ACTUAL AND PERCEIVED MOOD FLUCTUATIONS: A COMPARISON OF
MENSTRUAL, WEEKDAY, AND LUNAR CYCLES

by

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Abstract

The major purpose of the study was to examine mood fluctuations associated with phases of the menstrual cycle. To assess the relative impact of the menstrual cycle on moods, other cycles hypothesized to influence moods also were assessed. Mood fluctuations in women and men were studied both prospectively and retrospectively to determine whether cyclic changes occur with the phases of the menstrual cycle, lunar cycle, and/or days of the week. Each participant (15 women using oral contraceptives, 12 normally cycling women, and 15 men) recorded their moods daily for 70 days (prospective data). A daily mean score was obtained for both pleasantness and arousal (each on a 9-point positive to negative scale). Mood stability/variability was recorded daily on a 4-point scale. At the end of the study, participants recalled (retrospective data) their mood over the previous 2 months for each day of the week and the phases of their menstrual cycle (women only). The focus on menstrual cycles was sucessfully camouflaged. Prospectively, there were no group differences and no menstrually-related mood fluctuations. The retrospective reports, however, indicated systematic bias. Women recalled more positive moods in the follicular phase and more negative moods in the premenstrual and menstrual phases than they had reported prospectively. All groups reported weekday mood changes -- Monday lows and Friday/Saturday highs. Recollections of weekday mood fluctuations were similar to but more exaggerated than prospective reports. Prospective reports revealed no mood fluctuations over the lunar cycle. Together, these results indicate that stereotypes (both well- and ill-founded) influence recollections of mood, and are consistent with schematic processing theories. The importance for menstrual cycle research of obtaining information about positive as well as negative experiences, camouflaging the purpose of the study, collecting prospective data, and assessing results in the contexts of other cycles also is discussed.
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This study was designed to address the current controversy in scientific and lay circles concerning mood fluctuations associated with the phases of the menstrual cycle. The effects of ovarian hormones on mood were first studied by Benedek and Rubenstein (1939a, 1939b, 1942). Using psychoanalytic techniques, they found that the ovulatory phase (when ovarian hormones are typically high) tended to be accompanied by pleasant affect (emotions), the premenstrual phase (when ovarian hormone concentrations are dropping) by feelings of anxiety and depression, and the menstrual phase (when hormones are at their lowest) by feelings of depression. This emotional fluctuation has come to be known as the "classic" menstrual mood pattern, and has been discussed by a number of other researchers (e.g., Altman, Knowles, & Bull, 1941; Ivey & Bardwick, 1968; Moos, Kopell, Meiges, Yalom, Lunde, Clatton, & Hamburg, 1969).

The actual relationship between ovarian hormones and affective experience is not clear. Negative affect during the premenstrual and menstrual phases has been reported in numerous studies (Golub, 1976; Janowsky, Berens, & Davis, 1973; Luschen & Pierce, 1972; Patkai, Johannson, & Post, 1974; Rossi & Rossi, 1977). A feeling of elevated mood at midcycle was reported by Moos et al. (1969), and some researchers have found both elevated mood at midcycle and negative affect in the premenstrual and menstrual phases (Altman et al., 1941; Benedek & Rubenstein, 1939a, 1939b; Ivey & Bardwick, 1968; Moos et al., 1969). In marked contrast, other investigators have found no mood fluctuations associated with the menstrual cycle (Anderson, 1972; Golub, 1981; Lahmeyer, Miller, & DeLeon-Jones, 1982; Little & Zahn, 1974; Sommer, 1973; Swandby, 1981; Wilcoxon, Schrader, & Sherif, 1976; Zimmerman & Parlee, 1973). Many of the discrepancies in the results are due to methodological inconsistencies, noncomparability of measures, and differences in analytical techniques (Glick & Bennett, 1982).
Failure to conceal the menstrual purpose of the investigation and use of measures with a predominantly negative emphasis are characteristic of the studies in which the classic premenstrual pattern is found. Moreover, some researchers who obtained the classic mood pattern (e.g., Coppen & Kessel, 1963; Jessen, 1982; Moos, 1968; Moos et al., 1969), used retrospective measures. For example, women would be asked to recall their moods and check off "symptoms" based on their memory of the phases of their most recent menstrual cycle. There is growing evidence that retrospective reports do not correlate well with prospective daily reports of menstrual experiences (e.g., Ascher-Svanum, 1984; May, 1976; McCance, Luff, & Widdowson, 1937; Parlee, 1974; Slade, 1984). It has been suggested (e.g., Parlee, 1974; Slade, 1984) that retrospective reports are more likely to reflect participants' attitudes or stereotypes than their recall of actual experiences.

In addition to considering the methodological issues already mentioned, it is important to assess emotional patterns in other contexts. For example, Parlee (1982) found that the mood changes associated with an individual woman's menstrual cycle were relatively insignificant when compared to her overall mood pattern. Placing the menstrual cycle in a broader context has the advantage of revealing how important menstrual emotionality is to women. Contextual studies also are helpful in determining what constitutes a menstrual disorder, and have the potential to facilitate identification of women in need of treatment.

An integral part of placing the menstrual cycle in a broader context is the inclusion of appropriate comparison groups. One such group is women taking oral contraceptives (OCs). OCs exert their contraceptive effects (i.e., prevent ovulation) by significantly reducing endogenous levels of estrogen and progesterone. Morris and Udry (1972) found that most women taking OCs showed no change in their usual moods, but some women experienced
elated mood and increased activity whereas others experienced depressed mood. The bulk of the evidence seems to indicate that oral contraceptive users experience significantly fewer and less extreme mood fluctuations than do women with natural cycles (Morris & Udry, 1972; Paige, 1971, Rossi & Rossi, 1977). Glick & Bennett (1982) contend that OCs may stabilize moods but further investigation is necessary to establish firmly this effect. Another potentially important comparison group is men, since their reproductive hormone fluctuations do not have such obvious indications as monthly menstruation. Prospectively, men report more stable mood experiences than do women (Swandby, 1981; Wilcoxon et al., 1976).

Comparing mood patterns over the menstrual cycle with fluctuations over other cycles, for example, day of the week, also will help to place menstrual experiences in a broader context. Given that it is common to discuss one's emotional reaction to day of the week (e.g., lethargic or depressed because it is Monday, excited and energetic because it is Friday), the paucity of empirical evidence is surprising. Beliefs in weekday influences on human behaviour are expressed in our popular songs (e.g., "I don't like Mondays" by the Boomtown Rats), movies (e.g., "Thank God It's Friday (TGIF)"), and comic strips ("Garfield," by Jim Davis, is a chronic Monday-hater). In one well controlled study, Rossi and Rossi (1977) found that moods became less positive at the beginning of the week, and more positive on Fridays and Saturdays. More research needs to be done, however, to confirm the existence of such weekday fluctuations and their strength relative to menstrual changes.

Another cycle that has been proposed to affect moods is lunar phases. Some researchers have found that behaviour varies with phases of the moon (e.g., Blackman & Catalina, 1973; Cunningham, 1979 Jones & Jones, 1977; Lieber & Sherin, 1972; Ossenkopp & Ossenkopp, 1973; Tasso & Miller, 1976;
Taylor & Diespecker, 1972) but there is more convincing evidence the moon does not affect behaviour (e.g., Bauer & Hornick, 1968; Fitzhugh, Mulvaney, & Hughes, 1980; Frey, Rotton, & Barry, 1979; Lester, Brockopp, & Priebe, 1969; Lilienfeld, 1969; Michelson, Wilson, & Miclelson, 1979; Porkorny, 1964; Porkorny & Jachimezyk, 1974; Shapiro, Steiner, Gray, Williams, & Soble, 1970; Sharfman, 1980; Weskott, 1974). In spite of the inconsistent (at best) empirical evidence, belief in a "Transylvania Effect" (e.g., unusual behavior during the full moon) is widespread. This may be an ill-founded cultural stereotype which serves to explain unusual or bizarre behaviours of the self or others. Whether or not lunar fluctuations in mood or behaviour are common, since the belief is widespread, consideration of the lunar cycle will help place the menstrual cycle in the broader context of what is believed to influence human behaviour.

Three recent studies of moods and the menstrual cycle have included some of the important methodological features mentioned earlier. Swandby (1981) studied 8 normally cycling women, 10 women taking oral contraceptives, and 10 men. She recorded their weight, pulse, and temperature each day for 35 days. The purpose of the experiment was concealed. Based on visual inspection of her data, Swandby (1981) concluded that only two of the normally cycling women and one of the women taking oral contraceptives showed the classic menstrual mood pattern. Individual mood patterns were highly variable. Group comparisons revealed little evidence of significant menstrual effects on mood. Swandby (1981) concluded that individual variations are greater than menstrual effects on mood. However, she collected data for only 35 days. If she had studied the women for more than one cycle she might have increased her power to detect both individual differences (perhaps finding more women showing a classic pattern) and group differences (that is, differences between the groups might have become more pronounced).
Rossi and Rossi (1977) compared mood patterns over the menstrual cycle with mood changes over days of the week. A sample of 49 normally cycling women, 18 women taking OCs, and 15 men completed the brief mood measure daily for 40 days. Unfortunately, the purpose of the experiment was not concealed, raising the possibility that women's reports of their moods may have been biased by their expectations regarding menstrually related changes (Parlee, 1974). Rossi and Rossi (1977) found that men had a greater tendency to report mood fluctuations over days of the week than did women. Specifically, men tended to report less positive moods on Tuesdays and more positive moods on Fridays. Their reports of their somatic mood states (e.g., healthy, energetic, sexy) were even more strongly linked to day of the week than were their psychological moods. In general, Rossi and Rossi (1977) found that women showed a classic mood pattern, except that negative moods were associated with the luteal rather than the premenstrual phase.

Rossi and Rossi's (1977) study illustrates the importance of studying other cycles and other groups. Until then, researchers had not studied men and had assumed that women are unique in their behavioural cyclicity. Rossi and Rossi (1977) found that men may have more intense weekday behavioural cycles than do women. Their menstrual findings are less impressive, since the purpose of the study was not camouflaged and women were studied for only one menstrual cycle.

Slade (1984) prospectively studied 118 women's reports of their menstrual experiences for 8 weeks. The purpose of the investigation was concealed. She found that women did report significant physical changes (e.g., tender breasts) in the premenstrual and menstrual phases, but psychological changes occurred randomly throughout the cycle. Slade provided an interesting hypothesis to explain how stereotyped beliefs in menstrual psychological rhythms could be maintained in the face of their actual random
occurrence. It has been shown that negative experiences are more likely to be attributed to biological causes (Koeske & Koeske, 1975), and positive experiences are more likely to be attributed to other variables (Asso, 1983). Thus, women who occasionally or randomly experience negative moods during their premenstrual phase may, upon noticing them, look for a biological/hormonal cause. Since they usually know they will be menstruating shortly, they label their symptoms PMS (premenstrual syndrome). They probably are much less likely to notice the absence of symptoms or to consider lack of symptoms (i.e., positive moods) to be evidence contradicting PMS. Belief in PMS thus could be maintained when it had no systematic support. Slade's (1984) hypothesis is important because it has the potential to explain the widespread self-reports of PMS in light of empirical evidence indicating most women do not experience PMS. Slade did not discuss her hypothesis in the context of schema theory, but in essence, it is a schematic processing explanation. According to schematic processing theories (e.g., Martin & Halverson, 1981; Taylor & Crocker, 1979), individuals' perceptions and experiences of the world are filtered through their schemas. For example, research indicates that people are more likely to change the data to fit their stereotype or schema (e.g., to remember it incorrectly), than to change their stereotype to fit the data (see Martin & Halverson, 1983, for a discussion in the context of gender schemata).

Many different mood scales have been used to study the menstrual cycle but four are most commonly used. The Thayer Activation-Deactivation Adjective Checklist (AD-ACL), is a measure of activation and arousal. The AD-ACL is a 47-item inventory from which 22 adjectives are used to compute total scores on four scales: (1) General Activation (e.g., lively, active), (2) High Activation (jittery, intense), (3) General Deactivation (e.g., still, leisurely), and (4) Deactivation-Sleep (e.g., sleepy, drowsy) (Thayer,
The remaining 25 items ("fillers") are not scored. For each adjective, participants are asked to indicate "how you feel today" on a scale from 1 ("definitely do not feel") to 10 ("feel intensely"). The Profile of Mood States (POMS), contains 65 items designed to measure six mood states (McNair, Lorr, & Droppleman, 1971). Participants respond on a scale from 1 to 5, ranging from "not at all" to "extremely." The scales are: (1) Tension-Anxiety, (2) Depression-Dejection, (3) Anger-Hostility, (4) Vigor, (5) Fatigue, and (6) Confusion. The Multiple Affect Adjective Check List (MAACL) is a self-administered measure of anxiety, depression, and hostility. It consists of 132 adjectives from which participants check the words which best describe their mood states of the past day (Zuckerman, 1960; Zuckerman, Lubin, Vogel, & Valerius, 1964). The most common measure in the menstrual literature is the Menstrual Distress Questionnaire (MDQ) developed by Moos (1968, 1969). It consists of 47 symptoms constituting eight factors (pain, concentration, behavioural change, autonomic reaction, water retention, negative affect, arousal, and control). Each symptom is rated on a 6-point scale from "not present at all" to "acute or partially disabling."

All four of these mood measures can be criticized on several points. With the exception of the AD-ACL and one of six scales in the POMS (vigor), all measure only socially undesirable moods. Perhaps people respond more negatively than they would if the measures included neutral or positive options. In addition, if only negative moods are assessed, researchers learn nothing about fluctuations in positive moods. A second criticism is the assumption that people attach the same meaning to the mood labels. It is possible, however, that a mood one person labels as irritable, another person might label as anger, and yet another might label as restlessness. Asking participants to label their moods may introduce error variability deriving from each individual's unique interpretation of the mood label. In addition
it is not necessary to use a list of all mood labels because factor analytic evidence indicates that a two-dimensional mood structure (i.e., arousal and pleasantness) is sufficient (Russell & Mehrabian, 1977). Asking participants only about these two dimensions minimizes the label interpretation problem. A third criticism is the length of time these measures require. In most recent menstrual research, participants are asked to provide daily ratings of their moods for one to three months. The longer a mood scale takes to complete, the more likely it is that participants will tire of the task, drop out, or become less conscientious; that is, the greater the likelihood of attrition. Since longitudinal studies are crucial to our discovery and understanding of mood patterns, it seems wise to use measures that not only yield useful data, but also economically use participants' time.

The mood measure used in this study was the Affect Grid (Figure 1), designed by Russell (1983). It was chosen because it addresses the criticisms noted above. The horizontal axis of the 9 X 9 grid ranges from unpleasant feelings to pleasant feelings and the vertical axis ranges from high arousal to sleepiness. Eight moods are listed at equal intervals around the square. In clockwise order they are: high arousal, excitement, pleasant feelings, relaxation, sleepiness, depression, unpleasant feelings, and stress. Intensity is measured from the center (no or low intensity) to the circumference (high intensity). Participants describe their mood by placing an "X" in the box which best indicates their emotional state for that day. After training, the task can be completed very quickly.

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Insert Figure 1 about here
A bipolar scale similar to the Affect Grid has been found to be highly correlated with other mood measures including the AD-ACL, POMS, and MAACL. Russell & Mehrabian (1977) found that pleasantness and arousal (i.e., the dimensions of the Affect Grid) accounted for almost all the reliable mood variance in 42 commonly used scales of affect. Thus, although the Affect Grid used in this study differs substantially from scales used in previous studies of moods and the menstrual cycle, the findings can still be compared (e.g., Parlee, 1982; Swandby, 1981).

The present study was designed with the limitations of previous research in mind. Participants were studied daily over 70 days to ensure the inclusion of at least two menstrual cycles (Parlee, 1982). Three groups were studied: women who were normally cycling (womenNC), women taking oral contraceptives (womenOC), and men. To avoid biasing participants' reports, interest in the menstrual cycle was camouflaged (Parlee, 1974). Data were obtained both prospectively and retrospectively in order to detect possible reporting biases. That is, nonbiased data (prospective reports) were compared with information about the participants' stereotypes about menstrual and other cycles (retrospective reports). The menstrual cycle was studied in the broader context of weekday and lunar cycles. Positive as well as neutral and negative moods were assessed to avoid undue emphasis on "symptoms" and negative moods.

The development of hypotheses for this research was not straightforward. Poorly controlled investigations have yielded the "classic" menstrual mood pattern (depressed moods at premenstrual and menstrual phases), but some of the more recent, well-controlled studies have not. Since the present study was designed to be well-controlled, should the hypothesis be no menstrual fluctuations? Or, should the hypothesis reflect the majority of previous studies in which "classic" menstrual mood fluctuations were found? The
latter approach was adopted, if only to reflect historical and cultural predictions. In particular, for the prospective menstrual reports, it was expected that women would report decreased arousal and pleasantness in the premenstrual and menstrual phases (Dalton, 1982; Moos et al., 1969). It was further hypothesized that men, randomly assigned to "pseudo-menstrual cycles," would not show mood patterns associated with the menstrual cycle, and any variability in their reports would reflect non-systematic fluctuations. Consistent with cultural stereotypes and with previous research based on retrospective reports (e.g., Coppen & Kessel, 1963; Jessen, 1982; Moos, 1968; Moos et al., 1969), it was hypothesized that women would recall negative moods at the premenstruum (Slade, 1984).

Prospective weekday reports for both women and men were expected to show evidence of "Monday blues" and "Thank-God-It's-Friday (TGIF)" feelings (Rossi & Rossi, 1977). Specifically, arousal and pleasantness were expected to decrease on Monday and increase on Friday and Saturday. The same pattern was predicted for the retrospective data. Based on Rossi & Rossi's (1977) findings, it was expected that men would report greater mood fluctuations over the days of the week than would women. For the lunar cycle, it was hypothesized that prospective reports would not fluctuate significantly according to the lunar phases. (Retrospective reports about the lunar cycle were not obtained.).

The paucity of previous research made it difficult to predict how mood stability would be related to the menstrual, weekday, or lunar cycles. Literature on stereotypical beliefs about mood stability in women and men indicate that both women and men characterize men as rational, and characterized women as emotional and moody (Smith, 1983). It was hypothesized, therefore, that men's moods would be more stable than women's moods. In addition, it was expected that womenOC would have more stable
moods than womenNC (Morris & Udry, 1972). Mood stability/variability was examined both within each day and across days.

Method

Subjects

A sample of 20 men, 21 women taking oral contraceptives (womenOC), and 21 normally cycling women (womenNC) were recruited from the volunteer subject pool comprising first or second year undergraduates in Psychology courses. Course credit was not given for participation. After attrition² the sample consisted of 15 men, 15 womenOC, and 12 womenNC. Mean age for the final sample was 21 years (range 19 to 26).

Procedure

Potential participants were identified in the volunteer subject pool and then recruited by a telephone call during which the general purpose and length of the study were described. To conceal the menstrual purpose of the study, participants were told that the investigation concerned emotional, behavioural, and physical patterns.

In an initial 30-minute interview (Appendix A), demographic and other general information was obtained. Participants were asked about typical patterns of exercise, sleep, health, diet, menstrual cycle flow and discomfort (women only), complexion problems, libido, weight, and future plans for career and/or family³. They were instructed (Appendix B) to complete a chart (Appendix C) at home each day over the next 70 days. They also were asked to sign a consent form (Appendix D).

Participants were instructed to fill out the one-page daily chart at approximately the same time each day. This usually took less than five minutes. The first section of the chart indicated the time and date of completion. Participants were instructed to be sure to fill out a chart every day, but if they forgot, to "catch-up" by filling in two charts the
next day and indicating which one was for the missed day. For forgotten days, they were asked to provide only that information of which they were reasonably sure. They were instructed to leave a question blank rather than to guess. The second section, which dealt with body awareness, was designed to distract from the researcher's interest in the menstrual cycle. In this section, women were asked whether they were menstruating that day. The third section contained the Affect Grid (Russell, 1983). Participants placed a mark in the one box on the grid which best indicated their mood or emotional state for that day (see Figure 1). Finally, they rated the stability of their moods on a four-point scale ranging from very changeable to very stable. The completed daily charts were returned to the investigator about every two weeks via campus mail or by dropping the charts off at a convenient campus location. The actual length of participation in the study ranged from 60 to 70 days.

At the end of the investigation, participants returned for a final interview. They first completed the final questionnaire (Appendix E) in privacy. It contained questions about the purpose of the study, significant life events since the study began, employment, willingness to continue in the study, religion, change in birth control since the study began, and recollections of weekday (women and men) and menstrual mood fluctuations (women only). Next, the participant was given a written summary of the investigation and its hypotheses (Appendix F). Finally, the researcher verbally explained the study and answered any questions.

**Scoring**

**Menstrual Cycle.** The menstrual cycle was divided into the five phases used by Rossi and Rossi (1977): Menstrual= Day 1-4 (Day 1 = the first day of menstruation); Follicular= Day 5-11; Ovulatory= Day 12-16; Luteal= Day 17-24; and Premenstrual= Day 25-28. Since not all women have a 28-day cycle, cycles
were adjusted to a standard length. The procedure recommended by Rossi and Rossi (1977) was used. A midpoint in the reported cycle was taken to determine a probable date of ovulation. A band of two days before and two days after the midpoint yielded a 5-day ovulatory phase. Menstrual and premenstrual phases were calculated forward and backward from the first day of menstrual flow. For a 28-day cycle, the seven days between the menstrual phase and the ovulatory phase were coded as the follicular phase, and the seven days between ovulation and the premenstrual phase were coded as the luteal phase. For cycles less than 28 days, the menstrual, premenstrual, and ovulatory phases were calculated as described but the follicular and luteal phases were shortened to accommodate a shorter cycle. For cycles longer than 28 days, some of the days between the follicular and ovulatory phases, and between the ovulatory and luteal phases, were not coded. In cases of cycles an odd number in length, the luteal phase was shortened or an additional day between the ovulatory and luteal phases was not coded, as appropriate. Women who had menstrual cycles longer than 38 days were dropped from the study.

Men were randomly assigned to 28-day pseudo-menstrual cycles. Day 1 of these cycles varied such that the men's "cycles" began on different dates during the investigation. Staggering the men's cycles simulated the variations in starting dates of women's cycles. The purpose of assigning cycles to men was to allow men to be included in all prospective analyses. In addition, since men should not be affected by an imaginary cycle, if a difference was found it would indicate a possible methodological error or bias.

The means used in the prospective analyses were calculated by averaging across all days constituting each phase of the menstrual cycle and across all cycles for each dependent measure. If two cycles were observed, for example, and the mean for premenstrual phase arousal was desired, the arousal scores
for the four days constituting each of the two premenstrual phases observed (eight days) were included in the premenstrual arousal mean. Means were similarly calculated for each phase of the menstrual cycle for arousal, pleasantness, and stability. The women's retrospective menstrual cycle scores consisted of the single arousal and pleasantness scores recalled for each phase of their menstrual cycle during the study. Women were not asked retrospectively about the stability of their moods over the menstrual cycle, and, of course, retrospective menstrual cycle data were not obtained from men.

**Weekday cycle.** The weekday cycle was divided into seven days. The means used in the prospective analyses were calculated by averaging across all observed Sundays (for Sunday's mean), Mondays (for Monday's mean), and so on for each day of the week and for each dependent measure. The retrospective scores for both women and men consisted of the single arousal and pleasantness scores they recalled for each day of the week during the study.

**Lunar Cycle.** The lunar cycle was divided into four phases: new moon, first quarter, full moon, last quarter. The means used for both women and men in the prospective analyses were calculated by averaging across all days constituting each of the phases observed for each of the three dependent measures. Recollections regarding the lunar cycle were not obtained.

**Standard Deviation Analyses.** For the analyses on standard deviations, the same procedures used for means were followed except that, instead of means, standard deviations were calculated.
Results

Knowledge of the Menstrual Purpose of the Experiment

Only four participants (2 womenOC and 2 womenNC) guessed the purpose of the study. Data from the women who did and did not guess the purpose of the study were compared in multivariate analyses of variance (MANOVAs). There were no significant differences between the two groups of women for arousal, pleasantness, or mood stability means or standard deviations (Appendix G). The women who guessed the study's purpose also anecdotally reported during the interview that their menstrual cycles did not influence their moods. The data from women who guessed the purpose of the study were, therefore, included in the analyses.

Remembered versus Forgotten Days

A preliminary test was performed to determine whether reports made one or more days late (forgotten days) were different from reports made on the date specified (remembered days) for arousal, pleasantness, or stability. The forgotten days constituted 19.2% of the total data. The mean arousal score for forgotten days (5.49) was lower than the mean (5.83) for remembered days, \( t \) (3021)=4.15, \( p<.001 \). The differences for pleasantness and stability were not statistically significant (Appendix H). Preliminary analyses indicated the pattern of results for arousal, pleasantness, and stability was the same whether or not forgotten days were included. For all subsequent analyses, therefore, data from forgotten days were included.

Demographic Results

A MANOVA revealed that men, womenOC, and womenNC did not differ overall in terms of age, years of post-secondary education, or willingness to continue in the study for one or two months (Appendix I). Chi-square analyses revealed the groups did not differ in type of university program or future plans for a family or career (Appendix I).
Overview of Analyses

Three similar sets of analyses were performed, one for each cycle (menstrual, weekday, lunar). In the interest of brevity, the complete set of analyses for one cycle (the menstrual cycle) will be described in detail in this overview. The necessary changes for the remaining analyses will then be noted.

First, a set of repeated measures MANOVA was used to compare the three groups, i.e., men (who were assigned to pseudo-menstrual cycles), womenOC, and womenNC, across the five cycle phases (menstrual, follicular, ovulatory, luteal, and premenstrual). This was done on the prospective data for both means and standard deviations for each of the three dependent measures (arousal, pleasantness, and mood stability). Then, repeated measures MANOVAs were done on the retrospective menstrual data from the two groups of women for arousal and pleasantness. Next, the women's prospective means and retrospective scores were compared in MANOVAs for arousal and pleasantness.

In each of the above analyses, if the multivariate test was significant, univariate tests were done to ascertain which specific main effects and/or interactions were significant. Significant interactions were further broken down to determine the source of the interaction using simple main effects analyses. Differences among pairs of means were tested with the Tukey B range test.

The analyses were repeated for the weekday cycle using seven levels (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday), and for the lunar cycle using four levels (new moon, first quarter, full moon, last quarter). (see Appendix J for MANOVA F, df, & p values and significant ANOVAR summary tables). The main difference between these analyses and the menstrual cycle analyses described earlier is that men were included in the retrospective weekday analyses. Unfortunately, recollections of lunar moods
were not obtained, so only prospective analyses were conducted for the lunar cycle.

Standard Deviations and Stability

There were no significant differences for groups, cycles, or their interactions for any of the analyses based on standard deviations or stability (Appendix J). This consistent result indicates that young men and women do not report different degrees of fluctuation in their moods on different days of the week, and young women do not report different degrees of fluctuation in their moods during different phases of their menstrual cycle. This finding contradicts the stereotype that women are "more changeable" than men, especially premenstrually or menstrually.

Prospective Menstrual Cycle

Arousal. When arousal was examined over the phases of the menstrual cycle there were no significant differences due to group, phase, or their interaction (Appendix J).

Pleasantness. A MANOVA revealed that pleasantness did not vary overall according to group or phase of the menstrual cycle, but the interaction between the two was significant, $F(8, 72) = 2.13, p < .05$. WomenNC reported feeling more pleasant during the follicular phase than did both men and womenOC ($p < .01$ for both comparisons).

Retrospective Menstrual Cycle

Since men could not be asked to recall mood fluctuations in relation to the menstrual cycle, the retrospective analyses were limited to womenOC and womenNC.

Arousal. Retrospective reports of arousal did not vary according to whether women were normally cycling or taking oral contraceptives, either overall or for specific phases of the menstrual cycle (Appendix J). There was a significant variation over the menstrual phases in recall of arousal,
18

F(4,22)=3.98, p<.05, and the pattern was the same for womenOC and womenNC, i.e., the interaction was not significant. The means for the menstrual to premenstrual phases were: 5.29, 6.10, 5.96, 5.83, and 5.34, respectively. There was a tendency for arousal to be recalled as significantly lower in the menstrual than in the follicular phase. (The actual mean difference was .808, just below the difference of .842 required for significance at p<.05 for the Tukey B test.)

Pleasantness. The results for retrospective reports of pleasantness were similar to those for arousal. Reported pleasantness did not vary according to whether women were normally cycling or taking oral contraceptives, either overall or for specific phases of the menstrual cycle (Appendix J). WomenOC and womenNC both recalled variations in pleasantness according to menstrual phase, F(4,22)=13.00, p<.001. The means for the menstrual to premenstrual phases were: 5.28, 6.44, 5.76, 5.93, and 3.93, respectively. The menstrual phase was recalled as being significantly less pleasant than the follicular phase (p<.05) and the premenstrual phase was remembered as being less pleasant than all other phases of the cycle (p<.01). It is perhaps noteworthy that women's recollections of the pleasantness of their average mood during the premenstrual phase (3.93) was the only instance in the prospective or retrospective menstrual data of a mean on the negative side of the midpoint of the pleasantness or arousal scales.

Direct Comparison of Prospective and Retrospective Menstrual Data

In the next set of analyses the prospective and retrospective menstrual cycle data were compared directly. It was not possible to include both in one overarching analysis because men could not be included in any analyses involving retrospective reports related to the menstrual cycle. Only the type of Report (prospective or retrospective), the Report by Cycle, Report by Group, and the three-way interaction of Report, Group, and Cycle effects are
discussed below, since the main effects and other interaction effects have already been reported.

**Arousal.** When women's prospective and retrospective reports of arousal were compared in a MANOVA, no significant differences were found between womenNC and womenOC, nor did group interact with type of report (prospective, retrospective) or phase of the menstrual cycle (Appendix J). The difference between women's prospective and retrospective reports of arousal did differ with phase of the menstrual cycle, however, $F(4,22)=5.99, p<.01$ (see Figure 2). Both womenOC and womenNC retrospectively overestimated their arousal in the follicular phase ($p<.01$).

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**Pleasantness.** Averaging across the menstrual phases, women's retrospective reports of pleasantness (mean=5.47) were lower, $F(1,25)=6.52, p<.05$, than their prospective reports (5.76). Moreover, the pattern of similarities and differences between retrospective and prospective reports varied with the phases of the menstrual cycle, $F(4,22)=11.08, p<.001$. As illustrated in Figure 3, women retrospectively overestimated the pleasantness they had experienced in the follicular phase ($p<.05$) and underestimated their pleasantness in the premenstrual phase ($p<.01$). There also was a trend ($p<.051$) to underestimate pleasantness in the menstrual phase.

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Insert Figure 2 About Here

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Insert Figure 3 About Here

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Summary of Menstrual Cycle Results

When participants reported their moods prospectively, they reported no differences in arousal according to phase of the menstrual cycle. Contrary to the hypothesis, pleasantness was not lower in the menstrual or premenstrual phases, and indeed, womenNC reported more pleasantness in the follicular phase than did womenOC and men who had been randomly assigned to pseudo-cycles.

Whereas prospective reports indicated that women did not experience differences in either arousal or pleasantness according to the phases of the menstrual cycle, women recalled that their moods over the same period had been less positive in the menstrual and premenstrual phases. Both arousal and pleasantness were recalled as lower in the menstrual than the follicular phase, and pleasantness was recalled as lower in the premenstrual phase than in all other phases. In general, women recalled their arousal and pleasantness in the follicular phase as significantly more positive than they had reported prospectively, and recalled their arousal and pleasantness less positively in the premenstrual and menstrual phases than they had reported prospectively. These results indicate that women's recollections are consistent with stereotypes about women's mood fluctuations, and in particular, are consistent with the "premenstrual syndrome." The prospective data indicate that these recollections were not well-founded.

Prospective Weekday Cycle

Arousal. When reporting prospectively, men, womenOC, and womenNC did not differ in average weekday arousal level, and their reports were similar for each day of the week (i.e., the interaction was non-significant; see Appendix J). Averaging across the groups, arousal did vary significantly according to day of the week, $F(6,34)=4.79$, $p<.001$. From Sunday to Saturday the means were: 5.31, 5.49, 5.45, 5.48, 5.57, 5.87, and 5.74, $F(6,34)=4.79$,.
Arousal was higher on Friday than on Sunday (p<.01), Monday, Tuesday, and Wednesday (p<.05). In addition, arousal was higher on Saturday than on Sunday (p<.05).

**Pleasantness.** The pattern of results for pleasantness was similar to that for arousal; the groups did not differ overall, and the interaction of group and weekday was not significant (see Appendix J). Pleasantness varied with day of the week, F(6,34)=5.68, p<.001. From Sunday to Saturday the means were 5.64, 5.37, 5.44, 5.57, 5.59, 5.90, and 5.95. Mood on Saturday was reported to be more pleasant than on Monday, Tuesday (p<.01 for both), Wednesday, and Thursday (p<.05 for both). In addition, Friday was reported as more pleasant than Monday or Tuesday (p<.01).

**Retrospective Weekday Cycle**

**Arousal.** Retrospective reports of arousal did not vary by group or the interaction of group with day of the week (Appendix J). Averaging across the three groups, recollections of arousal varied by day of the week, F(6,33)=8.59, p<.001. The means for Sunday through Saturday were: 4.88, 5.26, 5.57, 5.11, 5.40, 6.20, and 6.56. Arousal was recalled as higher on Saturdays than on Sundays, Mondays, Tuesdays, Wednesdays, and Thursdays (p<.01). In addition, arousal was recalled as higher on Fridays than on Sundays, Mondays, Wednesdays (p<.01), and Thursdays (p<.05).

**Pleasantness.** Whereas the groups did not differ in their prospective reports of pleasantness, retrospectively womenOC (p<.05) and womenNC (p<.01) recalled feeling more pleasant, on average, than did men, F(2,38)=3.49, p<.05. Retrospective reports of pleasantness also varied significantly by weekday, F(6,33)=21.58, p<.001. Means for Sunday through Saturday were: 5.70, 5.18, 5.74, 5.73, 5.91, 6.97, 6.52. Greater pleasantness was recalled for Fridays than Sundays, Mondays, Tuesdays, Wednesdays, and Thursdays (p<.01). Participants also recalled feeling more pleasant on Saturdays than
on Sundays (p<.05), Mondays (p<.01), Tuesdays, and Wednesdays (p<.05 for both). In addition, Thursday was remembered as being more pleasant than Monday (p<.05). There was no interaction between group and day of the week for retrospective reports of pleasantness (Appendix J).

Direct Comparison of Prospective and Retrospective Weekday Data

**Arousal.** When the prospective and retrospective reports were analyzed together (Appendix J) prospective and retrospective reports differed significantly according to day of the week, $F(6,33)=4.60$, $p<.01$, as can be seen in Figure 4. Both men and women retrospectively underestimated feelings of arousal they had experienced on Sundays (p<.05) and overestimated their arousal on Fridays (p<.05) and Saturdays (p<.01).

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Insert Figure 4 About Here

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**Pleasantness.** Prospective and retrospective reports of pleasantness differed significantly overall, $F(1,38)=12.70$, $p<.001$ (Appendix J). Both men and women reported greater pleasantness prospectively (5.76) than retrospectively (5.47). The patterns of prospective and retrospective reports also differed significantly according to day of the week, $F(6,33)=7.42$, $p<.001$ (see Figure 5). In recalling their weekday moods, participants overestimated their pleasantness on Fridays and Saturdays (p<.01).

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Insert Figure 5 About Here

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Summary of Weekday Results

Whereas prospective reports of arousal and pleasantness did not vary significantly according to menstrual cycle, they did vary according to day of the week. The pattern was the same for men and women. The highest levels of both arousal and pleasantness were reported on Friday and Saturday. The lowest levels of arousal were reported on Sunday and Monday, and lowest pleasantness on Monday and Tuesday. These results do not support the hypothesis that womenOC and men would experience less change than womenNC. Instead, there were no group differences. The prospective results confirm the stereotype of weekend highs and Monday lows, and the same pattern occurred in the retrospective data. Participants recalled feeling more aroused and pleasant on Friday and Saturday than on other days of the week, and as having more negative feelings on both measures on Sunday and Monday than on other days. In addition, womenOC and womenNC recalled feeling more pleasant on average than men. In effect, both women and men accurately recalled their pattern of moods across the days of the week, but in an exaggerated way. These results, which are consistent with the stereotype of "Monday blues" and "Thank-God-It's-Friday" feelings, indicate the good days were remembered as better and the bad ones as worse than they had been reported when experienced. In a sense, the retrospective reports were exaggerations of a well-founded cultural stereotype, that is, one observed in prospective data.

Lunar Cycle

There were no significant mood fluctuations according to phases of the lunar cycle in any of the analyses for the prospective reports (Appendix J). These results contradict the "Transylvania Effect" and suggest that belief in this alleged phenomenon may be an ill-founded cultural stereotype. Unfortunately, participants were not asked to recall their moods according to
phases of the lunar cycle, so it is not known whether this stereotype was held by participants in this study.

Discussion

Several conclusions can be drawn from this study. The lack of menstrual mood patterns for arousal, pleasantness, and stability in the prospective data indicates that most young women are relatively unaffected emotionally by menstrual hormonal fluctuations. All of these results contradict the results of many previous investigations (Altman et al., 1941; Benedek & Rubenstein, 1939a, 1939b; Golub, 1976; Ivey & Bardwick, 1968; Janowsky et al., 1973; Luschen & Pierce, 1972; Moos et al., 1969; Patkai et al., 1974; Rossi & Rossi, 1977) in which women were asked retrospectively to list "symptoms" and the menstrual purpose of the research was not concealed. Instead, the results confirm the findings of other researchers who made some important methodological refinements (Anderson, 1972; Golub, 1981; Lahmeyer et al., 1982; Little & Zahn, 1974; Sommer, 1973; Swandby, 1981; Wilcoxon et al., 1976; Zimmerman & Parlee, 1973). The results of this study also fail to support the scientific and popular notion that women are "victims of their raging hormones." Demonstrating that most women do not have menstrual mood fluctuations, however, does not rule out the possibility that some or even all women do experience mood fluctuations across the phases of their menstrual cycle, (e.g., PMS). It also is possible that some individual women experience cyclic mood fluctuations, but the pattern is sufficiently unique that it is not apparent when averaged across individuals within a group. In future research, time series analyses will be conducted to pursue this possibility.

Evidence that both men and women experience significant weekday mood patterns demonstrates that men have emotional patterns and that women are not unique in their emotional fluctuations. The omission of men as a comparison
group in earlier studies may have led researchers to persist in the stereotype that women were more emotional than men. The finding that both sexes have similar emotional experiences underscores the importance of including comparison groups. In addition, evidence of mood cycles in men as well as in women indicates that treating emotional fluctuations as unhealthy symptoms, and assuming that women usually manifest them, is misleading.

The results of this study are not consistent with Rossi & Rossi's (1977) finding that men's somatic (e.g., healthy, energetic, sexy) moods varied more with day of the week than did women's moods. Rossi & Rossi (1977) suggested that the sex difference occurred because women's moods were affected by the menstrual cycle in addition to the weekday cycle. It is important to note, however, that they did not camouflage their interest in the menstrual cycle. In the present study, when the purpose was sucessfully camouflaged, menstrual mood fluctuations were not reported in the prospective data. This result contradicts Rossi & Rossi's (1977) emotion-related findings, but cannot speak to their data on somatic moods since the Affect Grid did not have a strong somatic component. Participants' reports regarding health, exercise, and sleep will be analyzed in subsequent research for evidence of menstrual, weekday, and lunar cycles.

Women's negative bias when recalling their menstrual mood patterns and the overestimation of weekday mood patterns by both sexes suggests that cultural stereotypes play an important role in answering retrospective questionnaires. Participants were not asked to recall their moods over the lunar cycle, but a similar tendency in that instance seems likely, at least for people who believe in lunar cycle mood fluctuations. The results confirm the findings of several other researchers (Ascher-Svanum, 1984; May, 1976, McCance, Luff, & Widdowson, 1937; Parlee, 1974; Slade, 1984) that retrospective reports are more consistent with stereotypes than actual
prospective experiences. As well as indicating the influence of cultural stereotypes, these results underscore the importance of concealing the menstrual purpose of research. Once alerted in the final interview to the researcher's interest in the menstrual cycle, women provided stereotypical responses.

Several methodological features of the investigation seem to have been successful and noteworthy. The first was the use of a measure that allowed participants to record positive as well as neutral and negative moods. The group averages of pleasantness and arousal were all above neutral and slightly positive. Since the means were above the midpoint of the scale, a measure with a negative bias would have been misleading. It also would have been impossible to detect exaggerated recall of positive moods (one of the retrospective results) with a negatively biased measure. Investigators who study only negative moods are unable to draw conclusions about the total emotional experience of their participants.

Another methodological improvement was the use of the Affect Grid. It took little time to complete in comparison to the lengthy measures used in the previous studies. This undoubtedly contributed to the finding that most participants said they were willing to continue in the study for at least one more month (a mean of 5.9 on a 9-point scale of willingness). Their willingness to continue indicates that the quality of the data they provided toward the end of the study probably was not affected by fatigue. Data collected using the Affect Grid also were relatively simple to analyze.

A final design feature was the collection of data for two menstrual cycles rather than only one. The resulting increase in power to detect mood fluctuations underlines more strongly the finding that most young women in this study did not experience menstrual mood fluctuations. Since participants were not tired of the procedures after 70 days, it seems wise in
future longitudinal studies to cover at least two menstrual cycles in order to benefit from the increase in power of the design.

In sum, the results indicate that young women's prospective reports of their moods do not fluctuate significantly over the phases of the menstrual cycle and are similar to those reported by young men. Retrospectively, however, young women recalled experiencing the classic menstrual mood pattern of more negative moods in the premenstrual and menstrual phases than in the other phases of their cycles. Together, the prospective and retrospective data for women are consistent with schema theory. A schema is a self-relevant belief or concept which guides expectations, perceptions, and memory (e.g., a stereotype). If women hold the stereotype that moods are likely to be negative during certain phases of their menstrual cycle, and they experience a negative mood at that point, they will be likely to process it through their schema or stereotype regarding moods and the menstrual cycle, attribute it to their hormones, and recall their negative mood at that time. Negative moods experienced at other times, and positive moods experienced during those same premenstrual and menstrual phases, would be inconsistent with the schema, and so would be ignored. Once established, schemas and stereotypes are very resistant to change, even in the face of contradictory evidence, because such evidence tends to be ignored or processed as an exception. Moreover, previous research indicates that people are more likely to change the data to fit the stereotype (e.g., remember it incorrectly) than to change their stereotype to fit the data (see Martin & Halverson, 1983).

Thus, even if women experience only positive moods during their premenstrual and menstrual phases, they may later recall negative moods. The finding that both women and men recalled their mood fluctuations over the days of the week in a distorted way also is consistent with the schema hypothesis, except that in the case of days of the week, the stereotype was well-founded (i.e., moods
were reported to fluctuate prospectively, although to a significantly lesser degree than they were recalled retrospectively).

In future research I plan to use individual difference measures, including measures of stereotypes regarding the menstrual cycle, sex-roles, et cetera, to explore further the theoretical aspects of these results. Women who hold well-developed stereotypes about the menstrual cycle should be more likely to show distorted recall than women with less well-developed stereotypes. In addition, since this study was limited to young university students, the age range will be extended upwards and non-students will be studied. Time-series analyses will be conducted to determine whether cyclic changes occur for individuals but are masked in the group data. (It should be noted, however, that the stereotypes regarding moods and the menstrual cycle addressed in the present study are stereotypes about most women having similar moods, not different ones.) Finally, women who experience premenstrual syndrome and/or dysmenorrhea will be studied to ascertain how their mood fluctuations differ from those of men and of women who report no menstrual difficulties.

An interesting question for future research is how stereotypes bias recollections of menstrual cycles. Perhaps asking participants about the menstrual cycle sets up a demand characteristic, or perhaps it evokes memories of a younger age when menstrual experiences were more negative (e.g., more cramps; Asso, 1983), or perhaps it makes the menstrual cycle more salient than usual. One puzzling question about the reporting bias is why it occurs even when participants are asked to recall their experiences over a very specific time period, in this case the preceding two months. Research comparing the relationship of menstrual stereotypes and early menstrual experiences to the extent of retrospective report bias might help to answer such questions.
Footnotes

1 These results provide strong evidence for the validity of the Affect Grid. Indicators of temporal stability are inappropriate for mood checklists because moods have been shown in this and other studies to vary across days and within days (Hedges, Jandorf, & Stone, 1985).

2 Attrition in the study: Three men, one womanOC, and three womenNC did not complete the study. One man, one womanOC, and two womenNC had more than seven missing days of data. Four womenOC changed their method of birth control. Four womenNC had menstrual cycles longer than 38 days. One man was dropped from the study because of prolonged illness.

3 Questions about family and career were added because Rossi & Rossi (1977) found that family-oriented women were more likely to have menstrual problems. All participants in this study, however, wanted a career and most wanted a family.

4 The number of forgotten days did not vary significantly across phases of the menstrual or lunar cycles. There were more forgotten days, however, on Fridays and Saturdays than on any other day of the week, $X^2(6)=89.20$, $p<.0001$. What implications does this have for the results? Parametric tests comparing forgotten and remembered days for arousal, pleasantness, and stability yielded a significant difference only for arousal. Specifically, arousal reported prospectively was lower on forgotten days than on remembered days. Since arousal on Friday and Saturday was significantly higher than on other days of the week in both the prospective and retrospective data, the increased number of forgotten days on Fridays and Saturdays would have produced a conservative test. That is, if these days had not been forgotten, the means for arousal would have been even higher on Friday and Saturday.
The means in the retrospective weekday analyses are slightly different in the direct comparison of prospective and retrospective analyses than the simple prospective analyses because one man did not answer the retrospective questions and thus it was necessary to drop him from the prospective half of the direct comparison analyses.
References


Patkai, P., Johannson, G., & Post, B. (1974). Mood, alertness and


Figure Captions

Figure 1. The Affect Grid, Russell (1983).

Figure 2. Comparison of prospective and retrospective menstrual reports of arousal (higher scores reflect increased arousal).

Figure 3. Comparison of prospective and retrospective menstrual reports of pleasantness (higher scores reflect increased pleasantness).

Figure 4. Comparison of prospective and retrospective weekday reports of arousal (higher scores reflect increased arousal).

Figure 5. Comparison of prospective and retrospective weekday reports of pleasantness (higher scores reflect increased pleasantness).
Put one checkmark in the grid to indicate your mood or emotional state today.

High Arousal

Stress

Excitement

Unpleasant Feelings

Pleasant Feelings

Depression

Relaxation

Sleepiness
**Figure 2**

Arousal Ratings

neutral

Menstrual Phase

**p < 0.01**

- retrospective
- prospective
Figure 3

The diagram illustrates the pleasantness ratings across different menstrual phases. Points indicate retrospective and prospective data. Significance levels are marked with asterisks and double asterisks: 

- *p<0.05
- **p<0.01
Figure 4

Days of the Week

Arousal Ratings

neutral

Sun Mon Tue Wed Thu Fri Sat

* p < 0.05
** p < 0.01

□ retrospective
● prospective
Figure 5

Pleasantness Ratings

neutral

Days of the Week

Sun Mon Tue Wed Thu Fri Sat

**p<.01

- ■ retrospective
- ○ prospective

** **
Appendix A

Initial Interview

Today's date: ___________________________ Group ID # ____________

yr    mo    day

Name: ___________________________________________________________

Phone: __________________________________________________________

Address: _________________________________________________________

_______________________________________________________________

female:____  male:____  Birthdate____________________

yr/mo/day

Marital status:_________  years married:_______

Occupation (specific):_____________________________________________

Education (highest level obtained): __________________________________

degree  yr  faculty  department

Are you living with: ______parents and/or siblings  ______spouse and/or children

______________________  ____romantic friend  ______friend  ______alone

_______________________________________________________________

Exercise

1) How much exercise does s/he get on the average weekday?

   ___none  ___a slight "work out"

   ___a moderate "work out"  ___a strenuous "work out"

2) How much exercise does s/he get on the average weekend day?

   ___none  ___a slight "work out"

   ___a moderate "work out"  ___a strenuous "work out"

_______________________________________________________________

Sleep

1) How many hours of sleep does s/he get on the average weekday night?

2) How many hours of sleep does s/he get on the average weekend night?

3) How would s/he describe the quality of sleep on the average weekday night?

   feels that s/he needs: ___less sleep  ___more sleep  ___no more or less sleep
4) How would s/he describe the quality of sleep on the average weekend night?

feels that s/he needs: ___less sleep ___more sleep ___no more or less sleep

Health

Would say that, in general, s/he is a healthy person throughout the year:

___yes ___no

If no, please explain why__________________________

Diet

1) Describe the quantity of food consumed on average:

___usually don't eat enough
___usually eat the right amount
___usually eat too much

2) After looking at the Canada Food Guide, how many food groups do you choose from for your average daily food intake? (interviewer gives participant the guide)

chooses from: ___one ___two ___three ___four food groups

3) Overall, would you say your nutrition is:

___poor
___all right
___good
___excellent

Menstrual cycle

___regular ___irregular
___usual cycle length in days
___minimum cycle length in days
___maximum cycle length in days

Length of menstrual bleeding

___usual length in days
___minimum length in days
___maximum length in days

Menstrual discomfort

frequency: ___none ___occasional ___frequent medication?_____

degree: ___slight ___moderate ___severe
Menstrual flow

Rate your menstrual flow for each day of your menstruation using this scale:

1 light (1-2 pads/tampons daily)
2 moderate (3-4 pads/tampons daily)
3 heavy (5 or more pads/tampons daily)
4 variable

___ day 1  ___ day 2  ___ day 3  ___ day 4  ___ day 5
___ day 6  ___ day 7  ___ day 8  ___ day 9  ___ day 10

Skin

Would say your skin:
___ is usually free from pimples/blemishes
___ occasionally has pimples/blemishes
___ is hardly ever without pimples/blemishes
___ has severe acne

Libido

___ number of times desired sexual activity (per ______)
___ number of times orgasm (per ______)
___ number of times coitus (per ______)

Weight over the last year

usual weight________
Minimum weight________
maximum weight________

Pregnancy

___ number of pregnancies whether or not carried to term.
___ Date of last delivery, miscarriage, or abortion________   yr / mo / day

Are you lactating now?  ___yes  ___no

Number of living children ______

Has your period occurred since your last pregnancy?  ___yes  ___no

Birth control (list all methods currently using)

___ breast feeding
___ rhythm
___ Billing's ovulation method or symptothermal
___ withdrawal
foam alone, suppositories (Encare)
condom alone
condom and foam
diaphragm
cervical cap
IUD copper or plastic
IUD progestasert or hormonal
contraceptive pills
male or female sterilization

If contraceptive pills:

drug name_________________

dosage__________________

days since last dose_______

How long have you been using the pills________

Prescription Drugs

drug 1

name __________________________ dosage ________

reason for taking_________________________

drug 2

name ______________________ dosage ________

reason for taking_________________________

drug 3

name ______________________ dosage ________

reason for taking_________________________

Do you have plans to raise a family? ______yes ______no.

Do you have plans to pursue a career? ______yes ______no

Have you any friends or co-workers that you know are participating in this study? ______yes ______no
If yes, provide the name of and how often each person is seen.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Comments

________________________________________________________________________

________________________________________________________________________
Appendix B

How to fill out the daily charts

Ideally you should fill out one daily chart just before you retire each evening when the day's events are still fresh in your memory. But if this time is inconvenient, you may want to fill out the chart the next morning for the previous day. If you decide that the morning time is best for you, you should try to remember exactly what your emotional, physical, and behavioural state was for the previous day and not confuse it with the present day's events and moods.

It is important that you schedule in a ten minute time period in your day when you are most likely to remember to fill out the daily charts.

You may forget to fill out a chart for one or more days. If you do forget you should fill out a chart for each missed day as soon as you remember. (For this reason it is a good idea to keep some blank charts in with your note books or brief case so that you may fill out the charts away from home.) It is also likely that you may not remember the details of the missed day as well as you do the present day. It is more important that you write down the information you are relatively sure of and omit the details of which you are unsure or would have to guess about. Try to concentrate on the missed day and write down as much as you can. It doesn't matter if you can only report a few details. The important thing is that the information is accurate.

Once you have filled in the chart(s) for the missed day(s), you should fill in another chart for the present day when you normally would do so (e.g., just before going to sleep).
The above diagram shows the questionnaire is divided into five different sections. The following are instructions on how to fill out each section.

**Section 1**

1) Fill in today's date and the time.
2) Check whether you are filling out the chart for today or for a previous, missed day. If you are filling out the chart for a missed day be sure to write in the date of that day.

**Section 2**

In this section answer each question by choosing the one alternative that best describes you that day.

**Section 3**

This section is called the Affect Grid. This is how to use the Affect Grid to describe your emotional state each day.

**The Affect Grid**

You use the "affect grid" to describe feelings. It is in the form of a square -- a kind of map for feelings. The center of the square (marked by X in the grid below) represents a neutral, average, everyday feeling. It is neither positive nor negative.
The right half of the grid represents pleasant feelings. The farther to the right the more pleasant. The left half represents unpleasant feelings. The farther to the left, the more unpleasant.

The vertical dimension of the map represents degree of arousal. Arousal has to do with how wide awake, alert, or activated a person feels — independent of whether the feeling is positive or negative. The top half is for feelings that are above average in arousal. The lower half for feelings below average. The bottom represents sleep, and the higher you go, the more awake a person feels. So, the next step up from the bottom would be half awake/half asleep. At the top of the square is maximum arousal. If you imagine a state we might call frantic excitement (remembering that it could be either positive or negative), then this feeling would define the top of the grid.
If the "frantic excitement was positive it would, of course, fall on the right half of the grid. The more positive, the farther to the right. If the "frantic excitement" was negative, it would fall on the left half of the grid. The more negative, the farther to the left. If the "frantic excitement" was neither positive nor negative, then it would fall in the middle square of the top row, as shown below.

Other areas of the grid can be labeled as well. Up and to the right are feelings of ecstasy, excitement, joy. Opposite these, down and to the left, are feelings of depression, melancholy, sadness, and gloom.

Up and to the left are feelings of stress and tension. Opposite these, down and to the right, are feelings of calm, relaxation, serenity.
Feelings are complex. They come in all shade and degrees. The labels we have given are merely landmarks to help you understand the affect grid. When actually using the grid, put an X anywhere in the grid to indicate the exact shade and intensity of feeling. Please look over the entire grid to get a feel for the meaning of the various areas.

Examples: Suppose that you were just surprised. Suppose further that the surprise was neither pleasant nor unpleasant. Probably you would feel more aroused than average. You might put your mark as shown to the right.

Example: Suppose, instead, that you were only mildly surprised but that the surprise was a very pleasant one. You might put your mark as shown to the right.
Each day check the space on the Affect Grid that best describes your AVERAGE mood for the last 24 hours.

Section 4

In this section you rate how stable your moods were for the past 24 hours. Check one alternative that best describes your moods.

In addition, indicate how typical your behaviour and moods today were for you. If atypical, indicate briefly how and why (if you know).

If you have difficulty filling out any section or if you have any questions about the study as a whole please do not hesitate to call: Jessica McFarlane (228-6487)
Appendix C: Daily Chart

Thursday

Today's date __________ yr __________ mo __________ day __________

I am filling this chart out on Thur. __________

I am filling this chart out later. __________

If later, when? __________

1) How much exercise did you get today? __________
   _____ none
   _____ a slight "work out"
   _____ a moderate "work out"
   _____ a strenuous "work out"

2) How many hours of sleep did you get last night? __________
   How would you describe your sleep?
   _____ I felt I needed more sleep.
   _____ I felt I had just the right amount of sleep.
   _____ I felt I had too much sleep.

3) Are you in good health today? __________
   __________ yes __________ no
   If no, please explain, list symptoms (eg. allergies, cramps, acne)

4) Are you menstruating today? __________
   __________ yes __________ no

5) Describe your eating patterns today.
   a) Describe the quantity of your food choices.
      _____ I ate too little food
      _____ I ate just the right amount of food
      _____ I ate too much food

Put an "x" in one space on the grid to indicate your average mood today.

stress __________ high arousal __________
unpleasant feelings __________ pleasant feelings __________

How stable were your moods today?
   __________ stable __________ changeable
   _____ very stable _____ very changeable
Appendix D

Consent Form

I agree to participate in a study of emotional, physical and behavioural changes being conducted at U.B.C. by Jessica McFarlane. The nature of my participation has been thoroughly explained to me.

I understand that I have the right to withdraw from the study at any time without future prejudice.

Name

Signature
Appendix E

Final Questionnaire

Please answer the following questions. Once you have answered all the questions on each page and turned to the next page, please do not add any further comments to your previous answers.

Name__________________________

ID number_____________________

Group________________________
What do you think the purpose of this study was?
1. List any significant events that have occurred since this study began (e.g., unusual illness, important career decision, new relationship, ended relationship, new residence, a significant change in life style). Beside the significant event write down roughly when it occurred.

<table>
<thead>
<tr>
<th>Event(s)</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Were you employed during this study?  
   a) If yes, how many hours per week did you work?
   b) What was your pay schedule?
   c) On what days of the month did you usually get paid?

3. How willing would you be to continue participating in this study if it lasted one more month?  
   a) Not at all  
   b) Very
   If it lasted two more months?  
   a) Not at all  
   b) Very

4. What is your religious affiliation (if any)?

5. Have you changed your method of contraception since the start of the study?  
   a) Yes  
   b) No
   If so please list your previous and new contraceptive in addition to when you changed.

<table>
<thead>
<tr>
<th>Old method</th>
<th>New method</th>
<th>Date changed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Put an "X" in the square on each continuum that best describes you over the last two months.

<table>
<thead>
<tr>
<th>Continuum</th>
<th>Rating</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Unemotional</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Unenergetic</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Energetic</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Unpleasant</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Sleepy</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Aroused</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Stable moods</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>Unstable moods</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>Hides emotion</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Expresses emotions</td>
<td></td>
<td>35</td>
</tr>
</tbody>
</table>
Use the affect grid to describe your average mood (over the last two months) for each day of the week.

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>high arousal</td>
<td>high arousal</td>
<td>high arousal</td>
<td>high arousal</td>
</tr>
<tr>
<td>stress</td>
<td>stress</td>
<td>stress</td>
<td>stress</td>
</tr>
<tr>
<td>unpleasant</td>
<td>unpleasant</td>
<td>unpleasant</td>
<td>unpleasant</td>
</tr>
<tr>
<td>feelings</td>
<td>feelings</td>
<td>feelings</td>
<td>feelings</td>
</tr>
<tr>
<td>depression</td>
<td>depression</td>
<td>depression</td>
<td>depression</td>
</tr>
<tr>
<td>sleepiness</td>
<td>sleepiness</td>
<td>sleepiness</td>
<td>sleepiness</td>
</tr>
<tr>
<td>relaxation</td>
<td>relaxation</td>
<td>relaxation</td>
<td>relaxation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>high arousal</td>
<td>high arousal</td>
<td>high arousal</td>
</tr>
<tr>
<td>stress</td>
<td>stress</td>
<td>stress</td>
</tr>
<tr>
<td>unpleasant</td>
<td>unpleasant</td>
<td>unpleasant</td>
</tr>
<tr>
<td>feelings</td>
<td>feelings</td>
<td>feelings</td>
</tr>
<tr>
<td>depression</td>
<td>depression</td>
<td>depression</td>
</tr>
<tr>
<td>sleepiness</td>
<td>sleepiness</td>
<td>sleepiness</td>
</tr>
<tr>
<td>relaxation</td>
<td>relaxation</td>
<td>relaxation</td>
</tr>
</tbody>
</table>

For coding only:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
Use the affect grid to describe your moods (over the last two months) for each phase of your menstrual cycle.

**Menstruation**
- **Menstruation**
  - Stress: high arousal
  - Pleasure: excitement
  - Unpleasant feelings: stress
  - Depression: sleepiness

**Next 7 days**
- Stress: high arousal
- Pleasure: excitement
- Unpleasant feelings: stress
- Depression: sleepiness

**Ovulation (middle 5 days)**
- Stress: high arousal
- Pleasure: excitement
- Unpleasant feelings: stress
- Depression: sleepiness

**Next 7 days after ovulation**
- Stress: high arousal
- Pleasure: excitement
- Unpleasant feelings: stress
- Depression: sleepiness

**Premenstrual**
- Stress: high arousal
- Pleasure: excitement
- Unpleasant feelings: stress
- Depression: sleepiness
For each of the following characteristics, rate the extent to which the characteristic is true of you. Use the scale as follows:

Mark a 1 if it is NEVER or ALMOST NEVER TRUE
Mark a 2 if it is USUALLY NOT TRUE
Mark a 3 if it is SOMETIMES BUT INFREQUENTLY TRUE
Mark a 4 if it is OCCASIONALLY TRUE
Mark a 5 if it is OFTEN TRUE
Mark a 6 if it is USUALLY TRUE
Mark a 7 if it is ALWAYS OR ALMOST ALWAYS TRUE

1. gentle
2. leadership abilities
3. assertive
4. tender
5. independent
6. affectionate
7. defends own beliefs
8. willing to take risks
9. understanding
10. loves children
11. aggressive
12. sympathetic
13. compassionate
14. forceful
15. dominant
16. eager to soothe hurt feelings
17. strong personality
18. willing to take a stand
19. warm
20. sensitive to the needs of others
Appendix F
Debriefing Statement

Over the past 60 or more days, you have filled in daily charts providing me with information about your exercise, sleep, health, eating patterns, and moods. As I mentioned at the beginning of the experiment, I am interested in studying emotional and behavioural cycles. In particular, I will be looking for behavioural and emotional patterns associated with day of the week, the menstrual cycle, and the lunar cycle.

In the past, researchers have found that some behaviours follow each one of these three cycles but the evidence is far from conclusive. By having men and women in my study and by studying these three cycles, I will be able to make comparisons that will help me put behavioural cycles in context.

Since a great deal of literature discusses people's stereotypes about men's and women's emotions and behaviours, I will be able to compare the data you and others have supplied to these stereotypes to see if they are valid.

Finally, the media, as well as the scientific literature, has recently been discussing the behavioural effects of the menstrual cycle. The consequences of premenstrual tension, in particular, have been reviewed. By comparing men's to women's data, I will be able to determine the existence of any behavioural patterns associated with the menstrual cycle.

Thank you very much for your participation. You may contact me in a few months time to find out the results of this study. I can be reached at 228-6487, Psychology Department, U.B.C.
Appendix G

F, df, and p Values for Comparisons (MANOVAs) Between Women Who Did and Did Not Guess the Menstrual Purpose of the Study.
Comparison of Participants Who Did and Did Not Guess the Menstrual Purpose of the Study
Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP F(1,25)=</td>
<td>0.115, p=.737</td>
<td>F(1,25)= 3.150, p=.088</td>
<td>F(1,25)= 1.445, p=.241</td>
</tr>
<tr>
<td>PHASE F(4,22)=</td>
<td>0.514, p=.726</td>
<td>F(4,22)= 0.349, p=.842</td>
<td>F(4,22)= 0.517, p=.724</td>
</tr>
<tr>
<td>GROUP BY PHASE</td>
<td>F(4,22)= 0.854, p=.507</td>
<td>F(4,22)= 0.277, p=.890</td>
<td>F(4,22)= 0.569, p=.688</td>
</tr>
</tbody>
</table>

Analyses of Standard Deviations

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP F(1,25)=</td>
<td>3.395, p=.077</td>
<td>F(1,25)= 1.053, p=.315</td>
<td>F(1,25)= 0.322, p=.576</td>
</tr>
<tr>
<td>PHASE F(4,22)=</td>
<td>0.659, p=.627</td>
<td>F(4,22)= 1.475, p=.244</td>
<td>F(4,22)= 0.419, p=.793</td>
</tr>
<tr>
<td>GROUP BY PHASE</td>
<td>F(4,22)= 0.335, p=.851</td>
<td>F(4,22)= 2.348, p=.086</td>
<td>F(4,22)= 0.182, p=.945</td>
</tr>
</tbody>
</table>
Appendix H

Comparison of Forgotten and Remembered Days

AROUSAL \[ t(3021)=4.15, \ p=.000 \]
PLEASANTNESS \[ t(627)=1.17, \ p=.244 \]
STABILITY \[ t(2999)=1.89, \ p=.059 \]

Comparison of Analyses With and Without Forgotten Days

<table>
<thead>
<tr>
<th></th>
<th>Means with Forgotten Days</th>
<th>Means without Forgotten Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>AROUSAL</td>
<td>5.536</td>
<td>5.500</td>
</tr>
<tr>
<td>PLEASANTNESS</td>
<td>5.612</td>
<td>5.627</td>
</tr>
<tr>
<td>STABILITY</td>
<td>2.622</td>
<td>2.642</td>
</tr>
</tbody>
</table>

Note: higher scores reflect increased arousal, pleasantness, and stability.

Distribution of Forgotten Days Across Cycles

<table>
<thead>
<tr>
<th>Cycle</th>
<th>[ x^2 ] Value</th>
<th>[ p ] Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENSTRUAL CYCLE</td>
<td>[ x^2(4)=1.69 ]</td>
<td>[ p=.792 ]</td>
</tr>
<tr>
<td>WEEKDAY CYCLE</td>
<td>[ x^2(6)=89.20 ]</td>
<td>[ p=.000 ]</td>
</tr>
<tr>
<td>LUNAR CYCLE</td>
<td>[ x^2(3)=1.21 ]</td>
<td>[ p=.749 ]</td>
</tr>
</tbody>
</table>
Appendix I

Demographic Data Comparisons Among the Groups*

1) MANOVA for age, years of education, willingness to continue in the study for one or two months:
   \[ F(8,70)=1.514, \ p=.168 \]

2) Type of university program (e.g., Science or Arts),
   \[ \chi^2(2)=5.59, \ p=.061 \]

3) Desire to raise a family,
   \[ \chi^2(2)=2.089, \ p=.352 \]

4) Desire for a career - no variability. All participants wanted a career.

* men, women taking oral contraceptives, and normally cycling women.
Appendix J

In Appendix J-1 through J-7, the F, df, and p values for the menstrual, weekday, and lunar cycles multivariate analyses of variance (MANOVAs) are presented. In Appendix J-8 through J-18, the univariate analyses of variance for the significant MANOVA analyses are presented.
### Results for Prospective Menstrual Scores
#### Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>Arousal</th>
<th>Pleasantness</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP</strong></td>
<td>F(2,39) = 1.866, p = .168</td>
<td>F(2,39) = 2.292, p = .114</td>
<td>F(2,39) = 0.386, p = .682</td>
</tr>
<tr>
<td><strong>PHASE</strong></td>
<td>F(4,36) = 0.820, p = .521</td>
<td>F(4,36) = 1.194, p = .330</td>
<td>F(4,36) = 0.582, p = .678</td>
</tr>
<tr>
<td><strong>GROUP BY PHASE</strong></td>
<td>F(8,72) = 1.161, p = .335</td>
<td>F(8,72) = 2.129, p = .044</td>
<td>F(8,72) = 1.730, p = .106</td>
</tr>
</tbody>
</table>

#### Analyses of Standard Deviations

<table>
<thead>
<tr>
<th></th>
<th>Arousal</th>
<th>Pleasantness</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP</strong></td>
<td>F(2,39) = 0.083, p = .920</td>
<td>F(2,39) = 0.062, p = .940</td>
<td>F(2,39) = 2.721, p = .078</td>
</tr>
<tr>
<td><strong>PHASE</strong></td>
<td>F(4,36) = 0.624, p = .648</td>
<td>F(4,36) = 0.893, p = .478</td>
<td>F(4,36) = 1.042, p = .399</td>
</tr>
<tr>
<td><strong>GROUP BY PHASE</strong></td>
<td>F(8,72) = 0.240, p = .982</td>
<td>F(8,72) = 0.294, p = .966</td>
<td>F(8,72) = 1.228, p = .295</td>
</tr>
</tbody>
</table>
Results for Retrospective Menstrual Scores
Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td>$F(1,25) = 1.170, p=.290$</td>
<td>$F(1,25) = 0.272, p=.607$</td>
</tr>
<tr>
<td>PHASE</td>
<td>$F(4,22) = 3.976, p=.014  $</td>
<td>$F(4,22) = 12.999, p=.000$</td>
</tr>
<tr>
<td>GROUP BY PHASE</td>
<td>$F(4,22) = 2.005, p=.129$</td>
<td>$F(4,22) = 1.181, p=.347$</td>
</tr>
</tbody>
</table>
## Direct Comparison of Prospective and Retrospective Menstrual Reports

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORT</td>
<td>$F(1,25)= 0.373$, $p=.547$</td>
<td>$F(1,25)= 6.515$, $p=.017$</td>
</tr>
<tr>
<td>REPORT BY GROUP</td>
<td>$F(1,25)= 0.065$, $p=.801$</td>
<td>$F(1,25)= 1.324$, $p=.261$</td>
</tr>
<tr>
<td>REPORT BY PHASE</td>
<td>$F(4,22)= 5.986$, $p=.002$</td>
<td>$F(4,22)=11.076$, $p=.000$</td>
</tr>
<tr>
<td>REPORT BY GROUP</td>
<td>$F(4,22)= 1.915$, $p=.144$</td>
<td>$F(4,22)= 0.148$, $p=.962$</td>
</tr>
</tbody>
</table>
### Results for Prospective Weekday Scores
#### Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP</strong></td>
<td>( F(2,39) = 1.989, \ p = .150 )</td>
<td>( F(2,39) = 2.947, \ p = .064 )</td>
<td>( F(2,39) = 0.478, \ p = .623 )</td>
</tr>
<tr>
<td><strong>WEEKDAY</strong></td>
<td>( F(6,34) = 4.787, \ p = .001 )</td>
<td>( F(6,34) = 5.677, \ p = .000 )</td>
<td>( F(6,34) = 0.954, \ p = .470 )</td>
</tr>
<tr>
<td><strong>GROUP BY WEEKDAY</strong></td>
<td>( F(12,68) = 1.274, \ p = .254 )</td>
<td>( F(12,68) = 1.435, \ p = .172 )</td>
<td>( F(12,68) = 1.401, \ p = .187 )</td>
</tr>
</tbody>
</table>

#### Analyses of Standard Deviations

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP</strong></td>
<td>( F(2,39) = 0.075, \ p = .927 )</td>
<td>( F(2,39) = 0.019, \ p = .981 )</td>
<td>( F(2,39) = 2.202, \ p = .124 )</td>
</tr>
<tr>
<td><strong>WEEKDAY</strong></td>
<td>( F(6,34) = 1.424, \ p = .234 )</td>
<td>( F(6,34) = 0.982, \ p = .452 )</td>
<td>( F(6,34) = 0.703, \ p = .649 )</td>
</tr>
<tr>
<td><strong>GROUP BY WEEKDAY</strong></td>
<td>( F(12,68) = 0.496, \ p = .910 )</td>
<td>( F(12,68) = 0.832, \ p = .618 )</td>
<td>( F(12,68) = 0.625, \ p = .814 )</td>
</tr>
</tbody>
</table>
Results for Retrospective Weekday Scores
Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td>F(2,38)= 0.358, p=.701</td>
<td>F(2,38)= 3.492, p=.041</td>
</tr>
<tr>
<td>WEEKDAY</td>
<td>F(6,33)= 8.591, p=.000</td>
<td>F(6,33)=21.577, p=.000</td>
</tr>
<tr>
<td>GROUP BY WEEKDAY</td>
<td>F(12,66)=1.377, p=.199</td>
<td>F(12,66)=0.686, p=.759</td>
</tr>
</tbody>
</table>
Direct Comparison of Prospective and Retrospective Weekday Reports

<table>
<thead>
<tr>
<th></th>
<th>Arousal</th>
<th>Pleasantness</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORT</td>
<td>$F(1,38) = 0.319, p = 0.575$</td>
<td>$F(1,38) = 12.697, p = 0.001$</td>
</tr>
<tr>
<td>REPORT BY GROUP</td>
<td>$F(2,38) = 0.736, p = 0.486$</td>
<td>$F(2,38) = 2.256, p = 0.119$</td>
</tr>
<tr>
<td>REPORT BY WEEKDAY</td>
<td>$F(6,33) = 4.598, p = 0.002$</td>
<td>$F(6,33) = 7.418, p = 0.000$</td>
</tr>
<tr>
<td>REPORT BY GROUP BY WEEKDAY</td>
<td>$F(12,66) = 0.800, p = 0.649$</td>
<td>$F(12,66) = 1.345, p = 0.216$</td>
</tr>
</tbody>
</table>
Results for Prospective Lunar Scores
Analyses of Means

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td>$F(2,39) = 1.961, p = .154$</td>
<td>$F(2,39) = 2.749, p = .076$</td>
<td>$F(2,39) = 0.481, p = .622$</td>
</tr>
<tr>
<td>PHASE</td>
<td>$F(3,37) = 0.820, p = .491$</td>
<td>$F(3,37) = 1.978, p = .134$</td>
<td>$F(3,37) = 1.572, p = .212$</td>
</tr>
<tr>
<td>GROUP BY PHASE</td>
<td>$F(6,74) = 1.525, p = .182$</td>
<td>$F(6,74) = 0.977, p = .447$</td>
<td>$F(6,74) = 1.095, p = .373$</td>
</tr>
</tbody>
</table>

Analyses of Standard Deviations

<table>
<thead>
<tr>
<th></th>
<th>AROUSAL</th>
<th>PLEASANTNESS</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td>$F(2,39) = 0.062, p = .940$</td>
<td>$F(2,39) = 0.074, p = .929$</td>
<td>$F(2,39) = 2.731, p = .078$</td>
</tr>
<tr>
<td>PHASE</td>
<td>$F(3,37) = 0.963, p = .420$</td>
<td>$F(3,37) = 0.741, p = .534$</td>
<td>$F(3,37) = 0.452, p = .718$</td>
</tr>
<tr>
<td>GROUP BY PHASE</td>
<td>$F(6,74) = 0.389, p = .884$</td>
<td>$F(6,74) = 0.646, p = .693$</td>
<td>$F(6,74) = 1.045, p = .404$</td>
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Prospective Menstrual Pleasantness (Means)

BETWEEN SUBJECT FACTORS ARE:

A - GROUP : 1 men, 2 womenOC, 3 womenNC

WITHIN SUBJECT FACTORS ARE:

B - PHASE: 1 Menstrual, 2 Follicular, 3 Ovulatory, 4 Luteal, 5 Premenstrual

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Retrospective Menstrual Arousal (Means)

BETWEEN SUBJECT FACTORS ARE:

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Retrospective Menstrual Pleasantness (Means)

BETWEEN SUBJECT FACTORS ARE:

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Direct Comparison of Prospective and Retrospective Menstrual Arousal

BETWEEN SUBJECT FACTORS ARE:

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Direct Comparison of Prospective and Retrospective Menstrual Pleasantness

BETWEEN SUBJECT FACTORS ARE:

A - GROUP : 1 womenOC, 2 womenNC

WITHIN SUBJECT FACTORS ARE:

B - REPORT : 1 Prospective, 2 Retrospective

C - PHASE: 1 Menstrual, 2 Follicular, 3 Ovulatory, 4 Luteal, 5 Premenstrual

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Prospective Weekday Arousal (Means)

**BETWEEN SUBJECT FACTORS ARE:**

A - GROUP : 1 men, 2 womenOC, 3 womenNC

**WITHIN SUBJECT FACTORS ARE:**

B - WEEKDAY : 1 Sun, 2 Mon, 3 Tues, 4 Wed, 5 Thur, 6 Fri, 7 Sat

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### Prospective Weekday Pleasantness (Means)

**BETWEEN SUBJECT FACTORS ARE:**

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**WITHIN SUBJECT FACTORS ARE:**

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Retrospective Weekday Arousal (Means)

BETWEEN SUBJECT FACTORS ARE:

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Retrospective Weekday Pleasantness (Means)

**BETWEEN SUBJECT FACTORS ARE:**

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Direct Comparison of Prospective and Retrospective Weekday Pleasantness

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