HEMISPHERICITY AND CONTRACEPTIVE BEHAVIOUR

by

Holly Maria Prochnau

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Name: Holly Maria Prochnau

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Examining Committee:

Chairperson: Dr. Christopher Davis

Dr. Paul Bakan

Dr. Barry Beyerstein

Dr. Clare Porac
External Examiner
Department of
Psychology
University of
Victoria

Date Approved: July 27, 1984

ABSTRACT

The following tests were administered to female subjects: the Conjugate Lateral Eye Movement (CLEM) test of hemisphericity and a modified version of the Moos Menstrual Distress Questionnaire (MDQ). The results supported the hypothesis that greater left hemispheric dominance is related to oral contraceptive use. These results are statistically significant using all subjects as well as using just those subjects who are right handed. Furthermore, there is no preference in hemispheric dominance between those virgin females who plan to use oral contraceptives and those virgin females who do not intend to use them when they become sexually active. The hypothesis that right hemisphere dominant females discontinued the use of oral contraceptives due to their higher awareness of visceral activity (and therefore greater awareness of the side effects of the contraceptive) was not supported. The females who discontinued oral contraceptives were significantly older than those who currently use oral contraceptives. Results are discussed in detail and suggestions for further research are also presented.

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Author:

(signature)

Holly Maria Prochnau

(name)

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(date)

DEDICATION

In consideration of the love and support that has been the backbone for completing this work, I would like to dedicate this thesis to my parents, Don and Joy Pourchalk.

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A. Introduction

The study of brain hemisphericity is concerned with an individual's tendency to rely on one hemisphere more than the other across a variety of situations. Recently, psychologists have attempted to develop typologies associated with relative hemispheric preference, and have also developed various tests enabling an experimenter to determine which hemisphere is relatively dominant in a given subject.

Bakan (1969) has argued that the direction of certain eye movements, conjugate lateral eye movements (CLEMs), is indicative of relative hemispheric dominance. When a person is asked a question the eyes usually move to the right or the left while he or she reflects on the answer (Day, 1964). Individuals tend to prefer either eye movements to the right side or the left side, and it is this tendency that allows individuals to be classified as right or left movers. Due to the contralateral relationship between the cerebral hemispheres and the eyes, Bakan (1969) suggested that right movers are generally left hemisphere preferent and left movers are generally right hemisphere preferent.

Recently, Prochnau (1983) found a significant positive correlation between hemispheric preference and contraceptive use among female subjects ($r = -0.27$, $p = 0.005$), i.e., right movers or left hemisphere preferent females were more likely to use

oral contraceptives. Reasons that were suggested to account for this correlation included: a left hemisphere characteristic that is more congruent with taking oral contraceptives; or right hemisphere dominant females tend to discontinue the use of oral contraceptives for some reason; or perhaps the hormones in the contraceptive influence the direction of conjugate lateral eye movements. Each of these suggestions requires further research.

I. Lateral Functioning

Early Studies

Early investigations of hemispheric specialization involved testing brain damaged subjects on a variety of tasks. These subjects suffered from brain lesions incurred due to strokes, heart attacks, blood clots, war wounds, disease, etc. Once the location of the damage was determined (usually at autopsy) and the functional deficiency was discovered, a correlation was suggested between the specific location in the brain and the physical or cognitive function it controlled. These experiments continued to support the theory that the left hemisphere controlled both speech and the dominant right hand (for right handers).

Initial scientific investigations of the roles of the two hemispheres began with the work of Dax (1836) and became widely known with Broca's work connecting brain lesions in the left hemisphere and aphasia (disturbance in the ability to use or understand language). Broca emphasized the importance of the left hemisphere because of its control of both language and the the right hand. He focused his research on this "dominant hemisphere" and considered the right hemisphere to be unimportant.

Independently, Jackson (1865) observed that the right hemisphere was also very important, but for the visuo-spatial tasks. He wrote:

> If then, it should be proven by wider experience that the faculty of expression resides in one hemisphere, there is no absurdity in raising the question as to whether perception - its corresponding opposite - may be seated in the other (Springer and Deutsch, 1981, p.13).

Jackson's work, however, was virtually ignored until the 1930's. While it gained increasing popularity, it was not until after the middle of the 20th century that it was appropriately recognized. Jackson's view that the left hemisphere may be dominant for language functions, and the right hemisphere dominant for perceptual functions, came to be called the "dual-dominance model" by Bakan (1971). This model was derived from the observations that while the occipital lobes are responsible for visual imagery, "the right posterior lobe is the leading side, the left is the more automatic." (Jackson, 1958).

Re-evaluated Theories

Contrary to the earlier theories, Sperry's work further supports Jackson's contention that the right hemisphere was important as well.

> [The] disconnected right hemisphere was by no means either word-deaf as anticipated, or word-blind....[In fact, it] seemed to have its own private perceptual, learning, and memory experiences, all of which were seemingly oblivious to corresponding events in the other hemipshere. (Sperry, 1982, pp. 1223-1224)

Resulting from this discovery, the traditional theory of a

retarded, subdominant, right hemisphere required a re-evaluation. In addition to earlier studies indicating that the right brain was, in fact, better equipped or specialized for visuospatial tasks, (this was recently confirmed by Ratcliffe, 1979) evidence was accumulating implying that the right hemisphere was capable of even higher gnostic functions. In support, Sperry summarizes Levy's work as follows:

> Levy proposed that left and right hemipsheres are characterized by inbuilt, qualitatively different and mutually antagonistic modes of cognitive processing, the left being basically analytic and sequential, the right spatial and synthetic (Sperry, 1982, p. 1224).

Further support was derived from Sperry's work with split brain patients.

Split Brain Patients

Initially, studies involving the isolation of a hemisphere had only been possible with animals whose corpus callosum and other commissures were surgically severed for experimental purposes. With humans, isolation of a hemisphere was at first only possible with the use of sodium amytal. This drug was administered in an attempt to avoid post-surgical speech deficits by determining where speech centers were located in patients about to undergo neurosurgery. The procedure involves injection of the barbiturate sodium amytal into the carotid artery ipsilateral to the hemisphere to be anaesthetized. Recently, however, it has been possible to observe the

independent hemisphere by use of the split brain patient.

Split brain patients have attracted a number of outstanding researchers from different fields of study. These subjects, previously victims of status epilepticus (a severe epilepsy), agreed to a commissurotomy as a last resort treatment. This operation severs the corpus callosum, the main nerve fibers connecting the two hemispheres, as well as other commissures. With these connections severed, seizures could no longer be transmitted from one hemisphere to the other.

This new subject provided novel methods of studying the hemispheres individually in humans. Experiments with these subjects enabled psychologists to test one hemisphere without interference from the other, and without the use of drugs. It is now possible to observe the recovery duration for numerous tasks and to determine which functions fail to respond to therapy when aid is not possible from the other hemisphere.

Note the important implications of the re-evaluated theories. By demonstrating the functional specialization of each hemisphere, Sperry's work leads to the important suggestion that the two hemispheres process external and internal stimuli in two different modes.

This laid the groundwork for a whole new field of study referred to as hemisphericity: the tendency for an individual to rely more on one hemisphere's mode of processing than the other (Bakan, 1969, Reynolds and Torrance, 1978).

II. Hemisphericity

Dual Dominance

In 1978, Bakan more explicitly characterized his theory of "dual dominance", writing:

> The left hemisphere mode is described as symbolic, abstract, linear, rational, focal, conceptual, propositional, secondary process, digital, logical, active, and analytic. The right hemisphere mode is described as iconic, concrete, diffuse, perceptual, appositional, primary process, analogue, passive, and holistic. (Bakan, 1978, p. 163)

Bakan further hypothesized that these two modes of processing external and internal stimuli also mediate personality typologies and physiological and behavioural responses. Other studies which are consistent with Bakan's "dual dominance" theory concern factors such as: field dependence-independence (Bakan 1978); extraversion-introversion (Bakan 1978); impulsion-reflection (Bakan 1978); euphoria-depression (Bakan 1971, Kinsbourne 1981); differences in locus of attention (Day 1964); differences in locus of anxiety (Day 1968, Smokler and Shevrin 1979); (see Tucker (1981) for a general overview). Bakan (1978) supported his suggestion by listing a number of personality typologies which might be a result of hemispheric preference: mystic/visionary and practical/orderly; empirical/inductive and theoretical/deductive; and artists and

thinkers.

Hemisphericity has been used as a possible explanation for the dichotomous typologies that seem to appear in the personality and cognition of individuals (Bakan, 1978). However, to support the hemisphericity model in normal individuals there was a need for a technique to examine correlates of personality and cognitive characteristics with hemispheric dominance. Bakan (1969, 1971) developed one of the first hemispheric typologies which classifies people with respect to preference for the use of either hemisphere. The method which has been proposed to observe hemispheric asymmetry in normal persons utilizes Conjugate Lateral Eye Movements (CLEMs).

Conjugate Lateral Eye Movement

Bakan has asserted that conjugate lateral eye movements (CLEMs) might indicate the relative hemispheric dominance for an individual. A brief summary of the antecedants that led to Bakan's suggestion might prove useful. In 1954, Teitelbaum noted that while facing the experimenter, a subject will avert his gaze before answering a question. Day (1964) further observed that when presented with a series of thought-provoking questions, the subject tended to divert his gaze consistently in the same direction. In 1969, Bakan extended Day's observation suggesting that perhaps CLEMs were indicative of a particular mode of hemispheric processing. Bakan's reasoning suggested that

if the eye muscles are controlled contralaterally, and a subject consistently shifts his/her gaze in the same direction when pondering a series of thought-provoking questions, the direction of the eye movement is indicative of greater relative activation of the contralateral hemisphere. Bakan wrote:

> In conclusion, a relatively more active right hemisphere, possibly indicated by the direction of eye-movements, implies a syndrome consisting or greater use of pre-verbal activities such as imagery, greater hypnotic susceptibility, greater interest in humanistic subjects, less mathematical ability, and more EEG alpha activity. (Bakan, 1969, p. 931)

Bakan (1971) writes that Day also noted psychological and physiological differences between the right and the left movers, such as:

> differences in attention, use of language, brain-wave pattern, muscle tonus and response to psychotherapy. (Bakan, 1971, p.66)

Consequently, Bakan suggested that people could be categorized as left movers and right movers.

CLEM Procedures

In the typical CLEM procedure a subject is asked a variety of questions that require some thought; the meaning of proverbs, the construction of a sentence using a particular grammatical rule, or the spelling of a lengthy word/name backwards. CLEM tests are usually conducted in a low-stimulus environment in order to reduce interferring stimuli which might capture the subject's attention thereby causing spurious CLEM measurements.

The experimenter and the subject sit facing each other in the cubicle. The experimenter will position a microphone on the table in front of the subject, indicating to the subject that he is required to speak into the microphone. This encourages the subject to face the experimenter which enables the latter to determine the direction of the eye movement more accurately. According to Bakan (1971) and Gur (1975), it is important to observe and record the initial eye movement at the conclusion of the question because this is the eye movement which is initially activated by the preferred hemisphere. Following this initial CLEM in normal subjects, both hemispheres will be involved to some extent due to the transference of information by way of the corpus callosum and other commissures.

III. Hemisphericity and Sex Differences

Emotions

The relation between functional hemispheric asymmetry and emotions was studied by Borod and Caron (1980) who suggested that the right hemisphere dominates both understanding and expression of emotions. They also found that females are more lateralized for positive emotions while males are more lateralized for negative emotions. Ladavas (1980) found evidence suggesting that females possess a right hemisphere advantage for discerning emotions of others. Ahern and Schwartz (1979) found that negative emotions are associated with left lateral eye movements (indicative of a right hemisphere preference) and positive emotions were associated with right lateral eye movements, reflective of left hemisphere preference.

Personality

Another interesting finding (Dunivin and Zenhausern, 1981) is that right-handed females with a left hemisphere preference (as measured by a self-rating questionnaire constructed to indicate left or right hemisphere preference) appear to have an obsessive personality tendency. Further, females with a right

hemisphere preference tend to show a hysteric personality typology. Although a similar pattern occurred for males it was not significant, however, it should be noted that only 49 males were used in this study, as oppossed to 248 females.

Brain Asymmetry

McGlone surveyed articles and experiments that both supported and criticized the notion of sex differences in the human brain, and came to the conclusion that

> there is an impressive accumulation of evidence suggesting that the male brain may be more asymmetrically organized than the female brain, for verbal and nonverbal functions. These trends are rarely found in childhood but are often significant in the mature organism. (McGlone, 1980, p.215)

While many hypotheses have been proposed to account for these data, none has yet attracted a significant following. In a commentary at the conclusion of McGlone's article, Ingel questions the specific studies which are researching the effect of prenatal, pubertal and postpubertal hormones on lateralization and cognitive abilities. While the literature includes considerable disagreement concerning the effects of hormones on lateralization, there are sufficient data to support tentative hypotheses concerning hormonal effects (contraceptive hormones included) on cognitive abilities.

Menstrual Cycle

Several studies have indicated that both cognitive and affective processes are altered throughout the menstrual cycle. Dennerstein and Burrows (1979) have reviewed various theories which have been purported to account for changes in affect associated with the menstrual cycle, several of which deal with hormonal fluctuations. Various studies have found a relationship between depression and the menstrual cycle, indicating that hormones are associated with the depression that occurs during the premenses and menses phases of the monthly cycle (Coppen and Kessel, 1963, Sutherland and Stewart, 1965). Furthermore, depression along with other negative affects have been associated with the right hemisphere (Gainotti, 1972, Dimond et al, 1976, Myslobodsky and Horesh, 1978, Ahern and Schwartz, 1979, Heller and Levy, 1981), indicating a possible connection between hemispheric activation and the menstrual cycle.

Another indication that changes in hemisphericity may be related to hormones is a study by Goldstein (1979). Goldstein analyzed nine depressed female patients (using electrophysiology) and found that depressive symptomatology was worse during menstruation "and was found to correspond with a marked increase in right hemispheric variance [as measured by EEG's]." (Goldstein, 1983). Furthermore, Goldstein (1983) discusses the case of a concert pianist

> who reported to be behaviourally incapacitated during her menses. A recording obtained at that time revealed

> intense right activation during both baseline and audition of a speech... the same subject, a week post-menstruation, had left activation during both baseline and listening to a text, (Goldstein, 1983, p. 126).

In regard to the changes that occur in cognitive processes, Ruggieri and Valeri (1981a) found that body perception (which was found to reflect cerebral dominance (1981)) fluctuates across the phases of the menstrual cycle.

Broverman et al (1981) present the most striking report of a correlation between hormones and cognitive abilities. Their study reveals a significant change in cognitive task performance across the menstrual cycle. Cognitive task measures included: speed reading of repeated colour names; speed of naming repeated colours; the Embedded Figures Test; and the WAIS Block Design Subtest. Broverman et al conclude that:

> the predicted changes in performance on automatization and perceptual-restructuring tasks from pre- to post-ovulation do occur when the testing sessions occur in close temporal relation to the preovulatory estradiol peak and the postovalutory progesterone peak. The predicted changes do not occur if the testing sessions are not in proper relation to these peaks (Broverman et al, 1981, p. 653).

Thus, taking all of these points into consideration, it would appear that because hormones affect cognitive and affective processes, and considering the effect menstrual hormones have on these processes, one may question the relationship between hemisphericity and contraceptive hormones.

IV. Hemisphericity and Contraceptive Use

In a previous study, Prochnau (1993) found an incidental relationship between hemisphericity and contraceptive use. A literature search revealed a number of similar characteristics between the menstrual and premenstrual phases of the monthly cycle, which lead Prochnau to study the relationship between hemisphericity and the menstrual cycle. Because of various studies which described side-effects due to the oral contraceptives, subjects were asked to indicate if they were currently using this form of contraception. During initial analysis, the subjects who were taking oral contraceptive were eliminated. An incidental finding, however, was that those subjects who were using oral contraceptives tended to be the same subjects who made up the group of left dominant females.

Further analysis found a correlation ($r = -0.27$, $p = 0.005$) between oral contraceptive use (yes-no) and hemisphericity (as measured by the Conjugate Lateral Eye Movement test). It appeared that the females who used oral contraceptives had a stronger left hemisphere preference than those females who did not use the contraceptive. A literature review revealed no information concerning the relationship between these two variables. Prochnau offered several suggestions to account for the finding:

a) mere coincidence

b) left hemisphere dominant females have some unique characteristic which predisposes them to use oral contraceptives
c) right hemisphere dominant females attempt to use oral contraceptives but because of a higher awareness of visceral activity are more likely to discontinue use due to side-effects
d) the contraceptive hormone influences conjugate lateral eye movements

The present study is a further exploration of the relationship between hemisphericity and oral contraceptive use. An attempt will be made to ascertain if there is a difference in hemispheric dominance between those females who have just begun using oral contraceptives and those females who have used the contraceptive for a period of time. If those females who have used oral contraceptives for the longest duration have a score indicating more left hemisphere dominance (as measured by the Conjugate Lateral Eye Movement, CLEM, test), then further analysis will ascertain whether or not this relationship is due to an initial hemispheric preference among those females who choose to use oral contraceptives. It was proposed to determine this by analyzing data from virgins about their plans concerning use of oral contraceptives and then relating this information to hemispheric dominance as measured by the Conjugate Lateral Eye Movement (CLEM) test.

Additional analysis will study another possibility that may account for the correlation between hemisphericity dominance and oral contraceptive use. The likelihood that right hemispheric dominant females discontinue the use of oral contraceptives may be due to the finding that right hemisphere dominant subjects are more aware of their visceral reactions (Bakan, 1978). This

being true, right hemisphere dominant females may be more aware of side-effects caused by the oral contraceptives, and therefore, discontinue using them.

The possibility that the contraceptive hormones influence conjugate lateral eye movement behaviour can only be ascertained through a causal study. Therefore, further research will be required to test this hypothesis.

B. Method

Requests for volunteers, for a Master's Thesis experiment, were made to all Simon Fraser University Psychology 101 female students. Of the 220 subjects who participated in the experiment, the data from 210 subjects were used. The ten subjects who were eliminated either failed to complete the questionnaire(s) appropriately, were bisexual or lesbians, one subject refused to continue, and one virgin was taking oral contraceptives for therapeutic reasons. It should be noted that while subjects were taken from the Psychology 101 classes, they were predominantly first year students, and therefore, not yet focused on a particular field of study. Ages ranged from 17 to 46 with an overall mean of 26.04, a standard deviation of 6.31, and a mode of 18.00.

Each subject was assigned to one of twelve groups defined by sexual activity and use of oral contraceptives. The twelve groups were as follows: Groups one through four have never used oral contraceptives. Groups one and two are the only virgin groups of the twelve groups. Group one does not intend to use oral contraceptives; group two plans to use oral contraceptives; group three does not intend to use oral contraceptives; group four plans to use oral contraceptives. Groups five through eight discontinued oral contraceptives after increasingly longer periods of time. Groups nine through twelve have currently been

using oral contraceptives for increasingly longer periods of time. The following table lists the criteria for each of the groups and presents the N for each group.

Table I: Group Criteria

VIRGINS

Group 01 N=27 Virgins
Does not intend to use oral contraceptives
Group 02 N=36 Virgins
Intends to use oral contraceptives

NONVIRGINS

Have Never Used Oral Contraceptives

Group 03 N=23 Nonvirgins
Does not intend to use oral contraceptives
Group 04 N=04 Nonvirgins
Intends to use oral contraceptives

Discontinued Oral Contraceptives

Group 05 N=11 Nonvirgins
Discontinued oral contraceptives after one to six months
Group 06 N=08 Nonvirgins
Discontinued oral contraceptives after six to twelve months
Group 07 N=04 Nonvirgins
Discontinued oral contraceptives after twelve to eighteen months
Group 08 N=32 Nonvirgins
Discontinued oral contraceptives after longer than eighteen months

Currently Use Oral Contraceptives

Group 09 N=11 Nonvirgins
Currently using oral contraceptives for one to six months
Group 10 N=09 Nonvirgins
Currently using oral contraceptives for six to twelve months
Group 11 N=13 Nonvirgins
Currently using oral contraceptives for twelve to eighteen months
Group 12 N=32 Nonvirgins
Currently using oral contraceptives for longer than eighteen months

Refer to Tables IV, V and VI, in the Appendix, for descriptive

analyses of the Age, CLEM and Menstrual Symptom variables, respectively.

I. Procedure

Psychology 101 students were presented with a brief outline of the experiment and the ensuing requirements without revealing the hypothesis concerned.

> I require females students who are willing to participate in a Psychology experiment. You will be required to complete a written questionnaire and answer a verbal questionnaire. All information will be documented by subject number in order to ensure complete confidentiality. All subjects maintain the full rights of a volunteer and will be allowed to discontinue the research at any time, should they feel so inclined. The time required for each subject will be approximately 15 minutes.

They were subsequently informed that a short form (see Appendix A) would be distributed and should they be interested in volunteering, they were asked to complete the form and return it at the conclusion of the lecture. Appointments were arranged and confirmations were made by phone. At the appointed time, subjects were asked to read and sign the protocol (see Appendix B). Having signed the form, the subject was asked to leave her belongings in the office and to accompany the experimenter to another room.

This second visually symmetrical room (2.7 m x 2.4 m) contained an oblong, wooden table (1.2 m x 0.7 m) with a chair at either side. The backdrop was formed by a symmetrical sand coloured screen. The screen and layout of the room were designed to reduce any visual distraction, and thereby, eliminate the

majority of spurious eye movements while the CLEM test was administered. A tape recorder was situated on the floor by the experimenter's chair, with a microphone centered on the table facing the subject.

Upon entering the room, each female was asked to take the seat that provided the least amount of visual stimulation, while the experimenter took the chair against the back wall. As the subject took her seat, the experimenter explained the following:

> I am going to ask you a series of 20 questions concerning proverbs and grammatical rules. There are, however, no right or wrong answers so there is no reason for stress or anxiety. Do not dwell too long on any of the questions, simply give me the first answer that comes to your mind. If you do not know the answer or you do not understand the question, please say so and we will go on to the next one. Due to the accoustics, it is necessary that you sit at the centre of the table, directly across from me and speak into the microphone. Are there any questions?

The microphone was then turned on and the questions began. If the subject was still pondering a question after approximately one minute's time, she was asked if she would like to continue with the next one.

The subject's initial eye movement at the conclusion of each question was recorded in the following manner. As the experimenter faced the subject, she superimposed the imaginary face of a clock on the face of the subject. Thus, every eye movement the subject made corresponded to a number on a clock. The experimenter's score sheet (see Appendix C) consisted of a linear array of the same numbers at the end of each question. As the subject answered each question, the experimenter indicated

on the score sheet where the subject had directed her initial eye movement. For example, if according to the experimenter, the subject's first eye movement went up and to the left, it would be recorded as a ten or an eleven depending on the angle. This would correspond with 10:00 or 11:00 on a clock. If the subject had looked down and to the right, a four or a five would have been recorded which would have corresponded to 4:00 or 5:00, again depending on the angle.

In addition to the clock numbers one to twelve, the linear array also included an "S" and an "N". These letters refer to the trials wherein the subject either continued to "stare" (S) at the experimenter or gave any "non-lateral" (N) eye movement while answering the question. These S and N trials were eliminated when calculating the CLEM scores. Only after the question had been answered did the experimenter record the eye movement. This procedure eliminated the possibility of the subject suspecting that the recording was associated with her eye movement. Instead, she would assume that the questioning was connected with her verbal answer. In support of the validity of this procedure, none of the subjects reported suspecting that her eye movements were being recorded.

Having finished the CLEM test, the subjects returned to the initial room. They were asked to fill out the written questionnaires. The following instructions were given:

> If you are presently, or have ever been, sexually active please fill out this questionnaire (see Appendix D). If on the other hand, you have never been sexually active at any time, fill in the first four questions on this

first questionnaire and then fill out the second questionnaire (see Appendix F). Once you have completed this second form, return to the first and continue from numbers 19 on. If you have any questions, please feel free to ask.

Once the subject completed all the forms, she was asked if she had any questions. If so, the questions were appropriately answered. The subject was then thanked for her cooperation and specifically asked not to divulge any information to subjects who had not yet participated as it would bias their responses.

II. Measures

Conjugate Lateral Eye Movements

It still remains a controversial issue whether or not the Conjugate Lateral Eye Movement (CLEM) test can be used as an indication of relative hemispheric dominance. The introduction provides information concerning the development of the CLEM test and the usual procedures for administering the test to subjects. The CLEM test has a test-retest reliability of .80 for females (Bakan and Strayer, 1973). The questions used in this experiment are the same as those developed by Bakan, Coupland, Glackman, and Putnam (1974). These questions are assumed to be neutral, in that while they require some reflective thought, their content tends not to influence CLEM direction.

When presenting the CLEM test, the experimenter asks the subject a series of questions concerning proverbs and grammatical rules. At the conclusion of each answer, the experimenter records the subject's initial eye movement.

The scores for the CLEM test were derived by totalling the number of the eye movements that went to the left (clockface numbers one to six, left CLEMs); totalling the number of eye movements that went to the right (clockface numbers seven to twelve, right CLEMs); and dividing the left eye movements by the

total number of eye movements to produce the CLEM ratio. Non-lateral trials were excluded from the totals. Although a minimum number of 14 movements were required in order that the subject's score be included in the analysis, none of the subjects' total eye movements fell below 15.

Due to the observation that those females who look to the left are more likely to repeat a question during the CLEM test, the experiementer began to check off those questions which subjects repeated (from subject number 130). This allowed for analysis of an incidental finding.

Moos Menstrual Distress Questionnaire

The Moos Menstrual Distress Questionnaire (MDQ) was used as a measure of the number of menstrual symptoms that an individual experienced. The MDQ was chosen over other measures of menstrual symptoms because of its good reliability and validity. Moos (1968) claims that his MDQ is consistent over time; i.e., regardless of what stage of the menstrual cycle one is in while completing the questionnaire, her report remains consistent. Therefore, neither time (phase of cycle) nor memory significantly alters the respondents' perception of the symptoms or the severity of the symptoms that they experience.

The MDQ requires females to report the degree to which they experience 47 different symptoms during three menstrual phases:

menstrual (menstrual flow)
premenstrual (the week before the beginning of the

menstrual flow)
intermenstrual (remainder of the cycle)
phases of her most recent menstrual cycle
and worst menstrual cycle.

The modified version used in this experiment required that the subject indicate, on the first blank, if she "usually" experienced a given symptom during:

ME - menses flow
PO - post menses flow
OV - ovulation
PR - premenstrual

and on the second blank, to what degree she experienced the symptom:

1 - no experience of the symptom
2 - barely noticeable
3 - present, mild
4 - present, moderate
5 - present, strong
6 - acute or partially disabling

The subject was also asked to indicate the phase of and the severity of the same symptom while using oral contraceptives, on the third and fourth blanks. If the subject never used oral contraceptives, the third and fourth blanks were not filled in (i.e., groups one, two, three and four). Subjects were permitted to indicate differenct severities of symptoms in different phases, if applicable.

The scores for each subject were determined by using eight different calculations. The first blank determined what phase (ME, PO, OV, or PR) the score in the second blank (1,2,3,4,5,6) was for. For example, the subject may experience (1) weight gain during the premenses (PR) mildly (3). Using the first two blanks, therefore, will give us four scores - one for each

phase. The third and fourth blanks will give us a similar four scores for the symptoms experienced while taking contraceptives. If the subject had never used oral contraceptives, the second set of blanks would provide a set of four zero scores. Consequently, for each subject eight measures were determined describing their monthly symptoms before using and while using oral contraceptives.

Moos (1968) assigned these 47 symptoms to eight categories: pain, concentration, behavioural change, autonomic reactions, water retention, negative affect, arousal and control (see Table IV). Of the 47 symptoms, Moos categorized 46, because he could not consistently locate "change in eating habits" on any one factor. Scores for these eight categories of symptoms were accumulated for each of the four menstrual phases when not using, and while using oral contraceptives. Consequently, for each subject there were 64 scores describing monthly menstrual symptoms. These scores were descriptive of contraceptive use, menstrual phase, and symptom category.

C. Results

Results were analyzed using T-tests and ANOVAs. Variables were compared within and across single and combined groups, utilizing the groupings described in the Method section, p. 20. These female subjects ranged in age from 17 to 46, with a mean of 23.04, a median of 21.00 and a mode of 18.00. The age variable will be examined in conjunction with the groups discussed in each section.

Traditionally, non-right-handers are eliminated when analyzing hemispheric dominance (as measured by the CLEM test). This is due to the findings that the eye behaviour of left handers is less consistent and less lateralized. While several reasons have been suggested for left handedness, the implications are complex, and as a result left handers are usually excluded from the analysis. Significant results, however, have been found using all subjects as well as "right handers only" for the CLEM results, and therefore, both are presented. With the other variables, however, there appears to be little reason to present the results for the "right handers only" groups when there is only minute differences between right handed subjects and all the subjects combined. Descriptive summaries are given in Tables V, VI and VII, (all the groups combined, individual groups, and amalgamated groups: two or more groups combined according to a particular criterion) for the

Age, CLEM and Menstrual Symptom variables. T-tests and ANOVAs comparing individual groups of subjects as well as amalgamated groups of subjects produced significant results (see Tables VIII, IX, X, XI, XII and XIII). Results will be discussed in order of relevance to the present study along with descriptive statistics. All the symbols noted in the tables are explained in Table II.

I. Hemisphericity and Oral Contraceptive Use

T-tests were used to analyze the CLEM ratio measure between group nine (those who have used oral contraceptives for one to six months, N=11) and group twelve (those who have used oral contraceptives for longer than eighteen months, N=32). This CLEM ratio was derived by totalling the left eye movements and dividing by the total number of eye movements (maximum of 20, minimum 15). Group nine had a mean CLEM ratio of .78 and group twelve had a mean CLEM ratio of .59 ($t = 2.05$, $df = 19.2$, $p = 0.054$) (see Table IX). Eliminating non right handers, the results only approached significance. Group nine ($N = 10$) had a mean CLEM ratio of .78 and group twelve ($N = 29$) had a mean CLEM ratio of .58 ($t = 2.01$, $df = 16.9$, $p = 0.061$).

Combining groups nine and ten (those who have used oral contraceptives for one to twelve months, N=20) and groups eleven and twelve (those who have used oral contraceptives for longer than twelve months, N=45), and then comparing the two new combined groups, there were still significant results. The CLEM ratio measure (total left CLEM movements divided by the total number of eye movements) revealed a mean of .71 for groups nine and ten and a mean of .56 for groups eleven and twelve ($t = 1.96$, $df = 37.0$, $p = 0.057$). Eliminating non right handers, the results were significant. Groups nine and ten ($N = 16$) had a mean CLEM ratio of .75 and groups eleven and twelve ($N = 41$) had

a mean CLEM ratio of .56 ($t = 2.39$, $df = 28.9$, $p = 0.024$) (see Table IX).

These results support the hypothesis, that there is a significant difference in hemisphericity between those females who have used oral contraceptives for a short period of time and those females who have used oral contraceptives for a long period of time. Furthermore, those who used oral contraceptives for the longest period had the greater left hemisphere dominance as measured by the CLEM test.

II. Hemisphericity and the Virgin

Several possibilities may acount for the apparent increase in left hemisphere dominance with the prolonged use of oral contraceptives. One possibility is that there is a left hemisphere characteristic that predisposes one to use this form of contraception. Because this was not a repeated measures design, the only way to analyze the hemisphericity of those people who have not yet used oral contraceptives was to test virgins. These virgins were asked what contraceptive method they planned to use once they became sexually active. As noted earlier, these subjects were divided into groups one and two. Group one (N=27) does not plan to use oral contraceptives whereas group two (N=36) does plan to use them. Using the t-test, little difference was found between groups one and two, on the CLEM ratio variable (total number of left CLEMs divided by the total number of eye movements). The mean CLEM ratio for group one was .57 and the mean CLEM ratio for group two was .63 ($t = -0.81$, $df = 54.8$, $p = .4194$). Eliminating non-right-handers still does not produce significant results. Group one ($N = 25$) had a mean CLEM ratio of .56 and group two ($N = 33$) had a mean CLEM ratio of .65 ($t = -1.15$, $df = 50.0$, $p = 0.256$) (see Table IX). Thus, the hypothesis that the relationship between left hemisphere dominance and oral contraceptive use is due to a left hemisphere characteristic which predisposes females to use oral

contraceptives was not supported.

It was decided to combine groups one (virgins who intend to use contraceptive methods other than oral ones, N=27) and two (virgins who plan to use oral contraceptives, N=36) with those sexually active groups who have never used oral contraceptives, groups three (nonvirgins intend to keep using contraceptive methods other than oral ones, N=23) and four (nonvirgins who plan to use oral contraceptives, N=4), to see if there were differences between the groups. Combining groups one and three (those who will not use oral contraceptives, N=50) and comparing them to groups two and four (those who plan to use oral contraceptives, N=40), failed to show a significant difference on the CLEM ratio variable. Groups one and three had a mean CLEM ratio of .63 and group two and four had a mean CLEM ratio of .61 ($t = 0.30$, $df = 80.6$, $p = 0.762$). Eliminating the non right handers still failed to reveal a significant difference in CLEM ratios. Group one and three ($N = 45$) had a mean CLEM ratio of .61 and groups two and four ($N = 35$) had a mean CLEM ratio of .64 ($t = -0.49$, $df = 70.6$, $p = 0.625$).

The only factor that did reveal significance, when combining these groups and including non right handers, was the age variable. Group one and three ($N = 50$) had a mean age of 21.96 and groups two and four ($N = 40$) had a mean age of 19.25 ($t = 2.99$, $df = 67.0$, $p = 0.004$) (see Table VIII). This age difference appears again in other analyses and will be discussed later.

III. Discontinued Use of Oral Contraceptives

Another factor that may account for the relationship between left hemisphere dominance and oral contraceptive use is that the right hemisphere dominant females discontinue the use of the contraceptive. This suggestion may be plausible because right hemisphere dominant people are more aware of their visceral activity (Bakan, 1978). These women may, therefore, be more aware of the side effects caused by the oral contraceptives and be more inclined to discontinue using them. Because this is not an experimental study, we cannot determine if their relative hemispheric dominance has shifted before discontinuing oral contraceptives. However, ANOVAs were used to analyze the groups of all discontinuers to determine if they experienced an increase in symptoms in general, in a particular phase, or a particular type of symptom, while using oral contraceptives.

Groups Five to Eight (Those who have discontinued oral contraceptives)

Overall Menstrual Symptoms

Using ANOVAs, the overall menstrual symptoms were analyzed for groups five to eight (N=55), in each of the menstrual

phases. Comparing the overall symptoms before using oral contraceptives to the symptoms experienced while using oral contraceptives, failed to reveal a significant difference. The only menstrual phase that came close to significance was the menses phase which revealed a drop in symptoms when using oral contraceptives, 14.73 to 10.89 ($F = 2.76$, $df = 54.0$, $p = 0.102$) (see Table X).

Moos' Menstrual Categories

While there is an overall drop in symptoms among these females who discontinued oral contraceptives, it was of interest whether or not a particular type of symptom increased and if discontinuing oral contraceptives was due to an increase in this symptom category.

Using the breakdown of symptoms into Moos' eight categories, (see Table IV) however, produced few significant results. Comparing the symptoms before oral contraceptive use to the symptoms during contraceptive use, the only significant differences were found during the menses phase: behaviour change, 2.849 to 1.358 ($F = 5.44$, $df = 52.0$, $p = 0.024$); and negative affect 3.151 to 1.434 ($F = 5.93$, $df = 52.0$, $p = 0.019$). These results, however, reveal a drop in symptoms while using oral contraceptives, not the predicted increase expected for those women who discontinued the use of oral contraceptives.

Groups Five to Seven (Those who discontinued oral contraceptives after one to eighteen months)

Overall Menstrual Symptoms

Those females who continued to use oral contraceptives for longer than eighteen months (group eight) before discontinuing them, are more likely to have had other reasons than side effects for discontinuing the pill, e.g., split up with their partner, physician's recommendation to take a break from the pill, sterilization of either self or the partner, want to start a family, are less sexually active, have a fear of cancer related side effects, the menopause, etc. Using this reasoning, the same analyses were done for groups five to seven (N=23). Comparing the overall difference in symptoms in each of the menstrual phases before using oral contraceptives, to the symptoms experienced while using oral contraceptives failed to reveal any significant differences. The premenses and menses phases, however, approached significance. The premenses symptoms dropped from 33.5651 to 23.8695 ($F = 3.00$, $df = 22.0$, $p = 0.097$) and the menses, from 13.8696 to 10.0870 ($F = 3.35$, $df = 22.0$, $p = 0.081$), indicating there is still no reason to suspect that those females who discontinued oral contraceptives did so because of an awareness of oral contraceptive side-effects.

Moos' Menstrual Categories

Breaking down the symptoms into Moos' eight categories, however, again produced few significant results. The only differences between non-use and use of oral contraceptives occured during the menses phase: behaviour change, 3.190 to 1.238 ($F = 4.14$, $df = 20.0$, $p = 0.055$); and autonomic reactions, 1.333 to 0.524 ($F = 6.67$, $df = 20.0$, $p = 0.018$). Again these results reveal a drop in symptoms while using oral contraceptives and not the predicted increase in symptoms for those females who discontinue oral contraceptives.

IV. Analyzing Differences Between Amalgamated Groups of Subjects

In an attempt to understand the differences between oral contraceptive users, nonusers, and discontinuers, comparisons were made between groups of subjects on various factors.

Groups Five to Eight and Groups Nine to Twelve (Discontinuers and current users of oral contraceptives)

Age

Using a t-test analysis, the menstrual symptoms were compared for each phase of the cycle between groups five to eight (those who discontinued the oral contraceptives, N=55) and groups nine to twelve (those who still use oral contraceptives, N=65). There was a significant age difference between these two amalgamated groups. Groups five to eight had a mean age of 28.80 and groups nine to twelve had a mean age of 21.34 ($t = 6.85$, $df = 78.9$, $p = 0.000$) (see Table VIII). Those people who discontinued oral contraceptives are older than those females who are currently using them.

Comparing the groups in a pairwise manner reveals that this age finding occurs for each time period, although not necessarily significantly. Comparing group five (discontinued oral contraceptives after one to six months, N = 11, $\bar{x} = 23.73$)

with group nine (has currently been using oral contraceptives for one to six months, N = 11, x̄ = 20.91) revealed that group five had a higher mean age, although not significant (t = 1.26, df = 16.0, p = .227). Comparing group six (discontinued oral contraceptives after six to twelve months, N = 8, x̄ = 26.25) with group ten (has currently been using oral contraceptives for six to twelve months, N=9, x̄ = 21.67) approached significance (t = 1.98, df = 10.4, p = 0.075). Comparing group seven (those who discontinued oral contraceptives after twelve to eighteen months, N = 4, x̄ = 30.25) with group eleven (has currently been using oral contraceptives for twelve to eighteen months, N = 13, x̄ = 19.15) approached significance as well (t = 2.92, df = 3.10, p = 0.059). Finally, comparing group eight (discontinued oral contraceptives after eighteen months, N = 32, x̄ = 30.99) with group twelve (has currently been using oral contraceptives for longer than eighteen months, N = 32, x̄ = 22.28) did reveal a significance (t = 5.95, df = 52.2, p = .000). Reasons for this age difference will be discussed further, later.

Overall Menstrual Symptoms

Using t-tests, the menstrual symptoms were compared between the two combined groups for each phase. When comparing the menses symptoms before the use of oral contraceptives, groups five to eight had a mean of 14.73 and groups nine to twelve had a mean of 22.20 (t = -2.15, df = 116.6, p = 0.033). The symptoms

experienced during the other three phases, when not using oral contraceptives, were higher for groups five to eight. The differences, however, were not significant.

While taking oral contraceptives, the same pattern emerges. For the menses phase, groups nine to twelve have the higher symptoms mean (18.40) compared to groups five to eight (10.89), ($t = -2.25$, $df = 11.9$, $p = 0.027$). Again, groups five to eight have the higher symptom means throughout the three other menstrual phases, but they are not significant. These findings indicate that the group of females who discontinued oral contraceptives experienced fewer symptoms when using the contraceptive then the groups who are still using them.

Due to the finding that groups five to eight have more symptoms during most of the phases, we compared the combined symptoms across all phases and generated a new variable. This new variable was compared between groups five to eight (those who discontinued oral contraceptives) and groups nine to twelve (those who are currently using oral contraceptives). While the result was not significant ($t = -0.51$, $df = 115.7$, $p = 0.610$), groups nine to twelve did have the highest symptom mean, 103.2613, compared to groups five to eight, 96.7271. The difference, however, is not significant. Again revealing that there appears to be little difference amongst the symptom variables to account for why groups five to eight discontinued oral contraceptives.

Groups Five to Seven and Groups Nine to Twelve (Discontinuers and current users of oral contraceptives)

Age

Again, using the reasoning that females who discontinued oral contraceptives after using them for a period of time longer than eighteen months may have had reasons other than symptomatic ones for discontinuing the contraceptive; groups five to seven were analyzed separately. These subjects discontinued the oral contraceptives after using it for one to eighteen months (N=23). T-tests compared this group with groups nine to twelve, those females who are currently using oral contraceptives (N=65). Again, there was a significant age difference between the groups who discontinued oral contraceptives and the groups who are currently using oral contraceptives. Groups five to seven had a mean age of 25.74 and groups nine to twelve had a mean age of 21.34 ($t = 3.03$, $df = 27.5$, $p = 0.005$).

Overall Menstrual Symptoms

The same symptom pattern also emerges when comparing the two amalgamated groups on the symptom variables. When comparing the menstrual symptoms experienced before using oral contraceptives, during the menses phases, groups five to seven

had a mean symptom of 13.87 and groups nine to twelve had a mean of 22.20 ($t = -2.21$, $df = 66.2$, $p = 0.005$). For each of the other phases, the symptoms experienced when not using oral contraceptives were higher for groups five to seven than for groups nine to twelve. The differences, again however, are not significant.

While taking oral contraceptives, the same pattern emerges. For the menses phase, groups nine to twelve have the higher symptom mean (18.40) compared to groups five to seven (10.09), ($t = -2.17$, $df = 59.2$, $p = 0.034$). Again groups five to seven have the higher symptom means throughout the three other menstrual phases, but the differences are not significant. Again the combined symptoms were compared between the two amalgamated groups and no significant difference was found.

Past, Present and Future Use of Oral Contraceptive

In an attempt to determine differences between the groups of females who have never used and do not intend to use oral contraceptives and those who have used them, are using or intend to use them, the following analyses were made. Groups one and three (those who have never used oral contraceptives, N=50) were compared with groups two and four to twelve (those who have used, are currently using, or plan to use oral contraceptives, N=160). There was no age difference between these amalgamated groups. This is probably because the older groups' (groups five

to eight) mean has been brought down by groups two, four, and nine to twelve. There was no difference in hemispheric preference (as measured by the CLEM ratio) either. The mean CLEM ratio for groups one and three (N = 50) was .63 and the mean CLEM ratio for groups two and four to twelve (N = 160) was .61 (t = 0.46, df =87.5, p = 0.650).

The only variable that approached significance was the menses symptom (while not using oral contraceptives). Groups one and three had a symptom mean of 27.52 and groups two and four to twelve had a symptom mean of 20.34 (t = 1.52, df = 63.6, p = 0.130). There were no significant differences between the amalgamated groups.

Current Users and Nonusers of Oral Contraceptives

If there was no difference other than the age variable between those who refused to use oral contraceptives and those who had used them, were currently using them or planned to use them, perhaps the groups should be divided according to current use. When we compared groups one to eight (those who are not currently using oral contraceptives, N=145) with groups nine to twelve (those who are currently using oral contraceptives, N=65), three variables revealed a significant difference. The mean age of groups one to eight was 23.81 and the mean age of groups nine to twelve was 21.34 (t = 3.28, df = 199.9, p = 0.001). This will be discussed along with the other age

difference findings later.

The other two variables that revealed a significant difference, when comparing groups one to eight to groups nine to twelve, were the overall symptoms for the post menses and ovulation phases of the menstrual cycle. These analyses could only be made for the symptoms experienced before oral contraceptive use since groups one to four have never used oral contraceptives. The post menses and ovulation differences ($t = 2.99$, $df = 208.0$, $p = .003$ and $t = 2.23$, $df = 189.6$, $p = .027$, respectively) revealed that groups one to eight have higher symptom means than groups nine to twelve before oral contraceptive use.

V. Incidental Findings

Another interesting finding is that those females who look predominantly to the left in the CLEM test are more likely to repeat the question before answering it. This relationship was not noticed until approximately subject 120. Additional records were then included from subject number 130 on, in order to analyze this observation. Correlational analysis between the CLEM ratio and the number of questions repeated while looking to the left revealed significant results when using all subjects observed, ($N = 81$, $r = .26$, $p = .01$). Eliminating non-right-handers, the correlation is even higher ($N = 72$, $r = .29$, $p = .01$). Using t-tests to compare subjects classified as left movers (those who have a CLEM ratio greater than 0.70, $N = 44$) to the right movers (those who have a CLEM ratio less than or equal to 0.30, $N = 15$) revealed significant results. Right movers (left hemisphere dominant) had a mean of 0.33 for repeating CLEM questions compared to left movers (right hemisphere dominant) who have a repeat question mean of 1.95 ($t = -3.30$, $df = 54.0$, $p = .001$) (see Table XIII). Possible explanations for this finding will be discussed later.

D. Discussion

In a previous study (Prochnau, 1983) that explored relationships between hemisphericity (measured by the CLEM test) and menstrual symptoms and phases (measured by an adapted version of the Moos Menstrual Distress Questionnaire), an unexpected relationship was discovered between left hemisphericity and oral contraceptive use. Because of previously discovered side effects due to oral contraceptives, Prochnau wanted to eliminate those females who used the pill in order to analyze a more homogeneous group. Subjects revealed, on a written questionnaire, whether or not they were currently using oral contraceptives (yes-no). During initial analysis, all those who reported that they were using oral contraceptives were eliminated. It was discovered, however, that the eliminated females tended to be left hemisphere dominant subjects (right CLEM movers). The following suggestions were made to possibly account for the observed correlation:

a) mere coincidence

b) left hemisphere dominant females have a unique characteristic which predisposes them to use oral contraceptives

c) right hemispehre dominant females attempt to use oral contraceptives but because of a higher awareness of visceral activity are more likely to discontinue use due to side-effects

d) the contraceptive hormone influences conjugate lateral eye

movements

I. CLEM and Contraceptive Behaviours

Is There A Relationship?

This research was initiated with the intention of replicating the relationship between hemisphericity and oral contraceptives, and arriving at explanations that might account for it. It was found that there is a definite hemispheric difference between groups of subjects who have been taking oral contraceptives for varying periods of time. Comparing group nine (those who have taken oral contraceptives for one to six months, N=11) with group twelve (those who have taken oral contraceptives for longer than eighteen months, N=32), a significant hemispheric difference was found. Group twelve showed greater left hemispheric dominance, as measured by the CLEM ratio (left eye movements divided by the total number of eye movements). Comparing groups nine and ten (those who have used oral contraceptives for one to twelve months, N=20) with groups eleven and twelve (those who have used oral contraceptives for longer than 12 months, N=45) produced a similar result. Thus, the hypothesis that there is a difference in hemisphericity between the groups of subjects who have used oral contraceptives for varying periods of time, is supported. This leaves several competing hypotheses that might account for

this finding.

Is There a Hemispheric Bias in Females Who Choose to Use Oral Contraceptives?

In an attempt to eliminate alternative explanations for the occurrence of the above mentioned relationship, group one (those who are sexually inactive and do not plan to use oral contraceptives when they become sexually active) was compared with group two (those who are not sexually active, but do plan to use oral contraceptives when they become sexually active). The mean CLEM ratio (left eye movements divided by the total number of eye movements) was approximately the same for each group. We thus eliminated the possibility that left hemisphere dominant females possess some inherent characteristic that predisposes them to use oral contraceptives because there is no hemispheric difference between females who intend not to use oral contraceptives and females who do intend to use them. Even when we combined the virgins with those sexually active females who have never used oral contraceptives: groups one and three (will not use oral contraceptives); and groups two and four (plan to use oral contraceptives); the CLEM ratio variable failed to reveal a significant difference. There is no apparent hemispheric bias in those females who choose to use oral contraceptives.

Do Right Hemisphere Dominant Females Discontinue Oral Contraceptives?

The next step was to determine whether or not right hemisphere dominant females tended to discontinue the use of oral contraceptives. The reasoning for this suggestion, stems from the literature which suggests that right hemisphere dominant people are more aware of their visceral reactions (Bakan, 1978). Should side-effects occur from the use of oral contraceptives, then the right hemisphere dominant females might be more aware of the symptoms and more likely to discontinue the use of this form of contraception. The analysis, however, revealed an interesting reversal. The subjects reported a decrease in their experience of symptoms, whether the symptoms were analyzed collectively or within Moos' eight categories. While the overall decrease in symptoms was not surprising, it was interesting that there was not even a particular group of symptoms that increased. Why these females are discontinuing the use of oral contraceptives when they are experiencing fewer symptoms requires explanation. Perhaps they feel more normal with the familiar discomfort; perhaps they are concerned about other complications occurring from the use of the contraceptive hormone; or perhaps it has something to do with the age variable, which will be discussed shortly.

Differences Between Groups of Subjects

Age

In an attempt to understand the differences between the groups of subjects, ages were compared between different groups. Comparing ages of the groups who discontinued oral contraceptives with the groups who currently use oral contraceptives revealed a significant difference. The groups who discontinued the pill are, in fact, older. Why? Explanations have been presented as to why group eight (those females who discontinued oral contraceptives after an eighteen month duration) discontinued oral contraceptives: splitting up with their partner; physician's recommendation to give the body a break from the "pill"; sterilization of either the self or the partner; family planning; are less sexually active; fear of cancer related side-effects; or the menopause. But why is it, that each group of discontinuers is older than the corresponding group of current users. Are older people more concerned about their physical well being? Do older people have more fear of the harm reported from oral contraceptive use? Are physicians more inclined to encourage an older female to discontinue oral contraceptives? These questions require further research.

Menstrual Symptoms

Another interesting question emerges from the finding that groups nine to twelve (current oral contraceptive users) have a higher mean symptom score, during the menses, than either groups five to eight (all oral contraceptive discontinuers) or groups five to seven (those who discontinued oral contraceptives after one to eighteen months). This higher score occurs both when not using oral contraceptives and when using oral contraceptives. On the other hand, the groups who discontinued oral contraceptives have higher symptom means (although not significant) in each of the other three phases, both before and while using the contraceptive. When comparing all groups who are not currently using oral contraceptives with groups who are currently using oral contraceptives, a significant difference was found in the overall symptoms for the ovulation and postovulation phases. Those groups not currently using oral contraceptives have the higher symptom mean. At this point, I have no explanations for these occurrences. Due to the consistent patterns, however, it warrants further contemplation and research. Perhaps the answer to the symptom question has some bearing on the reasons that groups five to eight were older and discontinued oral contraceptive use.

Hemisphericity and Repetition of Questions

Another interesting finding is that those females who look to the left are more inclined to repeat a question during the CLEM test than those females who look to the right. This finding was only discovered part way through the study and consequently only 70 subjects were observed on this factor. There is, however, a positive correlation which is supported by a t-test. Reasons that may account for left CLEM movers (right hemisphere dominant) subjects repeating CLEM questions stem from the research with split brain patients. Sperry (1982) found that the right hemisphere was capable of language functions and suggested that previous studies had been misleading. Sperry purported that

> left lesions in the presence of the commissures prevent the expression of latent function, actually present but suppressed, within the undamaged right hemisphere. The interpretation rests on the assumption that the two halves of the brain, when connected work closely together as a functional unit with the leading control being in one or the other. When this unitary function is rendered defective by a one-sided lesion, the resultant impaired function prevails with respect to both hemispheres. That is, the two continue to operate as an integral, though defective, functional unit. Only after the intact right hemisphere is releasedfrom its integration with the disruptive and suppressive influence of the damaged hemisphere, as effected by commissurotomy, can its own residual functionr become effective. (Sperry, 1982, p. 1224)

Extending from Sperry's interpretations of the functioning of the hemispheres, under abnormal conditions, the following interpretations may account for what is happening during the CLEM procedure, when left movers repeat CLEM questions. To begin with, there may be bilateral dominance, whereby both hemispheres

are struggling to answer the question. Should this be the case, one needs to question why it is predominantly the left movers who repeat the questions.

Secondly, a spill over effect may be happening, wherein the internal circuits that are processing the CLEM questions are over lapping or spilling over onto those circuits used for verbal output. Perhaps this happens predominantly in the left mover (right hemisphere dominant) person. The last suggestion stems from those studies dealing with cross-cuing effects. Sperry (1982) found that when the right hemisphere was isolated and questioned, the subject spoke aloud as if the left hemisphere was informing the right hemisphere of what was taking place. Perhaps a similar cross-cuing effect is occurring here. These suggestions need to be further researched.

SUMMARY AND CONCLUSION

It was hypothesized based on earlier work (Prochnau, 1983) that females who continue to use oral contraceptives are more left hemisphere dominant. This hypothesis was supported. Furthermore, evidence suggests that initially there is no hemispheric difference between those females who plan to use oral contraceptives and those females who do not plan to use the pill. In addition, we found that the females who are discontinuing the use of oral contraceptives are not the right hemisphere females who are more viscerally aware, and therefore experience side-effects from the oral contraceptives. Instead, the females who discontinue the use of the oral contraceptives have a reduction in menstrual symptoms. Further analysis of the Moos' categories of symptoms revealed only decreases in symptoms when using oral contraceptives. The only variable that remains constant, and which may account in some indirect way for females discontinuing oral contraceptives, is age. Those females who discontinue oral contraceptives are older.

To summarize, t-tests reveal a greater left hemisphere dominance with prolonged use of oral contraceptives ($p = .05$) Therefore, we can propose that the final suggestion in Prochnau's previous study, that the hormones in oral contraceptives influence conjugate lateral eye movements, needs to be further researched.

E. Appendix

Table I: Table Terms

Grp	Group of Subjects: 1 - 12
N	Number of Subjects
CLEM Ratio	Number of Eye Movements to the left divided by the total number of eye movements
LEFT CLEM MOVER	CLEM Ratio Equal To Or Greater Than 0.70
RIGHT CLEM MOVER	CLEM Ratio Equal To Or Less Than 0.30
ME1	Menstrual Symptoms Experienced When Not Taking Oral Contraceptives
ME2	Menstrual Symptoms Experienced When Taking Oral Contraceptives
PO1	Preovulatory Symtoms Experienced When Not Taking Oral Contraceptives
PO2	Preovulatory Symptoms Experienced When Taking Oral Contraceptives
OV1	Ovulatory Symptoms Experienced When Not Taking Oral Contraceptives
OV2	Ovulatory Symptoms Experienced When Taking Oral Contraceptives
PR1	Premenstrual Symptoms Experienced When Not Taking Oral Contraceptives
PR2	Premenstrual Symptoms Experienced When Taking Oral Contraceptives
O.C.	Oral Contraceptives
ME	Menstrual Symptoms
PR	Premenstrual Symptoms
BC	Behaviour Change
NA	Negative Affect
AR	Autonomic Reactions

Table III: Criterion for Group Assignment

VIRGINS

Group 01 N=27 Virgins who plan to use contraceptive methods other than oral ones
Group 02 N=36 Virgins who plan to use oral contraceptives

NONVIRGINS

Those who have never used oral contraceptives

Group 03 N=23 Nonvirgins who will not use oral contraceptives
Group 04 N=04 Nonvirgins who plan to use oral contraceptives in the future

Discontinued Oral Contraceptives

Group 05 N=11 Nonvirgins who discontinued oral contraceptives after one to six months
Group 06 N=08 Nonvirgins who discontinued oral contraceptives after six to twelve months
Group 07 N=04 Nonvirgins who discontinued oral contraceptives after twelve to eighteen months
Group 08 N=32 Nonvirgins who discontinued oral contraceptives after eighteen months

Currently Use Oral Contraceptives

Group 09 N=11 Nonvirgins who are currently using oral contraceptives for one to six months
Group 10 N=09 Nonvirgins who are currently using oral contraceptives for six to twelve months
Group 11 N=13 Nonvirgins who are currently using oral contraceptives for twelve to eighteen months
Group 12 N=32 Nonvirgins who are currently using oral contraceptives for longer than eighteen months

Table IV: Moos' Menstrual Symptom Categories

1. Pain	5. Muscle Stiffness
	9. Headache
	16. Cramps
	22. Backache
	25. Fatique
	37. General aches and pains
2. Concentration	2. Insomnia
	6. Forgetfulness
	7. Confusion
	24. Lowered judgement
	29. Difficulty concentrating
	33. Distractible
	35. Accidents
	42. Lowered motor coordination
3. Behavioural Change	4. Lowered school or work performance
	8. Take naps; stay in bed
	15. Stay at home
	20. Avoid social activities
	41. Decreased efficiency
4. Autonomic Reactions	17. Dizziness, faintness
	23. Cold sweats
	26. Nausea, vomitting
	28. Hot flashes
5. Water Retention	1. Weight gain
	10. Skin disorders
	30. Painful breasts
	34. Swelling
6. Negative Affect	3. Crying
	11. Loneliness
	21. Anxiety
	27. Restlessness
	36. Irritability
	38. Mood swings
	40. Depression
	45. Tension
7. Arousal	13. Affectionate
	14. Orderliness
	18. Excitement
	31. Feelings of well-being
	47. Bursts of energy, activity
8. Control	12. Feelings of suffocation
	19. Chest pains
	32. Ringing in the ears
	39. Heart pounding
	43. Numbness, tingling
	46. Blind spots, fuzzy vision

Table V: Summary Descriptive Analysis: Age
Subjects: All

Grp	N	Mean	Median	Mode	Range
All	210	23.04	21.00	18.00	17.00-46.00
1	27	20.37	20.00	18.00	17.00-29.00
2	36	19.33	19.00	18.00	17.00-29.00
3	23	23.83	20.00	18.00	18.00-46.00
4	4	18.50	18.00	18.00	18.00-20.00
5	11	23.73	21.00	19.00	18.00-37.00
6	8	26.25	26.00	not unique	19.00-39.00
7	4	30.25	29.50	not unique	23.00-39.00
8	32	31.00	31.50	35.00	21.00-45.00
9	11	20.91	19.00	not unique	18.00-28.00
10	9	21.67	21.00	not unique	18.00-28.00
11	13	19.15	18.00	18.00	17.00-22.00
12	32	21.28	21.00	19.00	18.00-37.00
Combined Groups					
1,3	50	21.96	20.00	18.00	17.00-46.00
1-8	145	23.81	21.00	18.00	17.00-37.00
2,4	40	19.49	18.50	18.00	17.00-29.00
2,4-12	160	23.38	21.00	18.00	17.00-45.00
5-7	23	25.74	25.00	19.00	18.00-39.00
5-8	55	28.80	27.00	35.00	18.00-45.00
9-10	20	21.25	20.00	not unique	18.00-28.00
9-12	65	21.34	20.00	18.00	17.00-37.00
11-12	45	21.38	21.00	not unique	17.00-37.00

Table VI: Summary Descriptive Analysis: CLEM
Subjects: All

Grp	N	Mean CLEM Ratio	Right Handers Only	N	Mean CLEM Ratio
All	210	0.61		188	0.61
1	27	0.57		25	0.56
2	36	0.63		33	0.65
3	23	0.69		20	0.66
4	4	0.37		2	0.43
5	11	0.61		9	0.62
6	8	0.44		8	0.44
7	4	0.81		4	0.81
8	32	0.61		30	0.60
9	11	0.78		10	0.78
10	9	0.62		6	0.69
11	13	0.50		12	0.50
12	32	0.59		29	0.58
Combined Groups					
1,3	50	0.63		45	0.61
1-8	145	0.61		131	0.61
2,4	40	0.61		35	0.64
2,4-12	160	0.61		143	0.61
5-7	23	0.59		21	0.59
5-8	55	0.60		51	0.60
9-10	20	0.71		16	0.78
11-12	45	0.56		41	0.56

Table VII: Summary Descriptive Analysis: Menstrual Symptoms
Subjects: All

Grp	N	ME1	PO1	OV1	PR1	ME2	PO2	OV2	PR2
All	210	22.05	04.67	03.90	25.83	-	-	-	-
1	27	30.07	07.11	03.74	26.30	-	-	-	-
2	36	26.33	08.31	06.94	24.14	-	-	-	-
3	23	24.52	03.65	03.57	31.04	-	-	-	-
4	4	13.50	05.75	04.25	25.25	-	-	-	-
Discontinuers of Oral Contraceptives									
5	11	14.45	04.09	08.82	20.55	13.73	08.09	07.28	23.09
6	8	13.00	05.75	01.00	54.00	06.25	03.00	02.88	23.88
7	4	14.00	01.00	10.00	28.50	07.75	00.00	13.50	26.00
8	32	15.34	03.44	02.25	22.18	11.47	03.28	03.44	23.84
Current Users of Oral Contraceptives									
9	11	16.90	00.64	03.63	20.55	18.64	01.45	04.36	18.36
10	9	37.00	06.44	03.33	31.56	28.11	09.56	07.22	27.44
11	13	23.54	02.38	02.00	25.23	19.15	03.00	03.77	26.85
12	32	19.31	02.56	01.81	22.22	15.23	03.53	02.47	22.63
Combined Groups									
5-7	23	13.87	04.13	06.30	33.57	10.09	04.91	07.04	23.87
5-8	55	14.73	03.73	03.95	26.95	10.89	03.96	04.95	23.85
9-12	65	22.20	02.74	02.32	23.83	18.40	03.91	03.71	23.42

Table VIII: T-TESTS: AGE Subjects: All

GROUP	GROUP ONE			GROUP TWO					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
1 / 2	27	20.37	2.92	36	19.33	2.43	1.50	49.9	0.141
1-8/9-12	145	23.91	7.03	65	21.34	3.85	3.28	199.9	0.001
1,3/2,4	50	21.96	5.85	40	19.25	2.33	2.99	67.0	0.001
1,3/2,4-12	50	21.96	5.85	160	23.38	6.43	-1.46	89.1	0.147
5-7/9-12	23	25.74	6.59	65	21.34	3.85	3.03	27.5	0.005
5-8/9-12	55	28.80	7.26	65	21.34	3.85	6.85	78.9	0.000
5 / 9	11	23.73	6.44	11	20.91	3.73	1.26	16.0	0.227
6 / 10	8	26.25	5.85	9	21.67	3.12	1.98	10.4	0.075
7 / 11	4	30.25	7.54	13	19.15	1.63	2.92	3.1	0.059
8 / 12	32	31.00	7.01	32	22.28	4.42	5.95	52.2	0.000

Table IX: T-TESTS: CLEM RATIO SUBJECTS: ALL

GROUP	GROUP ONE			GROUP TWO					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
1 / 2	27	0.57	0.29	36	0.63	0.28	-0.81	54.8	0.419
1-8/9-12	145	0.61	0.28	65	0.61	0.28	0.03	122.2	0.977
1,3/2,4	50	0.63	0.26	40	0.61	0.29	0.03	80.6	0.762
1,3/2,4-12	50	0.63	0.26	160	0.61	0.28	0.46	87.5	0.650
9 /12	11	0.78	0.26	32	0.59	0.29	2.05	19.2	0.054
9,10/11,12	20	0.71	0.27	45	0.56	0.28	1.96	37.0	0.057

SUBJECTS: ALL RIGHT HANDERS

GROUP	GROUP ONE			GROUP TWO					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
1 / 2	25	0.56	0.29	33	0.65	0.27	-1.15	50.0	0.255
1-8/9-12	131	0.61	0.27	57	0.61	0.29	-0.03	101.4	0.976
1,3/2,4	45	0.61	0.26	35	0.64	0.28	-0.49	70.6	0.625
1,3/2,4-12	45	0.61	0.26	143	0.61	0.29	-0.14	80.3	0.892
9 / 12	10	0.78	0.27	29	0.58	0.29	2.01	16.9	0.061
9,10/11,12	16	0.75	0.27	41	0.56	0.28	2.39	28.9	0.024

Table X: T-TESTS: MENSTRUAL SYMPTOMS Subjects: All

SYMPTOMS

	GROUPS 5 - 7			GROUPS 9 - 12					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
ME1	23	13.87	12.72	65	22.20	21.62	-2.21	66.2	0.031
ME2	23	10.09	13.50	65	18.40	20.70	-2.17	59.2	0.034
PO1	23	4.13	7.07	65	2.74	4.15	0.89	27.6	0.380
PO2	23	4.91	14.52	65	3.91	6.16	0.32	24.9	0.750
OV1	23	6.30	9.77	65	2.32	5.54	1.85	27.2	0.075
OV2	23	7.04	12.32	65	3.71	8.79	1.20	30.3	0.241
PR1	23	33.57	29.07	65	23.83	24.49	1.44	33.7	0.160
PR2	23	23.87	25.17	65	23.42	22.69	0.08	35.5	0.940
S	23	103.78	72.77	65	100.52	68.93	0.19	36.9	0.853

	GROUPS 5 - 8			GROUPS 9 - 12					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
ME1	55	14.73	16.35	65	22.20	21.62	-2.15	116.6	0.033
ME2	55	10.89	15.86	65	18.40	20.70	-2.25	116.9	0.027
PO1	55	3.73	7.30	65	2.74	4.15	0.89	82.4	0.376
PO2	55	3.96	10.69	65	3.91	6.16	0.03	83.1	0.973
OV1	55	3.95	7.52	65	2.32	5.54	1.32	97.6	0.188
OV2	55	4.95	10.40	65	3.71	8.79	0.70	106.2	0.488
PR1	55	26.95	24.91	65	23.83	24.49	0.69	114.1	0.493
PR2	55	23.85	22.66	65	23.42	22.69	0.08	35.5	0.940
S	55	96.73	68.88	65	100.52	68.93	0.19	36.9	0.853

	GROUPS 1 - 8			GROUPS 9 - 12					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
ME1	145	21.99	25.06	65	22.20	21.62	-0.06	141.5	0.950
ME2	145	5.11	12.31	65	18.40	20.70	-4.81	85.0	0.000
PO1	145	5.54	9.42	65	2.74	4.15	2.99	208.0	0.003
PO2	145	1.88	7.11	65	3.91	6.16	-2.10	141.0	0.037
OV1	145	4.60	9.12	65	2.32	5.54	2.23	189.6	0.027
OV2	145	1.93	6.81	65	3.71	8.79	-1.45	99.9	0.151
PR1	145	26.73	26.80	65	23.83	24.49	0.77	134.0	0.443
PR2	145	10.43	18.73	65	23.42	22.69	-4.04	104.8	0.000
S	145	83.74	63.77	65	100.52	68.93	-1.91	112.5	0.059

	GROUPS 1,3			GROUPS 2,4 - 12					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
ME1	50	27.52	31.19	160	20.34	21.09	1.52	63.6	0.130
ME2	50	2.84	10.21	160	11.22	17.63	-4.17	144.1	0.000
PO1	50	5.52	7.61	160	4.41	8.45	0.88	89.9	0.382
PO2	50	1.08	3.78	160	2.95	7.55	-2.33	167.3	0.021
OV1	50	3.66	7.87	160	3.97	8.37	-0.24	86.4	0.812
OV2	50	0.16	0.79	160	3.21	8.46	-4.49	167.6	0.000
PR1	50	28.48	33.78	160	25.01	23.23	0.68	64.1	0.500
PR2	50	4.00	11.51	160	17.71	22.06	-5.75	160.8	0.000
S	50	78.78	65.18	160	93.21	66.67	-1.36	83.5	0.178

Table XI: ANOVAS: MENSTRUAL SYMPTOMS GROUPS 5 - 7

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
ME	MEAN	6600.02	1	6600.02	22.19	0.000
	ERROR	6544.48	22	297.48		
	ME	164.54	1	164.54	3.35	0.081
	ERROR	1081.96	22	49.18		

	N	MEAN	ST.DEV.
ME (before O.C.)	23	13.87	12.72
ME (during O.C.)	23	10.09	13.60

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
PR	MEAN	37935.67	1	37935.67	33.92	0.000
	ERROR	24601.83	22	1118.26		
	PR	1081.07	1	1081.07	3.00	0.097
	ERROR	7930.43	22	360.47		

	N	MEAN	ST.DEV.
PR (before O.C.)	23	33.57	29.07
PR (during O.C.)	23	23.87	25.17

GROUPS 5 - 8

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
ME	MEAN	18048.01	1	18048.01	48.48	0.000
	ERROR	20101.49	54	372.25		
	ME	404.74	1	404.74	2.76	0.102
	ERROR	7912.76	54	146.53		

	N	MEAN	ST.DEV.
ME (before O.C.)	55	14.73	16.35
ME (during O.C.)	55	10.89	15.86

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
PR	MEAN	70967.60	1	70967.60	85.49	0.000
	ERROR	44824.40	54	830.08		
	PR	262.73	1	262.73	0.87	0.356
	ERROR	16339.27	54	303.51		

	N	MEAN	ST.DEV.
PR (before O.C.)	55	26.95	24.91
PR (during O.C.)	55	23.85	22.66

GROUPS 9 - 12

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
ME	MEAN	53571.70	1	53571.70	69.70	0.000
	ERROR	49190.80	64	768.61		
	ME	469.30	1	469.30	3.69	0.059
	ERROR	8145.20	64	127.27		

	N	MEAN	ST.DEV.
ME (before O.C.)	65	22.20	21.62
ME (during O.C.)	65	18.40	20.70

PHASE	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
PR	MEAN	72546.47	1	72546.47	70.40	0.000
	ERROR	65955.03	64	1030.55		
	PR	5.61	1	5.61	0.07	0.796
	ERROR	5339.89	64	83.44		

	N	MEAN	ST.DEV.
PR (before O.C.)	65	23.83	24.49
PR (during O.C.)	65	22.42	23.68

Table XII: ANOVAS: MOOS' MENSTRUAL CATEGORIES

GROUPS 5 - 8

SYMPTOM	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
BEHAVIOUR CHANGE	MEAN	469.14	1	464.14	28.07	0.000
	ERROR	868.36	52	16.70		
	BC	58.88	1	58.88	5.44	0.024
	ERROR	562.62	52	10.82		

	N	MEAN	ST.DEV.
BC (before O.C.)	55	3.19	4.81
BC (during O.C.)	55	1.24	2.50

GROUPS 5 - 7

SYMPTOM	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
BEHAVIOUR CHANGE	MEAN	205.93	1	205.93	10.41	0.004
	ERROR	395.57	20	19.78		
	BC	40.02	1	40.02	4.14	0.055
	ERROR	193.48	20	9.67		

	N	MEAN	ST.DEV.
BC (before O.C.)	23	3.19	4.81
BC (during O.C.)	23	1.24	2.50

GROUPS 5 - 8

SYMPTOM	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
NEGAIVE AFFECT	MEAN	557.07	1	557.07	19.93	0.000
	ERROR	1453.43	52	27.95		
	NA	78.12	1	78.12	5.83	0.019
	ERROR	696.38	52	13.39		

	N	MEAN	ST.DEV.
NA (before O.C.)	55	3.15	5.51
NA (during O.C.)	55	1.43	3.31

GROUPS 5 - 7

SYMPTOM	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	TAIL P
AUTONOMIC REACTIONS	MEAN	36.21	1	36.21	4.49	0.047
	ERROR	161.29	20	8.06		
	AR	6.88	1	6.88	6.67	0.018
	ERROR	20.62	20	1.03		

	N	MEAN	ST.DEV.
AR (before O.C.)	22	1.33	2.27
AR (during O.C.)	22	0.52	1.99

Table XIII: T-TEST: REPEATED CLEM QUESTIONS

SUBJECTS: GREATER THAN OR EQUAL TO SUBJECT NUMBER 130

	RIGHT CLEM MOVERS			LEFT CLEM MOVERS					
	N	MEAN	ST.DEV.	N	MEAN	ST.DEV.	T	DF	P
CLEM REPEATS	15	0.33	0.72	44	1.94	3.02	-3.30	54.0	0.002

APPENDIX A: VOLUNTEER REQUEST FORM

To all female students,

I am conducting a study requiring the completion of one verbal and one written quustionnaire. Information will be used by subject number only, thereby insuring complete confidentiality. Each subject will take less than 30 minutes.

If you will print your name and phone number below, and hand the form in at the end of the class, I will phone and make an appointment with you at your convenience.

Thank you

Holly Prochnau

Please print:

Name_____

Phone Number_____

APPENDIX B: PROTOCOL AND CONSENT FORM

As a subject you are required to complete one written and one verbal questionnaire. The information you provide will be referred to by subject number or as collective data only. Your name will in NO way be implicated.

As a volunteer subject you maintain the right to terminate your participation at any time.

If you are interested in obtaining the results you may contact Holly Prochnau.

Thank you for you cooperation.

Holly Prochnau

I understand the experimental procedure and agree to consent.

DATE _____

NAME _____

SIGNATURE _____

APPENDIX C: CONJUGATE LATERAL EYE MOVEMENT (CLEM) TEST

1. What is the meaning of the proverb: A watched pot never boils.
1 2 3 4 5 6 7 8 9 10 11 12 S N

2. What is the meaning of the proverb: It is an ill wind that blows no one good fortune.
1 2 3 4 5 6 7 8 9 10 11 12 S N

3. Make up a sentence using two forms of the same verb.
1 2 3 4 5 6 7 8 9 10 11 12 S N

4. Tell me two verbs beginning with "N".
1 2 3 4 5 6 7 8 9 10 11 12 S N

5. What is the meaning of the proverb: A poor worker blames his tools.
1 2 3 4 5 6 7 8 9 10 11 12 S N

6. Spell therapeutic. 1 2 3 4 5 6 7 8 9 10 11 12 S N

7. What is the meaning of the proverb: More than enough is too much.
1 2 3 4 5 6 7 8 9 10 11 12 S N

8. List two adverbs. 1 2 3 4 5 6 7 8 9 10 11 12 S N

9. What is the meaning of the proverb: Lend your money lose your friends.
1 2 3 4 5 6 7 8 9 10 11 12 S N

10. What is the meaning of the proverb: Call no man happy 'till he's dead.
1 2 3 4 5 6 7 8 9 10 11 12 S N

11. List two prepositions. 1 2 3 4 5 6 7 8 9 10 11 12 S N

12. What is the meaning of the proverb: Words should be weighed, not counted.
1 2 3 4 5 6 7 8 9 10 11 12 S N

13. What is the meaning of the proverb: He is rich who has few wants.
1 2 3 4 5 6 7 8 9 10 11 12 S N

14. Define inflation. 1 2 3 4 5 6 7 8 9 10 11 12 S N

15. What is the meaning of the proverb: A rolling stone gathers no moss.
1 2 3 4 5 6 7 8 9 10 11 12 S N

16. Make up a sentence using two adverbs.
1 2 3 4 5 6 7 8 9 10 11 12 S N

17. Tell me two verbs beginning with "R".
1 2 3 4 5 6 7 8 9 10 11 12 S N

18. What is the meaning of the proverb: The hardest work is to go idle.
1 2 3 4 5 6 7 8 9 10 11 12 S N

19. What is the meaning of the proverb: What saddens a wise man, gladdens a fool.
1 2 3 4 5 6 7 8 9 10 11 12 S N

20. Define the word economics. 1 2 3 4 5 6 7 8 9 10 11 12 S N

APPENDIX D: WRITTEN QUESTIONNAIRE

1. SUBJECT NUMBER _____ AGE ____ DATE _____
2. ARE YOU RIGHT-HANDED? YES _____ NO _____ BOTH ____
3. MARITAL STATUS: MARRIED ____ COMMON LAW ____ DIVORCED ____ SINGLE____
4. ARE YOU SEXUALLY ACTIVE? YES ____ NO ____
5. IF YES, DO YOU HAVE INTERCOURSE: DAILY____ 2-3 TIMES/WEEK____ 1/WEEK ____ EVERY OTHER WEEK ____ 1/MONTH ____
6. ARE YOU ATTEMPTING TO BECOME PREGNANT? YES ____ NO ____
7. IF NO, DO YOU USE CONTRACEPTIVES? YES ____ NO ____
8. IF YOU DO NOT USE CONTRACEPTIVES, PLEASE STATE REASON FOR NONUSE _____
9. IF YOU DO USE CONTRACEPTIVES, HOW OFTEN? 25% ____ 50% ____ 75% ____ 100% ____
10. IF YOU CHECKED OFF 25%, 50% OR 75% IN #9, WHICH REASON BEST ACCOUNTS FOR WHY A CONTRACEPTIVE WAS NOT USED THE LAST TIME THAT A CONTRACEPTIVE WAS NOT USED:
    a. DID NOT EXPECT TO HAVE INTERCOURSE ____
    b. WANTED TO USE SOMETHING BUT COULD NOT UNDER THE CIRCUMSTANCES, EXPLAIN:

       _____
    c. PARTNER OBJECTED ____
    d. SEX WAS NOT MUCH FUN WITH CONTRACEPTIVES OR CONTRACEPTIVE WAS TOO DIFFICULT TO USE ____
    e. OTHER, SPECIFY _____

       _____
11. IF YOU USE CONTRACEPTIVES, PLEASE CHECK OFF WHICH ONE(S) YOU ARE CURRENTLY USING:

ORAL ____	IUD ____
DIAPHRAGM ____	SPERMICIDAL FOAM ____
CONDOMS ____	RHYTHM ____
MALE OR FEMALE STERILIZATION ____	
DOUCHE ____	WITHDRAWAL ____

    OTHER, PLEASE SPECIFY _____
12. IF YOU USE ORAL CONTRACEPTIVES, PLEASE STATE:
    BRAND NAME ____
    DOSAGE ____ FREQUENCY ____
13. HOW LONG HAVE YOU BEEN USING THIS METHOD? 1-6 MONTHS ____ 6-12 MONTHS ____ 12 -18 ____ LONGER ____
14. WERE YOU USING ANOTHER METHOD PREVIOUS TO THIS ONE? YES ____ NO ____
15. IF YOU ANSWERED YES TO #14, PLEASE CHECK ONE OF THE FOLLOWING:

ORAL ____	IUD ____
DIAPHRAGM ____	SPERMICIDAL FOAM ____
CONDOMS ____	RHYTHM ____
MALE OR FEMALE STERILIZATION ____	
DOUCHE ____	WITHDRAWAL ____

    OTHER, PLEASE STATE WHAT _____
16. HOW LONG DID YOU USE THIS METHOD? 1-6 MONTHS ____ 6-12 MONTHS ____ 12-18 MONTHS ____ LONGER ____
17. IF YOU USED METHODS PREVIOUS TO THIS ONE, PLEASE STATE WHICH

ONE(S) AND THE DURATION DURING YOU USED IT (THEM)

18. IF YOU STATED ORAL CONTRACEPTIVES IN # 15, PLEASE STATE: NAME BRAND ____ QUANTITY ____ FREQUENCY ____

19. BEFORE YOU USED CONTRACEPTIVES, DID YOU EXPERIENCE ANY OF THE FOLLOWING SYMPTOMS DURING ANY PORTION OF THE MENSTRUAL CYCLE. PLEASE INDICATE, ON THE FIRST TWO BLANKS NEXT TO THE SYMPTOM, THE SEVERITY OF THE SYMPTOM (ACCORDING TO THE 'DESCRIPTIVE CATEGORIES' SCALE GIVEN BELOW) AND THE PHASE OF THE MENSTRUAL CYCLE (ACCORDING TO THE 'MENSTRUAL PHASES' TABLE GIVEN BELOW) THAT YOU EXPERIENCED THE SYMPTOM IN. PLEASE INDICATE, IN THE SAME WAY, ANY SYMPTOMS YOU EXPERIENCE WITH YOUR PRESENT METHOD OF CONTRACEPTION, ON THE LAST TWO BLANKS NEST TO EACH QUESTION.

DESCRIPTIVE CATEGORIES

1 - NO EXPERIENCE OF SYMPTOM
2 - BARELY NOTICEABLE
3 - PRESENT, MILD
4 - PRESENT, MODERATE
5 - PRESENT, STRONG
6 - ACUTE OR PARTIALLY DISABLING

MENSTRUAL PHASES

ME - MENSES FLOW
OV - OVULATION
PO - POST MENSES FLOW
PR - PREMENSES

1) WEIGHT GAIN ____ ____, ____ ____
2) INSOMNIA ____ ____, ____ ____
3) CRYING ____ ____, ____ ____
4) LOWERED SCHOOL OR WORK PERFORMANCE ____ ____, ____ ____
5) MUSCLE STIFFNESS ____ ____, ____ ____
6) FORGETFULNESS ____ ____, ____ ____
7) CONFUSION ____ ____, ____ ____
8) TAKE NAPS OR STAY IN BED ____ ____, ____ ____
9) HEADACHE ____ ____, ____ ____
10) SKIN DISORDERS ____ ____, ____ ____
11) LONELINESS ____ ____, ____ ____
12) FEELINGS OF SUFFOCATION ____ ____, ____ ____
13) AFFECTIONATE ____ ____, ____ ____
14) ORDERLINESS ____ ____, ____ ____
15) STAY HOME FROM WORK OR SCHOOL ____ ____, ____ ____
16) CRAMPS (UTERINE OR PELVIC) ____ ____, ____ ____
17) DIZZINESS OR FAINTNESS ____ ____, ____ ____
18) EXCITEMENT ____ ____, ____ ____
19) CHEST PAINS ____ ____, ____ ____
20) AVOID SOCIAL ACTIVITIES ____ ____, ____ ____
21) ANXIETY ____ ____, ____ ____
22) BACKACHE ____ ____, ____ ____
23) COLD SWEATS ____ ____, ____ ____
24) LOWERED JUDGEMENTS ____ ____, ____ ____
25) FATIGUE ____ ____, ____ ____
26) NAUSEA OR VOMITTING ____ ____, ____ ____
27) RESTLESSNESS ____ ____, ____ ____
28) HOT FLASHES ____ ____, ____ ____
29) DIFFICULTY IN CONCENTRATION ____ ____, ____ ____
30) PAINFUL OR TENDER BREASTS ____ ____, ____ ____
31) FEELINGS OF WELL-BEING ____ ____, ____ ____

32) BUZZING OR RINGING IN EARS ____ ____, ____ ____
33) DISTRACTABLE ____ ____, ____ ____
34) SWELLING (E.G. ABDOMEN, BREASTS OR ANKLES) ____ ____, ____ ____
35) ACCIDENTS (E.G. CUT FINGER, BREAK DISH) ____ ____, ____ ____
36) IRRITABILITY ____ ____, ____ ____
37) GENERAL ACHES AND PAINS ____ ____, ____ ____
38) MOOD SWINGS ____ ____, ____ ____
39) HEART POUNDING ____ ____, ____ ____
40) DEPRESSION ____ ____, ____ ____
41) DECREASED EFFICIENCY ____ ____, ____ ____
42) LOWERED MOTOR COORDINATION ____ ____, ____ ____
43) NUMBNESS OR TINGLING IN HANDS OR FEET ____ ____, ____ ____
44) CHANGE IN EATING HABITS ____ ____, ____ ____
45) TENSION ____ ____, ____ ____
46) BLIND SPOTS OR FUZZY VISION ____ ____, ____ ____
47) BURSTS OF ENERGY OR ACTIVITY ____ ____, ____ ____

20. STATE AS CLEARLY AND BRIEFLY AS POSSIBLE, THE REASONS FOR CHANGING METHODS OF CONTRACEPTION (EACH TIME)

APPENDIX E: ALTERNATE FORM

IF YOU ARE NOT SEXUALLY ACTIVE, PLEASE FILL OUT THIS QUESTIONNAIRE.

1. WHEN YOU BECOME SEXUALLY ACTIVE, WHAT FORM OF CONTRACEPTIVE(S) WOULD YOU USE:
   A. ORAL ____ B. IUD ____
   B. DIAPHRAGM ____ D. SPERMICIDAL FOAM ____
   E. CONDOMS ____ F. RHYTHM ____
   G. MALE OR FEMALE STERILIZATION ____
   H. DOUCHE ____ I. WITHDRAWAL ____
   J. OTHER, SPECIFY_____
   _____

2. EXPLAIN BRIEFLY WHY YOU WOULD USE THIS PARTICULAR ONE OR COMBINATION OF CONTRACEPTIVES._____
   _____

3. WHAT SIDE EFFECTS DO YOU THINK WOULD CONVINCE YOU TO ALTER THE METHOD OF CONTRACEPTION THAT YOU CHOSE IN NUMBER ONE._____
   _____

4. PLEASE RETURN TO THE FIRST QUESTIONNAIRE AND ANSWER NUMBER 19, FILLING IN THE FIRST TWO BLANKS OF THE ENSUING QUESTIONS. SKIP QUESTION 20 AND ANSWER QUESTIONS 21 TO 33.

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