982) of significant fluctuations in particular variables across the menstrual cycle. However, several similar studies which found no significant cyclic fluctuations in group data reported the presence of high variability within their samples (Schilling, 1981; Swandby, 1981). Although group means did not significantly vary across phases, a small number of subjects in each study did experience "intense reaction patterns of clinical significance" premenstrually (Schilling, 1981, p. 90), suggesting that the mean group comparison method was unsuitable for the assessment of

menstrual cycle fluctuations in heterogeneous samples.

In recognition of the heterogeneity inherent in women's premenstrual experience, newer instruments such as the Premenstrual Assessment Form (PAF) elicit reports of numerous symptoms and provide for individualized definitions of cycle phase. Although this highly specialized approach may be an advantage in clinical settings, it renders the comparison of daily data across subjects something of a logistic nightmare. Variations in the length of self-defined cycle phases (e.g. premenstrual phase can vary from 1 to 14 days) must be dealt with. Decisions must be made as to which of the 95 PAF items should be rated prospectively - a consistent group of items for everyone or select items tailored to the individual experience of each subject?

The only published study to date which has undertaken the analysis of daily ratings based on numerous symptoms, rated on an ordinal scale, and with a relatively large sample of women, was conducted by Endicott and colleagues (1986). Sixty-four women, who reported either moderate to severe dysphoric premenstrual changes or minimal or no dysphoric premenstrual changes, recorded their experience on a 20-item, 6-point rating form over the course of one menstrual cycle. The focus of the analysis was on the degree of change evident between the premenstrual and postmenstrual phases -- operationally defined as the mean ratings of the 3 most severe days within the 5 days

premenstrually and the mean ratings of the 5 days postmenstrually. Factor analyses were conducted with the change scores for each of the 20 items for the group of 64 women. Five different dimensions of premenstrual change were identified: dysphoric mood, physical discomfort, low energy, consumption, and an item including increased activity, sexual interest and alcohol use. The first four factors were highly correlated with one another. Of relevance to the current investigation is that a single factor emerged for dysphoric mood, suggesting that the various mood changes reported premenstrually covary.

The aforementioned factor analytic findings are representative of only a portion of the original 100 subjects who had completed daily ratings. Subjects had been initially screened to eliminate those whose daily ratings indicated more pervasive dysphoric changes (n=29). Since one of the major questions of the current investigation is the relationship between premenstrual depression and more persistent depression, the prospective symptom profile of subjects with more pervasive depression is equally of interest. The general phenomenology of premenstrual changes as indicated by daily ratings, and the potential existence of homogeneous subtypes of change represents a secondary focus of inquiry. The approach best suited to these foci was deemed to be a descriptive/exploratory analysis of the daily rating data, guided by the following questions:

1. Can separate subtypes of PMC be identified?

2. Does premenstrual depression -- in particular -- have validity as a separate subtype of PMC?

3. What factors are associated with the confirmation of retrospective report?

Method

Subjects

The subjects represented in the following analyses are basically the same women who participated in the experimental phase of research (Part II). That is, PMD and control subjects who had been delineated on the basis of their retrospective PAF responses and who had agreed to participate in further research. As outlined in Part II (p. 130), 55 subjects agreed to keep daily ratings for one complete cycle, whereas only 48 subjects successfully completed the two experimental test sessions. All 55 subjects who completed daily ratings are represented herein: (a) 32 PMD subjects who had reported major depressive syndrome premenstrually and (b) 23 control subjects who had reported either no changes or only physical changes premenstrually.

Measures

The format of the daily diary forms, as previously described in Part II (p. 130), was such that each day's ratings represented a single page. Twenty items were included which represented a range of psychological, physical and behavioral changes commonly reported premenstrually. The items selected reflected the basic

content of many of the 18 unipolar summary scales. Items were rated on a scale from 1 to 6 (not at all to extreme). An item concerning life events -- both stressful or uplifting -- was included to detect potential environmental influences on subjects' ratings. An example of the daily rating form is displayed in Appendix M.

Data Analysis

The criterion used to signify a meaningful degree of premenstrual change was a 30% increase in premenstrual ratings as compared to postmenstrual ratings (as in Endicott & Halbreich, 1982 and Rubinow et al., 1984). The premenstrual phase was defined as the five days prior to the onset of menses while the postmenstrual phase included the five days following the cessation of menses. These days are considered to represent the most clearly encapsulated report of symptomatic and asymptomatic experience respectively (Backstrom et al., 1983). Because of the variability in timing of premenstrual changes, an approach suggested by Endicott et al. (1986) was adopted to ensure a more sensitive contrast between pre- and postmenstrual ratings: the mean rating of the highest 3 consecutive days during the 5 premenstrual days was compared with the mean rating of the 5 postmenstrual days.

Equally important was the confirmation of the absence of significant symptom peaks (i.e. ratings of 4, 5, or 6) during the remainder of the cycle, unless they could be

attributed to a reported stressful event[13]. The remainder of the cycle was operationally defined as days other than the 10 pre- and postmenstrual days, with the exception of days of menstrual bleeding. The decision to exclude days of menstrual bleeding from the presumed aymptomatic phase was based on reports that premenstrual changes often continue into the first few days of menses (Endicott et al., 1986).

For each subject, then, the monthly ratings for each of 20 items was considered in turn to determine whether or not the item reflected significant premenstrual change. The confirmation process proceeded in the following manner. Firstly, the mean of the 3 highest consecutive premenstrual days was compared with the mean of the 5 days postmenstrual and secondly, the remainder of the cycle was examined for symptom peaks. Five outcomes were possible:

1. Premenstrual change on an item was nonexistent or minor (i.e. < 30%) and it showed no significant peaks during the remainder of the cycle that could not be attributed to a reported stressor; the item was not confirmed.

2. A 30% premenstrual increase was detected and the item showed no other significant peaks during the remainder of the cycle; the item was confirmed.

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[12] Although the potential influence of reported stessors required a subjective judgement by E, the majority of the items reported were fairly serious and their effects not unexpected (e.g. loss of job, death of relative, illness or operation). An item concerning the influence of uplifting events on subjects' ratings was provided, but it was rarely endorsed. Therefore, only the report of stressful events was taken into account as a potential modifier of symptom ratings.

3. A 30% premenstrual increase was detected and additional significant peaks were present, but plausible stressors were reported close in time to the peak; the item was confirmed.

4. A 30% premenstrual increase was detected but other significant symptom peaks occurred which could not be attributed to reported stressors; the item was not confirmed.

5. Significant symptom peaks occurred with no cyclic relationship and were not associated with reported stressors; the item was not confirmed.

Results

Prospectively Derived Subgroups

Following the confirmation analysis of each item for all subjects, subjects' symptom profiles were sorted into groups which met the following criteria: (a) the depression item (i.e. feel depressed, sad, low, blue or lonely) was confirmed, (b) the depression item ratings indicated more pervasive depression throughout the cycle, (c) only physical items were confirmed, and (d) none of the items were elevated or confirmed. In addition, it was noted that within the physical symptom group, a substantial proportion of subjects (50%) reported marked premenstrual or menstrual irritability along with their physical complaints. The physical symptom group was therefore divided in half to reflect subjects with physical symptoms alone, and those with physical symptoms and irritability.

The diary items which were confirmed for each of the four symptomatic subgroups are summarized in Table 18. A fifth subgroup, which was completely asymptomatic (n=12) is not represented. What is most striking in Table 18 is the many items other than depression which were also confirmed in the premenstrual depression subgroup. In particular, virtually all subjects who confirmed on the depression item also confirmed on the irritability item; a majority of these subjects also confirmed on other psychological change items including anxiety, malaise and mood changes. Signs of water retention were almost universally confirmed, and reports of

TABLE 18. Number of Subjects by Prospectively Derived Subgroup who met Confirmation Criteria for Daily Diary Items

Diary Item *	Prospectively Derived Symptomatic Subgroups: Premenstrual Depression (n=11)	Pervasive Depression (n=13)	Physical Symptoms (n=7)	Physical & Irritability (n=7)
Social withdrawal	6	3		
Increased well-being				
Lowered efficiency	7	2		1
Decreased appetite				
Malaise	9			2
Water retention	10	2	5	6
Increased energy				
Mood changes	8			1
Depression	11			
Increased sexual interest				
Increased sleep	6	2		2
Anxiety	9			
Decreased energy	9		2	1
Irritability	11			** 4
Increased appetite	4	1	1	3
Decreased sexual interest	3	1		
Headache or migraine	5	1	2	
Back, joint or muscle aches	7	3	3	1
Abdominal pain or discomfort	7	1	4	2
Breast pain or discomfort	8	4	4	4

* diary items are presented in abbreviated form; actual items are more descriptive (see Appendix M)

** the remaining 3 subjects were confirmed to have menstrual irritability

decreased energy were very common in the premenstrual depression subgroup. The subgroup exhibiting more pervasive depression throughout the month, however, demonstrated very low confirmation rates for all of the typical premenstrual symptoms. For example, breast pain or discomfort, although it was the symptom most commonly confirmed by this subgroup, was confirmed by only one-third of the members.

Both the physical symptom subjects and those with physical symptoms and irritability frequently confirmed on the water retention and breast pain items. The symptom profile of subjects with additional irritability showed slightly greater heterogeneity (i.e. a greater variety of items confirmed) than that of subjects with physical symptoms alone.

The origins of the 5 prospectively delineated subgroups, in terms of their retrospective classifications, are displayed in Table 19. Subjects confirmed as showing no symptoms or physical symptoms alone came predominantly from the original control group. Virtually the entire confirmed depression subgroup came from the original PMD group. The majority of the subjects found to have more pervasive depression or physical symptoms plus irritability derived from the original PMD group.

The fate of the original subject groups (PMD and control) in terms of membership in the five prospectively-derived subgroups is shown in Table 20. The percentages were adjusted following the removal of 5 subjects' data as

TABLE 19. Subjects Within Each Prospectively Delineated Subgroup as a Function of Original Retrospective Category (PMD, Control)

	Original Retrospective Category			
	PMD (n=32)		Control (n=23)	
Prospective Subgroups	n	(%)	n	(%)
No symptoms (n=12)	1	(8)	11	(92)
Physical symptoms (n=7)	1	(14)	6	(86)
Physical symptoms and irritability (n=7)	6	(86)	1	(14)
Depressive symptoms[1] (n=11)	11	(100)	-	
More pervasive depression (n=13)	12	(92)	1	(8)
Unclassified[2] (n=4)	-		4	(100)
Insufficient data (n=1)	1	(100)	-	

[1] those subjects with confirmed depression also had many other symptoms confirmed

[2] these subjects exhibited noncyclic peaks on items other than depression

TABLE 20. Subjects from Original Retrospective Categories (PMD, Control) as a Function of Prospectively Derived Subgroups

Retrospective Categories	Prospectively Derived Subgroups: Premenstrual Depression n (%) *	Pervasive Depression n (%) *	Physical & Irritability n (%) *	Physical Symptoms n (%) *	No symptoms n (%)
PMD (n=31) *	11 (36)	12 (39)	6 (19)	1 (3)	1 (3)
CONTROL (n=19) *	-	1 (5)	1 (5)	6 (32)	11 (58)

* subject numbers and percentages are adjusted for missing data (i.e. 4 unclassified controls and 1 PMD with insufficient data).

explained in Table 19. The confirmation rate for premenstrual depression was only 36%. Roughly an equivalent proportion of subjects (39%) who had originally reported PMD were found to exhibit more pervasive depression with no apparent cyclic relationship. An additional group of subjects classified as PMD were found to report irritability in lieu of depression (20%).

Retrospectively classified control subjects were generally apt to be confirmed as having physical symptoms alone (32%) or no symptoms (58%). These proportions are notably similar to those detected in control subjects retrospectively: as outlined in Part I (p. 109), the retrospectively delineated control group (n=49) consisted of approximately one-third physical complaint subjects and two-thirds asymptomatic subjects.

Confirmed Item Profiles of Symptomatic Subgroups

To provide an idea of the severity of prospective symptom report, means and standard deviations were calculated for those particular items which were most characteristic of each subgroup's report -- operationally defined as items confirmed by at least half of the subjects in each subgroup. The subgroup with more pervasive depression was effectively excluded on the basis of this criterion. A clear trend was noted in the ratings of the other three symptomatic subgroups for symptom report to continue into the first few days of menses. For the sake of comparison, equivalent criteria for phase length (i.e.

highest 3 consecutive days' ratings) were applied to the premenstrual and menstrual phases. The postmenstrual phase included the 5 days following the cessation of menses.

The means and standard deviations of diary items for the 3 symptomatic subgroups, generated according to the aforementioned criteria, are displayed in Tables 21, 22 and 23. Inferential statistics were not calculated for these data because of the manner in which items were selected for consideration: Items were specifically delineated on the basis of whether they were confirmed for more than half the subjects in the group, thereby ensuring that the items listed were those with the highest means. As well, the daily ratings were examined with a descriptive/exploratory intent and no hypotheses were ventured.

Initially striking is the relative paucity of items (i.e. 3 items) confirmed by at least half the subjects in either of the two physical subgroups (see Tables 21 and 22) in comparison to the premenstrual depression subgroup (13 items; see Table 23).

Both the physical subgroups show a decline in water retention and breast symptoms from premenstrual to menstrual phases, but the decline appears more marked in the group with physical symptoms and irritability. As well, premenstrual water retention seems more pronounced in the group with irritability.

The premenstrual depression subgroup consistently shows higher ratings premenstrually than menstrually. This

TABLE 21. Physical Symptom Subgroup (n=7): Mean Rating Scores (of items confirmed for at least half the group) During Premenstrual, Menstrual and Postmenstrual Phases

	Cycle Phase					
	Pre[1]		Menstrual[2]		Post[3]	
Diary Item	M	(SD)	M	(SD)	M	(SD)
Water retention	3.4	(1.7)	3.0	(1.2)	1.0	(0)
Abdominal pain or discomfort	2.7	(1.0)	2.7	(1.4)	1.0	(0)
Breast pain or discomfort	2.9	(1.7)	2.1	(1.3)	1.0	(0)

[1] based on the 3 highest ratings within the 5 days premenstrual

[2] based on the 3 highest ratings within the menstrual period

[3] based on the ratings of the 5 days postmenstrual

TABLE 22. Physical Symptom Plus Irritability Subgroup (n=7): Mean Rating Scores (of items confirmed for at least half the group) During Premenstrual, Menstrual and Postmenstrual Phases

	Cycle Phase		
	Pre[1]	Menstrual[2]	Post[3]
Diary Item	M (SD)	M (SD)	M (SD)
Water retention	4.1 (1.3)	2.6 (.9)	1.0 (0)
Irritability	3.5 (0.9)	2.5 (1.3)	1.2 (.4)
Breast pain or discomfort	2.8 (1.9)	1.8 (1.0)	1.0 (0)

[1] based on the 3 highest ratings within the 5 days premenstrual

[2] based on the 3 highest ratings within the menstrual period

[3] based on the ratings of the 5 days postmenstrual

TABLE 23. PMD Subgroup (n=11): Mean Rating Scores (of items confirmed for at least half the group) During Premenstrual, Menstrual and Postmenstrual Phases

	Cycle Phase					
	Pre[1]		Menstrual[2]		Post[3]	
Diary Item	M	(SD)	M	(SD)	M	(SD)
Depression	4.4	(.8)	2.9	(1.0)	1.6	(.5)
Mood changes	3.5	(1.5)	2.9	(1.1)	1.3	(.5)
Anxiety	4.2	(.7)	3.3	(1.3)	1.7	(.4)
Irritability	4.7	(.8)	3.3	(1.5)	1.8	(.6)
Lowered efficiency	4.0	(1.1)	3.3	(1.5)	1.7	(.6)
Social withdrawal	3.7	(.7)	3.1	(1.1)	1.7	(.6)
Malaise	4.6	(.7)	3.8	(1.5)	1.8	(.6)
Increased sleep	3.4	(1.7)	2.8	(1.6)	1.4	(.4)
Decreased energy	4.8	(.8)	3.9	(1.5)	2.1	(.8)
Back, joint or muscle aches	3.2	(1.6)	3.0	(1.8)	1.4	(.9)
Abdominal pain or discomfort	3.7	(1.7)	3.4	(1.5)	1.1	(.3)
Breast pain or discomfort	3.9	(1.6)	2.5	(1.3)	1.0	(0)
Water retention	4.4	(.9)	3.8	(1.2)	1.2	(.3)

[1] based on the 3 highest ratings within the 5 days premenstrual

[2] based on the 3 highest ratings within the menstrual period

[3] based on the ratings of the 5 days postmenstrual

contrast is somewhat less marked for abdominal pain and general aches and pains, which may reflect accompanying dysmenorrhea. The ratings of the premenstrual depression group appear the most severe, even for items which are common to all three subgroups (e.g. water retention, breast pain, abdominal pain), although the subgroup with physical symptoms and irritability does report severe water retention which approaches the level found in the depressed group.

Demographic and Menstrual History Form Data

Demographic and Menstrual History Form data was examined for the five prospectively delineated subgroups in an attempt to identify potential discriminating variables. Because of the relatively small subject groups involved, few statistically significant findings emerged from this endeavor. However, several trends were noticed that could be of relevance to future investigations and were therefore deemed worthy of comment. The relevant data and general test statistics, whether significant or not, are reported in Table 24.

The subgroup with physical complaint alone represented the oldest subjects, while the group with more pervasive depression represented the youngest; these two subgroups differed significantly from one another with respect to age. The subgroup with physical complaint also had relatively more children, while the premenstrually depressed subgroup had relatively few. As is evident from the means in Table 24, age and number of children do not exhibit a simple

TABLE 24. Response Trends in the Demographic and Menstrual History Form Data of Prospectively Derived Subgroups

	Prospectively Derived Subgroups				
	Premenstrual Depression	Pervasive Depression	Physical & Irritability	Physical Symptoms	No symptoms
Variable	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Age (means marked [a] differ at $p < .05$)	36.8 (4.5)	34.8 (3.9)[a]	36.1 (2.6)	39.9 (2.3)[a]	36.6 (2.8)
Number of children ($F(4,42) = 2.89$, $p < .07$)	.9 (1.1)	1.5 (1.2)	2.0 (.6)	2.4 (1.3)	1.8 (1.1)
	% of sample				
Intensity of menstrual flow					
($\chi^2 = 10.14$, df = 8, $p < .25$)					
light	11	–	14	–	–
average	67	23	72	43	92
heavy	22	27	14	57	8
Severity of dysmenorrhea					
($\chi^2 = 12.1$, df = 12, $p < .44$)					
no pain/minimal pain	40	69	50	44	83
moderate pain	30	23	50	28	17
severe pain	30	8	–	28	–
Sought treatment for PMC					
($\chi^2 = 14.4$, df = 4, $p < .01$)					
yes	60	46	29	–	–
no	40	54	71	100	100
Severity of PMC					
($\chi^2 = 36.8$, df = 12, $p < .001$)					
none/slight	–	16	14	72	92
moderate	60	17	57	14	8
severe	40	67	29	14	–
Onset of PMC					
($\chi^2 = 27.4$, df = 16, $p < .05$)					
1–4 days prior to menses	20	8	43	67	64
5–7 days prior to menses	50	42	43	–	18
> 1 week prior to menses	30	8	14	33	–
varies from month to month	–	42	–	–	18

Note. χ^2 statistics are presented for the general test of independence between categories of response and subject groups

positive correlation.

Subjects with physical complaint alone were somewhat more likely to report heavy menstrual flow than the other subgroups. They were also more likely, along with the premenstrual depression subgroup, to report severe dysmenorrhea.

Subjects with premenstrual depression and those with more pervasive depression were the subgroups most likely to have sought treatment for PMC. Subjects with more pervasive depression were most likely to globally report that their PMC were severe and to report that the onset of their premenstrual changes varied from month to month.

Retrospective Typological Report of Depression Subgroups

The original PAF typological profiles of the premenstrual depression and pervasive depression subgroups were reexamined to determine whether any features of their retrospective report were associated with their prospectively determined group membership. The proportion of subjects classified within the 18 typological profiles was very similar for the two subgroups, with one exception: virtually all of the premenstrually depressed group met criteria for anxious-agitated depressive features (i.e. feel anxious, jittery or restless, physically agitated, pick skin/bite nails), while only half the subjects with more pervasive depression did so. This represented a significant difference between groups, $X^2 = 4.08$ (after Yates correction), df=1; $p < .05$.

Discussion

Summary of Results

Daily symptom ratings of 55 subjects on 20 items across one menstrual cycle were assessed to determine which items were confirmed to show significant premenstrual elevations. On the basis of the presence or absence of confirmed symptoms -- particularly depressive mood and physical symptoms -- five relatively homogeneous clusters of subjects were delineated and characterized by the following subgroup descriptors: asymptomatic, physical symptoms, physical symptoms with irritability, premenstrual depression, and pervasive depression.

A comparison of retrospective and prospective classifications revealed that the asymptomatic subgroup and physical subgroup derived mainly from the original PAF control group, whereas the other three subgroups derived mainly from the retrospectively delineated PMD group. The original report of the control group was quite reliable and likely to be confirmed prospectively, while that of the PMD group was rather unreliable, due mainly to a significant proportion of subjects whose depressive mood was prospectively determined to be more widespread.

Confirmation of the depressive mood item was associated with the confirmation of numerous other psychological, behavioral and physical items, and with elevated item scores relative to the other two symptomatic groups (physical and physical with irritability). Premenstrual depressive mood

appeared to be part of a multidimensional symptom picture, and although it represented one of the most commonly and highly rated symptoms, it did not it stand out as the predominant feature of the premenstrual depression subgroup.

Several trends were noted concerning demographic and Menstrual History Form data.

A reexamination of the original retrospective typological profiles of premenstrual depression and pervasive depression subgroups revealed that the presence of anxious-agitated features was more common in the report of those PMD subjects most likely to prospectively confirm.

Interpretation of Results

The comparison of retrospectively and prospectively determined symptom classifications suggests that the Premenstrual Assessment Form (PAF) is highly effective in identifying both asymptomatic subjects and those who experience physical symptoms alone. The retrospective report of these two categories of subjects were very likely to be confirmed by their daily ratings. The PAF is less effective, however, in identifying subjects with premenstrual depressive mood changes, with only 36% of subjects so classified proving to be depressed only premenstrually. The majority of the nonconfirmed PMD subjects either exhibited premenstrual (13%) and/or menstrual (7%) irritability or more pervasive, noncyclic depressive mood (39%).

The fact that 20% of the original PMD subjects reported

irritability in lieu of depression is understandable in light of the inclusion criteria for the PAF category of major depressive syndrome. Subjects can be classified within this category on the basis of depressed mood or loss of interest or pleasure or irritability, plus a certain number of other common depressive symptoms. Officially, then, the confirmation rate for PMD could be considered to be 49% (36% premenstrual depression plus 13% physical with confirmed premenstrual irritability). However, no particular rationale exists for characterizing subjects with irritability alone as depressed and, in fact, there have been several suggestions that these two symptoms should be differentiated (Cullberg, 1972; Steiner & Carroll, 1977).

The type of subject, then, for whom PAF retrospective report of depression has the lowest reliability, appears to be women who experience intermittent depression throughout the month. Similar subjects, that is women with more widespread psychological symptoms, have been noted in many investigations of PMS (Clare, 1983; Steege et al., 1985), even within samples which had been initially screened for psychiatric disorder (Endicott & Halbreich, 1982; Haskett et al., 1980; Rubinow et al., 1984). They seem to represent a mildly yet chronically depressed group of women, perhaps with dysthymic disorder, who attribute their depression to the premenstrual phase when it is actually more widespread.

The propensity of more chronically depressed women to show up with complaints of premenstrual depression both in

empirical investigations and in treatment clinics represents an enigma. The daily ratings of the subgroup with pervasive depression indicated that their retrospective reports of symptoms other than depressive mood were also unreliable and unlikely to be confirmed. These subjects were most likely to globally rate their PMC as severe; they were also most likely to report that the onset of their PMC varied from month to month (42%), while all the subjects within the other three symptomatic subgroups were able to identify a set period for their PMC. The relative perceived severity and inconsistency in their PMC may suggest that this subgroup experiences intermittent depression throughout the month which coincides with the premenstrual phase (by chance) often enough for an association to be noted. In summary, then, the subgroup wih more pervasive depression, who may have mild levels of personality or adjustment difficulties, represent a serious confound in studies of premenstrual changes. Daily ratings appear to represent the best way to screen for such subjects, as psychiatric interviews alone may not detect their presence.

The examination of daily diary ratings lent a degree of support to the conceptualization of different subtypes of premenstrual change. The most clear differentiation was between subjects with physical changes alone and those with a mixed profile of physical and psychological changes. There may also be some utility in differentiating between subjects who report irritability but not depression. Within

the current sample, reports of confirmed premenstrual depression were associated with more severe symptom report, a more multidimensional symptom picture, and a greater co-occurrence of dysmenorrhea, in comparison to reports of irritability without depression.

Several questions were raised in the discussion section of Part I for which the current results have relevance. A negative correlation was noted between age and the degree of PMC reported. The current results suggest that the subgroup with more pervasive depression represented the youngest subjects within the sample. Since this subgroup represented 39% of the original PMD group, and tended to report relatively severe PMC, the negative correlation of symptom report with age could be partially attributed to their influence. The negative correlation with age, then, may not be representative of confirmed premenstrual suffers. An issue related to age is that of parity. An interesting trend in the current data was that the premenstrual depression subgroup had the fewest children yet they were not the youngest subgroup. Although there have been clinical reports that PMS begins or worsens following pregnancy (Green & Dalton, 1953), survey studies have not substantiated this claim (Reid, 1985). The relationship between age, parity and confirmed premenstrual changes has potentially important implications and requires further investigation.

Another issue raised in Part I concerned the influence

of cycle phase, during completion of the PAF, on symptom report. A trend was noted for more retrospectively classified PMD subjects to have answered the PAF in their premenstrual phase, and premenstrual phase responding was associated with elevated symptom report. An examination of the prospectively derived subgroups revealed that relatively more subjects who responded premenstrually derived from the premenstrual depression subgroup and the pervasive depression subgroup. The significance of responding premenstrually, then, may vary according to some index of adjustment. For subjects who actually had premenstrual depressive mood change, cycle phase of response may have had little impact or increased the accuracy of their recall, whereas for subjects with more pervasive depression, responding during the premenstrual phase may have increased their tendency to attribute depressive mood to the menstrual cycle.

To conclude, little evidence was found to support the validity of premenstrual depression as a distinct and separate subtype of PMC. When premenstrual depression does appear, it is associated with a host of other psychological, behavioral and physical symptoms. The construct suggested by daily ratings involves a multidimensional symptom picture in which low mood, irritability, anxiety, malaise, fatigue, water retention and breast pain co-occur. Dysmenorrhea apears to be associated with PMC for the majority of these subjects.

GENERAL DISCUSSION

Several questions were raised in the introduction as representing fundamental issues arising from the literature concerning premenstrual dysphoric mood change. These questions will be reiterated and addressed in light of the findings generated in the current investigation:

1. Does premenstrual depression represent a distinctive subtype of premenstrual change which can occur in the complete absence of affective psychopathology?

2. Do premenstrual depression and affective psychiatric illness represent points on the same continuum, differing only in severity and duration of symptoms?

3. Are women who experience premenstrual depression vulnerable or predisposed to the development of affective illness?

The current findings provide no support for the conceptualization of premenstrual depression as a distinct subtype of premenstrual change. The PMD subjects studied did fulfill PAF criteria for Major Depressive Syndrome on the basis of retrospective report. The symptom profiles generated retrospectively suggested that PMD subjects experienced a multidimensional symptom picture -- but it appeared that depression might represent their predominant complaint. Subsequent examination of the prospective symptom profiles of confirmed PMD subjects, however, revealed that their symptom picture was indeed

multidimensional and although depressive mood was a prominent complaint, it did not stand out as the predominant feature -- either according to the proportion of confirmed subjects endorsing it or to the relative severity of symptom ratings. Equally prominent in the prospective report of confirmed PMD subjects were irritability, anxiety, decreased energy, water retention and general malaise. Dysmenorrhea appeared to be a frequent additional complaint in this group. The current data were generated with a volunteer sample, however, and may not be representative of women with more severe PMD complaint. Profile analyses of the prospective report of confirmed samples of severe sufferers are clearly called for to establish the phenomenology of premenstrual complaint and the utility of delineating subtypes of premenstrual change.

The current results address the issue of concomitant psychopathology only indirectly. The predominance of depressive symptoms in the original retrospective PAF profiles may be partially attributable to the influence of the INTD group -- who represented 36% of the retrospectively delineated PMD group but reported noncyclic depression during the cycle of study. It is possible that INTD subjects do have cycles wherein their report of premenstrual depression would be confirmed; an extended course of daily ratings would be necessary to determine the course of their symptoms and their relationship to the menstrual cycle. It would appear, however, from the current findings, that this

subgroup of women is not completely free of affective pathology (perhaps dysthymic disorder?). They demonstrated mildly elevated depression during both pre- and postmenstrual test phases and exhibited an attentional bias hypothesized to co-occur with depression. However, since clinical interviews were not conducted, the presence of affective pathology in this subgroup cannot be assumed. Whether there would be any utility in labeling such a group (if they indeed exist) as premenstrually depressed is an empirical question. Glick (1985) proposes that there may be some utility in conceptualizing PMS as a model that includes both premenstrual exacerbations of psychiatric illness and PMS without concomitant psychiatric illness. Other authors, have suggested that women with underlying psychopathology should be carefully screened from both empirical and treatment investigations of PMS, and recommend that their psychiatric disorder be the primary focus of treatment (Hamilton et al., 1985a, Haskett et al., 1980). The position adopted in the revised edition of the DSM-III, in its criteria for Periluteal Phase Dysphoric Disorder, appears to be the latter; that is, only women without evidence of additional psychopathology will be classified within this category. Future research conducted with suoject groups delineated on the basis of the DSM-III criteria should, therefore, ultimately clarify the extent of accompanying psychopathology in women reporting dysphoric mood change premenstrually. What the current results do

suggest is that a multidimensional premenstrual symptom picture (as exhibited by the confirmed PMD group) -- which includes depression -- can apparently occur in the absence of affective pathology.

The fact that no clear group of subjects reporting premenstrual depression alone was detected in the current research limits the extent to which the second question can be addressed. What does emerge from the current data is that the symptom profile of the confirmed PMD group does not suggest continuity with clinical depression. The profile of confirmed PMD subjects, while it included depressive mood, also included symptoms not associated with depressive disorder (e.g. water retention, breast tenderness, dysmenorrhea). As well, certain common symptoms of clinical depression were not prominent in the profile of PMD subjects (e.g. sleep, appetite and libido disurbances). Furthermore, PMD subjects did not demonstrate cognitive sequellae (i.e. a dysphoric attentional bias) hypothesized to co-occur with depression. In conclusion, whereas premenstrual dysphoric mood and cinical depression were found to share an affective component which apparently differs in duration and severity, they also demonstrated a discontinuity in phenomenological terms.

The final question posed involved the potential relevance of PMD as a risk factor for affective illness. Two studies which assessed the incidence of lifetime history of depressive disorder in women with prospectively confirmed

premenstrual affective symptoms (DeJong et al., 1985; Halbreich & Endicott, 1985b) each reported rates of approximately 30%. This is close to three times the rate for lifetime history reported in epidemiological surveys of women (Robins et al., 1984). These data suggest that at least a subgroup of women with premenstrual affective symptoms may be vulnerable to depression. More questions than answers remain concerning the nature, direction, and possible underlying substrate of this relationship. The current findings provide only a preliminary indication that a cognitive vulnerability factor (i.e. idiosyncratic selective attention processes) may not be relevant to this relationship. However, it is plausible that the repeated experience of a dysphoric mood state premenstrually may lead to changes in a woman's self-concept and attitudes, and perhaps even to the development of new depressive schemata to aid her in making sense of her feeling state.

Finally, in light of the current controversy surrounding the inclusion of Periluteal Phase Dysphoric Disorder in the revised edition of the DSM-III, several comments seem warranted. The advantages of an agreed upon definition of premenstrual mood change and formal diagnostic criteria in a research area sorely in need of greater methodological consistency are clear. Certainly for the women who suffer from severe premenstrual symptoms, a formal acknowledgement of the legitimacy of their difficulties is often regarded as encouraging. In many ways, however, the

classification of premenstrual changes as a mental disorder carries with it a host of unspoken assumptions and seems precipitant granted the current state of knowledge regarding the phenomenon. One of the goals outlined in the introduction to the DSM-III in delineating diagnostic entities is: "consistency with data from research studies bearing on the validity of diagnostic categories" (APA, 1980, p.2). It is the opinion of this author that minimal empirical support exists for the construct validity of premenstrual dysphoric mood change. A fortuitous by-product of the controversy surrounding this issue, however, would be increased research efforts to address the validity and utility of the diagnosis, ultimately contributing to a more complete understanding of the phenomenon.

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APPENDIX B

MENSTRUAL CALENDAR

JANUARY

Sun	Mon	Tues	Wed	Thur	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY

Sun	Mon	Tues	Wed	Thur	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

MARCH

Sun	Mon	Tues	Wed	Thur	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

APRIL

Sun	Mon	Tues	Wed	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

MAY

Sun	Mon	Tues	Wed	Thur	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JUNE

Sun	Mon	Tues	Wed	Thur	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Instructions: Please circle your days of menstrual bleeding
To calculate cycle length, count the first day of bleeding as Day 1, and count until the day prior to the next onset of bleeding

APPENDIX C

MENSTRUAL HISTORY FORM

Name _____ ID No. _ _ _ _ _ _ _ _ _ (omit)

Age _ _ Date Form Completed _ _/_ _/_ _ Phone No.: _____-_____

Current Weight _ _ _ Current Height (in inches) _ _ _

Highest Weight Ever (excluding pregnancy) _ _ _

Did you have dysmenorrhea (cramps or other pain) during these early periods?
NO ____ YES ____
If yes, to what degree?
Mild ____
Moderate ____
Severe ____

HISTORY OF MENSTRUATION:

Age at onset of first menstrual period (years/months): _ _/_ _

Age when menstrual periods became regular (years/months) _ _/_ _

Number of pregnancies (whether carried full term or not) _ _

Have you ever sought treatment or taken anything for menstrual problems (such as cramps, too heavy a flow, clots)?
1 – No 2 – Yes, please specify _____

_____

Have you ever sought treatment or taken anything for premenstrual problems (such as depression, headaches, breast pain)?
1 – No 2 – Yes, please specify _____

_____

CHARACTERISTICS OF MOST RECENT MENSTRUAL CYCLE:

Date most recent menstrual period began (mo./da.) _ _ _ _ (* refer to menstrual calendar)

Number of days of flow (if still flowing, note this) _ _

How heavy was the flow as compared with your usual menses?

1 – average flow 2 – heavier than usual 3 – lighter than usual

Did your last menses start when it was expected? (Check one.)

___ Yes, started when expected or within 2 days of expected date (early or late)

___ No, was more than 2 days later than expected (number of days late _____)

___ No, was more than 2 days earlier than expected (number of days early _____)

Did you have dysmenorrhea (cramps or other pain) during your last menses?

1 – absent 2 – minimal 3 – moderate 4 – severe

CHARACTERISTICS OF MENSTRUAL CYCLE BEFORE MOST RECENT ONE:

Date of first day of menses which occurred before the most recent period began (mo./da.) _ _/_ _

Number of days of flow _ _ (* refer to menstrual calendar)

How heavy was the flow as compared with your usual menses?

1 – average flow 2 – heavier than usual 3 – lighter than usual

Did that menses start when it was expected? (Check one.)

___ Yes, started when expected or within 2 days of expected date (early or late)

___ No, was more than 2 days later than expected (number of days late _____)

___ No, was more than 2 days earlier than expected (number of days early _____)

Did you have dysmenorrhea (cramps or other pain) during that menses?

1 – absent 2 – minimal 3 – moderate 4 – severe

GENERAL MENSTRUAL CYCLE CHARACTERISTICS:

Any disruptions in your established menstrual pattern during the past six months?

1 – No 2 – Yes, please specify _____

_____

Regularity of cycle length during the past six months : (Check one.)
(Refer to *NOTE on menstrual calendar)

____ always between 25 and 35 days in length during the past six months?

____ at least one cycle during the past 6 months was shorter than 25 days – number of days in cycle __ __

____ at least one cycle during the past 6 months was longer than 35 days – number of days in cycle __ __

Usual cycle length during the past 6 months (if regular) __ __

Usual duration of flow of menses: 1 – 2 days or less 2 – 3 to 5 days 3 – 6 days or more

Average intensity of flow of menses: 1 – light (mostly spotting) 2 – average (2–3 days of bleeding with 1–2 days of subsequent spotting) 3 – heavy (4–5 days of bleeding with or without subsequent spotting)

Dysmenorrhea (cramps or pain) during menses: 1 – never 2 – rarely 3 – sometimes 4 – usually

Severity of pain: 0 – never any pain 1 – minimal 2 – moderate 3 – severe

Onset of menses is usually: 1 – gradual (spotting for a day) 2 – light (continuous but light flow) 3 – sudden (immediate full flow)

Can you generally predict the exact time of menses (e.g., know when you will start within an hour or that night)?
1 – No 2– Yes, within a day 3 – Yes, within a few hours

How can you usually tell? _____

_____

_____

PREMENSTRUAL CHANGES

Do you usually notice changes in your mood, behavior or physical condition premenstrually (the days before you start menses)?
1 – None at all (Skip to History of Oral Contraceptive Use)

2 – Slight 3 – Moderate 4 – Severe

How noticeable are your premenstrual changes? 1 – vague and barely noticeable 2 – clear-cut and apparent

If noticeable, when do the changes begin? (on average) 1: 1-2 days prior to menses

2: 3-4 days prior to menses 3: 5-7 days prior to menses

4: more than a week prior to menses 5: onset varies from month to month

APPENDIX C (3 of 3)

How do your premenstrual changes end? 1 - gradually 2 - abruptly

When do your premenstrual changes end? 1 - prior to the first day of menses
2 - during the first day of menses 3 - during the first few days of menses

To what degree do you regard these changes as problematic? (when they are at their worst)

1 - not at all: you alone notice mood or physical changes but either welcome them or consider them merely a minor irritant

2 - mildly problematic: you and your family notice changes in your mood or behavior which are considered unwelcome, but they do not effect social life or work

3 - moderately problematic: family relationships are disturbed; social life is curtailed; work can be done but with some interference

4 - severely problematic: disturbs relations within family; social life ceases; no work can be done; medication is sought.

What kinds of things do you do, if any, to try to cope with (i.e. lessen the influence of, control the effects of) these problematic changes? _____

_____

_____

_____

_____

HISTORY OF ORAL CONTRACEPTIVE USE:

Did you ever or do you now use oral contraceptives? 1 - Never used 2 - Yes, please specify (record age and duration of all periods of oral contraceptive use. Note brand name, if you remember.): _____

_____

_____

_____

Did you notice any apparent effects on your mood when using oral contraceptives?

1 - No 2 - Yes, please describe: _____

_____

_____

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APPENDIX E

PAF UNIPOLAR SUMMARY SCALE ITEM CONTENT

Scale 1 – Low mood/loss of pleasure
233 Feel depressed
236 Suicidal ideation
252 Feel tearful
262 Guilty feeling
263 Feel "empty"
265 Feel sad or blue
271 Feel lonely
316 Decrease in self-esteem
328 Want to be alone
339 Pessimistic outlook

Scale 2 – "Endogenous" depressive features
222 Loss of appetite
237 Less desire to talk/move
254 Become constipated
314 Terminal insomnia, if true equals 6
332 Feel worse in A.M.

Scale 3 – Lability
215 Rapid mood changes
260 Mood swings
261 Hysterical if upset

Scale 4 – "Atypical" depressive features
215 Rapid mood changes
219 Hypersomnia
241 Feels sleepy
260 Mood swings
330 Crave specific foods
331 Increased appetite

Scale 5 – "Hysteroid" features
239 Dissatisfaction with appearance
251 More childlike
255 Self-indulgent
261 Hysterical if upset
336 Sensitive to rejection

Scale 6 – Hostility/anger
240 Violence
264 Outbursts of irritability
269 Feel "at war"
270 Act spiteful
274 Intolerant/impatient
317 Blames others

Scale 7 – Social withdrawal
237 Less desire to talk/move
322 Stay at home
324 Avoid social activities
328 Want to be alone

Scale 8 – Anxiety
218 Feel anxious
221 Feel jittery or restless
228 Physical agitation
258 Feel under stress

Scale 9 – Increased well-being
244 More enjoyment/excitement
249 Increased well-being
318 Increased activity/efficiency
335 Bursts of energy

Scale 10 – Impulsivity
240 Violence
250 Lack self control
256 Impulsive behavior
264 Outbursts of irritability

Scale 11 – "Organic" mental features
217 Poor motor coordination
225 Easily distracted
226 Tend to have accidents
238 More forgetful
245 Difficulty concentrating
246 Feel confused

Scale 12 – Signs of water retention
223 Breast pain or swelling
272 Urinate less
273 Weight gain
276 Abdominal discomfort/pain
321 Puffiness/edema
325 Feel bloated

Scale 13 – General physical discomfort
224 Headaches or migraines
267 Backaches, joint or muscle pains
276 Abdominal discomfort/pain

Scale 14 – Autonomic physical changes
227 Nausea or vomiting
234 Dizziness, faintness, vertigo
243 Rapid heartbeat
253 Urinate frequently
254 Become constipated
272 Urinate less
334 Feel cold

Scale 15 – Fatigue
216 Decreased energy
220 Feeling of malaise
229 Feelings of weakness
266 Tired legs

Scale 16 – Impaired social functioning
235 Tend to nag
247 Decreased judgment
268 Family notes mood
322 Stay at home
324 Avoid social activities
326 Lowered performance/efficiency
327 Miss time at work
329 Lack of inspiration
333 Less attention to appearance
342 Less housework
343 Less leisure activities

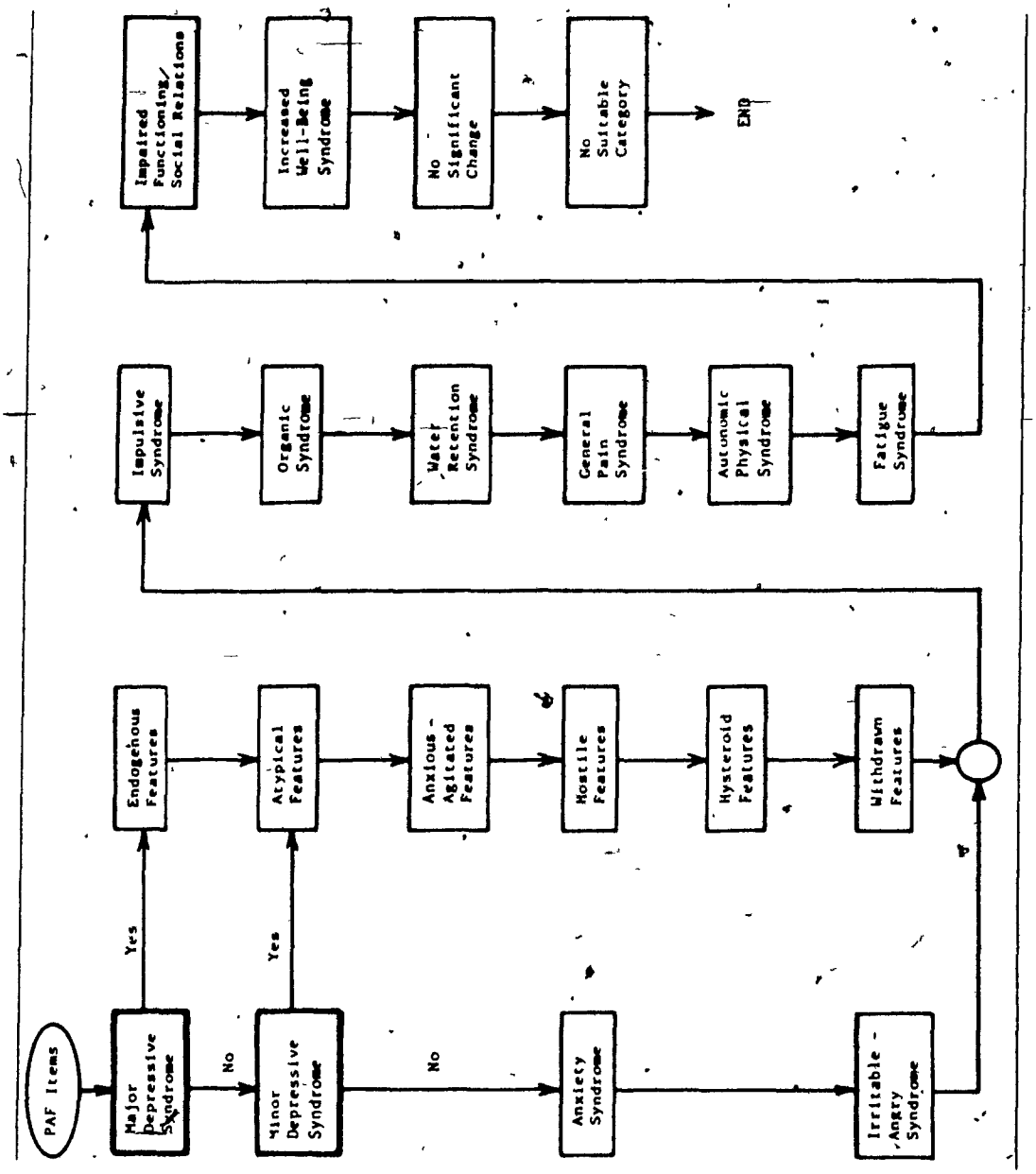
Scale 17 – Miscellaneous mood/behavior changes
230 Feel overwhelmed
231 Feel insecure
242 Sense of unreality
248 Feel passive
257 Smoke/drink more
259 Pick skin/bite nails
275 Overtalkative
277 Increased sexual interest
278 Trouble sleeping
319 Brood over events
323 Less sexual interest
337 More affectionate
338 Seek advice
340 Drink more coffee/tea

Scale 18 – Miscellaneous physical changes
232 Flare-ups of allergy
315 Abdominal cramps
320 Skin problems
341 Pain during intercourse
344 Physical flare-ups
345 Eye problems

* Abbreviations are listed. The actual items are longer with examples, etc.

APPENDIX F

PAF TYPOLOGICAL CATEGORIES



APPENDIX G

CORRELATIONS OF AGE WITH UNIPOLAR SUMMARY SCALE SCORES

Summary scale (#)	Pearson R	prob.	
Low mood/loss of pleasure (1)	-.16	.033	*
Endogenous depressive features (2)	-.04	.328	
Lability (3)	-.16	.036	*
Atypical depressive features (4)	-.10	.122	
Hysteroid features (5)	-.20	.013	*
Hostility/anger (6)	-.17	.03	*
Social withdrawal (7)	-.14	.061	
Anxiety (8)	-.15	.051	
Increased well-being (9)	.10	.141	
Impulsivity (10)	-.16	.037	*
Organic mental features (11)	-.08	.195	
Signs of water retention (12)	-.10	.125	
General physical discomfort (13)	-.04	.34	
Autonomic physical changes (14)	.01	.466	
Fatigue (15)	-.13	.079	
Impaired social functioning (16)	-.21	.009	*
Miscellaneous mood/behavior changes (17)	-.12	.088	
Miscellaneous physical changes (18)	-.07	.231	

* significant at $p < .05$

APPENDIX H

PAF INDICES OF INTERNAL VALIDITY: ANOVA RESULTS FOR ANALYSES USING NUMBER[1] AS THE DEPENDENT VARIABLE

NUMBER BY SEVERITY OF PREMENSTRUAL CHANGES (PMC)

Severity PMC	n	M	(SD)	SS	df	MS	F
slight	51	$_a$1.08	(2.89)				
moderate	48	$_b$3.67	(4.11)				
severe	21	$_c$9.48	(5.48)				
Group				1049.58	2	524.79	33.89 *
S(G)				1811.59	117	15.48	

* $p < .001$

$_{a,b,c}$ means with different subscripts significantly differ at $p < .05$ based on Tukey multiple comparison test

NUMBER BY PERCEIVED DISRUPTIVENESS OF PMC

Degree of Disruption	n	M	(SD)	SS	df	MS	F
not at all	46	$_a$1.67	(4.07)				
mild	51	$_a$2.55	(3.52)				
moderate	26	$_b$7.96	(5.00)				
severe	2	$_b$13.00	(5.66)				
Group				897.50	3	299.17	17.89 *
S(G)				2023.70	121	16.72	

* $p < .001$

$_{a,b}$ means with different subscripts significantly differ at $p < .05$ based on Tukey multiple comparison test

[1] number of unipolar scales endorsed at >50% of maximum value.

APPENDIX I

ALPHA COEFFICIENTS OF INTERNAL CONSISTENCY:
PAF UNIPOLAR SUMMARY SCALES (N=130)

Summary scale (#)	Alpha
Low mood / loss of pleasure (1)	.95
Endogenous depressive features (2)	.60
Lability (3)	.85
Atypical depressive features (4)	.75
Hysteroid features (5)	.84
Hostility / anger (6)	.93
Social withdrawal (7)	.88
Anxiety (8)	.89
Increased well-being (9)	.71
Impulsivity (10)	.86
Organic mental features (11)	.91
Signs of water retention (12)	.82
General physical discomfort (13)	.75
Autonomic physical changes (14)	.72
Fatigue (15)	.85
Impaired social functioning (16)	.90
Miscellaneous mood / behavior changes (17)	.89
Miscellaneous physical changes (18)	.70

APPENDIX J

ANOVA FOR NUMBER[1] BY CYCLE PHASE DURING WHICH PAF WAS COMPLETED

Cycle phase	n	M	(SD)	SS	df	MS	F
Premenstrual[2]	28	$_a$5.89	(5.9)				
Menstrual[2]	26	$_a$3.82	(5.1)				
Postmenstrual week	37	$_b$2.37	(4.4)				
Any other week[2]	30	$_b$2.07	(2.8)				
Group				560.6	2	280.30	4.27*
S (G)				889.0	85	10.46	

[1] number of unipolar summary scales endorsed at > 50% of maximum possible value

[2] variable time periods, self-defined by each subject

* $p < .01$

a,b. means with different subscripts significantly differ at $p < .05$

APPENDIX K

ANOVA FOR NUMBER[1] BY SEVERITY OF DYSMENORRHEA

Dysmenorrhea Severity	n		M	(SD)	SS	df	MS	F
none	11		2.82	(5.34)				
minimal	67	a	2.60	(4.74)				
moderate	35	a	3.26	(3.67)				
severe	16	b	7.00	(5.59)				
Group					254.55	3	84.85	3.94*
S (G)					2694.99	125	21.56	

[1] number of unipolar scales endorsed at > 50% of maximum value

a,b. means with different subscripts significantly differ at $p < .05$ based on Tukey multiple comparison test.

* $p < .01$

APPENDIX L

UNIPOLAR SUMMARY SCALE MEANS[1] AND STANDARD DEVIATIONS: TWO CONTROL SUBGROUPS AND THE PMD GROUP

	PMD (n=45)	CONTROL (n=49)		
		PHYSICAL (n=15)		NO CHANGE (n=34)
Summary scale (#)	Mean (SD)	Mean (SD)		Mean (SD)
Anxiety (8)	58.61 (18.3)	25.60 (9.6)		21.35 (5.9)
Fatigue (15)	57.50 (17.5)	28.57 (9.9)	*	23.74 (4.8)
General Physical Discomfort (13)	56.44 (19.4)	35.32 (11.4)	*	23.53 (5.3)
Low mood / loss of pleasure (1)	54.85 (17.9)	21.91 (3.6)		20.16 (3.9)
Lability (3)	53.92 (25.0)	26.59 (10.0)	*	20.26 (5.1)
Atypical depressive features (4)	51.52 (14.5)	27.58 (6.9)	*	21.81 (3.4)
Hysteroid features (5)	50.82 (18.2)	23.10 (7.1)		20.10 (4.1)
Hostility / Anger (6)	50.25 (21.9)	22.02 (4.1)		19.53 (3.7)
Water Retention (12)	49.16 (15.2)	32.92 (10.5)	*	26.80 (5.4)
Social Withdrawal (7)	48.80 (18.4)	20.24 (5.9)		18.38 (4.2)
Impulsivity (10)	45.93 (20.8)	22.62 (5.8)		19.12 (3.7)
Impaired Social Functioning (16)	44.66 (13.8)	21.86 (4.3)		19.42 (2.9)
Organic/mental features (11)	41.91 (18.3)	17.66 (2.3)		18.46 (3.0)
Endogenous depressive features (2)	40.07 (14.6)	21.19 (7.0)		18.82 (3.1)
Misc. mood/behavior changes (17)	40.00 (13.9)	19.93 (2.8)		19.57 (2.4)
Misc. physical changes (18)	37.69 (14.0)	21.83 (3.1)		20.67 (4.1)
Autonomic physical changes (14)	37.55 (12.4	20.07 (4.5)		19.68 (3.2)
Increased well-being (9)	27.32 (15.2)	18.16 (2.6)		18.14 (3.5)

[1] based on the % of maximum possible value per scale

* Scale means which vary more than 5 percentage points between the two control subgroups

APPENDIX M

DAILY RATING FORM

DAILY DIARY FOR: _____ (please enter date)

Directions: For these ratings we would like you to consider each item in turn, and rate it from 1 to 6 to indicate the degree to which you experienced the feelings or behaviors described in the item on that particular day. Please circle a number for every item on each day; if the item does not apply, then circle 1 (indicates 'not at all'). Although it is natural to feel quite different at different times of the day (e.g. high energy in the morning, tired after a day's work), try to have your ratings describe the average or overall tone of the day.

RATING SCALE:

1 = not at all 2 = minimal 3 = mild 4 = moderate 5 = very much 6 = extreme

Want to be alone, avoid social activity	1	2	3	4	5	6
Increased enjoyment and/or well-being	1	2	3	4	5	6
Feel less efficient at work (job, house, school)	1	2	3	4	5	6
Appetite down, eat less, less interest in food	1	2	3	4	5	6
Feeling of malaise (general, non-specific bad feeling; vague sense of physical or mental ill-health)	1	2	3	4	5	6
Feel bloated, have water retention (abdomen, ankles, fingers or breasts)	1	2	3	4	5	6
Increased energy/activity level	1	2	3	4	5	6
Have changes in mood (e.g. laughing, crying, angry, happy) within the same day	1	2	3	4	5	6
Feel depressed, sad, low, blue or lonely	1	2	3	4	5	6
Increased sexual interest	1	2	3	4	5	6
Get more sleep, take naps	1	2	3	4	5	6
Feel anxious, jittery or nervous	1	2	3	4	5	6
Low energy, tired, weak	1	2	3	4	5	6
Feel irritable, angry or impatient	1	2	3	4	5	6
Appetite up, eat more, crave specific foods	1	2	3	4	5	6
Decreased sexual interest	1	2	3	4	5	6
Experience pain or discomfort in the following areas:						
Headache or migraine	1	2	3	4	5	6
Backache, joints or muscles	1	2	3	4	5	6
Abdomen	1	2	3	4	5	6
Breasts	1	2	3	4	5	6

* Did you experience any events today of a particularly stressful or uplifting nature that might have influenced any of your above ratings? If so, please mention the event in the space below, rate its influence, and place a check mark beside those items above which were most affected by this event.

Event: _____ 1 2 3 4 5 6

stressful or uplifting? (please underline one)

APPENDIX N

BECK INVENTORY

I.D. #: _____ DATE: _____

On this questionnaire are groups of statements. Please pick out the one statement in each group which best describes the way you feel today, that is, right now. Be sure to read all statements in the group before making your choice for that group. Then, place a check (✓) to the left of the statement which best describes the way you feel right now. If none of the statements in a group fits exactly the way you feel, then select the one which is closest. Do not skip any groups.

1. ____ I do not feel sad.
____ I feel sad.
____ I am sad all the time and I can't snap out of it.
____ I am so sad or unhappy that I can't stand it.

2. ____ I am not particularly discouraged about the future.
____ I feel discouraged about the future.
____ I feel I have nothing to look forward to.
____ I feel that the future is hopeless and that things cannot improve.

3. ____ I do not feel like a failure.
____ I feel I have failed more than the average person.
____ As I look back on my life, all I can see is a lot of failures.
____ I feel I am a complete failure as a person.

4. ____ I get as much satisfaction out of things as I used to.
____ I don't enjoy things the way I used to.
____ I don't get real satisfaction out of anything anymore.
____ I am dissatisfied or bored with everything.

5. ____ I don't feel particularly guilty.
____ I feel guilty a good part of the time.
____ I feel quite guilty most of the time.
____ I feel guilty all of the time.

6. ____ I don't feel I am being punished.
____ I feel I may be punished.
____ I expect to be punished.
____ I feel I am being punished.

7. ____ I don't feel disappointed in myself.
____ I am disappointed in myself.
____ I am disgusted with myself.
____ I hate myself.

8. ____ I don't feel I am any worse than anybody else.
____ I am critical of myself for my weaknesses or mistakes.
____ I blame myself all the time for my faults.
____ I blame myself for everything bad that happens.

9. ____ I don't have any thoughts of killing myself.
____ I have thoughts of killing myself, but I would not carry them out.
____ I would like to kill myself.
____ I would kill myself if I had the chance.

APPENDIX N (2 Of 2)

10. ____ I don't cry anymore than usual.
____ I cry more now than I used to.
____ I cry all the time now.
____ I used to be able to cry, but now I can't cry even though I want to.

11. ____ I am no more irritated now than I ever am.
____ I get annoyed or irritated more easily than I used to.
____ I feel irritated all the time now.
____ I don't get irritated at all by the things that used to irritate me.

12. ____ I have not lost interest in other people.
____ I am less interested in other people than I used to be.
____ I have lost most of my interest in other people.
____ I have lost all of my interest in other people.

13. ____ I make decisions about as well as I ever could.
____ I put off making decisions more than I used to.
____ I have greater difficulty in making decisions than before.
____ I can't make decisions at all anymore.

14. ____ I don't feel I look any worse than I used to.
____ I am worried that I am looking old or unattractive.
____ I feel that there are permanent changes in my appearance that make me look unattractive.
____ I believe that I look ugly.

15. ____ I can work about as well as before.
____ It takes an extra effort to get started at doing something.
____ I have to push myself very hard to do anything.
____ I can't do any work at all.

16. ____ I can sleep as well as usual.
____ I don't sleep as well as I used to.
____ I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
____ I wake up several hours earlier than I used to and cannot get back to sleep.

17. ____ I don't get more tired than usual.
____ I get tired more easily than I used to.
____ I get tired from doing almost anything.
____ I am too tired to do anything.

18. ____ My appetite is no worse than usual.
____ My appetite is not as good as it used to be.
____ My appetite is much worse now.
____ I have no appetite at all anymore.

19. ____ I haven't lost much weight, if any lately.
____ I have lost more than 5 pounds.
____ I have lost more than 10 pounds.
____ I have lost more than 15 pounds.

I am purposely trying to lose weight by eating less. Yes ____ No ____

20. ____ I am no more worried about my health than usual.
____ I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
____ I am very worried about physical problems and it's hard to think of much else.
____ I am so worried about my physical problems, that I cannot think about anything else.

21. ____ I have not noticed any recent change in my interest in sex.
____ I am less interested in sex than I used to be.
____ I am much less interested in sex now.
____ I have lost interest in sex completely.

APPENDIX O

MULTIPLE AFFECT ADJECTIVE CHECK LIST

1 ☐ active
2 ☐ adventurous
3 ☐ affectionate
4 ☐ afraid
5 ☐ agitated
6 ☐ agreeable
7 ☐ aggressive
8 ☐ alive
9 ☐ alone
10 ☐ amiable
11 ☐ amused
12 ☐ angry
13 ☐ annoyed
14 ☐ awful
15 ☐ bashful
16 ☐ bitter
17 ☐ blue
18 ☐ bored
19 ☐ calm
20 ☐ cautious
21 ☐ cheerful
22 ☐ clean
23 ☐ complaining
24 ☐ contented
25 ☐ contrary
26 ☐ cool
27 ☐ cooperative
28 ☐ critical
29 ☐ cross
30 ☐ cruel
31 ☐ daring
32 ☐ desperate
33 ☐ destroyed
34 ☐ devoted
35 ☐ disagreeable
36 ☐ discontented
37 ☐ discouraged
38 ☐ disgusted
39 ☐ displeased
40 ☐ energetic
41 ☐ enraged
42 ☐ enthusiastic
43 ☐ fearful
44 ☐ fine
45 ☐ fit
46 ☐ forlorn
47 ☐ frank
48 ☐ free
49 ☐ friendly
50 ☐ frightened
51 ☐ furious
52 ☐ gay
53 ☐ gentle
54 ☐ glad
55 ☐ gloomy
56 ☐ good
57 ☐ good-natured
58 ☐ grim
59 ☐ happy
60 ☐ healthy
61 ☐ hopeless
62 ☐ hostile
63 ☐ impatient
64 ☐ incensed
65 ☐ indignant
66 ☐ inspired
67 ☐ interested
68 ☐ irritated
69 ☐ jealous
70 ☐ joyful
71 ☐ kindly
72 ☐ lonely
73 ☐ lost
74 ☐ loving
75 ☐ low
76 ☐ lucky
77 ☐ mad
78 ☐ mean
79 ☐ meek
80 ☐ merry
81 ☐ mild
82 ☐ miserable
83 ☐ nervous
84 ☐ obliging
85 ☐ offended
86 ☐ outraged
87 ☐ panicky
88 ☐ patient
89 ☐ peaceful
90 ☐ pleased
91 ☐ pleasant
92 ☐ polite
93 ☐ powerful
94 ☐ quiet
95 ☐ reckless
96 ☐ rejected
97 ☐ rough
98 ☐ sad
99 ☐ safe
100 ☐ satisfied
101 ☐ secure
102 ☐ shaky
103 ☐ shy
104 ☐ soothed
105 ☐ steady
106 ☐ stubborn
107 ☐ stormy
108 ☐ strong
109 ☐ suffering
110 ☐ sullen
111 ☐ sunk
112 ☐ sympathetic
113 ☐ tame
114 ☐ tender
115 ☐ tense
116 ☐ terrible
117 ☐ terrified
118 ☐ thoughtful
119 ☐ timid
120 ☐ tormented
121 ☐ understanding
122 ☐ unhappy
123 ☐ unsociable
124 ☐ upset
125 ☐ vexed
126 ☐ warm
127 ☐ whole
128 ☐ wild
129 ☐ willful
130 ☐ wilted
131 ☐ worrying
132 ☐ young

APPENDIX P

STIMULUS SCRIPT VALIDATION AND SELECTION

Twenty dysphoric and twenty non-dysphoric scripts were written as described on pages 135-137. The scripts were then recorded on audio cassette tapes by E (Shenker) in the following manner. Five scripts were randomly selected from the total forty and recorded in random order on one cassette. Five more were randomly selected from the remaining 35 scripts and recorded in random order on a second cassette. This procedure was carried out until all forty scripts had been recorded, five per cassette, on eight cassettes. All scripts were recorded at approximately 100 words per minute, with 1-minute interstimulus intervals.

Seven naive individuals were asked to serve as judges. The seven judges ranged in age from 19 to 32, and were chosen from a variety of occupations. All had completed at least one year of university study; four were university graduates. There were four males and three females. All were personal acquaintances of E and understood that the task was part of a research project in psychology, but none knew the nature or purpose of the research. All judges were considered to be non-depressed. This clinical judgement was supported by administering the BDI to each within two days after completion of their ratings; their BDI scores were all less than 6.

Each judge was given the eight cassettes and instructed

to listen to them in a predetermined order. The order was varied between judges. They were given rating forms, and instructed to listen to each stimulus, fill out a rating form for that stimulus, then listen to the next stimulus, fill out a rating form for that stimulus and so on until they had completed rating forms for all forty stimuli. They were instructed to take breaks whenever they felt they needed to.

The rating forms required two groups of judgments: the extent to which each script deals with ten different depressive themes, and the mood or affective quality of each script. Thematic content was assessed by instructing the judge to, "Please rate the extent to which this script deals with the following themes or subjects". Ten themes were listed, each with a 7-point rating scale anchored at the ends and middle with the words, "not at all', "moderately", and "extremely". The themes were: helplessness, rejection, loss, a negative view of the world, hopelessness, escape, personal deficiency, failure, deprivation, and loneliness. Mood or affective quality was assessed by instructing the judge to, "Please rate the extent to which this script is described by each of the following words". Eleven adjectives were listed, of which eight were dsyphoric mood adjectives. Three positive mood adjectives were included to guard against response bias on the part of judges. Each adjective was rated on a 7-point scale identical to those described above. The dysphoric mood adjectives were:

pessimistic, hopeless, sad, distressing, discouraging, gloomy, unhappy, and dysphoric -- the latter defined on the rating sheet as, "something that tends to arouse generally negative feelings". The positive mood adjectives were pleasant, cheerful, and good-natured. A sample rating sheet appears on the following two pages.

Ten dysphoric scripts were selected to become dysphoric distracter stimuli. The primary selection criterion was that each script selected obtain mean judges' ratings of at least 5 on the extent to which it deals with each of at least three depressive themes. For each script so selected, the mean judges' rating on the extent to which it is described by the eight dysphoric mood adjectives was greater than 4.75, whereas the mean rating of the three positive mood adjectives was less than 2.

Thirteen non-dysphoric scripts were selected to become non-dysphoric distracter stimuli (three extra non-dysphoric stimuli were required to construct practice and baseline trials). The primary selection criterion was that no script receive a mean judges' rating higher than 2 for any depressive theme. Each script so selected received a mean judges' rating for the extent to which it is described by the eight dysphoric mood adjectives of less than 2. Mean judges' ratings of the three positive mood adjectives ranged from 2.6 to 4.8 for the thirteen stimuli. Means and ranges of ratings in all categories for all distracter stimuli are presented on the page following the sample rating sheet.

RATING FORM FOR VALIDATION OF DISTRACTOR STIMULI

Please rate the extent to which this script is described by each of the following words:

PESSIMISTIC:	1 not at all	2	3	4 moderately	5	6	7 extremely
HOPELESS:	1 not at all	2	3	4 moderately	5	6	7 extremely
SAD:	1 not at all	2	3	4 moderately	5	6	7 extremely
PLEASANT:	1 not at all	2	3	4 moderately	5	6	7 extremely
DISTRESSING:	1 not at all	2	3	4 moderately	5	6	7 extremely
CHEERFUL:	1 not at all	2	3	4 moderately	5	6	7 extremely
DISCOURAGING:	1 not at all	2	3	4 moderately	5	6	7 extremely
GLOOMY:	1 not at all	2	3	4 moderately	5	6	7 extremely
UNHAPPY:	1 not at all	2	3	4 moderately	5	6	7 extremely
GOOD-NATURED:	1 not at all	2	3	4 moderately	5	6	7 extremely

DYSPHORIC: (i.e., something that tends to arouse generally negative feelings):

1	2	3	4	5	6	7
not at all			moderately			extremely

****

Please rate the extent to which this script deals with the following themes or subjects:

HELPLESSNESS:

1	2	3	4	5	6	7
not at all			moderately			extremely

REJECTION:

1	2	3	4	5	6	7
not at all			moderately			extremely

LOSS:

1	2	3	4	5	6	7
not at all			moderately			extremely

A NEGATIVE-VIEW OF THE WORLD:

1	2	3	4	5	6	7
not at all			moderately			extremely

HOPELESSNESS:

1	2	3	4	5	6	7
not at all			moderately			extremely

ESCAPE:

1	2	3	4	5	6	7
not at all			moderately			extremely

PERSONAL DEFICIENCY:

1	2	3	4	5	6	7
not at all			moderately			extremely

FAILURE:

1	2	3	4	5	6	7
not at all			moderately			extremely

DEPRIVATION:

1	2	3	4	5	6	7
not at all			moderately			extremely

LONELINESS:

1	2	3	4	5	6	7
not at all			moderately			extremely

Ratings of Dysphoric and Non-Dysphoric Distractor Stimuli

By Seven Judges on a 7-Point Rating Scale[1]

Distractor Type	Depressive Themes (N = 10 themes)	Dysphoric Mood Adjectives (N = 8 adjectives)	Positive Mood Adjectives (N = 3 adjectives)
Dysphoric (N = 10 stimuli)	mean[a] = 4.3 range[b] = 1.7-6.8	mean[c] = 5.3 range[d] = 4.8-6.2	mean[c] = 1.2 range[d] = 1.0-1.9
Non-Dysphoric (N = 13 stimuli)	mean[a] = 1.2 range[b] = 1.0-2.0	mean[c] = 1.2 range[d] = 1.0-1.9	mean[c] = 3.9 range[d] = 2.6-4.8

[1]Scale from 1 to 7, anchored at the ends and middle with the words, "not at all", "moderately", and "extremely".

[a]Mean of 7 judges' ratings across all stimuli and depressive themes.

[b]Range of mean judges' ratings for each stimulus on each theme.

[c]Mean of judges' ratings of all stimuli across all adjectives.

[d]Range of mean judges' ratings across all adjectives for each stimulus.

APPENDIX Q

PREPARATION OF STIMULUS TAPES

All target and distracter scripts were initially recorded in the following manner. The experimenter (Shenker) read each script while seated in a shielded, sound attenuated room, with a unidirectional microphone worn around his neck to minimize amplitude changes which might otherwise result from head movement. The microphone cord was plugged into a wall outlet in the room.

All scripts were recorded on one track of an open reel tape (BASF LH Super Hi Fi, DP-26), using a stereo tape recorder (Sony 4-track, model TC-788; tape speed 7.5 inches/second), situated outside the sound attenuated room with its mic input connected to a wall outlet outside the room. A research assistant operated the tape recorder and communicated with E (Shenker) verbally via microphone and earphones, and visually through a window.

The research assistant adjusted the recording level such that when E read at a comfortable amplitude, the VU meter registered input at approximately the optimum recording level, with amplitude peaks registering between -5 and +1 on the VU meter. The experimenter attempted to read all scripts at the same amplitude. The research assistant monitored input levels during recording and, when E's amplitude deviated from this standard, signalled him and the stimulus was re-recorded. Approximately equal amplitudes of

all stimuli were obtained on this initial recording in this manner.

All scripts were read at approximately 120 words per minute. This rate was monitored by the research assistant who timed a previously counted 100-word segment in the middle of each script. When necessary, scripts were re-recorded until they achieved the desired rate of presentation. This first tape is designated Tape 1.

The stimuli recorded on Tape 1 were then dubbed onto a second tape, designated Tape 2. This was accomplished by directly connecting the output jack of the Sony to the channel 1 input jack of a Revox Type A77 stereo tape recorder set at 7.5 inches/second, with the Dolby system engaged. A 10-second, 1000 cps calibration tone was first recorded at the beginning of the tape. In addition, a 1-second 1000 cps tone was recorded at the onset and offset of each target stimulus, to signal the beginning and end of each stimulus.

Remaining amplitude variations between stimuli on Tape 1 were removed as the stimuli were dubbed onto Tape 2. This was accomplished by adjusting the playback level of the Sony and the recording level of the Revox so that the VU meter of the Revox registered optimum recording amplitude, with peaks registering between -5 and +1. After the first script was recorded in this way the playback level of the Sony was adjusted for each subsequent stimulus to achieve the same VU meter readings on the Revox. After completing Tape 2, the

success of these procedures in achieving approximately equal stimulus amplitudes was verified by playing the tape through headphones (Yamaha HP-1 stereo headphones) into a sound level meter, and monitoring the amplitude peaks.

The result of these procedures was an open reel tape (Tape 2) consisting of a 10-second 1000 CPS calibration tone, and all target and distracter stimuli recorded on one channel, at approximately equal amplitudes, with 1-second signal tones at the beginning and end of each target stimulus.

The stimuli on Tape 2 were then dubbed onto a third tape, designated Tape 3, in the following manner. The channel 1 output jack of the Revox was connected directly to the input jack on a second Revox Type A77 stereo tape recorder, with both machines set at 7.5 inches/second and Dolby systems engaged. Playback and record levels of the machines were set so that the calibration tone was recorded onto Tape 3 with the VU meter of the recording machine registering +1. All target stimuli, with their signal tones, were then recorded onto channel 1 of Tape 3, with 10-second interstimulus intervals.

The machines were then set up, and calibrated in the same manner, to record distracter stimuli onto channel 2 of Tape 3 at the same amplitude as the target stimuli were recorded on channel 1. The specific target-distracter combinations were arranged in the following manner: target stimuli which were designated to be practice and baseline

trials were paired with non-dysphoric distracter stimuli; thereafter pairings were made such that non-dysphoric distraction trials alternated with dysphoric distraction trials, i.e. every second target stimulus was paired with a dysphoric distracter stimulus.

Coordination of channel 1 with channel 2 (target stimulus with distracter stimulus) was accomplished in the following manner for each pair of stimuli. The tape recorder containing the distracter stimulus (Tape 2) was stopped with the "pause" lever just before the first word of the stimulus. The tape recorder containing the target stimulus (channel 1 of Tape 3) was started, with E monitoring the playback via earphones. On the 10th word of the target stimulus, the "pause" lever of the first machine was released, allowing the distracter to begin being recorded onto channel 2 of Tape 3. Thus, for each stimulus, the target began first and after 10 words was joined by the distracter on the other channel. Since each target stimulus was approximately 120 words long; this left about 110 words on the target stimulus, the last 10 of which would not be scored. That is, the segment of each target stimulus that will be scored for shadowing errors is the 100 words which immediately follow the onset of distraction. For this reason, each distractor must be long enough to cover that 100 word target's next 10 words. These segments had all been timed prior to this taping, and each distractor could be ended in several places. The end point was chosen so

that the distracter covered the critical 100 word target segment, and then terminated before the target did. The distracter stimulus was terminated by stopping Tape 2 with the "pause" lever of its tape recorder.

Thus, for each stimulus pair, the target stimulus on channel 1 began first, preceded by its signal tone. The distracter stimulus on channel 2 began 10 words after the target's onset. The two stimuli continued simultaneously for at least the next 100 words of the target. The distracter then terminated sometime during the next 10 words of the target, followed by termination of the target stimulus, followed by the signal tone indicating the end of that trial. This procedure was followed for each stimulus pair, with 10-second intervals between trials.

The result of these procedures, Tape 3, consisted of 2 practice, 1 baseline, and 20 experimental trials, the latter with alternating dysphoric and non-dysphoric distraction. All target and distraction stimuli were recorded at approximately equal amplitudes and rates of presentation. The twenty pairs of experimental stimuli recorded on Tape 3, as described above, are designated Series X.

The procedures used to make Tape 3, above, were repeated in the identical manner to make another tape, Tape 4. This tape contains Series Y, which differs from Series X in the following ways. Each target stimulus which is paired with a dysphoric distracter in Series X is paired with a non-dysphoric distracter in Series Y. Similarly, each

target stimulus which is paired with a non-dysphoric distracter in Series X is paired with a dysphoric distracter in Series Y. In addition, the order in which targets and distracters occur was altered so that the order of presentation of stimuli on Series X differs from that of Series Y. Finally, although both series contain alternating dysphoric with non-dysphoric distractions trials, Series X begins with a non-dysphoric distraction trial and Series Y begins with a dsyphoric distraction trial.

The final step in the production of the stimulus tapes was to dub the stimuli on Tapes 3 and 4 onto cassette (Maxwell Low Noise C90) tapes. The open reel tapes were played on the Revox A-77 stereo tape recorder, with the output jacks of each channel connected directly to the input jacks of the corresponding channels of a stereo cassette (Yamaha 800 GL) tape recorder. Both channels were recorded at equal amplitudes, with the VU meters of each of the cassette recorder's channels registering bettween -5 and +1 at the amplitude peaks.

For each series, the calibration tone and half the trials were recorded onto one cassette, and the calibration tone and remaining trials recorded onto a second cassette. That is, for each series, X and Y, two cassettes were created, each with ten target distraction pairs. Each cassette, containing half the stimuli of a series, is designated A and B. Thus, four cassettes were created, each containing ten pairs of stimuli: Series X, parts A and B;

Series Y, parts A and B. Note that XA contains the same target and distracter stimuli as YA, but in different target-distracter combinations and orders. Similarly, XB and YB contain identical stimuli but in different combinations and orders. In addition, a cassette was made which contained the two practice and one baseline trial.

APPENDIX R

DYSPHORIC DISTRACTER STIMULUS D-1

A dominant characteristic of modern societies is the helplessness and impotence of the individual. In simpler societies, people could direct their own lives, their efforts could make a diffference. Now, individuals are helpless. Like passive blades of grass, they are blown this way and that, powerless to influence the forces that determine their lives. In many respects, people's lives are governed by faceless bureaucracies, important decisions about them made by computers. A terrible sense of impotence pervades modern life, as people bow to the sure knowledge that they are powerless to effect their own lives, much less make an impression on the society around them.

DYSPHORIC DISTRACTER STIMULUS D-2

It is no longer possible to be optimistic about the future. There was a time when people could plan for a bright future; now such bright hopes are naive illusions, for the future is bleak. Our once-promising technologies now poison the environment with deadly pollutants. Overpopulation will, in the next 50 years, deplete the earth's food supplies, natural resources, and even room to breathe. We face a world which will be teeming with starving, diseased people killing each other just for space to lie down. Young people can look forward only to destruction by a world which they did not make.

DYSPHORIC DISTRACTER STIMULUS D-3

People often come to grief because they lose something on which their entire life was based. It can happen when someone very close is lost, either through death, illness, unfaithfulness, or loss of affection. It may be a parent who dies or becomes old and unable to protect and care for you. It may be a lover, without whom the world is empty, life is barren, and there is no joy. One can also lose important personal attributes, without which life holds only despair. This can happen when one becomes less attractive, less energetic, or less intellectually capable.

DYSPHORIC DISTRACTER STIMULUS D-4

Some emotions are so strong and pervasive that they just overpower us and cannot be controlled. Depressed, despondent, melancholy moods can be like that, uncontrollable. When life feels bleak, empty, without meaning; when every day brings only sadness, despair and sorrow, then it is futile to fight it. Such feelings are overwhelming; efforts to banish such black misery invariably fail. In the grip of such melancholy feelings, it is useless to even get out of bed in the morning, for the day can only be bleak and empty, as yesterday was and as tomorrow will inevitably be. Such a suffering person does not have the energy to banish such overwhelming gloom.

DYSPHORIC DISTRACTER STIMULUS D-5

Happiness is always precarious. The things that are essential for one's happiness could be lost in an instant. Only then, after disaster strikes, do people realize how fragile their happiness is, how vulnerable they are, how much they are at the mercy of forces whieh they cannot control. People may think that they control their lives, that every achievement makes their happiness more secure. This is a dangerous delusion which may be disproven with one cruel blow which causes all their cherished dreams to crumble around them. Poverty, loneliness, sickness, grief, despair and ruin are always possible.

DYSPHORIC DISTRACTER STIMULUS D-6

The life of a parent can be full of joy or tragedy, depending on the child. Fortunate parents have children who grow to be happy, loving and successful. For these lucky parents, children fill their lives with joy and pride. But some unfortunate parents have children who bring them only grief and disappointment. Despite the nurturance and concern of their parents, such children are incapable of responding with love, and consistently fail to meet society's standards. Some become lazy, cruel, unloving, inept and unlovable, causing their parents undeserved grief. It seems that these pathetic parents have only discouragement, despair, and frustration to look forward to.

DYSPHORIC DISTRACTER STIMULUS D-7

Losing something important to you is one of life's saddest experiences. Lives can be ruined by losing a good friend or lover. That is often a loss from which one never recovers. Throughout life, the memory of the lost loved one can cause pain, sadness, and an aching loneliness. To have to go through life with such emptiness is a terrible deprivation. Other kinds of loss can be equally devastating. Sometimes a person loses some powers, abilities or skills that they once had. For example, someone's intellectual abilities may decline, or their physical appearance might deteriorate. In such cases, the individual is tragically aware of the loss and may be grief-stricken.

DYSPHORIC DISTRACTER STIMULUS D-8

The future holds nothing but famine, disease, anarchy, poisoning, and destruction. Environmental and social decay are already irreversible; conditions can only get steadily and rapidly worse until this planet will no longer support life. Three-and-a-half billion prople now inhabit this over-populated earth, and every year this number increases by 70 million. Yet most of us have no appreciation of the dimensions of the world food shortage. This mass of humanity will eventually destroy life on this planet. In most industrial nations the air grows more foul and the water more undrinkable each year. Rates of drug usage, crime and civil disorder continue to rise.

DYSPHORIC DISTRACTER STIMULUS D-9

A series of grievous losses, one after another, can leave someone desolate. Such a run of tragedies often begins with illness or disability. Any healthy young person might be stricken with a crippling disease causing sudden disability or gradual physical deterioration. To suddenly become crippled or to have one's body deteriorate is itself devastating. However, the sad fact is that other people are repulsed by traagedy, sickness, unhappiness and deprivation. People who are stricken soon find themselves abandoned by their loved ones, who find their physical disabilities burdensome. Little by little, friends also desert them. Until, finally, such unfortunate people find themselves having lost all the important people in their lives, alone and desolate.

DYSPHORIC DISTRACTER STIMULUS D-10

Failure is usually the result of personal deficiency. Inadequate people, being less capable, are likely to fail to aghieve their goals. This is often tragic, because the frustrated person might desperately want to achieve some important goal, but simply be inadequate, and no amount of trying will help. This is true whether the goals are intellectual, interpersonal, monetary, academic, or whatever. For example, a mediocre student might desperately try to achieve high grades, but lack the intellectual ability. Such an unhappy person might spend the rest of their life regretting their failure, never understanding why they weren't good enough.

APPENDIX S

NON-DYSPHORIC DISTRACTER STIMULUS ND-1

Many people use plants as background in their home aquariums, and it is possible to make them almost as interesting as the fish themselves. Underwater plants come in many beautiful varieties and colors, and some of them even have flowers. Also, many experts maintain that the plants which consume carbon dioxide and give off oxygen can actually help keep the fish healthier. Underwater plants, available at most aquarium shops, fall into several basic categories. The most popular are the long, stringy grasses that grow in clumps and drift upward in the water. These come in assorted shapes and in varying shades of green. Also popular are the floating plants.

NON-DYSPHORIC DISTRACTER STIMULUS ND-2

Wine must be stored properly to avoid spoiling. There are several general principles for storage of wines. Corked bottles should lay on their sides. The wine keeps the cork moist and prevents it from shrinking and admitting air. The safest storage is in a rack that gives each bottle a compartment to itself, allowing you to withdraw any bottle without jogging the others. Screw-top bottles should be stored upright. Maintain an even temperature. A few degrees difference between summer and winter won't do harm, provided the change occurs slowly and steadily. What damages wine is rapid and frequent heating and cooling.

NON-DYSPHORIC DISTRACTER STIMULUS ND-3

Seafood provides a whole world of interesting protein foods. Seafood contains about the same amount of protein as does meat and poultry, but is relatively low in both saturated fat and calories. The fat that fish does contain is primarily valuable unsaturated fatty acids which are desirable in your diet. If the fish is not washed excessively or soaked, it is rich in phosphorous, iodine, and the B vitamins. Raw clams and oytsters are particularly rich in iron. Fresh oysters, clams and mussels should have tightly closed shells when purchased or should close when touched. Good methods of preparing seafood include broiling, baking, steaming, and poaching.

NON-DYSPHORIC DISTRACTER STIMULUS ND-4

From the time that young children watch older siblings and adults around them pick up books and become absorbed, they want to learn to read. To them this is a skill which provides the entrance ticket to the grown-up world. Because of their spontaneous interest, learning to read, while not accomplished in one day, can become a challenging and enjoyable adventure. There is general agreement that reading is the single most important skill a child can possess. It is the one that is taught earliest and continued longest. What is often overlooked is the fact that teaching children to read is fascinating for the teacher as well.

NON-DYSPHORIC DISTRACTER STIMULUS ND-5

The object of any piece of writing is to make the reader understand exactly what you have to say - and understand it as quickly and as effectively as possible. To make your reader do this you must lay out your article, report, story - whatever it may be - like a carefully surveyed road. Otherwise, it will never get anywhere in particular; it will merely stop short after a certain number of pages. Think of a peice of writing as a trip from a definite starting point to a definite destination. At the very start we look for a sign-post pointing the way and naming the place we are headed for.

NON-DYSPHORIC DISTRACTER STIMULUS ND-6

Most bicycle campers these days will find that they need a stove at least some of the time. Except for use by large groups, a small backpacker's stove is generally best suited to the cyclist's needs, since it takes only a little space in the corner of one of the panniers, and it is light enough so that it will not drag too much on the long hills. There are many good stoves, but the main choice is between those fueled by white gasoline and those using small pressurized cannisters of propane or butane. White gasoline is more widely availavle on the road, is less expensive, and produces more heat.

NON-DYSPHORIC DISTRACTER STIMULUS ND-7

Cotton has been used as a textile fibre for so long and in such widely separated parts of the world that no one can be sure where the plant originated or who used it first. Beautiful cotton prints were produced in India long before Alexander's conquests, and in the Americas the wearing of cotton was an ancient art in Mexico and Peru before the Europeans came. Ready made for spinning, cotton is produced today in every country where it will grow and is far and away the world's leading textile fibre. It can be dyed and printed easily in endless variety. Cotton clothing is absorbent and comfortable to wear.

NON-DYSPHORIC DISTRACTER STIMULUS ND-8

Good nursery schools range all the way from lavish model institutions to temporary arrangements to simple home situations. What they have in common is an atmosphere that children find both comfortable and stimulating. Sometimes children spend the first weeks at school wanting to explore the equipment and investigate the child-sized world before they go on to relate to teachers or other children. For a comfortable environment planned to nursery scale, the child first strengthens his feelings that he is a whole, normal, and belonging person. If the staff has chosen supplies with care and ingenuity, the child will then be drawn into the imaginative exploration of his surroundings.

NON-DYSPHORIC DISTRACTER STIMULUS ND-9

Swallows are small birds with long, pointed wings, and are widely distributed in North America. They rely on flying insects for their food, although one or two species can survive on berries when cold weather prevents insects from flying. Their search for food is constant, and swallows are in the air for most of the day, resting occasionally on wires or trees. When the young are in the nest or learning to hunt, the parents seldom rest. By midsummer, the young birds have begun to form large flocks of their own. In the early spring and late summer, great numbers of swallows can be seen feeding together.

NON-DYSPHORIC DISTRACTER STIMULUS ND-10

If your house is showing its age, one of the best ways to rejuvenate it is to replace the outer walls with new siding. This will not only improve its appearance, but greatly reduce future maintenance work. And it will give you an opportunity to add more insulation to the walls, a benefit that will partly offset the cost of siding. A number of old and new siding materials are available. Wood siding is still preferred by many. Western red cedar is best, but other soft woods are also used. For a rustic, natural appearance, rough cedar siding is still very popular, particularly on the west coast.

NON-DYSPHORIC DISTRACTER STIMULUS ND-11

The infant has to learn at least three different things about objects. She has to learn that objects remain the same even when they appear to be different. She must learn that objects continue to exist even when she can't see or feel them any longer. Finally, the infant has to learn that individual objects retain their identity from one encounter to another. For example, the crib is the same object each time she is placed in it, and so on. These understandings about objects and people may seem so basic that you may not be able to imagine the child's not having them, but she does not.

NON-DYSPHORIC DISTRACTER STIMULUS ND-12

A magazine is an instrument of communication. With the aid of ink and paper it carries messages in the form of articles, stories, editorials, advertising, pictures, drawings, and paintings. Before manufacturing begins, articles and stories are chosen for publication, editorial text and advertising copy are prepared, photographs are taken and paintings produced. These are combined by the magazine's art department into a preliminary layout of the magazine. Photo-engraving and typesetting are the first steps in the manufacturing process. Photographs, drawings and paintings are sent to a photo-engraver, who produces their images on copper or zinc plates, known in the trade as "originals".

NON-DYSPHORIC DISTRACTER STIMULUS ND-13

Wine has been used for thousands of years as a beverage. Certain kinds of wine have come to be favored for certain uses. There are no hard-and-fast rules, but some combinations of wine and food have proved to be pleasing to the average palate. The generally accepted uses of wine are as follows: The aperitif is a slightly sweet, fortified wine meant to be drunk as an appetizer before dinner. Table wine is dry, and is meant to be drunk with the meal. Its dryness complements the flavour of the food. White table wine goes well with light, bland foods such as fish and fowl.

APPENDIX T

TARGET STIMULUS T-1

A natural food diet is a realistic way to achieve one's proper weight and to maintain it. It isn't very unpleasant, because natural foods taste good and tend to automatically help regulate the appetite after a while. It is slower than fad or crash diets, but healthier in the long run. Natural food diets consist of all natural, nutritional foods - those not processed, refined, nor full of additives. Most natural foods from the supermarket will keep one very healthy. A natural food diet will help one to discriminate from among the vast choices available at the supermarket while one is developing a taste for the natural foods that are nutritionally best.

TARGET STIMULUS T-2

Rainmaking is an ancient hope, a 19th entury fake, and a modern scientific fact. Every primitive tribe has tried one way or another to make it rain. Primitive magic, rain dances, and sacrifices have all been used to induce rain. By coincidence, rain has followed these efforts often enough to keep alive the belief in the efficiency of the methods. Quite a boom in rainmaking developed in the nineteenth century. Drums were beaten, cannons shot, and explosives were set off, producing great quantities of smoke, but not rain. Modern rainmaking techniques are based on known facts of coalescence and genuinely influence rainfall. Modern techniques depend upon the seeding of rain clouds, usually with silver iodide crystals.

TARGET STIMULUS T-3

The earth has five motions in space. It rotates on its axis once each twenty-four hours, with a slow wobble like that of a top, which takes twenty-six thousand years to complete. It revolves around the sun at 18. miles per second, making the circuit in three hundred and sixty-five and . days. It speeds with the rest of our solar system at 12 miles per second toward the star Vega. Finally, our entire galaxy, with its billions of stars, is rotating in space - our part of it at a speed of a hundred and seventy miles per second. Only two of these motions affect the weather, but their effect is profound. Earth's annual trip around the sun gives us our seasons and their typical weather. Earth's daily rotation results in night and day.

TARGET STIMULUS T-4

The wide variations in rainfall over different parts of the country produce important effects on the quality of the soil. We might expect soil fertility to increase with abundant rainfall. But actually it often deteriorates. Some of the most fertile soil in the United States, for example, is in the Arizona desert. With irrigation, a desert may become fabulously productive. But with too much irrigation, the soil is given more water than it can hold and its dissolved minerals are washed away. They are carried out of reach of the plant roots. The ability of soil to absorb water and to hold it depends on the help of plants and animals which bring to the soil qualities not possessed by the original particles.

TARGET STIMULUS T-5

Blankets made of wool or wool blends can be washed or dry-cleaned, according to personal preferance. If you send them to the laundry be sure you have selected a reliable one and that the blankets are tagged for special attention. If you are washing blankets at home, choose a fine warm day with a light breeze blowing. Wash one blanket at a time. First shake it out lightly to remove loose dust, then pay special attention to spots. Using a soft brush and lukewarm water, work a detergent into especially soiled portions. For washing the blanket use the same mild detergent and lukewarm water. Water that is too hot shrinks wool. After washing, dry in the shade on a line.

TARGET STIMULUS T-6

For good appearance and better wear, carpets and rugs should be kept free of the surface dust that dims their colors. Areas of heavy traffic and random spills ~~can be~~ cleaned up easily if you keep a small carpet sweeper handy. Once a week, rugs should be vacuum-cleaned and spots and stains should be attended to when they occur to avoid setting. Periodically, at least once a year, carpets and rugs should be shampooed by a professional or at home with one of the new appliances designed for the task. Small rugs can be shampooed by hand with special shampoos. But hand cleaning a large rug is a usually difficult business and the results are often not at all satisfactory.

TARGET-STIMULUS T-7

Ever since the days of the cave man, an open fire has been a comfort and pleasure to the human race. The fireplace in your room is the focus of attention and deserves special care so that it may be attractive in appearance. While it is an almost irresistable impulse, probably also dating to cave man days, to toss scraps of paper and other waste objects into it, do try to resist that urge. The ashes from last night's fire need not be removed. The next day's fire is much easier to light and burns better if the ashes stay there. Let the flames burn down before you retire and cover the embers with ashes as a fire precaution.

TARGET STIMULUS T-8

If England has produced a single artistic genius among her many painters of talent and originality, that painter is Joseph Turner. Only he, among English painters, had such exceptional natural capacity for creative and original ideas. Turner's originality was so great that it has been revealed only gradually over the last hundred years. His personal history as an artist is also the history of modern art. The impressionists were the first painters to discern that Turner had anticipated them. Since then, the abstract painters of the '50s and the new colorists of the '60s have claimed him not only as an ancestor, but even more enthusiastically as a colleague. But Turner's art had little influence on his contemporaries.

TARGET STIMULUS T-9

Birds are the most readily observable form of wildlife. They are present in almost every habitat, in forests and fields as well as in every town and city in North America. Some species are seen only briefly, as migrants in the spring and fall. Others arrive in the spring from their wintering areas to nest, and are seen through the summer. And then there are still others, such as some sparrows and owls, which migrate into our area from the north, and are seen only in winter. A few species are with us for all seasons of the year. Nature groups involved in bird watching exist in almost every town and city in North America. They are especially active during the migration period.

TARGET STIMULUS T-10

The robin is surely the most familiar bird in North America. There is not a part of the continent which they do not visit at some time of the year, with the exception of northern Alaska and the treeless eastern Arctic. They breed everywhere except in the extreme southern United States. In wild areas they prefer open patches near the edge of a forest, along streams and lake shores and in other natural openings. Civilization has provided ideal habitat with shade trees for nesting and lawns and berry trees for feeding. Pairs nest twice each season and lay about four blue eggs with each nest. The nest is usually placed in a branch of a tree, from five to fifteen feet above the ground.

TARGET STIMULUS T-11

A baby back carrier with a light metal frame is a wonderful way for a parent and baby to be together. The big advantage, and the best proof of its worth, is that babies and toddlers are so happy in them. You can tell two ways. In the first place, they smile and laugh all the time they are awake, and second, they fall asleep there very easily when they are sleepy. For some families the use of the back carrier simply brings order back into their lives. When the baby is too tired to play, but not ready for sleep, you can quickly put him in the carrier and go about your business. When you are finished, he will probably already be asleep.

TARGET STIMULUS T-12

Home siding made of vinyl was relatively expensive when it was introduced in Canada about ten years ago, and the early forms tended to get brittle in cold weather. But because vinyl takes less energy to produce than aluminum, the price comparison has changed in recent years and today the two materials are about equal in cost. Vinyl compounds have also improved to suit Canadian weather conditions, and brittleness seems no longer to be a problem. The resiliency of vinyl is one of its main advantages, in fact, since blows merely bounce off it. Another advantage is that the color extends throughout the thickness of the siding and can't scratch or wear off. But colors are limited to white and pastel shades.

TARGET STIMULUS T-13

Today, more and more emphasis is being placed on a child's experiences with learning in his early years. These experiences are crucial in aiding or hindering his later growth in learning. One of his first learning experiences is reading. Success in learning to read gives the child a feeling of competence in one of his first intellectual endeavours, and develops in him confidene in his ability to learn and to think. Children enjoy learning to read when the experience is a challenge to their minds, when they understand, not memorize, every step in the learning process. In this way the child's intellectual growth is significantly stimulated in the very process of learning to read. He also learns to enjoy reading.

TARGET STIMULUS T-14

Agatha Christie is the most durable, as well as the most celebrated English writer of the classic detective story; that is, the one involving a detective, a tightly-organized puzzle, and a surprise solution. Her pre-eminence in the field is the result not only of her steady productivity at a steady level of quality, but also of the craftsmanship which underlies the construction of her stories, and of the fertile imagination which has enabled her to create more ingenious plot devices than any other living novelist. Miss Christie's style tends to be undistinguished, but efficient, and her characters tend to be slightly old-fashioned stereotypes. However, she has shown an exceptional ability to weave tightly-knit, captivating stories.

TARGET STIMULUS T-15

The key to Canada's progress has been the use of mechanical power. A hundred years ago, when men and animals did most of the work, the return was small, whether the produce was food, tools, clothing, or building materials. Now men have more leisure than ever before, but their ability to produce has been increased many times by powered machines. The energy for the machines comes from water, coal, natural gas, and oil. Of these, oil is the greatest source of energy for power and heat in both Canada and the United States. Oil meets the requirements of modern industry better than any other energy source. Approximately ninety percent of oil is used for heat, light, and power.

TARGET STIMULUS T-16

Today, it is more for enjoyment than for any practical use that most people care for the flowers, shrubs, and trees growing wild about us. Our ancestors enjoyed them too, but were also carefully taught from early childhood of their numerous other values, not only as medicinal plants, but as spices, grains and herbs, to mention only a few. The employment of plant life by man dates far back in history to the most ancient of times, when, having found that certain plants could be eaten as food, it was discovered that the stem fibres of some other kinds could be woven into garments, while their juices could be turned into dyes for applying to the hair and body.

TARGET STIMULUS T-17

The spirit of the tea hour seems to be associated with England, for in no other corner of the world is this simple function still preserved with such dignity and care. Tea was originally introduced to the English people from China. Although first considered to be expressly for medicinal purposes, it soon grew to be better known as a refreshment. It is recorded that tea found instant favor with the ladies and gentlemen of the court, and it was not long before it was imported in larger quantities. As it became available in large quantities, the price was lessened until, eventually, it reached a price where it could be enjoyed by everyone. Many people then began drinking tea daily.

TARGET STIMULUS T-18

Forty or fifty years ago, most people believed that newborn babies couldn't hear, and many thought that the infant couldn't see much either, if at all. Today, although there are still many people who believe that newborn babies can't see and hear, research has shown conclusively that many visual and hearing abilities are present from birth. It is completely clear that the newborn baby can hear a whole range of sounds. If you ring a bell, shake a rattle, or squeak a rubber toy near the baby's ear, she will react in one of several ways. For example, she may move or her heartbeat may speed up. The fact that the child shows some reaction indicates that she heard the sound.

TARGET STIMULUS T-19

The climate in which one lives exerts an enormous influence over one's life. The differences between living in a climate with severe winters and hot summers, compared to a single-season climate such as that of southern California are profound. One is affected by the changing seasons economically, psychologically, and physically. The changing seasons requires one to buy clothing for both hot and cold weather, as well as inbetween, to insulate one's houses and, of course, to buy fuel for heat. It is clearly economically advantageous to live in a constant, temperate climate. However, the changing seasons is more interesting; one's daily life changes with the season, adding variety to life. Many people find constant, unchanging temperate weather dull.

TARGET STIMULUS T-20

More and more people are planting their own vegetable gardens. Some people have small plots around their houses where they can plant a garden. Others plant in large pots or even buckets on porches and window sills in their houses. Some vegetables are very easy to grow, and can supply you with fresh garden vegetables for many months. For example, lettuce, tomatoes, cucumbers and radishes grow easily with little care required. And there is nothing like a salad with fresh vegetables from your garden, garnished with herbs and spices. During the last few years, many people have discovered the pleasures and savings of having their own gardens. One problem is how to control insects. There are many organic ways to do this.

TARGET STIMULUS T-21

Bicycle camping, though not a very new idea, has recently begun to provide an alternative to automobile camping for a great many Canadians. Like hiking, ski touring, mountaineering, and canoeing, it has been practiced by a few enthusiasts all along; but suddenly a large segment of the population is beginning to discover bicycle touring and camping. Though the equipment needed requires a significant investment, it is trifling compared to the outlay of the average car camper, to say nothing of the huge camping vehicles brought by so many people in their efforts to get outdoors. By starting a bicycle trip early in the morning, one can combine the advantages of a camping trip without the disadvantages of automobile travel.

TARGET STIMULUS T-22

There is an increasing interest in and appreciation of Chinese food in this country. It would seem that nearly every week a new Chinese restaurant opens. The great difference between eating the Chinese way and the Western way is that the Chinese use chopsticks and we use knives and forks. This inevitably means that large peices of fish, meat and poultry are not possible at the Chinese table. Most dishes, therefore, are made up of mouth-sized pieces which are taken up by chopsticks and transferred to the mouth. A morsel of the fish, meat or poultry is taken up with chopsticks, dipped in sauce and eaten. The use of chopsticks determines the size of the portions to be consumed.

TARGET STIMULUS T-23

Everybody talks about the weather from time to time, but most people know very little about what makes our weather. The fact that we are all so dependent upon the weather makes weather our most common topic of conversation, a factor in much of our agricultural, industrial, and civic planning, and a constant concern of everyone. The quesion is, what can be done about the weather? Today, the science of weather - meteorology - is used to make our lives safer and better. Some types of forecasts are ninety-eight percent accurate. Clouds are seeded to cause rainfall where it is needed. A network of weather stations enables planes to fly safely. A continued program or research reveals more and more about the weather.

APPENDIX U

CONSENT FORM

Your responses to the questionnaires from Phase I of our study have been analyzed and found to be representative of one of the groups of women we are interested in studying further. The next phase of the study involves keeping daily records of a number of feelings and behaviors. We would like you to keep records throughout one complete menstrual cycle (i.e. approximately 28 days). These records take the form of short checklists and should require no longer than 2-3 minutes per evening to fill out.

We would also like to visit you on two occasions during your cycle to administer several tasks. These include the following: 1) listening to tapes and repeating what you hear; 2) checking off a list of adjectives describing how you feel. These two tasks will require about 20-30 minutes in total to complete.

All your responses will remain confidential. They will be identified only by a subject number. Once they have been scored, the daily records will be destroyed or returned to you if you wish. Similarly, the responses you give during the tasks will be disposed of after they have been scored.

You will be mailed a summary of our findings upon completion of the data analysis. You can expect to hear from us by late spring. The findings will refer to groups of women's responses - the individuals involved will remain anonymous.

If you decide to participate, you may withdraw from participation at any time. If you have any questions, please ask.

_____

SIGNATURE

_____

SIGNATURE OF INVESTIGATOR

APPENDIX V

KEY FOR SCORING SHADOWING PERFORMANCES

1. Word omitted: 1 error per word.
   E.g.: Script reads, "...with a slow wobble like that of a top."
   Subject says, "...with a slow wobble like a top."
   - 2 errors for omitting "that" and "of".

2. Word added: 1 error per word.
   E.g.: Script says, "...earth's daily rotation results in night and day."
   Subject says, "...earth's daily rotation results in our night and day." - one error for adding "our".

3. Substitute one word for another: one error.
   E.g.: Script says, "...It rotates on its axis once each 24 hours."
   Subject says, "It rotates on its axis once every 24 hours." - 1 error for substituting "every" for "each".

4. Substitute 2 incorrect words for one word: 2 errors.
   E.g.: Script says, "It rotates on its axis once each 24 hours."
   Subject says, "It rotates on its axis one time each 24 hours." - 2 errors.
   Note that this is really the same as scoring 1 error for substituting "one" for "once" and a second error for adding "time".

5. Jargon (These are sounds which are not intelligible as an attempt to say the correct word): 1 error per word not correctly spoken.

6. Incorrect order: 1 error for each word out of place.
   E.g.: Script says, "...is therefore..."
   Subject says, "...therefore is..."
   - 1 error, since only once of those words is out of place.

7. Repeats words: 1 error for each word repeated. It doesn't matter whether the word was correct or incorrect the first time.

8. Distortions which are intelligible as attempts to say the correct word, but the word is not correctly or fully enunciated; is somewhat garbled, or is spoken too fast to be fully enunciated in an attempt to catch up. This category differs from jargon in that the subject's response is recognizable as the correct word. - 1 error per word distorted.

9. Partial addition. Subject gets most of the word right, but adds something. 1 error.
   E.g.: Subject says "affects" instead of "affect", "increasing" instead of "increase", "blankets" instead of "blanket", etc.

10. Partial omission. Subject gets most of the word, but omits some part of it. 1 error.
   E.g.: Subject says "motion" instead of "motions", "rotate" instead of "rotating", "carry" instead of "carried", "easy instead of "easier", etc.

11. Partial substitution. Subject gets most of the word, but changes some part of it. 1 error.
   E.g.: Subject says "polisher" instead of "polishing", "carried" instead of "carrying", etc.

APPENDIX W

BASELINE DICHOTIC SHADOWING PERFORMANCE

Means and Standard Deviations of Baseline Trials

	PMD (n=11)		INTD (n=10)		CONTROL (n=17)	
Phase	M	(SD)	M	(SD)	M	(SD)
Pre	11.0	(8.6)	12.5	(12.1)	13.0	(8.4)
Post	9.2	(7.4)	12.6	(10.4)	10.0	(7.8)

Analysis of Variance for Baseline Trials

Source	SS	df	MS	F	p
Group (G)	67.05	2	33.53	0.26	ns
S (G)	4455.33	35	127.29		
Phase	37.13	1	37.13	1.05	ns
Phase X Group	22.95	2	11.47	.33	ns
Phase X S (G)	1233.33	35	35.24		

APPENDIX X

CONFIRMATION OF COUNTERBALANCING:
NUMBER OF SUBJECTS PER GROUP WHICH MET EACH CONDITION

	Ear of target presentation		Order of Testing		Series Received		Test Tape Received Pre			
GROUP	RIGHT	LEFT	PRE/ POST	POST/ PRE	X	Y	CXA	CXB	CYA	CYB
PMD (n=11)	7	4	6	5	5	6	3	2	2	4
INTD (n=10)	5	5	5	5	4	6	2	2	4	2
CONTROL (n=17)	10	7	10	7	10	7	4	6	4	3

APPENDIX Y

ACTUAL TIMING OF PREMENSTRUAL[1] AND POSTMENSTRUAL[2] PHASE TEST SESSIONS BY GROUP

	Premenstrual Test			Postmenstrual Test		
Group	Mean	Range	Mode	Mean	Range	Mode
PMD	2.32	.5-5	2	3.18	.5-7	4.5
INTD	2.70	1-5	2	4.70	1-7	5
CONTROL	3.15	1-7	2.5	4.90	1-11*	6

[1] days prior to the onset of menses

[2] days following cessation of bleeding

* the postmenstrual testing of several control subjects exceeded the one week criterion; this was not considered problematic as it occurred postmenstrually; also their daily ratings indicated that these subjects were consistently asymptomatic.

APPENDIX Z

REPLICATION OF EXPERIMENTAL PHASE (PART II) WITH A CLINICALLY DEPRESSED SAMPLE

Subjects

Subjects studied were women with a primary DSM-III diagnosis of affective illness (either bipolar or unipolar affective disorder, or cyclothymic or dysthymic disorder) who had exhibited exacerbations of their affective symptoms premenstrually. In most cases, patients themselves reported major depressive syndrome on the Premenstrual Assessment Form (PAF) questionnaire, but several subjects were studied who recognized or admitted to no changes premenstrually. Their psychiatrists, however, had repeatedly noted premenstrual phase exacerbations in their conditions which had required hospitalization. Patients were generally euthymic during the course of the study. Although their psychological ratings were somewhat more erratic than those of the normal sample, intermenstrual ratings on the depression item were rarely elevated beyond a moderate level (i.e. score of 4). The diagnostic status of the women studied, according to both psychiatric and premenstrual (PAF) criteria, as well as their medication status is indicated in Table A.

Method

The experimental procedure represented an exact replication of that outlined in Part II with the exception

that an observer-rated index of depression -- the Hamilton Rating Scale for Depression (HRS; Hamilton, 1960) -- was also administered to subjects pre- and postmenstrually.

Results

The subjects' daily diary ratings for the depressive mood item were subjected to confirmation analyses as outlined in PART II. Prospective ratings confirmed the presence of premenstrual depression in eight of the 15 patients studied. Of those patients who failed to confirm, five reported minimal depression during this cycle and two reported more erratic depression ratings with no cyclic relationship. Interestingly, the five patients who exhibited little depression were all maintained on medication at the time of the study.

The psychometric and dichotic shadowing data of the 8 patients confirmed to show premenstrual depression are presented in Tables B and C. The MAACL-D, MAACL-A and MAACL-H scales all showed significant increases premenstrually as compared to postmenstrually. The premenstrual levels can be considered very mild, however, particularly for a clinical population. The observer ratings for depression (HRS) also showed a significant premenstrual elevation; again the level of depression demonstrated was very low. Surprisingly, Beck depression scores failed to reveal significant premenstrual elevations due, apparently, to the high degree of variability within the premenstrual phase data. This could be due to denial

mechanisms. The format of the BDI is very straightforward in comparison to the MAACL, and some of the patients studied reacted quite negatively to items involving suicide and guilt feelings. The fact that several patients scored 1 or 2 on the BDI when observer ratings of depression were rather elevated suggested a defensive avoidance of upsetting stimuli.

Analysis of the dichotic shadowing data revealed only a significant distraction effect, $F(1,7) = 6.73$, $p < .05$, but neither a phase nor Phase X Distraction interaction. More errors were made shadowing targets in the presence of dysphoric distraction than in the presence of non-dysphoric distraction, and this differential performance occurred both premenstrually and postmenstrually.

These data suggest that women who have been diagnosed as clinically depressed and who report additional PMD, demonstrate a dysphoric attentional bias even when ostensibly euthymic (i.e. postmenstrually). These data represent preliminary findings and are proffered tentatively.

TABLE A. CLINICALLY DEPRESSED SAMPLE: DESCRIPTIVE AND DIAGNOSTIC DATA

Subject #	Age	Psychiatric Diagnosis	Medication	PAF Classification	Daily Diary Confirmation
1	32	bipolar	Lithium (Haldol-prn)	none	no, > D
2	36	bipolar	Lithium	minor depression	no
3	35	cyclothymic	Elavil	major depression	no
4	26	bipolar	Etrafon	minor depression	no
5	30	cyclothymic	none	major depression	yes
6	28	cyclothymic	none	major depression	yes
7	35	bipolar	Lithium	minor depression	no
8	35	unipolar	Imipramine	major depression	no
9	27	cyclothymic	none	major depression	yes
10	37	dysthymic	none	major depression	yes
11	35	unipolar	none	major depression	yes
12	35	cyclothymic	Imipramine	major depression	no, > D
13	43	unipolar	Imipramine/ (Diazepam-prn)	no depression, only phsyical	yes
14	39	dysthymic	none	major depression	yes
15	37	cyclothymic	none	major depression	yes

TABLE B. MULTIPLE AFFECT ADJECTIVE CHECKLIST RESULTS FOR CLINICALLY DEPRESSED SUBJECTS CONFIRMED TO SHOW PREMENSTRUAL DEPRESSION

MAACL-D

Phase	M	(SD)	df	MS	F	p
Pre	19.5	(5.2)				
Post	12.0	(4.6)				
Phase			1	225.0	10.43	.01
Error			7	21.6		

MAACL-A

Phase	M	(SD)	df	MS	F	p
Pre	14.75	(4.5)				
Post	8.25	(6.6)				
Phase			1	109.0	12.59	.01
Error			7	13.4		

MAACL-H

Phase	M	(SD)	df	MS	F	p
Pre	13.25	(3.2)				
Post	7.5	(2.7)				
Phase			1	132.3		
Error			7	11.3	11.76	.01

TABLE C. BECK DEPRESSION INVENTORY, HAMILTON DEPRESSION SCALE, AND DICHOTIC SHADOWING RESULTS FOR CLINICALLY DEPRESSED SUBJECTS CONFIRMED TO SHOW PREMENSTRUAL DEPRESSION

Beck Depression Inventory

Phase	M	(SD)	df	MS	F	p
Pre	15.38	(11.3)				
Post	8.13	(6.8)				
Phase			1	210.3	1.86	ns
Error			7	112.8		

Hamilton Rating Scale for Depression

Phase	M	(SD)	df	MS	F	p
Pre	7.75	(6.3)				
Post	3.25	(3.7)				
Phase			1	81.0	5.67	.05
Error			7	14.3		

Dichotic Shadowing Data

Phase/distraction	M	(SD)	df	MS	F	p
Pre-D	5.88	(3.8)				
Pre-ND	4.59	(2.7)				
Post-D	4.85	(2.8)				
Post-ND	3.39	(1.6)				
Phase			1	9.8	0.92	ns
Error			7	10.7		
Distraction			1	15.1	6.73	.05
Error			7	2.2		
Time X Distraction			1	0.1	0.02	ns
Error			7	2.9		