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AFFECT FLUCTUATION DURING THE MENSTRUAL CYCLE

IN DEPRESSED AND NONDEPRESSED WOMEN

by

Marlys Ann Conrad

A Thesis Submitted to the Faculty of the Graduate School

of Loyola University of Chicago in Partial Fulfillment

of the Requirements for the Degree of

Master of Arts

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VITA

Marlys Ann Conrad is the daughter of Dr. Maynard M. Conrad and Mrs. F. Gene Roberts Conrad of Kalamazoo, Michigan. She was born on May 3, 1950, in Kalamazoo, Michigan.

Her elementary and secondary education was obtained in the public schools of Portage, Michigan. During her senior year she was an exchange student through the American Field Service and lived in Graz, Austria.

In September, 1968, she entered Kalamazoo College and received a Bachelor of Arts degree with a major in mathematics in June, 1972. She was elected a member of Phi Beta Kappa in 1971.

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CHAPTER 1

INTRODUCTION

The purpose of this project was to determine if depressed women experience the menstrual cycle differently than nondepressed women. Previous research has indicated that women in general can experience a range of physical and emotional symptoms concurrent with phases of the menstrual cycle. Physical discomforts recorded include headache, backache, digestial problems, salt and water retention, acne, breast swelling, tiredness, and cramping. Mood fluctuations in the areas of irritability, depression, nervousness, restlessness, and anxiety have been noted. Anywhere from 15% to 95% of sampled populations have acknowledged symptoms. Of particular concern in this study is how depressed women experience the menstrual cycle. Research has suggested that premenstrual and menstrual depressed women experience these particular times more negatively than nondepressed women due to increased psychiatric emergencies, suicides and attempted suicides. This study attempts to ascertain, how in fact, the depressed woman experiences a regular menstrual cycle and if there exist significant differences between her experience and that of the nondepressed woman.

Specifically, the relationships among the menstrual cycle phases, depression, menstrual distress, anxiety, stress, and sex-role orientation are explored. The questions raised are: first, how do depressed versus nondepressed women experience the menstrual cycle phases with regard to depression and menstrual distress; second, how is anxiety related to the depressed and nondepressed woman's experience of her cycle; and third, how do stress and sex-role orientation influence these previously mentioned variables.

CHAPTER II

REVIEW OF THE LITERATURE

Physiological Changes During the Menstrual Cycle

The menstruating woman experiences monthly, hormonally deter-

mined, physiological changes in her body. The menstrual cycle which

occurs in most women between the ages of 12 and 48 is regulated by

changes in hormone levels which are controlled by the hypothalamus

and the pituitary gland. Although individual women vary in the

lengths of their cycles from month to month, the average menstrual

cycle is 28 days long (Freize, Parsons, Johnson, Ruble & Zellman,

1978).

As Frieze et al. (1978) have smmarized, the standard practice

in most recent research has been to define Day 1 of the menstrual

cycle as the first day of menstruation. This initiates the

menstrual phase of the cycle and lasts on the average five days.

During these few days, the endometrium, or lining of the uterus, is

shed in the usual menstrual flow. Also at this time, the key female

sex hormones, estrogen and progesterone, are at relatively low

levels. In response to the low estrogen level, the hypothalamus

signals the pituitary gland to release FSH (follicle stimulating

hormone), which stimulates the maturation process of an ovum

contained in one of the two ovaries, which in turn increases the production of estrogen by the ovary. During this two week period, the estrogen levels continue to rise, the developing ovum grows and matures, and the endometrium begins to build up in preparation to receive the ovum if fertilization occurs. On approximately Day 15, estrogen reaches its highest point in the cycle, and the ovary releases the mature ovum. In response to the high level of estrogen, the pituitary gland releases LH (luteinizing hormone) which stimulates the development of a glandular structure called the corpus luteum which in turn produces and continues to produce estrogen and progesterone if fertilization has taken place. If fertilization has not occurred, there is a peak in estrogen and pro-gesterone levels around Day 22 followed by a rapid decline. The de-cline in these hormones signals the end of the cycle and the uterus prepares to shed the lining developed during that cycle. Both estrogen and progesterone reach their lowest point about three to four days before menstruation and continue at low levels during this premenstrual phase of the cycle. This drop in the estrogen level triggers the shedding of the endometrial lining and, at the same time, signals the hypothalamus to stimulate the pituitary gland to begin again its product of FSH and the next cycle (Freize et al., 1978; Williams, 1977).

Physical and Emotional Changes During the Menstrual Cycle

Concurrent with changes in the sex organs and hormone levels, many women report physical discomfort, especially while premenstrual or menstrual. These physical symptoms can include headache, backache, digestive problems and gas, salt and water retention with accompanying weight gain, acne, breast swelling and tenderness, and cramping (Frieze et al., 1978; O'Connor-Miller, Note 1). In addition to these physical symptoms, there is indication that some women experience parallel mood fluctuations including variations in irritability, depression, nervousness, restlessness, and anxiety (Altman, Knowles & Bull, 1941; Coppen & Kessel, 1963; Dalton, 1971; Frank, 1931; Golub, 1976; Ivey & Bardwick, 1968; Janowsky, Berens & Davis, 1973; May, 1976; Paige, 1971; Patkai, Johannson & Post, 1974; Wilcoxon, Schraeder & Sherif, 1976). Ivey and Bardwick (1968) studied mood changes during the menstrual cycle in 26 college students (ages 19 to 22) to determine whether or not a distinct emotional cycle exists which parallels the pattern of hormonal change. The subjects were asked to talk for five minutes on "any memorable life experience" twice during a cycle (at ovulation and two to three days before menstruation) for two complete menstrual cycles. The verbal material was examined for thematic variations and was scored according to Gottschalk's (Gottschalk, Springer & Gleser, 1961) Verbal Anxiety Scale for death, mutilation,

separation, guilt, shame, and diffuse anxiety. Analysis of their data showed that women feel the greatest sense of self-esteem and competition near ovulation, when the hormone estrogen is at its highest; and that women become comparatively more depressed, hostile, anxious and aggressive just before menstruation, when estrogen and progesterone are at their lowest. Ivey and Bardwick (1968) stated that in spite of differences between individual subjects, their findings indicate significant and predictable affect fluctuations during the menstrual cycle in normal women which correlate with endocrine changes.

In one of the earliest articles published on this topic, Frank (1931) identified the existence of a large group of women who were handicapped by premenstrual disturbances. Not only did he indicate that normal women suffered varying degrees of discomfort prior to the onset of menstruation, but another group of women suffered from symptoms of such severity as to require one to two days of bed rest. He described this "premenstrual tension" syndrome as developing during the second half of the menstrual cycle and as being characterized by tension, irritability, swelling of the abdomen and limbs, itching, thirst, and various tendencies to migraine, asthma, and epilepsy.

In another early investigation, Altman, Knowles and Bull (1941) studied the menstrual cycles of 10 college women ranging in age from 22 to 36 years old. They were observed during a total of 55 men-

strual cycles covering a period of five months. Physiological data and psychological information concerning fatigue, moods, and levels of activity were collected. Their observations revealed a consistent outburst of physical and mental activity before the onset of menstruation, coupled with high tension and irritability preceded or accompanied by depression. Another time of high activity was discovered during the ovulatory phase of the cycle. In contrast to the high activity before menstruation, this activity was free of nervous tension and bore more resemblance to elation.

In a more recent study examining the relationship between mood changes and the menstrual cycle, May (1976) studied the responses of 30 young women to a battery of mood sensitive tests given during the menstrual phase, mid-cycle, and premenstrual phase for two complete menstrual cycles. The results indicated that 50% of the subjects showed increased depression just before menstruation, while another 40% had their most positive mood premenstrually and their most depressed mood during menses. The premenstrual tension group was characterized as being less traditional in the sense of having been raised in less religious households and being more willing to accept certain impulses (e.g., admitted to liking sex, disliking forced politeness).

Wilcoxon, Schrader and Sherif (1976) studied the relationship between the menstrual cycle and the experience of both stressful events and pleasant activities. Thirty-three undergraduates (11

males, 11 females taking oral contraceptives, and 11 females not taking oral contraceptives) filled out daily self-reports on pleasant activities, stressful events, moods, and somatic changes for 35 consecutive days. The males were assigned "pseudo" cycles, and the data were analyzed to compare the three samples across the three phases of the menstrual cycle. For this population of young, well-educated, and fairly healthy (both physically and psychologically) students, males reported somewhat more stable but less positive experiences than the females. While the males indicated fairly stable, low levels of pain and water retention, both female samples reported increased pain and water retention during the premenstrual and menstrual phases. There were no overall differences among the samples for the reports of negative affect, impaired concentration, and stressful events, but there were significant sample by cycle interactions. Females not taking contraceptives and females taking contraceptives peaked on measures of negative affect during the menstrual period and premenstrual phase respectively. The experience of stressful events and impaired concentration increased for both female samples during the premenstruum, decreasing during the menstrual phase only for the females taking contraceptives. The authors pointed out, however, that the experience of stressful events accounted for more of the variance than did cycle phase for negative mood, but not for pain and water retention.

Although a number of premenstrual symptoms have been identified, the most frequent problems reported include feelings of tension, irritability, depression, headaches, and swelling of the breasts and abdomen (Coppen & Kessel, 1963). These symptoms are said to be most severe in the days before menstruation, and to be relieved by the onset of menstruation. Reports vary with regard to the frequency of premenstrual symptoms in the general population. Bickers and Woods (1951) reported that 30% of the women in a factory applied for treatment of premenstrual symptoms. Pennington (1957) suggested that 95% of all American women suffered from premenstrual symptoms at one time or another. Paige (1973) indicated that anywhere from 15% to 95% of sampled populations have acknowledged premenstrual symptoms.

Another group of menstrual problems is characterized by painful menstruation or dysmenorrhea. Although some women suffer from both premenstrual symptoms and dysmenorrhea, this is not always the case. Coppen and Kessel (1963) studied the responses of 465 women ages 18 to 45 who were questioned about menstrual symptoms. Their results indicate that dysmenorrhea was experienced to a severe degree by 12% of their subjects, to a moderate or severe degree by 45%, and was maximal on the day the period started. Its prevalance was unaffected by marriage but declined significantly with parity. In addition, they found that dysmenorrhea was the most important of all menstrual symptoms in causing a reduction of everyday

activity. It was significantly correlated with menstrual irritability, depression, anxiety, nervousness, headaches, and sensations of swelling. There was no significant correlation between dysmenorrhea and neuroticism as measured on the Maudsley Personality Inventory (Eysenek. 1959). With regard to the psychological symptoms studied (irritability, depression, anxiety, nervousness), Coppen and Kessel (1963) reported that these symptoms were worse before menstruation and were significantly correlated with headaches, swelling and reduction in activity during menstruation. All of these symptoms were in turn significantly correlated with neuroticism. In addition, there was a statistically significant correlation between high neuroticism and menstrual irregularity. between high neutroticism and moderate or severe menstrual irritability, and between high neutroticism and moderate or severe general irritability. The authors conclude that it appears that a woman who complains of premenstrual irritability is more likely to be irritable at other times as well, and, therefore, it is as though premenstrual symptoms are an exacerbation of personality traits.

Hain, Linton, Eber and Chapman (1970) gave 71 first year nursing students ages 17 to 28 an MMPI and menstrual history questionnaire in order to explore the relationships among menstrual irregularity, premenstrual and menstrual symptoms, and personality. The results indicated that menstrual irregularity is

associated with several psychological and physical premenstrual symptoms. In particular, premenstrual depression, abdominal swelling, irritability, and total premenstrual symptoms correlated significantly with degree of irregularity. There was also a significant relationship between irregularity and abnormal flow. From the comparison of a selected extremely regular group (reported maximum difference of five days between longest and shortest cycle) and irregular group (minimum difference of 14 days) on the 13 standard scales of the MMPI, it was found that scales K, Hs, Pa, Sc and Ma discriminated significantly between the two groups. The authors state that the relationships on these standard clinical scales and a number of research scales suggest that, in general personality terms, the irregular group was more immature and impulsive with numerous neurotic symptoms including somatic ones. The group also tended to have more difficulty in interpersonal relationships. Levitt and Lubin (1967) found supporting data for the relationship between menstrual cycle problems and personality in their study of 221 student nurses, as did Paige (1973) in her questionnaire study of 352 unmarried university women. Golub (1976), however, did not find evidence to support the hypothesis that premenstrual mood changes are a function of personal adjustment.

In an attempt to explore the effects of premenstrual hormonal changes in normal women on mood, personality, and a range of intel-

lectual activities, Golub (1974, 1976) studied the self-report data of 50 married, parous, middle class, Caucasian women between the ages of 30 and 45. A battery of mood, personality, and cognitive tests were administered twice to each subject, once when she was premenstrual and once while intermenstrual. Although Golub (1974) determined that there was a significant incidence of increased negative affect, depression, and anxiety during the premenstruum, these changes were, on the average, small and less than those reported as reactions to unusual stress or found in psychiatrically ill populations. No statistically significant differences were found in the area of cognitive functioning.

The literature has identified a number of physical and emotional symptoms which appear to fluctuate during the course of the menstrual cycle. Premenstrual symptoms have included high anxiety and nervousness, irritability, depression, headaches, and swelling of the breasts and abdomen. In addition, increased pain, water retention, increased difficulty handling stressful events, and impaired concentration have been identified. Premenstrual symptoms have been acknowledged in 15% to 95% of sampled populations although for most women they are small and are less than those reported as reactions to unusual stress or found in psychiatrically ill populations. Another group of women appear to suffer from the premenstrual tension syndrome, a condition with more severe but similar symptoms affecting women during the second half of the

menstrual cycle. For some women premenstrual symptoms appear to be relieved by the onset of menstruation, for others symptoms continue or begin. Depression, anxiety, nervousness, irritability, headaches, and sensations of swelling have been associated with the menstrual phase along with dysmenorrhea, the most important of all menstral symptoms in causing a reduction in everyday activity. The suggestion has been made that menstrual cycle symptomology is exacerbated by already existing personality traits.

Cognitive Functioning and the Menstrual Cycle

A review of the pertinent literature on the effects of the menstrual cycle on cognitive functioning has, as a whole, indicated negative results. Lough (1937) tested college students during four phases of the menstrual cycle and found no statistically significant differences in performance on a digit symbol learning test. Wickham (1958) gave a battery of intelligence, spatial, mechanical, verbal, and math tests to 4000 young women and found no significant difference in performance during the four days before and after the onset of menstruation. However, Wickham's inclusion of the menstrual days could have diluted the effects of the premenstrual mood change, since it has been documented that after the onset of menstruation there is a relaxation of premenstrual tension and irritability and an improvement in mood (Benedek & Rubenstein, 1942; Janowsky, Berens & Davis, 1973). Sommer (1972, 1973) reported no association between menstrual cycle phase and the performance of college women on the

Watson-Glaser Critical Thinking Apraisal Test, regular class exam-
inations, or matched forms for the Repetitive Psychometrics
Measures. In Golub's (1974) investigation of the effects of premen-
strual anxiety and depression on cognitive function in 50 women, no
statistically significant differences were found in cognitive test
performance. In addition, correlation data failed to support any
consistent relationship between premenstrual mood and cognitive
function.

Only Dalton's studies report a premenstrual decrement in intel-
lectual performance, and these studies have been criticized by
Sommer (1973) on methodological grounds. Dalton (1960) studied
school performance and analyzed the effect of the premenstrual and
menstrual phases of the cycle on weekly grades of students at a
boarding school. She reported a fall in the standard of school work
during the premenstrual and menstrual phases in 27% of the
students. However, 17% improved and 56% showed no change in their
performance. The magnitude of the changes was not reported nor was
statistical validation of the data provided. Therefore, it is
considered that the effects of the menstrual cycle on cognitive and
perceptual-motor behavior are not associated with significant
performance changes.

Distressed Women and Menstrual Cycle Phases

The assumption that the menstrual cycle constitutes a source of
stress for all women cannot be made. Too much individual

variability exists. However, judging from Sommer's (1978) summary of the major findings related to the incidence of menstrual symptoms, a majority of women do report unpleasant or uncomfortable symptoms to some degree in association with the premenstrual and/or menstrual phases of their cycles. The most common complaints are of pelvic and back pain, water retention, and negative moods, particularly irritability, nervousness, depression and fatigue. Less than one-third of all women appear to alter their routines, i.e., work absence, bed rest, or seeing a doctor, and most reports of severe cases remain under one-fourth. However, one group of women for whom the menstrual cycle does appear to present major problems is that composed of individuals suffering from physical illnesses, behavioral disturbances, or psychiatric illnesses.

Dalton, in particular, was one of the early investigators into the adverse effects of the menstrual cycle in women's lives. She conducted a number of surveys investigating the effects of the eight-day paramenstruum (four days before menstruation plus the first four days of menstruation) on various facets of a woman's life. Her surveys (Dalton, 1966) indicate that during the paramenstruum, 45% of schoolgirls' punishments were inflicted, 45% of industrial employees reported sick, 46% of acute psychiatric admissions and 49% of acute medical and surgical admissions took place, 52% of emergency accident admissions were noted, 52% of patients with acute fever presented for diagnosis, and 49% of

prisoners committed their crimes. In Cooke's (1945) discussion of the "hypersensitization of the nervous system" which occurs during the premenstrual phase of the menstrual cycle, he states that a report of a Parisian prefect of police indicated that 84% of all the crimes of violence committed by women take place during the premenstrual and early menstrual phases of the cycle.

In an early article on the "Hazards of the Menstrual Cycle," MacKinnon and MacKinnon (1956) present the results of two-and-one-half years of postmortem examinations of 47 women of reproductive age who had died in accidents, by suicide, or because of disease. They were interested in comparing the number who had died during the follicular phase (preovulatory) with those who had died during the luteal phase (postovulatory) of the menstrual cycle. Of the 47 deaths, only two had taken place in the follicular phase. The authors conclude that there is clear evidence that suicides, fatal accidents, and deaths from disease are more common in the luteal than in the follicular phase of the cycle. They suggest that "highly strung women" and those suffering from chronic disease be warned of these hazards and advised to "rest and take more care." In addition, they advise that planned operations, especially major ones, be carried out in the follicular phase of the menstrual cycle.

Gregory (1957) studied a number of groups of psychiatric patients between 1948 and 1953. In a group of 219 patients, he found that the mean cycle length was significantly increased in

psychiatric patients, except for the group of psychoneurotics who did not differ markedly from normals. In addition, he determined that amenorrhea (cessation of menstruation) occurred with great frequency in psychotics, especially schizophrenics. The incidence in psychoneurotics and patients with affective disorders was not significantly greater than in normals. Of the 22 psychotics who were studied over a two year period, a significantly higher proportion of behavior disturbances were found to occur during the last 10 days of the cycle with a correspondingly lower proportion occurring during the first 10 days of the cycle. Gregory suggests that this is probably due to the occurrence of premenstrual tension symptoms.

Symptoms of menstrual disturbance were studied in a group of 52 neurotics and 46 psychotics (Gregory, 1957). Gregory's results indicate that (1) a high incidence of previous gynecological procedures was found in the neurotic group; (2) premenstrual tension was shown to occur in a high proportion of both neurotics (88%) and psychotics (65%), with the incidence significantly greater in neurotics; (3) dysmenorrhea was shown to occur in a high proportion of both neurotics and psychotics, with a mild type more common in psychotics and a severe varity more often found in neurotics.

Jacobs and Charles (1970) investigated the relationship between the phases of the menstrual cycle and the development of psychiatric

symptoms requiring professional intervention in an outpatient population. A total of 200 randomly selected patients were screened in the emergency room and walk-in clinic of a large metropolitan medical center over a six-month period, 100 being seen from each unit. The menstrual cycle was viewed as seven four-day periods in which days one to four corresponded to menstruation, days 13 to 16 to ovulation, and days 25 to 28 to the premenstruum. The results indicate that outpatients sought psychiatric help most frequently during menstruation (24.5%) followed by the premenstrual phase (22.5%) and the midcycle period (18%). A statistically significant relationship was found between phases of the cycle and the patients' requests for help. No significant differences were evident as to when in the menstrual cycle help was sought according to diagnostic entities. In both schizophrenic and depressed patients, the two largest diagnostic categories, a similar pattern emerged. No significant differences were found among married, single, separated, divorced, or widowed patients with regard to the time of the menstrual cycle in which psychiatric assistance was sought. A tendency was observed for the "more ill" emergency room patients to present more frequently menstrually than premenstrually, while the "less ill" walk-in clinic patients presented more frequently premenstrually than menstrually.

In a similar study, Glass, Heinger, Lansky and Talan (1971) assessed whether phases of the menstrual cycle related to specific

types of psychiatric emergencies. Throughout a one-year period menstrual cycle data was collected from a sample of female patients appearing in a psychiatric emergency room. Of the 166 female psychiatric emergencies evaluated, 84 women were experiencing active natural menstrual cycles and were included in the data analysis. In contrast to Jacobs and Charles' (1970) results, their data did suggest the existence of a certain type of psychiatric emergency related to the menstrual cycle. In particular, nonpsychotic women who had a more severe history of medical and gynecologic illness and more past marital and sexual problems were likely to manifest hostility, suicidal ideation, and actual suicide attempts during the week preceding menstruation. In addition, there existed a tendency for the more disturbed patients to present themselves more frequently in the menstrual phase. These patients were characterized by more past psychiatric hospitalizations, a trend toward more past psychiatric contacts, and relatively more psychotics than the group of patients who presented in the premenstrual phase.

Evidence does exist which suggests that fluctuations from one menstrual cycle phase to another can present major problems for women suffering from physical illnesses, behavior disturbances, or psychiatric disorders. Surveys suggest the largest proportion of working women reporting sick as well as psychiatric admissions, acute medical and surgical admissions, and emergency accident

admissions are noted during the eight-day paramenstruum. Suicides, fatal accidents, and deaths from diseases have been found to be more common in the luteal than in the follicular phase. Premenstrual tension and dysmenorrhea have a greater frequency among both neurotics and psychotics than in the normal population.

Suicide and Menstrual Cycle Phases

The incidence of suicides or suicide attempts in conjunction with phases of the menstrual cycle is of particular concern. Gregory (1957) reported that Heller (1900) had found that 36% of 70 suicides he had studied occurred at the time of the menses. In addition, Ollendorf (1905) had found an incidence of 22% in 79 cases, and Slavik (1910) had found 30% in 474 cases. Dalton (1959) studied the admissions records of British hospitals. Of the 276 female psychiatric patients admitted on an acute basis, 46% of the admissions occurred during the paramenstruum. This percentage included 53% of the attempted suicides and 47% of the patients with depression. Ribeiro (1962) reported that 23 of the 26 women who committed suicide that he studied had been menstruating at the time of their deaths.

Two particular studies (Mandell & Mandell, 1967; Wetzel, Reich & McClure, 1971) utilized data collected from women calling a suicide prevention center. Mandell and Mandell (1967) were interested in determining during which phases of the menstrual cycle the maximum psychological disturbance was experienced. Their

findings for the relationship between the incidence of suicide calls and phases of the menstrual cycle are similar to those reported by Dalton (1959) for acute psychiatric hospital admissions. Fifty-two percent of the 87 documented calls took place either while the women were menstrual or premenstrual. The highest number of calls occurred during the first four days of menstruation (30%), the second highest took place premenstrually (22%), and the third highest during the midcycle (17%). Their analysis allowed for the rejection of the hypothesis of a uniform distribution over the seven phases into which the cycle had been divided.

In an attempt to access the relationship between phases of the menstrual cycle at the time of a call to a suicide prevention center and self-judged lethality, Wetzel, Reich and McClure (1971) studied the responses of 56 women who called a suicide prevention center. These 56 women represented 30% of the 181 women who called the center. Women were excluded from the study either due to lack of an interview (some were referred for help immediately) or inability to assign the women to some phase of the menstrual cycle (e.g., lack of information, pregnancy, menopausal, hysterectomy). Their results indicated that the number of women calling during the menstrual phase was almost twice the expected frequency. In addition, 57% of the callers in the luteal or menstrual phase of their cycle reported they had considered suicide seriously on the day of the call, while only 23% of the callers in the folicular phase felt they had serious

suicidal thoughts on the day of the call. Seventy-seven per cent of those with previous attempts calling in the luteal or menstrual phase said they had serious suicidal thoughts on the day of the call. The authors point out that the results may be biased due to the small percentage of callers who were interviewed often because of the seriousness of the caller's situation. They mentioned that this may explain why they did not find the increased frequency of calls in the late luteal phase of the cycle as Mandell and Mandell (1967) found.

Wetzel, Reich, McClure and Wald (1975) tested the hypothesis that there is a relationship between the reporting of premenstrual affective symptoms and the later development of a clinically significant affective disorder. They studied a group of normal, primarily white, middle class, college women. They reasoned that women reporting premenstrual affective symptoms prior to the start of their college careers would seek psychiatric treatment more frequently during their college career than other women and would be more likely when treated to be diagnosed as affective disorder (depression, hypomania or mania). The results of their study of 589 women confirmed the relationship between the presence of premenstrual affective symptoms of sufficient severity to interfere with a woman's life or to be recognizable to others and the later seeking of psychiatric care for an affective disorder. In particular, women originally reporting a premenstrual affective

syndrome were significantly more likely to attend a psychiatric clinic (20% vs. 14%) and more likely to present with an affective disorder. During the four-year follow-up period, 18% of the premenstrual affective syndrome group presented with an affective disorder, compared with 10% of the remainder. Combining this data with that of Kashiwagi, McClure and Wetzel (1976) in which a significant association was found between clinical depression and the report of a history of premenstrual affective symptoms in a population composed primarily of black, lower socio-economic, middle aged women, the authors (Wetzel et al., 1975) conclude that the relationship between premenstrual affective syndrome and clinical affective disorders appears to hold across variations in race, education, socio-economic class and age.

Along a similar line, Diamond, Rubenstein, Dunner and Fiere (1976) undertook a study to determine the extent of premenstrual and menstrual somatic and affective disturbances in a group of women with primary affective illness. They studied 63 women with primary affective illness (ages 19 to 67) who were attending a psychiatric clinic and a control group of 25 women (ages 20 to 77) who were either social workers or wives of male patients. All data collected regarding the menstrual cycle relied on retrospective report on a current basis for women still menstruating or historically for those no longer menstruating. In contrast to the results of Wetzel el al. (1975) and Kashiwagi el al. (1976), their results indicated that the

affectively ill women and control women had similar menses with regard to regularity, length of menstrual cycle, and duration of menstrual flow. In addition, the patients' reports of somatic symptoms associated with the premenstrual and menstrual phases of the cycle were found to be comparable to those of controls in type, severity, frequency of occurrence, and mean number of symptoms reported. However, the percentage of patients reporting premenstrual and menstrual affective symptoms was consistently (although not significantly) higher than that of the controls. Of the 23 (46%) who could recall the phase of their menstrual cycle for their most recent hospitalization, 70% were hospitalized during the menstrual or premenstrual phases. The authors suggest that it appears as though affectively ill women not suffering from an affective episode experience menstruation in much the same way, physically and affectively, that controls do. However, patients in the middle of an affective episode may experience premenstrual and menstrual changes as an exacerbation of already present symptoms that then lead to hospitalization (Diamond et al., 1976). This may be a reasonable assumption given the data. However, May (1976) found that there is no correspondence between one-time retrospective reports of menstrual mood variations and the actual reports of mood at different points in the menstrual cycle. Therefore, the results of the study remain in question.

Despite the methodological problems which exist in this area of research, it does seem probable that there are some women who have a greater risk of a suicide threat, attempt, or even a successful act in particular phases of the menstrual cycle (Moos & Leiderman, 1978).

Anxiety and Life Stress During the Menstrual Cycle

In the Jacobs and Charles (1970) investigation into the relationship between the phases of the menstrual cycle and the development of psychiatric symptoms, they suggest that the menstrual cycle can play a significant role, especially during the premenstrual, menstrual, and ovulatory phases of the cycle in precipitating or augmenting psychiatric symptomatology, particularly that of anxiety. In one of the earliest investigations into the correlations between the physiological phases of the mentrual cycle and psychodynamic processes, Benedek and Rubenstein (1939, Parts I and II) studied daily vaginal smears, temperature charts, and associative material from 15 neurotic patients. They concluded that there existed clear correlations between the physiological and psychological processes. They noted that during the follicular phase during which estrogen is the predominating hormone, the psychological material presented dealt with heterosexual tendencies accompanied by feelings of well-being and alertness. When no opportunity for gratification of these libidinal urges existed, as was the case with most of these neurotic subjects, the mood of the

women was irritable and restless. Ovulation was followed by a release of tension after which the analytic material was described as both receptive and passive in nature. During the premenstrual phase, the emotions were characterized by fears of pain and mutilation and feelings of regret and inadequacy. Some emotional relaxation was evident at menses.

In another of Dalton's (1966) surveys, the mothers of 91 children who brought their children to a medical clinic during a seven-month period in 1965 with complaints of minor coughs and colds were questioned about their current menstrual cycle phase. Fifty-four per cent of the women had brought their children during the eight-day paramenstruum. Dalton (1966) suggests that these mothers were unable to assess the severity of their children's symptoms and feared they might be in the early stages of a serious illness due to the added anxiety experienced during the paramenstruum. In support of Dalton's findings, Fekete-Mackintosh (1979) determined that for both ovulatory and anovulatory women, anxiety was highest during the menstrual, midluteal, and premenstrual phases of the cycle. Stocker (1973) found a trend for anxiety, both psychological and physiological, to be lowest during the intermenstrual period and highest during menstruation. O'Connor-Miller (Note 1) determined that low anxious women displayed stable state-anxiety throughout the cycle. However, high trait-anxious women tended to peak on measures of state-anxiety at ovulation and have a low point during the luteal

phase. Marini (1978) found that chronic elevations in stress arousal and stress prone personality traits were exhibited by high menstrual distress complainers.

In Paige's (1973) questionnaire survey of 352 unmarried university women, it was found that those women who scored high on the Menstrual Distress Questionnaire, MDQ, (Moos, 1969), i.e., who reported more menstrual symptoms, were significantly more likely to report high psychological stress, greater use of drugs, more aches and pains, and illness. These women were generally anxious and nervous, responded to stress with physical symptoms, and tended to act on signs of illness by taking drugs. They tended to treat menstruation like an illness and, therefore, reduced activities.

Approaching the stress issue from a different point of view, Siegel, Johnson and Sarason (1979) examined the relationship between life stress and the reporting of problems associated with menstruating. They reasoned that since numerous studies had shown that the accumulation of life changes, or life stress, is significantly related to physiological and psychological disorders (Dohrenwend & Dohrenwend, 1974), it would be important to assess the relationship between various types of life events and menstrual problems. Data was collected from 244 women on a one time basis to determine the extent of desirable and undesirable life events which had occurred within the previous year and to assess the extent of menstrual cycle difficulties. The results supported the existence of a significant

relationship between life stress and symptoms of menstrual dis-
comfort among women not using oral contraceptives. However, the use
of oral contraceptives was shown to attenuate the correlation
between life stress and the number of menstrual symptoms endorsed.
Although the authors conclude that negative life stress is a sig-
nificant predictor of menstrual distress, this factor accounted for
a small proportion of the total variance in the study (Siegel et
al., 1979).

As a whole, there does appear to be a relationship between gen-
eral anxiety and the experience of menstrual distress. Although
general life stress factors appear to increase menstrual symptoms,
their overall significance is still in question.

Sex-Role Orientation and the Menstrual Cycle

Another variable considered a possible influence on a woman's
particular experience of menstrual distress is that of sex-role ori-
entation. Menninger (1939) hypothesized that menstrual distress is
the somatization of the woman's rejection of her femininity, and
Paulson (1956) found premenstrual tension to be associated with con-
flicts surrounding psychosexual and psychosocial roles.

Berry and McGuire (1972) investigated the possible relationship
between symptoms of menstrual distress and a woman's acceptance of
her own sexual role. They studied 100 female patients at a state
hospital who were of childbearing age, in contact with reality, and
able to participate in the study. Each subject completed a Moos MDQ
(Moos, 1969) premenstrually and menstrually and a measure of role

acceptance. Their results indicated that those subjects with a lesser acceptance of the female role reported a significantly higher number of symptoms of menstrual distress, largely in the areas of pain, concentration, autonomic reactions, and control. In addition, these symptoms occurred in either the premenstrual or menstrual phase of the cycle. Scores of dysmenorrhea correlated significantly with role acceptance, but cramps reported premenstrually did not. They concluded, therefore, that dysmenorrhea and menstrual distress symptoms are significantly and negatively related to role acceptance, while premenstrual tension is not significantly related. In contrast to these results, other researchers have found positive correlations between femininity and the experience of menstrual distress symptoms. Paige (1973) explored the roll of femininity and found that the traditionally feminine woman was the one who tended to get cramps and complain of other menstrual symptoms.

Gough (1975) studied personality factors related to the reported severity of menstrual distress. A sample of 201 women completed the MDQ and the California Psychological Inventory, CPI, (Gough, 1966) rating on a recall basis their most recent menstrual, premenstrual, and intermenstrual periods. The results revealed low but significant positive correlations between femininity as measured on the CPI and menstrual distress at all three cycle phases. In addition, the highest distress was reported by subjects

characterized as shy, given to self-doubt, eager to seek help from others, and tending to behave in self-defeating ways. The least distress was reported by the women characterized as appreciative, cautious, conventional, stable, and unemotional.

In another study, Chernovetz, Jones and Hansson (1979) investigated the effect of sex-role identification on the severity of reported menstrual symptoms. Eighty-four female college students completed a questionnaire on the basis of their menstrual experiences during the preceding six months (with no specific reference to cycle phase). The questionnaire consisted of the Bem Sex Role Inventory (Bem, 1974), the MDQ, and an indication of willingness to more publically discuss menstrual experience. Using a mean masculine score and mean feminine score, Chernovetz et al. (1979) were able to identify those subjects identified primarily with masculine, feminine, or a balance of masculine and feminine traits (i.e., androgyny). On the basis of the MDQ, each subject received a total score and a score in each of eight sub-categories related to menstrual distress. The results indicated that sex-role scores were related to the amount of menstrual distress reported and to the subject's willingness to discuss menstruation. In particular, femininity scores were positively related to the amount of stress reported on the MDQ and specifically to high scores on the negative affect subscale of the MDQ. Masculinity scores were not related to MDQ scores, but rather to the subject's willingness to discuss menstruation.

Slade and Jenner (1980) found in their study of 108 teacher training students that femininity as measured on the CPI (Gough, 1966) was signficantly related to impaired concentration during menstruation and negative affect during menstruation.

Early researchers appear to link lack of acceptance of an appropriate sex-role orientation to increased menstrual distress while some later investigators suggest the opposite. Not only has the psychosocial climate changed, i.e., it is more acceptable for women to have both masculine and feminine traits, but testing instruments are different and may not be comparable. In addition, the use of one-time retrospective reports of menstrual mood variations have been used in a number of these studies (Chernovetz et al., 1979; Gough, 1975; Paige, 1973; Salde & Jenner, 1980), leaving the results in question (May, 1976).

Summary and Hypotheses

The assumption of some relationship between menstruation and monthly mood swing appears quite reasonable. How different women handle these mood swings is less clear. It does appear that women suffering from physical illnesses, behavior disturbances, and psychiatric disorders are at some greater risk during particular menstrual cycle phases. Of particular interest to this investigator is how depressed women experience and cope with the effects of this cycle in their lives. This group is considered of special concern. Not only are there from two to six women for every man

clinically diagnosed as depressed (Arieti, 1979; Scarf, 1979; Weissman & Klerman, 1977), but the occurrence of depression among women appears to be on the rise (Weissman & Klerman, 1977). In addition, research on suicide attempts among females has shown a similar trend upward, primarily among younger ·women (Weissman, Paykel & French, 1973). This data combined with the research suggesting that increase depressive symptomatology, suicides, and suicide attempts are more prevalent during particular menstrual cycle phases (Altman el al., 1941; Coppen & Kesel, 1963; Dalton, 1959; Diamond et al., 1976; Glass et al., 1971; Golub, 1974; Gregory, 1957; Jacobs et al., 1970; Kashiwagi et al., 1976; MacKinnon et al., 1956; Manell et al., 1967; May, 1976; Ribeiro, 1962; Wetzel et al., 1971; Wetzel et al., 1975) constitutes the rationale for studying this group. This study has probed into the degree of mood variation during the menstrual cycle in depressed women as compared with nondepressed women. In particular, depressive symptomatology, menstrual distress, anxiety, general life stress, and sex-role orientation were investigated.

The following hypotheses were tested:

1. Depressed women evidence a greater increase in depressive symptomatology during the premenstrual phase of the menstrual cycle when compared with the intermenstrual phase than occurs for non-depressed women.

2. Depressed women evidence a greater increase in menstrual distress during the premenstrual phase of the menstrual cycle when compared with the intermenstrual phase than occurs for nondepressed women.

3. Depressed women evidence a greater increase in depressive symptomatology during the menstrual phase of the menstrual cycle when compared with the intermenstrual phase than occurs for nondepressed women.

4. Depressed women evidence a greater increase in menstrual distress during the menstrual phase of the menstrual cycle when compared with the intermenstrual phases than occurs for nondepressed women.

5. Depressed women evidence a higher level of anxiety throughout the cycle than do nondepressed women.

The added variables of stress and femininity were explored in terms of their relationship to menstrual distress. No specific hypotheses were tested with regard to these variables.
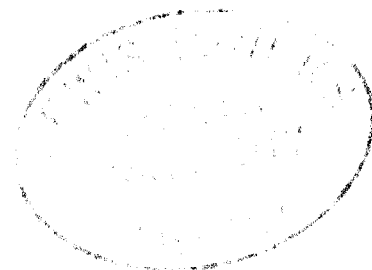
CHAPTER III

METHOD

Subjects

The 78 female subjects were selected from introductory psychol-
ogy courses during the spring (26 subjects) and fall (52 subjects)
semesters of 1980 on the basis of their scores on the Beck
Depression Inventory, BDI, (Beck, 1967). In addition, these
subjects were limited to physically healthy women who reported
regular menstrual cycles and no significant gynecological
problems. Of these 78 subjects, 33 women were classified as
depressed, BDI > 11, and 45 were classified as nondepressed, BDI < 4
(Bumberry, Oliver & McGlure, 1978). Fifty-four subjects (69%)
returned complete data capable of being entered into the data
analysis. The remaining 24 subjects (31%) were excluded due to lack
of data at particular cycle phases (11 subjects) or failure to
return the testing materials (13 subjects). Of the 54 subjects in
the final data analysis, 24 were in the depressed group, and 30
subjects were classified as nondepressed. Fourteen of these
subjects were from the spring semester (5 depressed, 9 nondepressed)
and 40 were from the fall term (19 depressed, 21 nondepressed).

The mean age of the subjects was 18.6 years ($\underline{SD} = \pm 1$) and the
range was from 17 to 22. All the women were single with 81%
Caucasian and 19% from other minority groups. Eighty-one percent

stated they were Roman Catholic, 13% were Protestant, and the remaining 6% were of other religious affiliations.

Materials

The standardized tests used in the study were the Beck Depression Inventory (Beck, 1967), the Life Events Inventory (Cochrane & Robertson, 1973), the Bem Sex-Role Inventory (Bem, 1974), the Depression Adjective Checklist, Form B (Lubin, 1967), the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970), the Cognitive-Somatic Scale of Anxiety (Holmes, 1980), and the Menstrual Distress Questionnaire, Form T (Moos, 1977). A questionnaire related to social and menstrual history was also administered (Appendix A).

Beck Depression Inventory (BDI). The original classification of subjects into depressed and nondepressed groups was done on the basis of scores on the BDI (Beck, 1967). The BDI is a widely used self-report measure of depression consisting of 21 categories of symptoms and attitudes clinically related to depression. The scale was clinically derived and designed for use in psychiatric populations for assessing the current depth of depression. It is intended to be a state measure of depression although it tends to confound state and trait aspects of depression. The inventory provides a numerical score which represents a combination of the number of symptoms the subjects has and the severity of those particular symptoms.

Validity and reliability are reported for the BDI. Based on a psychiatric sample of 409 patients, a corrected split-half reliability coefficient of 0.93 is reported (Beck, Ward, Mendelson, Mock & Erbauch, 1961). Miller and Seligman (1973) reported a test-retest reliability coefficient of 0.74. Concurrent validity of the inventory was shown by studies which employed clinical ratings of the depth of depression and/or other psychometic measures including the Depression Adjective Checklists (Lubin, 1965) and the MMPI-D scale. Beck (1967) presented his evidence for the construct validity of the measure citing a number of his own studies as well as those of other researchers. Beck and Beck (1972) reported that the BDI had been used as a criterion measure in over 100 studies with much of this literature supporting the validity of the inventory.

The BDI is a useful, reliable and fairly well validated state measure of depression. It is helpful in assessing severity and reflecting change over time. It has been shown to be useful in treatment studies and detecting depression in normal populations. In particular, Bumberry, Oliver and McClure (1979) validated the use of the BDI in university populations, determining that the cut off score of 12 (mean of 14) accurately classified mildly depressed college students. The BDI has also been found to be relatively free of anxiety confounds (Beck, 1967; Becker, 1974) yet does confound state and trait depression. The BDI tends to emphasize cognitive

aspects of depression with a de-emphasis on the somatic symptoms (Mayer, 1977). The inventory correlates well with other depression scales such as the MMPI-D scale, the Depression Adjective Checklists, and Hamilton's Rating Scale (1972).

Life Events Inventory (LEI). The LEI (Cochrane & Robertson, 1973) is a measure of current and recent stressful events, including positive, negative, frequent, and rare occurrences. Weights for the items on the LEI were derived from psychiatrists and psychologists ($\underline{n}$=60), psychiatric patients ($\underline{n}$=42), and students ($\underline{n}$=75), with close agreement found between the relative weights assigned by the three groups. The stressfulness of a particular person's life is measured by determining what events he or she has encountered within the past six to eight months and scoring the occurrences according to their concensually quantified weights. This approach to stress as measurable environmental events allows uncomplicated analysis of the relationship between stressful life events and other variables of interest. In particular, a similar scale, the Social Readjustment Rating Scale (Holmes & Rahe, 1967), has been used successfully to show a relationship between stressful life events and subsequent health change (Rahe, 1969; Rahe, Mahan & Arthur, 1970).

Bem Sex-Role Inventory (BSRI). The BSRI (Bem, 1974) is a self-report scale designed to measure the extent of an individuals' identification with desirable masculine and feminine traits. It

consists of 60 personality characteristics, 20 feminine, 20 masculine, and 20 neutral characteristics, which the subject is to indicate on a seven-point scale, from "never true" to "always true," the extent to which each characteristic is "true of you." The internal consistency of the BSRI is masculine alpha=0.86 and feminine alpha=0.80. Test-retest reliabilities have been reported as r=0.90 for masculinity and r=0.93 for femininity. Normative data for college aged females and males are also available (Bem, 1974).

When Bem originally developed the BSRI, the classification of an individual was determined by calculating the t ratio of scores in response to masculine items versus responses to feminine items. In this manner, both males and females were classified as sex typed (feminine females and masculine males), androgynous (equal endorsement of masculine and feminine qualities), or opposite sex typed (masculine females and feminine males). In 1977, however, Bem agreed with Spence, Helmreich and Stapp (1975) that the androgynous category should be used to designate individuals who score high in both masculine and feminine items. The new scoring method is based on a median split, with subjects now classified as androgynous (masculine and feminine scores above the medians), sex typed or opposite sex typed (one score above, the other below the median), and undifferentiated (both scores below the median). The median masculine and feminine scores for the male and female normative sample were 4.89 and 4.76, respectively. For the female population

in this study, the median masculine and feminine scores were 4.75

and 5.25, respectively, and were used as such. In addition, the

high feminine group in this study refers to that group composed of

women scoring high in femininity and not high in masculinity. The

androfeminine group is composed of women scoring above the median on

the femininity scale, i.e., the combined feminine and androgynous

groups.

Depression Adjective Checklist (DACL). The DACL (Lubin, 1967)

is a brief, reliable and valid measure of self-reported transient

depressive mood. The lists consist of 32 adjectives connoting

varying degrees of depression and elation. Forms A-D were normed

with females and have no overlapping items. Only Form B was used in

this study. Much of the original literature regarding the DACL

addresses validity and reliability issues (Lubin, 1967; Lubin, Dupre

& Lubin, 1967). The checklists show fairly high concurrent validity

with the BDI and the MMPI-D scale. The individual lists

intercorrelate highly and discriminate between normals, nondepressed

psychiatric patients, and diagnosed depressives. The DACL is

primarily a measure of affective aspects of depression. It does not

separate out anxiety which often accompanies a depressed mood, and,

therefore, anxiety and depression are confounded (Giambra, 1977).

State-Trait Anxiety Inventory (STAI). The STAI (Spielberger,

Gorsuch & Lushene, 1970) is based on the state-trait conceptualiza-

tion of anxiety as originally outlined by Cattell and Scheier

(1958). Anxiety is viewed as consisting of two distinct components: state anxiety (A-state) and trait anxiety (A-trait). A-state fluctuates over time and refers to an individual's emotional response to perceived dangerous stimuli. A-trait is relatively stable and refers to an individual's tendency to perceive threatening elements across a broad spectrum of stimulus conditions. The STAI was constructed to provide a brief and reliable self-report measure of the two anxiety constructs. The A-state scale consists of 20 statements about emotional states with instructions to subjects to indicate how they feel at that particular moment, evaluating their feelings on a scale of one to four from "not at all" to "very much so." The A-trait scale consists of 20 items with instructions to indicate general feelings on a similar four-point scale. Half the A-state and seven of the 20 A-trait items are stated in reverse so as to minimize an acquiescence set. A-state test-retest reliability coefficients for males and females vary between 0.54 and 0.27, while A-trait varies between 0.86 and 0.73 for retest periods of 20 days and 104 days, respectively (Hedberg, 1972). Internal consistency, as measured by formula K-R 20, yields coefficients between 0.83 and 0.92 for A-state and 0.86 and 0.92 for A-trait (Hedberb, 1972). Studies of concurrent validity for trait scores estimated by correlating the scores with the IPAT Anxiety Scale, Manifest Anxiety Scale, and the Affect Adjective Check List were 0.75, 0.80, and 0.52, respectively, for 126 college women (Dreger, 1978). The

inventory is considered a reliable and valid index of either individual differences in proneness to anxiety or individual differences in transitory experiences of anxiety (Katkin, 1978). In this study, only the A-state measure was used.

Cognitive-Somatic Scale of Anxiety (CSSA). The CSSA (Holmes, Note 2) is a 21 item, self-report form with instructions for the subject to indicate on a scale from one to five (from "not at all" to "very much") how much a statement reflects "how you are feeling right now." Six of the statements reflect cognitive aspects of anxiety (e.g., "I feel frustrated" or "I feel worried"), seven other items suggest somatic manifestations of anxiety (e.g., "My heart is beating fast" or "My stomach feels tight"), and the remaining eight items are related to aspects of resting (e.g., "I feel physically calm" or "I feel mentally at ease"). The CSSA was used in this study as a more refined measure of cognitive and somatic aspects of anxiety. No reliability or validity data regarding the CSSA is available.

Menstrual Distress Questionnaire (MDQ). The MDQ (Moos, 1969, 1977) is a widely used, self-report instrument for measuring changes of mood, behavior, concentration, pain, and physical symptoms in the menstrual cycle. The test consists of 47 items, each describing a "symptom that women sometimes experience." The subjects are asked to rate their experience of the symptoms on a 6-point scale, ranging from "no experience of the symptom" through "symptoms present, mild"

to "acute or partially disabling." They are asked to do this for each of three phases of their most recent menstrual cycle ("menstrual"--during menstruation, "premenstrual"--the week before menstruation, and "intermenstrual"--the remainder of the cycle) and for their "worst" menstrual cycle.

The 47 items were factor analyzed and intercorrelated for a sample of 839 women. Eight stable and recurrent elements were identified: pain, disturbances of concentration, behavior decrements (e.g., lowered school or work performance or avoidance of social activities), autonomic nervous system imbalance reactions (e.g., dizziness, faintness or nausea, vomiting), water retention, negative affect, arousal (e.g., affectionate or bursts of energy, activity), and control (e.g., feelings of suffocation or blind spots, fuzzy vision). The control scale is composed of items with a low frequency of endorsement among 20-30 year-old women, and which Moos (1977) assumes reflects a general tendency to complain of a variety of symptoms regardless of whether or not they are usually associated with the menstrual cycle. Intercorrelations among the eight scales are reported as all positive ranging from 0.59 between pain and negative affect to 0.18 betwen arousal and autonomic reactions (Moos, 1977). Split-half reliabilities ranging from 0.74 to 0.98 are all statistically significant (Markum, 1976). The manual (Moos, 1977) lists normative data for Form A which is based on the retrospective report of how a woman feels about three different phases of her

cycle. The manual indicates that normative data for Form T, with instructions to report symptoms for that day, are similar to Form A. Form T was used in this study.

Social and Menstrual History Questionnaire. The questionnaire (Appendix A) related to social and menstrual history consists of questions formulated by Weideger (1975) with some modifications and additions. It is included in order to obtain additional factual information from the subjects and as an informal assessment of the environmental effects of the menstrual cycle in the lives of the subjects.

Procedure

Available female subjects assigned to the depressed and nondepressed groups on the basis of previous classroom testing with the BDI were called by telephone and asked if they would be interested in participating in a study investigating how different women experience the menstrual cycle. Interested subjects were further interviewed on the phone to determine whether they fit the additional characteristics of subjects sought, i.e., physically healthy, regular predictable cycles, and no significant gynecological problems (e.g., hormonal problems, past gynecological surgery, pregnant, etc.). Qualified subjects were then asked about their current menstrual cycle phase and an attempt was made to schedule the women in such a manner that a balance existed with regard to the number of subjects beginning the experiment during the

three different menstrual cycle phases. At the first scheduled appointment, the subject signed a consent form and filled out an LEI, BSRI, DACL, CSSA and an MDQ. Specific information about the subject's current cycle was collected and dates were set so data was collected during all three cycle phases--menstrual (during menstrual flow up to five days), intermenstrual (Day 6 to five days before the next expected period avoiding the three midcycle days), and pre-menstrual (any of four days before menstrual flow begins). On the calculated dates, the subject was asked to fill out another set of report forms (DACL, CSSA, an MDQ only) which she took home with her. A phone call was made to remind the subject. Following the last packet of report forms, the subject was asked to fill out the social and menstrual cycle history questionnaire. Scoring and analysis was done using subject numbers as an insurance of confidentiality. Approximately one-third of the subjects were run by one female experimenter and the remainder by another female experimenter. Both were blind to the subjects' depression classification.

CHAPTER IV

RESULTS

Preliminary Analyses

Preliminary analyses of the data included investigation of the
effects due to (1) collection of data at two different time periods,
(2) of women beginning their participation in the study at different
phases in the menstrual cycle, and (3) of the possible existence of
relationships between the primary independent variables of depres-
sion, stress, "femininity," and "androfemininity" (androgyny and
femininity combined).

To explore the effects of the collection of data at two dif-
ferent time periods (spring of 1980 and fall of 1980), a one-way
analysis of variance was performed on 42 dependent variables (14 de-
pendent variables for three cycle phases) controlling for possible
early or late data effects. Of the 42 analyses performed, three
were significant. They included the analyses during the menstrual
phase on the DACL, behavior change on the MDQ, and autonomic
reactions on the MDQ. Although these significant effects did all
appear during the menstrual phase and the means for the later,
larger ($\underline{n}=40$) group were consistently higher for these three
variables, a strong systematic effect of the early and late data
collection did not exist considering the number of variables
analyzed.

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Of the 54 total subjects, 33 began participation in the study during the intermenstrual phase, nine began during the premenstrual phase, and 12 began while they were menstruating. To investigate the possible effects of these unequal groups, a one-way analysis of variance was performed on the 42 dependent variables (14 dependent variables for three cycle phases). Of the 42 analyses performed, four were significant. All during the menstrual phase, they included the analyses of the DACL, somatic anxiety, negative affect on the MDQ, and the MDQ total. Investigation of group means indicates that the lowest mean scores for these four variables were consistently earned by the group which began the study while menstruating. A test-taking situational effect might account for these results. In other words, the group that began the study menstrually filling out the initial packet of materials with other women and the experimenter in the same room may have had a tendency to downplay negative symptoms more than the women who filled out the forms while menstruating in the privacy of their own living quarters. However, the existence of a strong systematic effect did not occur considering the data and the number of variables analyzed.

To investigate the relationships among the four identified independent variables (depression, stress, femininity, and androfemininity), crosstabulations were performed on each variable with the other three. The only significance resulted in the

crosstabulation of femininity with androfemininity, a spurious result due to the obvious overlapping of groups. Therefore, on the basis of this analysis depression, stress and femininity are independent of one another, as are depression, stress and androfemininity.

The results of the preliminary analyses were such that the investigation of the proposed variables proceeded as originally conceived.

Depression and Menstrual Distress

The five major hypotheses held that depressed subjects would experience greater physical and psychological distress during the menstrual and premenstrual phases of the cycle then nondepressed subjects. To test these hypotheses, separate two-way analyses of variance with repeated measures were performed with group (depressed vs. nondepressed) the between subject variable and phase of the menstrual cycle the within subjects variable for each of 13 dependent variables (depression, A-state, cognitive anxiety, somatic anxiety, resting, MDQ pain, MDQ concentration, MDQ behavior change, MDQ autonomic reactions, MDQ water retention, MDQ negative affect, MDQ arousal, and MDQ control). A summary of each analysis including means and standard deviations is presented in Table 1. No significant interaction effects were found. However, group effects were significant for every dependent variable except arousal on the

TABLE 1

Two-Way ANOVA with Repeated Measures
with Depression the Between Subjects Variable
and Phase of the Menstrual Cycle the Within
Subjects Variable for 13 Dependent Variables

DACL Depression

Source	df	MS	F
Group (Depressed vs. Nondepressed)	101	583.53	9.45***
Error	52	61.76	
Phase	2	107.13	2.48
Group x Phase	2	6.29	0.15
Error	104	43.15	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	6.00 (5.98)	9.04 (7.15)	7.35
Premenstrual	7.03 (6.15)	11.38 (8.94)	8.96
Menstrual	8.30 (6.92)	12.38 (7.11)	10.11
Marginal Means	7.11	10.93	8.81

State Anxiety

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	5740.73	29.13****
Error	51	197.04	
Phase	2	118.49	1.22
Group x Phase	2	33.82	0.35
Error	102	96.82	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	34.03 (11.22)	44.50 (12.24)	38.77
Premenstrual	35.55 (12.78)	47.63 (9.72)	41.02
Menstrual	35.24 (11.28)	48.92 (10.73)	41.43
Marginal Means	34.94	47.01	40.41

TABLE 1 - <u>Continued</u>

Cognitive Anxiety

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	823.27	17.88****
Error	50	46.05	
Phase	2	24.31	1.17
Group x Phase	2	3.08	0.15
Error	100	20.70	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	9.10 (2.87)	13.26 (7.39)	10.94
Premenstrual	10.24 (5.28)	14.83 (6.49)	12.27
Menstrual	9.52 (4.19)	14.65 (5.82)	11.79
Marginal Means	9.62	14.25	11.67

Somatic Anxiety

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	337.16	8.03***
Error	50	41.99	
Phase	2	62.31	4.03**
Group x Phase	2	17.70	1.14
Error	100	15.47	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	10.00 (3.08)	11.96 (6.58)	10.87
Premenstrual	11.24 (4.67)	13.91 (5.33)	12.42
Menstrual	10.97 (4.00)	15.22 (5.81)	12.85
Marginal Means	10.74	13.70	12.04

TABLE 1 - <u>Continued</u>

Resting

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1599.30	14.47****
Error	50	110.51	
Phase	2	142.91	3.38**
Group x Phase	2	38.48	0.91
Error	100	42.27	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	29.83 (8.28)	27.74 (7.48)	27.58
Premenstrual	27.72 (8.75)	21.87 (7.09)	25.13
Menstrual	28.31 (8.76)	19.91 (7.40)	24.60
Marginal Means	28.62	22.17	25.77

MDQ Pain

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	511.15	7.63***
Error	51	67.02	
Phase	2	269.68	12.25****
Group x Phase	2	47.49	2.16
Error	102	22.01	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	9.72 (4.10)	11.71 (5.13)	10.62
Premenstrual	12.00 (6.14)	15.13 (8.05)	13.42
Menstrual	12.34 (6.03)	18.04 (6.68)	14.92
Marginal Means	11.36	14.96	

TABLE 1 - <u>Continued</u>

MDQ Concentration

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1691.33	30.16****
Error	51	56.07	
Phase	2	27.73	1.15
Group x Phase	2	7.75	0.32
Error	102	24.01	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	10.79 (2.57)	16.46 (7.49)	13.36
Premenstrual	11.45 (4.33)	18.46 (8.81)	14.62
Menstrual	11.31 (5.27)	18.29 (5.69)	14.47
Marginal Means	11.18	17.74	14.15

MDQ Behavior Change

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1042.71	40.79****
Error	51	25.56	
Phase	2	28.34	2.07
Group x Phase	2	2.34	0.17
Error	102	13.66	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	7.38 (2.78)	12.08 (4.63)	9.51
Premenstrual	7.69 (3.59)	12.88 (4.73)	10.04
Menstrual	8.41 (3.86)	13.96 (5.50)	10.92
Marginal Means	7.83	12.97	10.16

TABLE 1 - <u>Continued</u>

MDQ Autonomic Reactions

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	102.02	10.56***
Error	51	9.66	
Phase	2	9.28	4.21**
Group x Phase	2	3.16	1.43
Error	102	2.20	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	4.21 (0.77)	5.25 (2.19)	4.68
Premenstrual	4.38 (1.08)	6.25 (3.30)	5.23
Menstrual	4.59 (1.45)	6.50 (3.28)	5.42
Marginal Means	4.39	6.00	5.12

MDQ Water Retention

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	93.23	4.93**
Error	51	18.89	
Phase	2	147.81	24.55****
Group x Phase	2	6.61	1.10
Error	102	6.02	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	5.34 (1.70)	6.71 (2.87)	5.96
Premenstrual	8.28 (3.90)	9.21 (3.76)	8.70
Menstrual	7.93 (2.76)	10.25 (3.86)	8.98
Marginal Means	7.18	8.72	7.88

TABLE 1 - <u>Continued</u>

MDQ Negative Affect

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1537.26	15.65****
Error	51	98.22	
Phase	2	115.68	2.98*
Group x Phase	2	26.05	0.67
Error	102	38.87	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	14.00 (5.96)	18.63 (8.79)	16.09
Premenstrual	15.59 (7.73)	22.75 (9.10)	18.83
Menstrual	14.97 (6.87)	21.92 (7.52)	18.11
Marginal Means	14.85	21.10	17.68

MDQ Arousal

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	130.07	2.60
Error	51	50.11	
Phase	2	98.67	6.70***
Group x Phase	2	1.60	0.11
Error	102	14.74	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	17.31 (4.54)	15.83 (5.34)	16.64
Premenstrual	15.97 (5.23)	13.79 (5.93)	14.98
Menstrual	14.76 (5.36)	12.96 (4.41)	13.94
Marginal Means	16.01	14.19	15.19

TABLE 1 - <u>Continued</u>

MDQ Control

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	424.75	14.88****
Error	51	28.55	
Phase	2	9.96	2.06
Group x Phase	2	0.75	0.16
Error	102	4.83	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	6.48 (1.02)	9.50 (5.02)	7.85
Premenstrual	6.90 (1.90)	10.25 (5.41)	8.42
Menstrual	7.10 (1.99)	10.58 (4.45)	8.68
Marginal Means	6.83	10.11	8.31

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* $p < .10$
** $p < .05$
*** $p < .01$
**** $p < .001$

MDQ, and in each of these cases, the depressed group scored higher than the nondepressed group, except for the resting measure where the nondepressed group was highest. In other words, on measures of negative conditions, the depressed group consistently scored higher throughout all phases of the menstrual cycle than did the non-depressed group.

The analyses also revealed significant main effects of cycle phase on measures of somatic anxiety, resting, MDQ pain, MDQ autonomic reactions, MDQ water retention, and MDQ arousal. For somatic anxiety, MDQ pain, MDQ autonomic reactions, and MDQ water retention, more symptoms were consistently indicated during the menstrual phase, followed by the premenstrual phase and intermenstrual phase, respectively. The resting and MDQ arousal measures were consistently higher intermenstrually, followed by the premenstrual and menstrual phases. See Table 1.

By combining the numerous measures of menstrual distress, it was hoped that group by phase interactional effects would be heightened. After all variable data were standard scored, a factor analysis with varimax rotation was performed. Two factors emerged consistently across the three phases. "Factor I" consisted of adding the standard scored values of the six variables of MDQ pain, MDQ concentration, MDQ autonomic reactions, MDQ water retention, MDQ control, and somatic anxiety. Factor I is considered a measure

primarily of menstrual distress. "Factor II" consisted of adding standard scores of five variables, the positive values on the DACL. A-state, and cognitive anxiety and negative values on the resting measure and MDQ arousal. Factor II is considered a measure of depression and anxiety. In addition to these two factors, the MDQ total was calculated by adding the standard scored values for each of the MDQ variables for each phase (O'Connor-Miller, Note 1: Gough, 1975). Contrary to Moos' (1977) original findings which indicated positive intercorrelations among all the MDQ variables, this was not the case with the data collected in this project. The resulting intercorrelations obtained for the three cycle phases are presented in Tables 2, 3 and 4. Since the variable arousal was consistently negatively correlated with the other MDQ variables, a modified MDQ total was calculated by summing all variables except arousal. As a result, four new variables emerged--Factor I, Factor II, MDQ Total and Modified MDQ Total. Again, two-way analyses of variance with repeated measures were performed on each of these four variables. The results of these analyses are presented in Table 5. Significant interaction effects were not found. However, similar to the previous results, consistent significant group and phase effects were found with the depressed group obtaining highest scores across all four variables and the greatest distress reported menstrually for both depression groups.

With regard to depressive symptomology and menstrual distress

TABLE 2

Average Intercorelations of Eight MDQ Variables

During the Intermenstrual Phase

(Form T, N=54)

		1	2	3	4	5	6	7	8
(1)	Pain	–	0.56****	0.49****	0.66****	0.50****	0.52****	-0.15	0.64****
(2)	Concentration		–	0.70****	0.47****	0.51****	0.74****	-0.15	0.64****
(3)	Behavior Change			–	0.46****	0.52****	0.64****	-0.39***	0.57****
(4)	Autonomic Reactions				–	0.32**	0.46****	-0.14	0.69****
(5)	Water Retention					–	0.29**	-0.05	0.54****
(6)	Negative Affects						–	-0.46****	0.54****
(7)	Arousal							–	-0.21
(8)	Control								–

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

TABLE 3

Average Intercorrelations of Eight MDQ Variables

During the Premenstrual Phase

(Form T, N=59)

		1	2	3	4	5	6	7	8
(1)	Pain	–	0.71****	0.71***	0.61****	0.58****	0.79****	-0.22	0.69****
(2)	Concentration		–	0.81****	0.66****	0.42****	0.78****	-0.04	0.66****
(3)	Behavior Change			–	0.58****	0.39****	0.72****	-0.28**	0.60****
(4)	Autonomic Reactions				–	0.36***	0.57****	-0.12	0.72****
(5)	Water Retention					–	0.46****	-0.02	0.44****
(6)	Negative Affect						–	-0.31**	0.66****
(7)	Arousal							–	-0.19
(8)	Control								–

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

TABLE 4

Average Intercorrelations of Eight MDQ Variables

During the Menstrual Phase

(Form T, N=53)

		1	2	3	4	5	6	7	8
(1)	Pain	–	0.61****	0.63****	0.55****	0.66****	0.80****	-0.34**	0.64****
(2)	Concentration		–	0.64****	0.48****	0.49****	0.72****	-0.24*	0.69****
(3)	Behavior Change			–	0.49****	0.52****	0.52****	-0.42***	0.36***
(4)	Autonomic Reactions				–	0.32**	0.43****	-0.21	0.52****
(5)	Water Retention					–	0.54****	-0.26*	0.54****
(6)	Negative Affect						–	0.24*	0.72****
(7)	Arousal							–	-0.16
(8)	Control								–

* $p < .10$
** $p < .05$
*** $p < .01$
**** $p < .001$

TABLE 5

Two-Way ANOVA with Repeated Measures with
Depression the Between Subjects Variable and
Phase of the Menstrual Cycle the Within Subjects
Variable for Four Dependent Variables

Factor I[1]

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	683.11	17.83****
Error	52	38.32	
Phase	2	117.37	13.53****
Group x Phase	2	12.71	1.47
Error	104	8.67	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	− 3.05 (1.83)	0.16 (5.08)	− 1.63
Premenstrual	− 1.29 (3.72)	2.74 (6.15)	0.50
Menstrual	− 1.19 (3.38)	3.96 (5.11)	1.10
Marginal Means	− 1.84	2.29	− 0.01

Factor II[2]

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	437.10	18.31****
Error	52	23.89	
Phase	2	39.71	3.39**
Group x Phase	2	2.87	0.24
Error	104	11.72	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	− 2.24 (3.62)	0.59 (4.36)	− 0.98
Premenstrual	− 1.21 (4.19)	2.13 (4.23)	0.28
Menstrual	− 1.06 (3.90)	2.70 (3.51)	0.61
Marginal Means	− 1.50	1.81	− 0.03

TABLE 5 – <u>Continued</u>

MDQ Total			
Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1024.71	21.54****
Error	52	47.58	
Phase	2	93.87	9.02****
Group x Phase	2	11.27	1.08
Error	104	10.41	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	− 3.30 (1.95)	0.83 (5.50)	− 1.46
Premenstrual	− 1.75 (4.08)	3.34 (7.12)	0.51
Menstrual	− 1.72 (3.87)	4.25 (5.41)	0.93
Marginal Means	− 2.26	2.81	− 0.01

TABLE 5 – <u>Continued</u>

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Modified MDQ Total[3]

Source	df	MS	F
Group (Depressed vs. Nondepressed)	1	1161.59	24.80****
Error	52	46.84	
Phase	2	132.75	10.60****
Group x Phase	2	12.67	1.01
Error	104	12.09	

Means with Standard Deviations in Parentheses

	Nondepressed	Depressed	Marginal Means
Intermenstrual	– 3.68 (2.41)	0.70 (5.51)	– 1.73
Premenstrual	– 1.88 (4.31)	3.60 (7.02)	0.55
Menstrual	– 1.65 (4.10)	4.67 (5.55)	1.16
Marginal Menas	– 2.40	2.99	– 0.01

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** $\underline{p} < .05$
**** $\underline{p} < .001$

[1]Factor I = MDQ Pain + MDQ Concentration + MDQ Autonomic Reactions + MDQ Water Retention + MDQ Control + Somatic Anxiety

[2]Factor II = DACL + A-state + Cognitive Anxiety – Resting – MDQ Arousal

[3]Modified MDQ Total = MDQ Total – MDQ Arousal

in depressed and nondepressed women. the results of this investigation did not support the hypothesis suggesting that depressed women experience particular cycle phases differently than nondepressed women (Hypothesis 1-4). However, the results did indicate that the depressed group of women experienced all phases of the menstrual cycle more negatively than the nondepressed group. The depressed group was understandably more depresssed. In addition, the group reported more anxiety (in measures of state, cognitive and somatic anxiety), experienced more pain, had greater difficulty concentrating, reported more behavior decrements and autonomic nervous system imbalance reactions, indicated the experience of more negative affect, reported a greater tendency to retain water, and complained of a greater number of physical symptoms considered unrelated to the menstrual cycle. The depressed group was also significantly less apt to indicate feelings of restfulness at any time during the cycle when compared with the nondepressed group. For both depressed and nondepressed groups, significant phase effects were present for depression, state anxiety, somatic anxiety, pain, autonomic nervous system imbalance reactions, water retention, and control symptoms with the highest endorsement of symptoms during menstruation. followed by the premenstrual phase, with the fewest symptoms acknowledged intermenstrually.

Anxiety

To investigate Hypothesis 5 that depressed women evidence a higher level of anxiety throughout the cycle than nondepressed women, the group effects for the anxiety variables in the two-way analysis of variance with repeated measures reported in the previous section were examined. As already mentioned, the group effects for the three anxiety variables (state, cognitive and somatic) were all significant (see Table 1). It, therefore, does appear that depressed women endorsed more statements indicative of higher levels of state, cognitive and somatic anxiety than the nondepressed women did. In addition, the nondepressed group was significantly more apt to indicate feelings of restfulness than the depressed group (Table 1).

Stress

In the investigation of the stress variable (LEI), the 54 subjects were categorized into high and low stress groups irrespective of BDI scores. Subjects with LEI scores between 0 and 200 were assigned to the low stress group. This low stress group consisted of 26 subjects, 17 with low BDI scores and nine with high BDI scores. Those women with LEI scores greater than 200 were categorized in the high stress group. This group consisted of 28 subjects: 13 with low BDI scores and 15 with high BDI scores. To explore group (high and low stress) by phase effects, a two-way analysis of variance with repeated measures was performed with group (high and low stress) the between subjects variable and phase of the menstrual cycle the

within subjects variable for each of the 13 dependent variables plus Factor I, Factor II, the MDQ total and the modified MDQ total (MDQ total minus the arousal score). The results of these analyses are presented in Table 6. No interaction effects were significant. However, two group effects were significant and two approached significance. Pain, as measured on the MDQ and behavior change on the MDQ showed significant ($p < .05$) group effects, with the high stress group indicating more pain and behavior changes than the low stress group. A similar trend was seen for the depression variable (DACL) and the modified MDQ total. Menstrual phase effects were understandably similar to those reported in the previous section.

Although the crosstabulation analysis of the depression groups and the high and low stress groups was not significant (see Preliminary Analyses), when a one-way analysis of variance was performed with depression groups the independent variable and life stress as mesured on the LEI the dependent variable significant results were obtained. The results are presented in Table 7. The depressed group of women obtained significantly ($p < .01$) higher life stress scores (mean=246) than the nondepressed group (mean=169).

In summary, life stress does appear related to depression classification with depressed women indicating the experience of more life stress than the nondepressed women. Although menstrual cycle symptomatology was not related to the interaction of life stress

TABLE 6

Two-Way ANOVA with Repeated Measures
with Stress the Between Subjects Variable
and Phase of the Menstrual Cycle the Within
Subjects Variable for 17 Dependent Variables

DACL Depression

Source	df	MS	F
Group (high vs. low stress)	1	216.93	2.97*
Error	52	73.15	
Phase	2	109.98	2.38*
Group x Phase	2	20.11	0.44
Error	104	46.15	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	6.35 (7.00)	8.29 (6.26)	7.35
Premenstrual	7.46 (7.62)	11.14 (8.85)	9.37
Menstrual	9.42 (7.52)	10.75 (7.04)	10.11
Marginal Means	7.74	10.06	8.94

State Anxiety

Source	df	MS	F
Group (high vs. low stress)	1	373.56	1.24
Error	51	302.29	
Phase	2	109.51	1.13
Group x Phase	2	8.49	0.09
Error	102	97.32	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	34.04 (12.76)	40.32 (12.71)	38.77
Premenstrual	39.04 (13.58)	42.79 (12.25)	41.02
Menstrual	40.28 (13.44)	42.46 (12.57)	41.43
Marginal Menas	38.79	41.86	40.41

TABLE 6 - Continued

Cognitive Anxiety

Source	df	MS	F
Group (high vs. low stress)	1	1.26	0.02
Error	50	62.49	
Phase	2	23.30	1.13
Group x Phase	2	8.99	0.44
Error	100	20.58	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	10.92 (5.16)	10.96 (6.24)	10.94
Premenstrual	12.00 (7.02)	12.52 (5.50	12.27
Menstrual	12.36 (6.06)	11.26 (5.10)	11.79
Marginal Means	11.76	11.58	11.67

Somatic Anxiety

Source	df	MS	F
Group (high vs. low stress)	1	46.09	0.96
Error	50	47.81	
Phase	2	56.65	3.59*
Group x Phase	2	3.41	0.22
Error	100	15.76	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	10.20 (3.30)	11.48 (6.15)	10.87
Premenstrual	12.16 (4.16)	12.67 (5.92)	12.42
Menstrual	12.08 (4.58)	13.56 (5.85)	12.85
Marginal Means	11.48	12.57	12.04

TABLE 6 - Continued

	Resting		
Source	df	MS	F
Group (high vs. low stress)	1	28.49	0.20
Error	50	141.93	
Phase	2	131.36	3.06*
Group x Phase	2	2.58	0.06
Error	100	42.99	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	28.04 (8.55)	27.15 (8.13)	27.58
Premenstrual	25.80 (8.48)	24.52 (8.64)	25.13
Menstrual	24.80 (9.90)	24.41 (8.55)	24.60
Marginal Means	26.21	25.36	25.77

	MDQ Pain		
Source	df	MS	F
Group (high vs. low stress)	1	322.59	4.56**
Error	51	70.72	
Phase	2	244.81	10.81****
Group x Phase	2	14.78	0.65
Error	102	22.65	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	9.72 (3.43)	11.43 (5.46)	10.62
Premenstrual	11.80 (5.42)	14.86 (8.27)	13.42
Menstrual	12.92 (6.88)	16.71 (6.50)	14.92
Marginal Menas	11.48	14.33	12.99

TABLE 6 - Continued

MDQ Concentration

Source	df	MS	F
Group (high vs. low stress)	1	58.93	0.67
Error	51	88.08	
Phase	2	26.71	1.12
Group x Phase	2	12.51	0.52
Error	102	23.92	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	12.32 (4.05)	14.29 (7.33)	13.36
Premenstrual	14.56 (8.25)	14.68 (7.00)	14.62
Menstrual	13.64 (6.45)	15.21 (6.48)	14.47
Marginal Means	13.51	14.73	14.15

MDQ Behavior Change

Source	df	MS	F
Group (high vs. low stress)	1	217.31	5.21**
Error	51	41.75	
Phase	2	26.69	1.95
Group x Phase	2	1.97	0.14
Error	102	13.67	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	8.48 (3.45)	10.43 (4.96)	9.51
Premenstrual	8.60 (4.29)	11.32 (5.05)	10.04
Menstrual	9.68 (4.31)	12.04 (6.08)	10.92
Marginal Means	8.92	11.26	10.16

TABLE 6 - <u>Continued</u>

MDQ Autonomic Reactions

Source	df	MS	F
Group (high vs. low stress)	1	12.17	1.07
Error	51	11.42	
Phase	2	8.35	3.70**
Group x Phase	2	0.44	0.19
Error	102	2.26	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	4.36 (0.95)	4.96 (2.06)	4.68
Premenstrual	5.04 (2.91)	5.39 (2.15)	5.23
Menstrual	5.08 (2.14)	5.79 (2.97)	5.45
Marginal Means	4.83	5.38	5.12

MDQ Water Retention

Source	df	MS	F
Group (high vs. low stress)	1	42.50	2.14
Error	51	19.89	
Phase	2	142.66	23.96****
Group x Phase	2	10.00	1.68
Error	102	5.95	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	5.92 (2.40)	6.00 (2.40)	5.96
Premenstrual	8.04 (3.48)	9.29 (4.09)	8.70
Menstrual	8.04 (3.18)	9.82 (3.56)	8.98
Marginal Means	7.33	8.37	7.88

TABLE 6 - Continued

MDQ Negative Affect

Source	df	MS	F
Group (high vs. low stress)	1	277.95	2.26
Error	51	122.92	
Phase	2	105.33	2.68*
Group x Phase	2	3.82	0.10
Error	102	39.30	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	14.76 (7.14)	17.29 (8.04)	16.09
Premenstrual	17.12 (8.16)	20.36 (9.65)	18.83
Menstrual	16.96 (8.79)	19.14 (7.05)	18.11
Marginal Means	16.28	18.93	17.68

MDQ Arousal

Source	df	MS	F
Group (high vs. low stress)	1	126.68	2.52
Error	51	50.18	
Phase	2	99.34	6.75***
Group x Phase	2	2.95	0.20
Error	102	14.71	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	17.72 (4.98)	15.68 (4.76)	16.64
Premenstrual	16.08 (6.07)	14.00 (5.07)	14.98
Menstrual	14.60 (4.49)	13.36 (5.41)	13.94
Marginal Means	16.13	14.35	15.19

TABLE 6 - Continued

MDQ Control

Source	df	MS	F
Group (high vs. low stress)	1	64.58	1.81
Error	51	35.61	
Phase	2	9.84	2.04
Group x Phase	2	1.01	0.21
Error	102	4.83	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	7.04 (1.84)	8.57 (4.78)	7.85
Premenstrual	7.72 (4.03)	9.04 (4.34)	8.42
Menstrual	8.16 (3.48)	9.14 (3.95)	8.68
Marginal Means	7.64	8.92	8.31

Factor I[1]

Source	df	MS	F
Group (high vs. low stress)	1	126.29	2.58
Error	52	59.03	
Phase	2	110.06	12.40****
Group x Phase	2	2.07	0.23
Error	104	8.46	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	-2.43 (2.22)	-0.88 (4.99)	-1.63
Premenstrual	-0.29 (4.88)	1.24 (5.65)	0.50
Menstrual	-0.05 (4.58)	2.17 (5.08)	1.10
Marginal Means	-0.92	0.84	-0.01

TABLE 6 - <u>Continued</u>

Factor II^2

Source	df	MS	F
Group (high vs. low stress)	1	35.61	1.13
Error	52	31.60	
Phase	2	38.20	3.26**
Group x Phase	2	2.46	0.21
Error	104	11.73	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	-1.54 (4.24)	-0.46 (4.11)	-0.98
Premenstrual	-0.39 (4.79)	0.89 (4.19)	0.28
Menstrual	0.37 (4.51)	0.83 (3.84)	0.61
Marginal Means	-0.52	0.42	-0.03

MDQ Total

Source	df	MS	F
Group (high vs. low stress)	1	171.27	2.68
Error	52	63.99	
Phase	2	87.21	8.24****
Group x Phase	2	1.92	0.18
Error	104	10.59	

Means with Standard Deviations in Parentheses

	Low Stress	High Stress	Marginal Means
Intermenstrual	-2.33 (3.02)	-0.65 (5.33)	-1.46
Premenstrual	-0.55 (5.86)	1.50 (6.31)	0.51
Menstrual	-0.33 (5.27)	2.11 (5.46)	0.93
Marginal Means	-1.07	0.99	-0.01

TABLE 6 – <u>Continued</u>

<center>Modified MDQ Total[3]</center>

Source	df	MS	F
Group (high vs. low stress)	1	228.17	3.52*
Error	52	64.79	
Phase	2	124.45	9.77****
Group x Phase	2	1.46	0.11
Error	104	12.74	

<center>Means with Standard Deviations in Parentheses</center>

	Low Stress	High Stress	Marginal Means
Intermenstrual	-2.78 (2.96)	-0.76 (5.60)	-1.73
Premenstrual	-0.70 (5.83)	1.71 (6.51)	0.55
Menstrual	-0.23 (5.54)	2.45 (5.66)	1.16
Marginal Means	-1.24	1.14	-0.01

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   * $\underline{p} < .10$
  ** $\underline{p} < .05$
 *** $\underline{p} < .01$
**** $\underline{p} < .001$

[1]Factor I = MDQ Pain + MDQ Concentration + MDQ Autonomic Reactions + MDQ Water Retention + MDQ Control + Somatic Anxiety

[2]Factor II = DACL + A-state + Cognitive Anxiety – Resting – MDQ Arousal

[3]Modified MDQ Total = MDQ Total – MDQ Arousal

TABLE 7

One-Way Analysis of Variance
with Depression Groups the Independent
Variable and Life Stress the Dependent Variable

Source	df	MS	F
Between Groups	1	78,574.94	8.38***
Within Groups	52	9,374.31	
Total	53		

	Mean	Standard Deviation
Nondepressed Group	169.07	89.48
Depressed Group	245.83	105.35

*** p < .01

grouping and cycle phases, evidence did exist that high stress women report significantly more symptoms of pain and behavior decrements throughout the menstrual cycle.

Femininity and Androfemininity

As with the stress variable, exploratory investigation of feminine identification and the experience of the menstrual cycle took place. In order to specifically look at the variables of femininity and androfemininity, high and low groups of each variable were assigned. The feminine group consisted of eight women with high feminine scores (BSRI feminine score > 104) and low masculine scores (BSRI masculine score < 96). Four were from each of the depression groups. The nonfeminine group consisted of all the remaining 46 subjects, 26 from the low BDI group and 20 from the high BDI group. The androfeminine group consisted of 27 women with high feminine scores (BSRI feminine score > 104) irrespective of masculine scores. Seventeen were from the low depression group and 10 from the high depression group. The nonandrofeminine group (masculine and undifferentiated subjects) consisted of the remaining 27 subjects (BSRI feminine score < 105). Thirteen were from the low BDI group and 14 from the high BDI group. Separate two-way analyses of variance with repeated measures were performed on two group variables (feminine vs. nonfeminine and androfeminine vs. nonandrofeminine) with groups the between subjects variable and

phase the within subjects variable for each of the 17 dependent variables (13 original variables plus Factor I, Factor II, the MDQ total and the modified MDQ total). The results of these analyses are presented in Tables 8 and 9. No significant group or interaction effects were evident for either the feminine/nonfeminine groups or the androfeminine/nonandrofeminine groups. As a result, there is no clear evidence that experience of the menstrual cycle is related to sex-role orientation as classified in this investigation.

Questionnaire Results

Questionnaire frequency data are reported in Appendix B. From these data, the average subject in this study could be described as a white, Catholic, single woman of 18.6 years. She is a virgin and does not use any form of birth control. She has been menstruating approximately 6 years, feels that she was adequately prepared for menstruation, and is aware of physical or emotional changes which accompany her cycle. She feels that men do have a special advantage in that they do not menstruate and if she could retain fertility, would opt for no menstrual flow. As a result of the questionnaire frequencies, crosstabulations were run on selected questionnaire items and independent variables (depression, stress, androfemininity, femininity). These tabulations are presented in Table 10. Three significant findings resulted with two involving the questionnaire item regarding adequate preparation for the

TABLE 8

Two-Way ANOVA with Repeated Measures
with Femininity the Between Subjects Variable
and Phase of the Menstrual Cycle the Within Subjects
Variable for 17 Dependent Variables

DACL Depression

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	162.66	2.19
Error	52	74.19	
Phase	2	18.21	0.40
Group x Phase	2	30.57	0.67
Error	104	45.95	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	7.00 (8.35)	7.41 (6.40)	7.35
Premenstrual	5.63 (6.70)	10.02 (8.57)	9.37
Menstrual	7.00 (6.09)	10.65 (7.34)	10.11
Marginal Means	6.54	9.36	8.94

State Anxiety

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	52.83	0.17
Error	51	308.57	
Phase	2	8.33	0.09
Group x Phase	2	129.36	1.36
Error	102	94.95	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	41.13 (18.43)	38.36 (11.66)	38.77
Premenstrual	39.63 (13.42)	41.27 (12.95)	41.02
Menstrual	36.38 (14.53)	42.33 (12.56)	41.33
Marginal Means	39.04	40.65	40.41

TABLE 8 - Continued

Cognitive Anxiety

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	35.90	0.58
Error	50	61.80	
Phase	2	7.24	0.35
Group x Phase	2	8.06	0.39
Error	100	20.60	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	13.00 (9.49)	10.57 (4.78)	10.94
Premenstrual	13.38 (7.67)	12.07 (6.01)	12.27
Menstrual	12.00 (6.82)	11.75 (5.39)	11.79
Marginal Means	12.79	11.46	11.67

Somatic Anxiety

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	8.22	0.17
Error	50	48.57	
Phase	2	9.55	0.62
Group x Phase	2	19.68	1.28
Error	100	15.43	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	13.00 (9.29)	10.48 (3.80)	10.87
Premenstrual	11.75 (3.58)	12.55 (5.36)	12.42
Menstrual	13.00 (4.69)	12.82 (5.43)	12.85
Marginal Means	12.58	11.95	12.04

TABLE 8 - <u>Continued</u>

<div align="center">Resting</div>

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	0.01	0.00
Error	50	142.50	
Phase	2	92.59	2.16
Group x Phase	2	4.66	0.11
Error	100	42.95	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	28.25 (10.94)	27.45 (7.84)	27.58
Premenstrual	25.25 (8.76)	25.11 (8.56)	25.13
Menstrual	23.88 (12.59)	24.73 (8.55)	24.60
Marginal Means	25.71	25.77	25.77

<div align="center">MDQ Pain</div>

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	37.65	0.49
Error	51	76.31	
Phase	2	88.72	3.91**
Group x Phase	2	12.17	0.54
Error	102	22.70	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	10.75 (3.28)	10.60 (4.89)	10.62
Premenstrual	11.38 (3.07)	13.78 (7.64)	13.42
Menstrual	13.38 (4.87)	15.20 (7.20)	14.92
Marginal Means	11.83	13.19	12.99

TABLE 8 - <u>Continued</u>

<div align="center">MDQ Concentration</div>

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	6.35	0.07
Error	51	89.11	
Phase	2	13.23	0.56
Group x Phase	2	31.23	1.33
Error	102	23.55	

<div align="center">Means with Standard Deviations in Parentheses</div>

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	14.75 (7.76)	13.11 (5.75)	13.36
Premenstrual	13.00 (5.24)	14.91 (7.89)	14.62
Menstrual	16.13 (6.62)	14.18 (6.45)	14.47
Marginal Means	14.63	14.07	14.15

<div align="center">MDQ Behavior Change</div>

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	47.85	1.06
Error	51	45.07	
Phase	2	9.29	0.68
Group x Phase	2	5.00	0.37
Error	102	13.61	

<div align="center">Means with Standard Deviations in Parentheses</div>

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	11.63 (6.09)	9.13 (3.99)	9.51
Premenstrual	10.75 (4.74)	9.91 (4.92)	10.04
Menstrual	12.00 (5.45)	10.73 (5.43)	10.92
Marginal Means	11.46	9.93	10.16

TABLE 8 - Continued

MDQ Autonomic Reactions

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	8.13	0.71
Error	51	11.50	
Phase	1	3.98	1.76
Group x Phase	2	0.26	0.11
Error	102	2.26	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	4.25 (0.71)	4.76 (1.76)	4.68
Premenstrual	4.50 (1.41)	5.36 (2.66)	5.23
Menstrual	5.00 (1.51)	5.53 (2.77)	5.45
Marginal Means	4.58	5.21	5.12

MDQ Water Retention

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	0.00	0.00
Error	51	20.72	
Phase	2	56.57	9.31****
Group x Phase	2	3.67	0.60
Error	102	6.08	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Premenstrual	6.63 (2.67)	5.84 (2.34)	5.96
Premenstrual	8.13 (2.70)	8.80 (4.01)	8.70
Menstrual	8.88 (3.04)	9.00 (3.57)	8.98
Marginal Means	7.88	7.88	7.88

TABLE 8 – <u>Continued</u>

MDQ Negative Affect

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	28.98	0.23
Error	51	127.80	
Phase	2	21.05	0.54
Group x Phase	2	28.55	0.74
Error	102	38.82	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	16.50 (9.53)	16.02 (7.41)	16.09
Premenstrual	15.88 (7.06)	19.36 (9.32)	18.83
Menstrual	17.63 (8.60)	18.20 (7.89)	18.11
Marginal Means	16.67	17.86	17.68

MDQ Arousal

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	2.78	0.05
Error	51	52.61	
Phase	2	38.38	2.61*
Group x Phase	2	2.72	0.18
Error	102	14.71	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	16.00 (4.81)	16.76 (4.99)	16.64
Premenstrual	14.38 (4.66)	15.09 (5.80)	14.98
Menstrual	14.25 (2.92)	13.89 (5.30)	13.94
Marginal Means	14.88	15.24	15.19

TABLE 8 — <u>Continued</u>

MDQ Control

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	4.47	0.12
Error	51	36.79	
Phase	2	5.33	1.13
Group x Phase	2	7.57	1.61
Error	102	4.70	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	8.13 (4.52)	7.80 (3.65)	7.85
Premenstrual	7.00 (0.93)	8.67 (4.51)	8.42
Menstrual	8.63 (3.29)	8.69 (3.84)	8.68
Marginal Menas	7.92	8.39	8.31

Factor I[1]

Source	df	MS	F
Group (feminine vs. nonfeminine)	1	2.56	0.05
Error	52	52.41	
Phase	2	37.00	4.26**
Group x Phase	2	12.08	1.39
Error	104	8.69	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	−0.85 (5.12)	−1.76 (3.77)	−1.63
Premenstrual	−0.98 (1.89)	0.76 (5.66)	0.50
Menstrual	0.91 (4.04)	1.13 (5.10)	1.10
Marginal Means	−0.31	0.04	−0.01

TABLE 8 - <u>Continued</u>

Factor II[2]			
<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Group (feminine vs. nonfeminine)	1	0.85	0.03
Error	52	32.27	
Phase	2	8.92	0.76
Group x Phase	2	4.03	0.34
Error	104	11.70	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	-0.44 (6.05)	-1.07 (3.84)	-0.98
Premenstrual	-0.03 (4.62)	0.33 (4.52)	0.28
Menstrual	-0.14 (4.60)	0.74 (4.10)	0.61
Marginal Means	-0.20	0.00	-0.03

MDQ Total			
<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Group (feminine vs. nonfeminine)	1	2.72	0.04
Error	52	7.23	
Phase	2	29.65	2.87*
Group x Phase	2	14.46	1.40
Error	104	10.35	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	-0.71 (4.93)	-1.59 (4.37)	-1.46
Premenstrual	-1.17 (2.65)	0.80 (6.52)	0.51
Menstrual	0.93 (4.88)	0.94 (5.60)	0.93
Marginal Means	-0.32	0.05	-0.01

TABLE 8 - <u>Continued</u>

Modified MDQ Total[3]

Source	df	MS	F
Group (feminine vs. non-feminine)	1	1.90	0.03
Error	52	69.14	
Phase	2	43.12	3.45**
Group x Phase	2	14.10	1.13
Error	104	12.50	

Means with Standard Deviations in Parentheses

	Feminine	Nonfeminine	Marginal Means
Intermenstrual	-0.88 (5.50)	-1.88 (4.48)	-1.73
Premenstrual	-1.02 (2.69)	0.83 (6.67)	0.55
Menstrual	1.10 (5.12)	1.17 (5.86)	1.16
Marginal Means	-0.27	0.04	-0.01

* $p < .10$
** $p < .05$
*** $p < .01$
**** $p < .001$

[1]Factor I = MDQ Pain + MDQ Concentration + MDQ Autonomic Reactions + MDQ Water Retention + MDQ Control + Somatic Anxiety

[2]Factor II = DACL + A-State + Cognitive Anxiety - Resting - MDQ Arousal

[3]Modified MDQ Total = MDQ Total - MDQ Arousal

TABLE 9

Two-Way ANOVA with Repeated Measures
with Androfemininity the Between Subjects Variable
and Phase of the Menstrual Cycle the Within
Subjects Variable for 17 Dependent Variables

DACL Depression

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	38.52	0.50
Error	52	76.58	
Phase	2	110.13	2.44*
Group x Phase	2	68.75	1.52
Error	104	45.21	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	6.19 (6.32)	8.52 (6.85)	7.35
Premenstrual	8.26 (7.55)	10.48 (9.20)	9.37
Menstrual	10.93 (7.62)	9.30 (6.88)	10.11
Marginal Means	8.46	9.43	8.94

State Anxiety

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	522.67	1.75
Error	51	299.35	
Phase	2	107.10	1.12
Group x Phase	2	100.08	1.05
Error	102	95.52	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	36.63 (12.86)	41.00 (12.42)	38.77
Premenstrual	38.11 (12.84)	44.04 (12.50)	41.02
Menstrual	41.15 (12.82)	41.73 (13.24)	41.43
Marginal Means	38.63	42.26	40.41

TABLE 9 - <u>Continued</u>

Cognitive Anxiety

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	0.41	0.01
Error	50	62.51	
Phase	2	23.47	1.15
Group x Phase	2	18.39	0.90
Error	100	20.39	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	10.50 (5.78)	11.38 (5.68)	10.94
Premenstrual	12.15 (6.50)	12.38 (6.06)	12.27
Menstrual	12.50 (6.29)	11.08 (4.72)	11.79
Marginal Means	11.72	11.62	11.67

Somatic Anxiety

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	7.85	0.16
Error	50	48.58	
Phase	2	56.58	3.67**
Group x Phase	2	21.04	1.37
Error	100	15.41	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	11.35 (5.57)	10.38 (4.38)	10.87
Premenstrual	11.92 (4.05)	12.92 (6.02)	12.42
Menstrual	13.54 (4.67)	12.15 (5.84)	12.85
Marginal Means	12.27	11.82	12.04

TABLE 9 - Continued

Resting

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	118.56	0.85
Error	50	140.13	
Phase	2	131.21	3.23**
Group x Phase	2	119.12	2.93*
Error	100	40.66	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	29.65 (8.31)	25.50 (7.83)	27.58
Premenstrual	26.50 (8.18)	23.77 (8.76)	25.13
Menstrual	23.77 (9.92)	25.42 (8.39)	24.60
Marginal Means	26.64	24.90	25.77

MDQ Pain

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	19.76	0.26
Error	51	76.66	
Phase	2	248.66	11.24****
Group x Phase	2	41.79	1.89
Error	102	22.12	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	10.15 (4.06)	11.12 (5.23)	10.62
Premenstrual	13.67 (6.68)	13.15 (7.78)	13.42
Menstrual	16.19 (6.59)	13.62 (7.07)	14.92
Marginal Means	13.33	12.63	12.99

TABLE 9 - Continued

MDQ Concentration

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	1.70	0.02
Error	51	89.20	
Phase	2	24.88	1.04
Group x Phase	2	14.79	0.62
Error	102	23.87	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	12.89 (5.91)	13.85 (6.25)	13.36
Premenstrual	14.30 (7.20)	14.96 (8.00)	14.62
Menstrual	14.96 (6.90)	13.96 (6.04)	14.47
Marginal Means	14.05	14.26	14.15

MDQ Behavior Change

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	0.08	0.00
Error	51	46.01	
Phase	2	26.51	1.96
Group x Phase	2	9.28	0.69
Error	102	13.53	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	9.19 (4.11)	9.85 (4.71)	9.51
Premenstrual	9.85 (4.60)	10.23 (5.20)	10.04
Menstrual	11.37 (5.42)	10.46 (5.44)	10.92
Marginal Means	10.14	10.18	10.16

TABLE 9 - <u>Continued</u>

MDQ Autonomic Reactions

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	4.47	0.39
Error	51	11.57	
Phase	2	8.22	3.73**
Group x Phases	2	3.14	1.42
Error	102	2.21	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	4.67 (1.44)	4.69 (1.87)	4.68
Premenstrual	5.30 (2.84)	5.15 (2.19)	5.23
Menstrual	5.89 (2.99)	5.00 (2.12)	5.45
Marginal Means	5.28	4.95	5.12

MDQ Water Retention

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	0.18	0.01
Error	51	20.72	
Phase	2	146.38	24.34****
Group x Phase	2	7.02	1.17
Error	102	6.01	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	5.67 (1.84)	6.27 (2.84)	5.96
Premenstrual	9.11 (3.99)	8.27 (3.68)	8.70
Menstrual	8.96 (3.40)	9.00 (3.61)	8.98
Marginal Means	7.91	7.85	7.88

TABLE 9 - <u>Continued</u>

<div align="center">MDQ Negative Affect</div>

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	44.35	0.35
Error	51	127.50	
Phase	2	105.83	2.77*
Group x Phase	2	61.48	1.61
Error	102	38.17	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	16.00 (6.98)	16.19 (8.45)	16.09
Premenstrual	18.74 (9.44)	18.92 (8.80)	18.83
Menstrual	19.85 (8.51)	16.31 (6.95)	18.11
Marginal Means	18.20	17.14	17.68

<div align="center">MDQ Arousal</div>

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	122.32	2.43
Error	51	50.26	
Phase	2	97.81	6.66***
Group x Phase	2	4.25	0.29
Error	102	14.68	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	17.52 (4.25)	15.73 (5.48)	16.64
Premenstrual	16.11 (4.99)	13.81 (6.06)	14.98
Menstrual	14.52 (5.21)	13.35 (4.78)	13.94
Marginal Means	16.05	14.29	15.19

TABLE 9 - <u>Continued</u>

MDQ Control

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	17.64	0.48
Error	51	36.54	
Phase	2	9.33	1.97
Group x Phase	2	5.10	1.08
Error	102	4.75	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	7.33 (2.87)	8.38 (4.47)	7.85
Premenstrual	7.93 (3.80)	8.92 (4.61)	8.42
Menstrual	8.70 (3.28)	8.65 (4.22)	8.68
Marginal Means	7.99	8.65	8.31

Factor I[1]

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	1.99	0.04
Error	52	51.42	
Phase	2	110.95	12.75****
Group x Phase	2	11.16	1.28
Error	104	8.70	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	-1.90 (3.25)	-1.35 (4.59)	-1.63
Premenstrual	0.49 (4.86)	0.51 (5.80)	0.50
Menstrual	1.71 (4.65)	0.49 (5.21)	1.10
Marginal Means	0.10	-0.12	-0.01

TABLE 9 - <u>Continued</u>

Factor II[2]

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	37.06	1.17
Error	52	31.57	
Phase	2	37.92	3.32**
Group x Phase	2	18.63	1.63
Error	104	11.42	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	-1.86 (4.11)	-0.09 (4.12)	-0.98
Premenstrual	-0.47 (4.36)	1.02 (4.58)	0.28
Menstrual	0.81 (4.39)	0.42 (3.96)	0.61
Marginal Means	-0.51	0.45	-0.03

MDQ Total

Source	df	MS	F
Group (androfemininity vs. nonandrofemininity)	1	16.51	0.25
Error	52	66.96	
Phase	2	88.23	8.56****
Group x Phase	2	16.57	1.61
Error	104	10.31	

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	-1.67 (3.38)	-1.25 (5.31)	-1.46
Premenstrual	0.78 (5.65)	0.24 (6.67)	0.51
Menstrual	1.83 (5.32)	0.04 (5.55)	0.93
Marginal Means	0.31	-0.33	-0.01

TABLE 9 - <u>Continued</u>

<table>
<tr><td colspan="4" align="center">Modified MDQ Total[3]</td></tr>
<tr><td><u>Source</u></td><td><u>df</u></td><td><u>MS</u></td><td><u>F</u></td></tr>
<tr><td>Group (androfemininity vs.
 nonandrofemininity)</td><td>1</td><td>3.31</td><td>0.05</td></tr>
<tr><td>Error</td><td>52</td><td>69.11</td><td></td></tr>
<tr><td>Phase</td><td>2</td><td>125.60</td><td>10.13****</td></tr>
<tr><td>Group <u>x</u> Phase</td><td>2</td><td>19.49</td><td>1.57</td></tr>
<tr><td>Error</td><td>104</td><td>12.40</td><td></td></tr>
</table>

Means with Standard Deviations in Parentheses

	Androfem.	Nonandrofem.	Marginal Means
Intermenstrual	-2.13 (3.78)	-1.34 (5.34)	-1.73
Premenstrual	0.59 (5.94)	0.52 (6.68)	0.55
Menstrual	1.95 (5.73)	0.37 (5.69)	1.16
Marginal Means	0.14	-0.15	-0.01

* $p < .10$
** $p < .05$
*** $p < .01$
**** $p < .001$

[1]Factor I = MDQ Pain + MDQ Concentration + MDQ Autonomic Reactions + MDQ Water Retention + MDQ Control + Somatic Anxiety

[2]Factor II = DACL + A-state + Cognitive Anxiety - Resting - Arousal

[3]Modified MDQ Total = MDQ Total - MDQ Arousal

TABLE 10

Chi Square Analysis of the Significant
Questionnaire Data Associations

Adequate Preparation by Nondepressed vs. Depressed

		Nondepressed	Depressed	Totals
Adequate Preparation	yes	25	13	38
	no	4	11	15
Totals		29	24	53

Chi Square(1)=6.64, $p < .01$

Adequate Preparation by Androfemininity

		Androfeminine	Nonandro-feminine	Totals
Adequate Preparation	yes	23	15	38
	no	3	12	15
Totals		26	27	53

Chi Square(1)=7.07, $p < .01$

Awareness of Physical or Emotional Changes by Stress

		Low Stress	High Stress	Totals
Aware of Changes	yes	17	25	42
	no	7	2	9
Totals		24	27	51

Chi Square(1)=4.14, $p < .05$

menstrual cycle. When adequate preparation for the menstrual cycle (yes or no) was related to high and low depression as measured on the BDI, significant findings resulted. Chi Square(1)=6.64, $p < .01$. The largest group consisted of those women who were nondepressed and felt they had been adequately prepared. The smaller group included those who were nondepressed but felt they had not been prepared for menstruation. The depressed group was quite evenly split between the prepared and unprepared groups. The investigation of the adequate preparation item and androfemininity also resulted in significant findings, Chi Square(1)=7.07, $p < .01$. The largest group was represented by the androfeminine group that felt they had had adequate preparation. The smallest group consisted of the androfeminine women who had not been adequately prepared. The masculine and undifferentiated (nonandrofeminine) group was approximately evenly divided between the prepared and unprepared categories.

The third significant result involved the awareness of physical or emotional changes during the menstrual cycle (yes or no) and stress as measured on the LEI (Chi Square(1)=4.14, $p < .05$). The largest cell was represented by the high stress women who were aware of changes during their cycle. The smallest group consisted of the remaining high stress women who were not aware of physical or emotional changes during their cycle.

CHAPTER V

DISCUSSION

The most important findings of this analysis of 24 depressed
and 30 nondepressed women's experience of the menstrual cycle is
that the depressed women experienced the entire cycle significantly
more negatively than the nondepressed women. The depressed women
reported more feelings of depression and anxiety, experienced more
pain, had greater difficulty concentrating, reported more behavior
decrements and autonomic nervous system imbalance reactions,
indicated the experience of more negative affect and water
retention, and complained more often of physical symptoms normally
considered unrelated to the menstrual cycle. As anxiety and
depression frequently co-exist in both psychiatric and
nonpsychiatric conditions (Klerman, 1977), this result is not
dissimilar to Coppen and Kessel's (1963) finding of a significant
correlation between high neuroticism and moderate or severe general
irritability throughout the cycle. The result is also similar to
Moos, Kopell, Melges, Yalom, Lunde, Clayton and Hamburg's (1969)
finding suggesting that women who are high on negative affect
premenstrually also tend to be high menstrually and
intermenstrually.

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The investigation did not find clear evidence that depressed women show greater reaction to the menstrual or premenstrual phases as compared with the intermenstrual phase than nondepressed women. Support for the hypothesis that depressed and nondepressed women experience the menstrual cycle differently may be missing due to the population studied. Not only was the population limited by age, marital and religious affiliation factors, but the depressed group on the whole was only moderately depressed (average BDI=17.5) according to Beck's (1967) original classifications. An older population with more even representation of married and single women who have been diagnosed as depressed would better represent a depressed group. In addition, a similar control group of nondepressed women would add validity to the study.

Another explanation for the lack of evidence suggesting that depressed women show greater reaction to the menstrual or premenstrual phases as compared with the intermenstrual phase than nondepressed women is the fact that both groups of women experienced comparable fluctuations in mood during similar cycle phases. In particular, significant phase effects (depressed and nondepressed women grouped together) were present for depression, state anxiety, somatic anxiety, pain, autonomic nervous system imbalance reactions, water retention, and control symptoms, with the highest endorsement of symptoms during menstruation, followed by the premenstrual phase, with the fewest symptoms reported intermenstrually. The later results are similar to those reported by Wilcoxon et al. (1963) in

their study of 33 undergraduates, Mandell and Mandell (1967) in their study of 87 women's calls to a suicide prevention center, and Jacobs and Charles' (1970) survey of 200 women ages 21 to 40 making initial psychiatric contacts. Although other researchers report greater symtomatology during the premenstrual phase (Coppen & Kessel, 1963; Glass et al., 1971; May, 1975), no evidence has been found suggesting a significant difference between women's reported experience of the premenstrual as compared with the menstrual phase of the cycle. The sensitivity of the premenstrual and menstrual phases is stressed by Dalton (1966) who included both in what she termed the paramenstruum.

The investigation into the effects of life stress indicate that high and low stressed women differ in their experiences of pain and behavior changes during the menstrual cycle with high stressed women endorsing more of these symptoms. In addition, it was determined that the depressed group of women indicated significantly greater life stress than the nondepressed group. A further look at depression and stress and its effects during the menstrual cycle using a stress measure during each cyle phase is suggested.

The investigation into sex-role orientation and its possible effects on the experience of the menstrual cycle were inconclusive. There was no indication that sex-role orientation is related to a woman's experience of the menstrual cycle. In addition, sex-role orientation had little to do with whether a women

was depressed or not as both depressed and nondepressed women were well represented in both the androfeminine (feminine and androgynous) group and the nonandrofeminine (masculine and undifferentiated) group.

Eighty-two percent of this population (evenly distributed between the depressed and nondepressed groups) indicated that they were aware of physical or emotional changes which accompanied the menstrual cycle. However, no further subjective elaboration regarding the extent of these changes was gathered in the questionnaire. The criteria outlined by Kashiwagi et al. (1976) in their investigation of the premenstrual affective syndrome and psychiatric disorders would help delineate the extent of these menstrual cycle symptoms. In particular, they look for the endorsement of specific psychological symptoms (sad, blue, depressed; tense or nervous; crying easily; decreased energy; increased mood or energy) and specific somatic symptoms (swelling of legs, swelling of abdomen, tenderness in breasts, weight gain) along with the subjective rating of these symptoms and whether behavior changes are recognizable to others. The use of such criteria would greatly increase the descriptive power of a statement regarding the incidence of physical or emotional changes experienced during the menstrual cycle.

Beck (1963) reported that suicidal ideation was related to the subject's conceptualization of his/her situation as hopeless. A key issue in working with depressed clients who have suicidal tendencies

is anticipating and understanding those times when negative experiences and hopelessness increase. In contrast to the initial hypothesis suggesting that depressed women experience the menstrual cycle differently than nondepressed women, it was found with this population of college women that fluctuations during the cycle were quite similar with negative symptoms acknowledged most often menstrually, followed by the premenstrual phase, with fewest symptoms intermenstrually. However, it was also determined that the depressed women experienced a number of negative symptoms including anxiety, depression, negative affect, behavior decrements, difficulty concentrating, and pain to a greater extent throughout the cycle. In addition, the experience of stressful events was related to depression classification with depressed women indicating greater life stress than nondepressed women.

If it is considered important to anticipate and help the depressed woman understand her own affect fluctuations in hopes of reducing the occurrence of feelings of hopelessness, then discussion and understanding of mood fluctuations as related to the menstrual cycle appear important. If the depressed woman can anticipate and understand her varying moods with the knowledge that she will feel worse during particular phases of her menstrual cycle and better during others, then some of the helplessness, hopelessness, and fear associated with times when depression is greater may be better understood and hopefully brought better under control.

To further investigate this area the following suggestions are made: (a) collect data from a more representative population of adult women taking into consideration such variables as age, marital status, religious affiliation and level of depression; (b) further delineate the type and severity of particular physical and emotional changes experienced by menstruating women; (c) collect stress data during all cycle phases in order to gain a better understanding of depression, stressful events and their influence during particular menstrual cycle phases.

SUMMARY

Variations in menstrual symptoms were assessed during three cy-
cle phases in 24 depressed and 30 nondepressed college women. All
negative symptoms including anxiety were consistently reported more
often by the depressed women than by the nondepressed women through-
out the menstrual cycle ($\underline{p}$ .05). However, no clear evidence was
found that depressed women react differently to particular cycle
phases than nondepressed women. In fact, fluctuations during the
cycle were similar for measures of depression, state anxiety,
somatic anxiety, pain, autonomic nervous system imbalance reactions,
and water retention with the highest endorsement of symptoms during
menstruation, followed by the premenstrual phase, with fewest
symptoms acknowledged intermenstrually.

The roles of life stress and sex-role orientation were also ex-
plored. Evidence was found that women reporting greater life
stress acknowledged more symptoms of pain and behavior change than
the low stress group. In addition, the depressed women indicated
significantly greater life stress than the nondepressed women. With
regard to sex-role orientation, no evidence was found suggesting a
relationship between sex-role orientation and a woman's experience
of the menstrual cycle.

A more representative population of depressed and nondepressed women, a more refined delineation of type and severity of menstrual symptoms, and collection of stress data throughout the cycle are suggested for further research.

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APPENDIX A

SOCIAL AND MENSTRUAL HISTORY QUESTIONNAIRE

Please answer the following questions in as much detail as possible. Use the back of the page if more space is needed. If, however, you do not wish to answer any particular questions, feel free to leave them blank. Thank you for your cooperation in doing this reseach.

At what age did you begin to menstruate?

By what term do you refer to menstruation?

How did you first learn about it?

At what time of the month is conception most likely to occur?

Is there a time of the month when it is impossible to conceive?

When you learned about menstruation, did you know how "babies are made?"
yes _____, no _____. Did you understand the relationship between sex and reproduction? yes _____, no _____, sort of _____.

Did your attitude toward boys change when you began to menstruate?
yes _____, no _____. If yes, how?

Did your attitude toward yourself change? yes _____, no _____. If yes, how?

When you began to menstruate, did you feel you had been adequately prepared? yes _____, no _____. Explain and include what might have helped.

Was your first flow a positive experience _____, negative _____, neutral _____, frightening _____, exciting _____, (other) _____.

Are you aware of any physical or emotional changes during the menstrual cycle? yes _____, no _____. If yes, when do they occur and what are they?

How, when, and by whom were you first told about menstruation? Include your feelings and reactions.

What "old wives" tales or home remedies were passed on to you about menstruation?

How many years have you been menstruating?

Do you feel that menstruation brings any special advantage to women? yes _____, no _____. Explain.

Do you feel men have special advantage because they do not menstruate? yes _____, no _____. Explain.

If you could retain fertility but have no more menstrual flow would you opt for that yes _____, no _____. Explain.

Is there a particular time of the month when you feel sexually turned on? yes _____, no _____. If yes, when?

Are you a virgin? yes _____, no _____. If yes, skip the next three questions.

Have partners objected to sexual activity when you were menstruating? yes _____, no _____, occasionally _____.

Do you object to sex when you are menstruating? yes _____, no _____. Explain why.

Do you use some form of birth control? yes _____, no _____. If so, what kind and does it affect your menstrual cycle experience or flow? Explain.

How old are you? _____

What is your height? _____

What is your weight? _____

What is your religious background? _____

What is your racial background? _____

Are you married? yes _____, no _____. If yes, for how long? _____.

Please add any additional comments you would like to make.

APPENDIX B

APPENDIX B

QUANTITATIVE RESULTS OF THE

SOCIAL AND MENSTRUAL HISTORY QUESTIONNAIRE

At what age did you begin to menstruate?
mean	12.9
range	10-18
SD	1.5
cases	53

When you began to menstruate, did you feel you had been adequately prepared?
yes	38 (72%)
no	15 (28%)
cases	53

Are you aware of any physical or emotional changes during the menstrual cycle?
yes	42 (82%)
no	9 (18%)
cases	51

How many years have you been menstruating?
mean	5.9
range	4-9
SD	1.4
cases	53

Do you feel that menstruation brings special advantages to women?
yes	23 (45%)
no	28 (55%)
cases	51

Do you feel men have a special advantage because they do not menstruate?
yes	40 (78%)
no	11 (22%)
cases	51

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If you could retain fertility but have no more menstrual flow would
you opt for that?
```
        yes        45 (90%)
        no          5 (10%)
        cases      50
```

Are you a virgin?
```
        yes        37 (70%)
        no         12 (23%)
        no ans.     4 ( 7%)
        cases      53
```

Do you use some form of birth control?
```
        no         41 (77%)
        yes         8 (15%)
                   pill  3 (6%)
                   IUD   0 (0%)
                   other 5 (9%)
        no ans.     4 (8%)
        cases      53
```

How old are you?
```
        mean       18.6
        range      17-22
        SD          1.0
        cases      53
```

What is your religous background?
```
        Catholic    43 (81%)
        Protestant   7 (13%)
        Jewish       1 ( 2%)
        Other        2 ( 4%)
        cases       53
```

What is your racial background?
```
        white      43 (81%)
        black       4 ( 8%)
        other       6 (11%)
        cases      53
```

Are you married?
```
        no         53 (100%)
        yes         0 (  0%)
        cases      53
```

APPROVAL SHEET

The thesis submitted by Marlys A. Conrad has been
read and approved by the following committee:

Dr. Alan S. DeWolfe, Director
Professor, Psychology, Loyola

Dr. Patricia A. Rupert
Assistant Professor, Psychology, Loyola

The final copies have been examined by the director
of the thesis, and the signature which appears below
verifies the fact that any necessary changes have been
incorporated and that the thesis is now given final
approval by the Committee with reference to content
and form.

The thesis is therefore accepted in partial fulfillment
of the requirements for the degree of Master of Arts.

2/3/83
Date

Alan S DeWolf
Director's Signature

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