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# Impact of the Menstrual Cycle on Communication

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# **IMPACT OF MENSTRUAL CYCLE ON COMMUNICATION**

By

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THESIS

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### Abstract

A thirty day survey was conducted among a small but diverse group of women soliciting journal and questionnaire responses to identify data related to communicator image and style as well as sensory and mood changes. The assessment extracts data and compares to the female menstrual cycle to ascertain if there are possible roadmaps for future research. The findings illustrate potential relationships predominately on day one of the menstrual cycle with possibilities ranging from days twenty-eight to two, as well as mid-cycle.

*Keywords:* communibiology, communication styles, female, gender, menstrual cycle

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## **Background**

### **Introduction**

This thesis will focus on independent research to observe patterns in communication relative to menstrual cycle phase. This is an exploratory study of information to determine if there are areas to pursue further research. The literature review is segmented into four primary information categories: physical changes, communibiological paradigm, social learning theories, and communicator style. The primary assumption is that the physical change a menstruating woman goes through on a monthly basis may correlate with a delta in measurable output, communication style.

During the menstrual cycle, typically a 28 to 30 day period, levels of progesterone and estrogen fluctuate throughout the month. There is research to support change in mood and senses relative to hormone changes (for example, McFadden, 1998 and Walpurger, et al, 2004). Given the research that mood and sense changes relative to hormone, one can make an assumption that mood is a variable impacting a person's communication. Therefore, it is possible that physical changes might impact the way a person communicates. The investigative research covers a breadth of material to review and dissect where further investigation might materialize in useful information. By reviewing daily journals, self-rating, and sensory changes, it acts as a navigation tool for more specific research.

The communibiological paradigm focuses on the metadata that supplies the building blocks for theory. While there is no opposition to social learning

theories, there is a debate regarding the percentage of contribution from nurture versus nature. There are four primary assumptions that drive this concept: brain activity is the force behind social interaction, individual communicator traits and temperament, differences in the brain systems that control communication traits are primarily inherited, and situation has less of an impact than expected. Social learning theories argue that communication and socialization are predominantly an outcome of learned behaviors. Both sides agree it is a combination of the two. However, the difference of opinion lies in the application of the Pareto (80/20) rule.

The pilot study focuses on seven broad research questions with a small sample size. The more fruitful results represent communicator image, style and sensory change. The first and second day of the cycle represent the lowest average communicator image rating at 1.86 as well as the most communicator style changes. No other days had a mean below a 2.0. Of the six women noting sensory changes on day one of the cycle, five exhibit stylistic changes that extend the parameters represented as her norm during the month. The highest rated communicator image day is the ninth at 3.71. Days eight thru ten were the only reported positive sensory changes. Expressive and/or emotional communicators seem to have larger fluctuations in style but perhaps it is because they are more animated by nature. Additional findings are detailed in the results section and implications are expounded upon in the discussions section.

**Physical Changes**

**The Endocrine System: Hormones.**

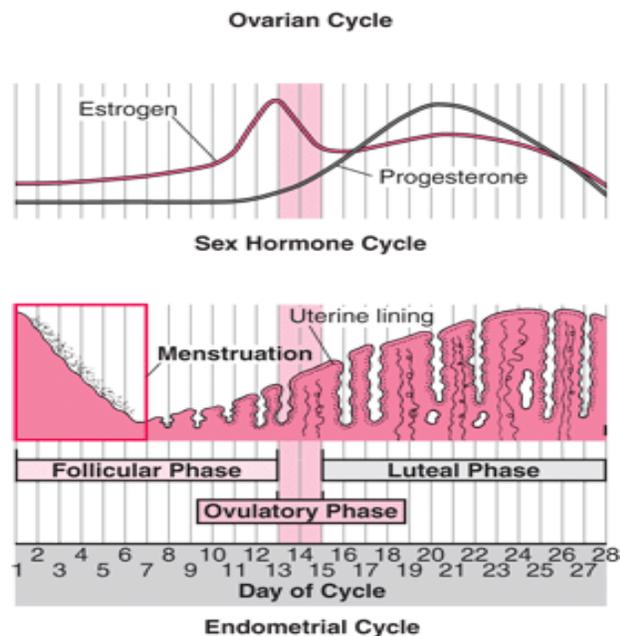
During different stages of the menstrual cycle, women experience changing levels of estrogen and progesterone. Preliminary studies reviewed indicate that cyclic hormonal changes are related to a variety of sensory and skill changes. In Figure 1, I have concatenated and summarized the studies of Walpurger, Pietrowsky, Kirschbaum, and Wolf (2004), Hampson (1990a, 1990b), Hausmann, Slabbekoorn, van Goozen, Cohen-Kettenis, and Gqntqrkqn (2000), Kimura (1996), Maki, Rich, and Rosenbaum, (2002), Postma, Winkel, Tuiten, and van Honk (1999), and the Merck Manual (2007).

Figure 1

		Hormone Levels				
Phase (Merck Manual)	Days (Merck)	Estrogen (Merck Manual)	Progesterone (Merck Manual)	Sense	Impact	Related Study(ies)
Follicular	1-13	Low	Low			
Follicular/Meses	1-5			Hearing	Negative	McFadden, 1998
Ovulatory	13-15	Spikes	Low			
Luteal	15-30	High*	High*	Perception	Negative	Walpurger, et al. (2004) p. 604
				Learning	Negative	Walpurger, et al. (2004) p. 604
				Spatial Ability	Negative	Walpurger, et al. (2004, p.600),Hampson, (1990a,b); Hausmann et al., (2000); Kimura, (1996); Maki et al., (2002); Postma et al., (1999)
				Mental Rotation	Negative	
				Deductive Reasoning	Negative	
				Verbal Fluency	Positive	Walpurger, et al. (2004) p. 600
				Articulation	Positive	Walpurger, et al. (2004) p. 600
				Manual Speed	Positive	Walpurger, et al. (2004) p. 600

\*Hormone levels continue to vary throughout the luteal phase, see figure 2 (Merck, 2007).

Figure 2



The endocrine system is a complicated system comprised of several major glands that send messages throughout the body using hormones as a communication channel. The pituitary gland is commonly referred to as the master gland which coordinates the activity of the endocrine system. Ironically, the master gland is managed by the hypothalamus. The hypothalamus is connected to the limbic system and, the HOPES website indicates that it, “controls many functions including hunger, thirst, pain, pleasure and the sex drive” (2004). The hypothalamus is made up of 3 regions of cells to manage body equilibrium, self-expression and survival.

The pituitary gland manages the ovaries which regulate the estrogen and progesterone (sex) hormone activity. The role of the hormone is to speed up or slow down a cell’s process. Hormones are very specific about the cell that they interact with, only certain hormones attach to certain cells. Floyd and Roberts

note, “hormones either increase or decrease the likelihood that a particular behavior will occur in the presence of a particular stimulus” (2009, p. 96).

Throughout the month, a woman has fluctuating levels of estrogen and progesterone. Both hormones bear impact on the mood and cognitive nature of the woman. Since mood and thinking skill are directly related to communication, it seems likely that positive and negative impact resulting from hormonal variation might produce a behavior change.

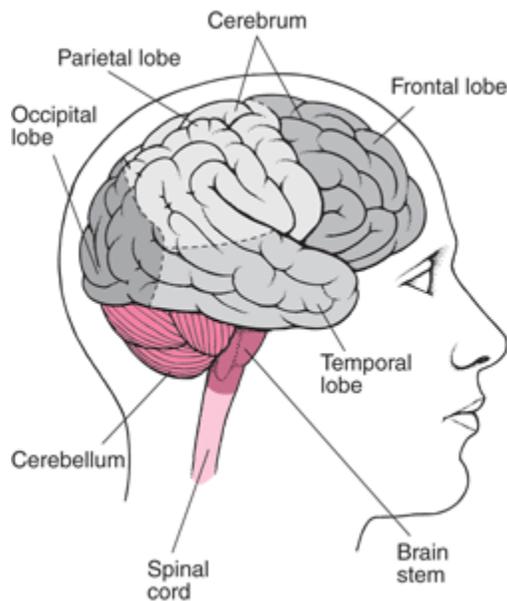
### **The Brain**

In addition to the hormonal changes that occur throughout the cycle, which are regulated by the brain (the hypothalamus), there can also blood flow changes to the brain. Dr. Ing Lam introduced me to *Images of Human Behavior* by Dr. Daniel Amen and provided an explanation of the material. Dr. Amen uses SPECT (single photo emission computed tomography) photographs of the blood flow activity in the brain, which is then related to brain activity. The Mayo Clinic website defines SPECT as, “a type of nuclear imaging test... can show how blood flows to your heart or what areas of your brain are more active or less active” (Mayo Clinic, 2009a). Dr. Amen published SPECT photos of women that suffer from PMS just before and a week after onset of menses. According to the Mayo Clinic website, “An estimated 3 of every 4 menstruating women experience some form of premenstrual syndrome” (Mayo Clinic, 2009b). If you Google “how many women suffer from PMS”, you will find a wide range of percentage results. I selected Mayo Clinic as the reference because they are a highly regarded medical facility and their website complies with “HON Code standard for

trustworthy health information”. If 75% of females suffer from PMS, and Dr. Amen’s SPECT pictures illustrate a defined change in brain activity, the results need to be included in this study as yet another potential physiological change occurring during the month of a menstruating female.

Figure 3 is an illustration and synopsis of the brain (“Viewing the Brain”) from Merck (2007). Figure 4 from the HOPES website (2004) is a view of the limbic system, which includes the cingulated gyrus. Figures 3 and 4 are useful as a reference when viewing a summary of Dr. Amen’s 2 specific clinical & photographed PMS patterns from Section 10 as represented in Figure 5.

Figure 3



### Viewing the Brain

The brain consists of the cerebrum, brain stem, and cerebellum. Each half (hemisphere) of the cerebrum is divided into lobes. Within the skull, the brain is covered by three layers of tissue called the meninges. (Merck, 2007)

Figure 4

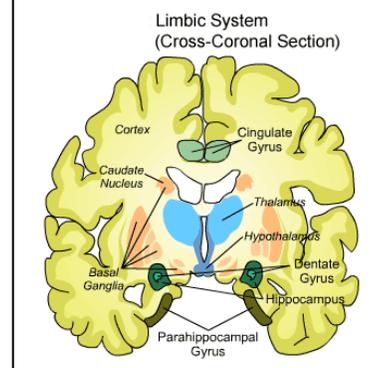


Figure 5

Pattern #	Brain Impact	Translates into...
1	“increased deep limbic activity”  Decreased blood flow to the temporal lobe	
1.a. – Limbic activity stronger on right side		“sadness, emotional withdrawal, anxiety, and repressed negative emotion”
1.b. – Limbic activity stronger on left side		“anger, irritability, and expressed negative emotion”
2	“increased deep limbic activity”  “increased cingulate gyrus activity”	“increased sadness, worrying, repetitive negative thoughts and verbalizations (nagging) and cognitive inflexibility”

Since the brain is so complex, it is worthwhile to provide a rudimentary summary of certain areas of the brain and its respective function. The *cerebral cortex* is generally referred to as the learning center of the brain. It is gray matter that covers the brain. The prefrontal cortex is the learning center. The other areas of the cerebral cortex are, “...more primitive areas are located in the medial temporal lobes and are involved with olfaction and survival functions such as visceral and emotional reactions” (Swenson, 2006, ¶2). Paraphrasing Dr. Amen (2004), the function of the *limbic system* is to filter and store emotional events and

memories. It manages eating, sleeping, sex drive, and olfactory senses. Dr. Amen (2004), references the *anterior cingulated gyrus* as the part of the brain that helps provide fluidity to the human process, rather than the opposing fixated focus. It is responsible for shifting from one idea to the next in a calm and cooperative manner. Another function is to enable a person to see options and alternatives. The *temporal lobes* manage different processes depending on which side, right or left. Dr. Amen (2004) comments that the dominant side is usually the left. This side helps understand/process language, responsible for, memory, verbal and auditory processing and learning, and stability. The right side is typically not dominant and is responsible for visual learning and processing (i.e., – what does a specific facial expression mean).

In summary, the number of physiological changes occurring in PMS and non-PMS suffering women as identified from preliminary research are so significant and easily correlated with ability to communicate (i.e. – cognitive, emotional) that it is worth investigating a relationship between the “time of the month” and one’s communication style and image. It also seems probable that women that suffer from PMS might have an even more significant communication variation. The communibiology paradigm proposed by Beatty and McCroskey ties the biological changes into behavioral changes (Beatty, M., et al, 1998, p. 198). Therefore, using communication style as a measure, the goal is to generate foundational subjective and objective statistics that signify if the topic is worthy of future research.

### **Communibiological Paradigm**

Beatty and McCroskey dispute the magnitude of degree and acceptance of wholly social learning theories in favor of biological forces compelling humans to behave (nature over nurture). “Beatty and McCroskey (in press) posited a trait-based paradigm, which they refer to as communibiology...” (Beatty, M., et al, 1998, p. 198). The authors comment that the “propositions evolved across the literature to reflect emerging research findings and changing thought about the nature of social interaction.” (Beatty, McCroskey, & Floyd, 2009, p. 5). The propositions presented by Beatty, McCroskey, and Pence are an outline of assumptions to research, test and analyze. It is a paradigm rather than a theory because the focus is testing the assumptions, thereby creating a valid foundation for theories. Since the authors are prolific and discuss the evolutionary nature of the propositions, the reference below identifies the most recent set of axioms reported (Beatty, et al, 2009, pp. 5-12):

*Proposition 1: All Mental Processes Involved in Social Interaction are Reducible to Brain Activity.*

*Proposition 2: Communicator Traits and Temperament Characteristics Represent Individual Differences in Neurobiological Functioning*

*Proposition 3: Individual Differences in the Neurobiological Systems Underlying Communicator Traits Are Principally (But Not Completely) Inherited.*

*Proposition 4: Dimensions of Situations have only Negligible Effects on Behavior.*

**Discussion on the Assumptions Summarized****Proposition 1: All Mental Processes Involved in Social Interaction are Reducible to Brain Activity.**

This assumption illustrates the authors', Beatty, McCroskey, and Pence's, position relative to the three stances in the "mind-brain problem" (Popper & Eccles, 1977) referenced in the 2009 text. The three positions referenced are coined, "mentalism", "interactionism", and "physical reductionism" and sit on the spectrum of the "mind-brain problem" continuum. A "mentalist" is on one end of the spectrum; believing that the conscious mind controls the brain's output. A "reductionist" relies on the polar opposite; believing the brain controls the conscious mind. The "interactionist" rests in the middle; believing there is interplay between the brain and mind that results in behavior. The first communibiology paradigm postulate assumes the "reductionist" position.

**Proposition 2: Communicator Traits and Temperament****Characteristics Represent Individual Differences in Neurobiological Functioning.**

The foundation for this assumption is based primarily on the works of Gray, Eysenck, and the relationship between the two. Beatty, McCroskey, and Pence note that, "Gray (1991) proposed the most detailed model linking neurobiology to temperament. Gray integrated neurobiological structures into three systems, each giving rise to different classes of behavior when activated" (2009, p. 6). The systems are, "behavioral activation system (BAS), which energizes goal-directed behavior", "behavioral inhibition system (BIS), which

triggers cessation of behavior”, and the “fight or flight system (FFS)” (Beatty, et al, 2009, p. 6). They continue to comment that, “Gray maintained that Eysenck’s major dimensions of personality – extraversion, neuroticism, and psychoticism – represented behavioral manifestations of “parameter values” of the subsystems.” (Beatty, et al, 2009, p. 7). Therefore, the range in each personality category was directly linked to the three neurobiological subsystems.

**Proposition 3: Individual Differences in the Neurobiological Systems Underlying Communicator Traits Are Principally (But Not Completely) Inherited.**

There are multiple studies that demonstrate support for this assumption which will be outlined after disclosing the secondary dimension to the proposition. The authors are not contesting social learning theories but rather the balance between whether a trait is inherited or created. Additionally, the proposition expands inherited to include the prenatal impact of the mother’s internal and external surroundings. Therefore, some personality characteristics are inherited while others are a result on hormonal and biological experiences while in utero. I have assembled the table below as a summary of studies Beatty, McCroskey, and Pence (2009, pp. 7-12) reference illustrating support for this assumption:

Figure 6

Inborn Manifestation	Study Findings	Referenced Authors
Inherited	“...the best predictor...of a person’s trait level is that of his or her twin...” “The list of social traits that appear to be highly heritable includes altruism, empathy, nurturance, aggressiveness, assertiveness, and social anxiety.”	Lykken & Tellegen,  1996
Inherited	“Horvath found strong hereditary components to the relaxed, open, dominant, and communicator image dimensions of the construct with percentages...ranging from 50% to 78%.”	Horvath, 1995
Inherited	“...found comparable estimates [to Horvath] for social composure and use of wit.”	Beatty, Marshall, &  Rudd, 2001
Inherited	In response to criticism, research used conservative quantitative methods to calculate results. The, “cluster of variables assessing interpersonal affiliation (e.g., friendliness, empathy, socialability, perspective-taking, social competence) was 70% heritable, ...social anxiety was 65% heritable, and the aggression cluster was 58% heritable.”	Beatty, et al, 2002
Inherited PLUS prenatal hormonal influence	Beatty, et al, 2009, describe how studies have illustrated certain traits, like sexual orientation and aggression, are partially heritable and, “affected by different prenatal hormonal environments.”	Heritable: Sexual orientation – Bailey, Dunne, & Martin, 2000 Aggression – Beatty, Heisel, Hall, Levine, & La France, 2002 Prenatal Hormonal Environments: Sexual orientation – Ellis & Ames, 1987 Aggression - Reinisch, 1981

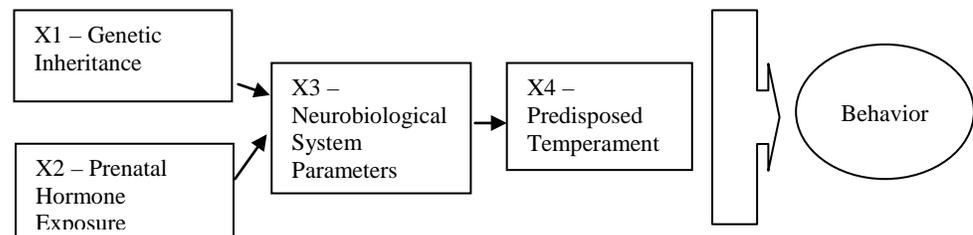
While the table outlines the studies involved the crucial element to capture in this assumption is the concept of inheriting traits (either genetically or in utero) that result in communicative behaviors. The proposition does not negate learning theories but suggests a shared role where the biological function is weighted heavier than the learned function.

**Proposition 4: Dimensions of Situations have only Negligible Effects on Behavior.**

This axiom reviews the authors’ approach to situation as a variable of behavior. The axiom represents that the situation is not the variable impacting the behavior because a person is predisposed to a situation based on his/her behavior. So, an aggressive, highly-tempered person, is less likely to be found in a library and a meek, quiet person is less likely to be at an underground, drug-induced, social gathering. Second, each person is an active participant in an event. His/Her behavior directly contributes to the situation. Finally, each person views a situation differently. His/Her personal perception impacts his/her interpretation of the situation.

**Applying the Axioms - Formulaic Model – The Causal Analysis (p. 13)**

Figure 7



Applying the Beatty, et al., (2009) causal formula, it is logical to consider that, during periods of fluctuating hormones and changes in brain metabolism, there would be an impact to X3, the organism's systematic parameters. Assuming these physiological changes impact BAS, BIS, and FFS boundaries, it would result in a change in temperament, thereby causing a behavior inconsistent with that person's norm. This behavior correlates into the manner in which that woman communicates. Since X1 & X2 are what you are born with, each woman should, in theory, vary in the way they convey a message. However, it would be interesting to compare the timing of the delta and relationship to hormones.

During a menstrual cycle, there are clearly hormonal changes that occur in women. These changes are controlled, without thoughtful decision of the individual, by the brain. This is an inherent physical process post-pubescence and pre-menopause. There is also pictorial evidence of changes in brain metabolism, neurological processing changes, for women that experience PMS. These changes impact the limbic system; the older, emotional center of the brain. Given the presentation of the paradigm, and the physical changes that occur, I believe the communication style, image, or reactions, might lend support to the concept that a communication delta is a function of physical change. Thus, monitoring a female cycle would provide support to identify potential patterns through measuring output and comparing for consistency.

### **Social Learning Theories**

It is easy to accept that nature and nurture are both part of the communication process. The communibiological paradigm explains foundations,

meta-data, based on the physiological core concepts that result in a communicative behavior. It does not negate social learning nor seek to replace the concept. However, it is easy to see a dichotomy when comparing social learning to communibiology, each can represent one end of the belief spectrum.

Social learning theories profess that people learn through observing social behaviors and related outcomes. Skinner is one of the highly regarded earlier researchers. His concept of operant learning revolves around immediate reinforcement. Gerwartz and Pelaez-Nogueras credit Skinner for coining, "...three-term contingency relation (antecedent stimulus, behavior, consequent stimulus), and the notion of reinforcement inherent in it" (1992, p. 1411).

Operant learning is where a behavior is learned through consistent and immediate consequence of an event or action.

In 1974, Bandura wrote an article discussing an adaptation of the social learning theories which incorporate a cognitive function. His approach was that people learned from their own actions and well as observing other people's actions. He felt the consequences observed from another person's event is incorporated into an individual's learning process. There is an internal driver, an intrapersonal communication, which creates the imposition of self-consequence. He notes, "They do things that give rise to self-satisfaction and self-worth, and they refrain from behaving in ways that evoke self-punishment" (1974, p. 861). He deviates from Skinner's model in that he considers long-term and immediate reinforcement, observant consequences, and self-mediation. This results in a less instinctual or automatic approach to reinforcement and conditioning.

Patterson comments on a “cognitive revolution” occurring relative to traditional behavior theories (2009, p. 160). This implies that the consequence continuum is not as simple or linear as input, behavior, consequence but a continual cognitive assessment of alternatives and considerations of alternatives. These social learning and communibiological theories/paradigm can co-exist because there is no logical conflict between the two. Social learning theories utilize the prefrontal cortex, the learning center of the brain to filter out the impulses driven by the older portions of the brain. The older brain is that which a person is born with and the basis for the instinct, personality, disposition, intelligence, and many other genetic traits which is relative to the communibiological paradigm.

### **Measuring Output: Communicator Style**

Norton’s definition of communicator style (1983):

in the context of interpersonal communication is the way one communicates. It can be defined broadly as ‘the signals that provided to help process, interpret, filter, or understand literal meaning.’ Communicator style is marked by the following characteristics: It is (1) observable, (2) multifaceted, (3) multicollinear, and (4) variable, but sufficiently patterned. (p. 47)

Norton postulates that, “...the communicator style construct is contingent upon context, situation, and time” (p. 82). Therefore, a person’s communicator style is consistent enough to be generalized but variable enough to adapt to social standards.

Norton's variable is communicator image. There are a range of six self-judgment standards. A higher score translates into a higher sense of confidence in ability to communicate. It is "...assumed that a person who has a "good" communicator image finds it easy to interact with others whether they are intimates, friends, acquaintances, or strangers. As such, this subconstruct represents an overall evaluation of the person's perception of whether the self is a good communicator" (Norton, 1983, p. 72). Norton is not concerned with how or why the person feels s/he is a good communicator. "It is enough that the overall perception is present" (Norton, 1983, p. 72).

In a more recent effort to construct a communication style basis, using a "multiphase lexical" approach, de Vries, Bakker-Pieper, Siberg, van Gameren, and Vlug:

define communication style as *the characteristic way a person sends verbal, paraverbal, and nonverbal signals in social interactions denoting (a) who he or she is or wants to (appear to) be, (b) how he or she tends to relate to people with whom he or she interacts, and (c) in what way his or her messages should usually be interpreted* (2009, p. 179, emphasis in original).

The authors feel that Norton's definition is, "too narrowly focused on the interpretation of a message" (de Vriers, et al, 2009, p.179), and does not regard how the person wants to be seen nor how the person prefers to communicate.

Both communicator/ion style studies results were defined using different methods. Norton leveraged existing style research and studies as his starting point. De Vries, Bakker-Pieper, Siberg, van Gameren, & Vlug used the (Dutch Van Dale) dictionary as their starting point. There may also be cultural differences between the two studies. Since the de Vries and colleagues study was

published in 2009, and used an extensive, time-consuming methodology; it is difficult to find any replicated research from other countries that might offer insight into the cultural consistency. There could also be generational differences as Norton's book is from 1983 while the de Vries and colleagues study is from 2009. For the purpose of this study, I will use both definitions.

The purpose of this thesis is to create a pilot study to research the implications, if any, of the menstrual cycle on female communicator style. The studies done to date indicate physiological changes that are related to communication (hearing, perception, verbal fluency, etc). My hypothesis is that there will be evidence women adapt communication style, throughout the cycle, to compensate for, or as a translation of, positive and negative changes resulting from human biology. The size of the sample group is too small to provide statistically relevant information but can indicate if there are trends that warrant further research with a larger group. The specific questions researched in this pilot study are:

RQ1. Do women notice a change in communication style during a menstrual cycle?

RQ2. Is there a relationship between sensory or skill change, as noted in the table, and communication style?

RQ3. Do women notice a change in communicator image during the menstrual cycle?

RQ4. Is there a relationship between sensory or skill change, as noted in the table, and communicator image?

RQ5, Can any communication patterns be discerned, relative to phase, among the group?

### **Method**

#### **Sample Group**

A group of 10 menstruating women, ages 18 and older, were assembled from varying racial, age, and socio-economic backgrounds using the snowball sampling method. Of the 10 women, 7 submitted the journal and questionnaire. The sample of successful participants ranged in age from 19 to 38 ( $M=30.14$ ,  $SD=7.9$ ). Of the sample, 6 or 86% cited they suffered from PMS and 2 or 29% were on some form of hormonal contraception. The group was predominantly single, 71%, and 57% have children. Four of the women, 57%, were American citizens of European descent, and there was one woman, or 14%, from each of the following categories, American – African descent, American – Hispanic/South American descent, and citizen of the UK. The majority of the women, 6 or 86%, were employed, and average hours worked was 35.93, ranging from 0 hours (for the one unemployed female) to 60 hours per week. Three of the women, 43%, had an annual salary of up to \$30,000, while the remaining four represented one from each category of \$30,000-\$60,000, \$60,000 - \$90,000, \$90,000 - \$125,000 and \$125,000 - \$250,000. Educational ranges were varied including two high school/GED graduates, three 2-YR college attendees or graduates, one 4-YR college graduate, and one Master's graduate. Most of the women, 86%, travelled outside the United States. Five of the women, 71%, are Catholic, while the remaining two, 14% each, cited Christian and Methodist. Four women, 57%, are

from suburban areas, two women, 29%, live in urban cities, and one woman, 14%, is from a rural neighborhood. A copy of the data collection form is available in Appendix B.

Each woman was randomly assigned a pseudonym and a number. The pseudonyms were gathered on October 7, 2010 from [http://names.mongabay.com/baby\\_names/1975.html](http://names.mongabay.com/baby_names/1975.html) and are the top ten names of 1975. The women were provided a Statement of Informed Consent which is available in this document, labeled as Appendix A.

### **Instruments**

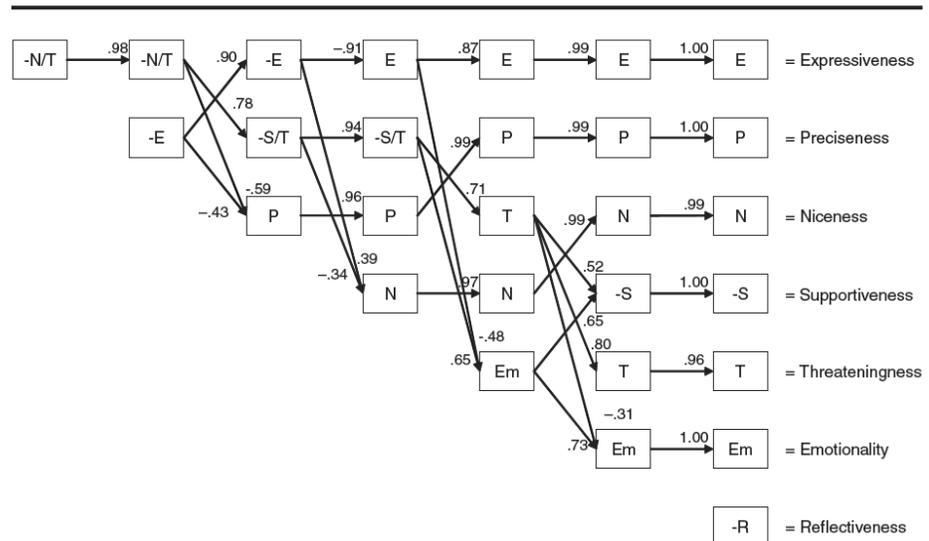
The design was a mixed-method approach including qualitative journaling and quantitative review of daily communicator image. Norton's CSM Scale question on communicator image was used to measure self-perception on communication abilities for each day. The reliability factor for the Communicator Image question has an alpha score of 0.72 (Rubin, et al, 2009, p. 135). Missing data was omitted from the mean for a particular day in order to preserve data validity. A member check was completed after assessing each journal to validate findings.

PRESENT is an acronym for the seven communication styles that deVries and colleagues identified in the 2010 study: Preciseness, Reflectiveness, Expressiveness, Supportiveness, Emotionality, Niceness, and Threateningness. The thirty highest loading descriptors on pages 190-191 provide a sense of the overall communication style and were used as a guideline to code the journals. While the seven styles are independent of each other there are overlapping words

loading into each of the categories. The four most fundamental styles are Expressiveness, a blend of Supportiveness/Threateningness, Preciseness and Reflectiveness. Niceness and Emotionality would align under Supportiveness/Threateningness. The factor tree presented on p. 188 of the study by deVries and colleagues is copied below as Figure 8. The factor tree identifies the overlap between/among categories.

Figure 8

**Factor Tree With Pearson's Correlations Greater Than .30 of the One to Seven Principal Components Solutions of the Combined List (consisting of both adjectives and verbs)**



**Procedure**

The women were asked to journal every night for 30 consecutive days. The journals were numbered, and assigned a pseudonym, and participants' information was stored with their journal number in a separate file. This way, if a journal was lost the woman's identity would not be exposed to the public. Each entry was dated to maintain formatted page breaks. Instead of trying to guess

cycle date, and to avoid reinforcement of “that time of the month” mentality, the only menstrual information requested was that the Participants write “1” at the top of their journals on the first day of their periods. In order to avoid deltas that are unrelated to phase and unknown, there was a box at the top of the page for participants to check if something extraordinary occurred during the day. Extraordinary was defined to the participants by using examples including, births, deaths, wedding, divorce, & diagnosis of a major illness. The participant was able to write down her own extraordinary event if she felt it was applicable but not one of the examples provided.

Each journal is reviewed and tagged using a liberal application of the lexical assignments to communication style as indicated by deVries and colleagues (2009). A note page was kept on each journal monitoring the following by day:

- Comments on senses, abilities, skills
- Comments on style
- Alignment between descriptive nomenclature in, writing style and general feeling of the journal and the highest loading adjectives and verbs in Table 2 in *The Content and Dimensionality of Communication Styles* (deVries, et al, 2009, pp. 191-192).

After daily notes were collected, the information was summarized in writing and any data that could be analyzed was separated into an Excel file.

The self-assessment (Appendix C) is a slightly modified version of Norton’s self-assessment question from the Communicator Style Measure (CSM).

Again, when measuring a person's communicator image, "it is enough that the overall perception is present" (Norton, 1983, p. 72). The first step was to review the sheet for any errors or omissions. Errors and omissions are marked as such in the data collection process and included as caveats by the associated graphs. Next, I reviewed the journal for day 1 of the cycle, the first day of her period, and denoted the scores. The scores were graphed as absolute values and compared to each other and against estrogen and progesterone levels on the graph. The scores were also graphed by the day-to-day delta with negatives indicating detracting in self-image of ability and positives indicating an improvement in self-concept.

### **Results**

Due to the small sample size, with six solid journals and a seventh partial journal, it is important to emphasize that the results below are high-level indications of whether a topic may or may not warrant further investigation. Two of the journals had more than five missing journal days, one person interpreted instructions differently than expected and another did not have time. The woman that did not have time had very limited entries even when she wrote and, as a result, I could not even guess a communication style. However, I did extract any useful data that I could identify in any journal because of the small number of participants in the survey.

#### **RQ1. Do women notice a change in communication style during a menstrual cycle?**

Of the survey group, the most noticeable change in women was clearly on day one of the menstrual cycle. When reviewing the journals, there appears to be

parameters over a couple of styles with extremities occurring typically on the last and first few days of the cycles. For this research question, the deVries and colleagues PRESENT model is used to categorize the journal entries. The illustration below is an English-only adaptation of the categories on pp.190-191 to provide descriptive reference to each of the communication styles.

Figure 9

<b>Label</b>	<b>Description</b>
Preciseness	Communicator is professional, expert, precise, efficient, well-thought-out, concise, consistent, well-prepared, meticulous, purposeful, meticulous, businesslike, skillful, composed, conscious, cautious, accurate, crystal-clear, functional, disciplined, directed, mature, consistent, calm, well-considered, clear, decisive, resolute, credible.
Reflectiveness	Communicator is: to dissect oneself, to dissect something or someone, passionate, engaged, to reflect (on), to philosophize, poetic, sensitive, profound, philosophical, to explore something, to fathom something or someone, to ridicule oneself, to muse (on), uninhibited, hypersensitive, to expose something, inspired, penetrating, busy, profound, to explore something
Emotionality	Communicator is stressed, sad, bad-tempered, depressed, dejected, upset, worked up, angry, sulky, downcast, tense, anxious, hurt, unreasonable, cross, irritable, panicky, annoying, pissed off, hurried, gloomy, constrained, limited, touchy.
Supportiveness	Communicator is supportive, calming, sympathetic & empathetic to

	<p>others, appreciates others, open with feelings, peeps up other people, encouraging, makes others happy, cheers people up, protective of others, compromising, praises others, plays mother to others, trusting, reassuring, urges others on.</p>
Expressiveness	<p>Communicator is: Extroverted, eloquent, fluent, temperamental, self-assured, talkative, sure, articulate, energetic.</p> <p>Communicator is not: withdraw into one’s shell, to fall silent, to snap shut , to clam up, to hide oneself, to keep quiet, to wait and see, to remain silent, to withdraw myself, shy, to be silent, reserved, to not commit oneself, to surpress oneself, to hesitate, to heavily criticize oneself, closed, restrained, introverted, to waver, to keep oneself aloof.</p>
Niceness	<p>Communicator is nice, soft-hearted, friendly, cheerful, kind, laughing, funny, understanding, modest, sympathetic, polite, loving, pleasant, happy, sweet.</p>
Threateningness	<p>Communicator is described as abusive, threatening, roars, booing, screaming, blackmailing, humiliates others, snaps, jeers, bullies, belittles, tells someone off, hits someone when s/he is down, offensive, spoils something, brings people down, cheats, looks for trouble, deceptive, pestering, cries out.</p>

Of the seven journals, three of the women are predominantly categorized as “Expressiveness”, two are best defined as “Preciseness”, one is labeled “Supportiveness” and the last woman is Undefined. Although each woman’s communication style is generalized into one of the categories, there are

parameters or ranges that are noticeable during the month. The figure below represents each of the participants along with her primary communication style as well as defined changes and dates of change.

Figure 10

Participant	Primary Style	Extremities	Dates of Extremities
Melissa	Expressiveness	Emotionality Threateningness	29-30 & 2 1
Nicole	Expressiveness	Threateningness Supportiveness	1 & 3 9
Amy	Expressiveness	Emotionality Supportiveness Reflective	2-5, 10, 24-26 21-23, 27 1
Kimberly	Preciseness	Emotionality Emotionality/Threateningness	30, 2-3, 6, 24 & 26 1
Angela	Preciseness	None	
Jennifer	Supportiveness	Emotionality	26-3
Michelle	Unknown		

There appears, in the small sample group, to be more change and breadth in parameters in style for women that fall into the Expressiveness style. There were also more styles exhibited during the month, if averaged, than the other groups. Three Expressiveness women with a total of ten styles is an average of 3.33 styles per person while two Preciseness women with a total of four styles is

an average of 2 styles per person. There was one Supportiveness woman with a total of 2 styles. There was difficulty discerning, on multiple occasions, between emotional and expressive communication styles for all three women. For example, on day 15, Melissa is aggravated with work and while she is stressed and irritated, her writing clearly delineates that she is upset, but with cause. Therefore, she is worked up and angry (Emotionality) but the writing indicates that she is effectively articulating her anger (Expressiveness).

So I get to work once again & these lazy people are doing nothing. No machines are running but there is work to do. I guess they are saving it all for me. Can't wait until this is over. Don't feel like doing other peoples jobs today or any other day for that matter. Lord help me. Give me the strength to deal with this madness around this place. I'm so tired of this place. This retarded manager needs a backbone.

Another example, on Day 12, Nicole's friend at school is speaking negatively about other people and Nicole listens because this friend reciprocates the same trustworthy confidence. When a new student approached her friend and asked a question, the friend, "responds like a bitch so I told her she was being mean and acting like a bully." While the name-calling comments might be considered emotional or even threatening, she is also unrestrained and does not keep her comments to herself, which is indicative of expressiveness.

Conversely, the two Preciseness communicators show less flexibility in movement to other categories. Angela's journal entries are short and concise, formatted exactly the same day by day. Angela's journal is specific to work communication. On Day 2 she comments, "I make sure I think about what I need to say before saying. Today this worked out good". She refers to her emails as

“straight and to the point” and notes, “I have to remember that people can take things differently so being straightforward seems to work”. Angela is the only participant that did not waiver or show a hint of movement to another category.

Kimberly is the other Preciseness communicator. Kimberly wrote about both work and home. While she demonstrated a very to-the-point communication style, both in what she wrote she said, and the stylistic patterns, she also showed a supportive attitude towards her husband in commenting how and/or why she communicated the way she did. On Day 4, she feels she has concisely and efficiently communicated herself to the laborers working on her house. Even though she had, “a very hard time communicating...” due to language barriers she managed to not bend on saying, “NO” she wasn’t satisfied with the work. She references her husband, “I wish [Husband] was home to see them.” “I told them [Husband] has to see them first.”

Kimberly does waiver to other communication styles but the degree is not as distinct or severe as expressive communicators. On Day 1, she writes about how her daughter did not behave in line with established expectations while her father was out of town. Kimberly comments that she, “picked him up at the airport and told myself I wouldn’t start bitching right away, but he wasn’t in the car 10 minutes when I started telling him. I feel like I am just spinning my wheels.”

Jennifer ranged consistently during the month between Supportiveness and Niceness. It is difficult to decipher between nice and supportive because the two styles are very closely related. The majority of her writings depict her as nice,

soft-hearted, but really focused on the emotions and feelings of other people, which is the differentiator between the two styles. Jennifer moved specifically from days 26 thru 3 of her cycle to Emotionality. On Day 10, Jennifer describes a heated meeting with many people where there was a lot of anger among all the people. She was “trying to stay calm and stop [Jane Doe] from killing someone or saying something”. Her description of the meeting seems like she was on the outside looking in which makes her seem like a mediator or that she was working focused on the goal and managing the people. On Day 2, there was also a discussion on workflow and a change in the agreed-upon process as people were non-compliant. Jennifer’s comment was that:

I was pissed. I snapped at both of them that I did not want to hear it, which put [Mary Jane] in a bad mood and she would not speak to me for a few hours, [Suzy Q] was mad too, but not as much as [Mary Jane]. I should not have lost my temper, but I was angry.

There is a distinct change from the Supportiveness Jennifer that is trying to mediate the meeting and the Emotional Jennifer that is anger and shows it during a meeting.

It was also interesting to discern between Intrapersonal and Interpersonal communication styles. Journaling is a very personal event and therefore what a woman writes in a journal does not necessarily express what she said or how she acted. On Day 17, Nicole comments on a stressful event. She worked hard studying and took several tests early only to find much later after the fact that the new teacher or administrator decided that, because she took them early they might not count. She is devastated. Her journal provides a very emotional and open intrapersonal reaction.

I wanted to get up and beat the fuck out of her. Two things came to mind. (1) This will get me kicked out, arrested, and I will look like a fool. (2) It will not accomplish anything. So I swallowed my pride and bit my tongue.

She continues to comment how she will follow up with two specific teachers that, “will be on my side, and are the two teachers with the most power in the school.”

She is temperamental yet self-assured, waiting for a better moment to manage a bad, highly-charged, situation.

Of the six women that were classified as a communication style, only one, Angela, did not deviate on day 1 of her cycle. While the degrees of change varied among the women, there were two movements to Threateningness, two to Emotionality, and one to Reflective. Emotionality and Threateningness are very close in description. One dramatic illustration is evident in Nicole’s journal. Her typical style, Expressiveness, is illustrated for day 8 of her monthly cycle while her commentary on Day 1 is quite different.

On Day 8 she demonstrates her patterned Expressiveness style:

Today I think I communicated well with people. [Albert’s] car situation is stressful and instead of taking my anger out on anyone I tried to come up with solutions to the problem. Although my point may not have fully got across, I feel confident he is going to trust my family and I to help him.

On Day 1 she shows a Threateningness style:

“I had a shitty day at school. I didn’t make it in time for theory. I was starting to do my worksheet when my teacher [Penelope] says, ‘If you’re not with a client, you need to be in specialty.’ I gave her a dirty look and walked away.

I go to specialty class and guess who it is – [JANICE]. I hate her. So I fell asleep during her dumb presentation. I hear her say, ‘She doesn’t get stickers, she’s sleeping.’ I yelled, ‘I’m up’ I took the stickers and put my head back down. My other teacher [BEVERLY] tells me to put my head up. I yelled to her I didn’t

want to be there and put my head back down. She told me to leave and I told her I was forced to be there. She shut up.”

On Day 8, Nicole is solution-oriented, clear in her communication, and sharing her opinion with other while on Day 1, she is angry and yelling at her teachers. These are two clearly different communication styles.

Another example is looking at Days 9 and 1 in Amy’s journal. On Day 9, Amy is temperamental and self-assured, an Expressiveness communicator.

I believe our trip was great except that my co-worker whom I went & trained seems to think she knows more than I do because she’s been with the company for over 10 years. Well the fact of the matter was she didn’t understand the preparation of the file & tried telling me how to run reports...My boss should have told her that’s work we had to do it because it was the correct way to bill accordingly.

On Day 1, Amy avoids others, work, doctor’s appointments, and hides within herself, becoming a Reflective communicator.

I really didn’t feel good...I was miserable so not only did I not go to the doctor but I didn’t even make it to work. I laid in my bed. I felt like I had a hang over all day long. My body was sore and I didn’t feel like moving. So the truth of the matter is that I did not try to communicate this to anyone but my left & my back are in pain and not to deal with the bad news I didn’t reschedule the appointment. How sad.

On Day 16, Kimberly shares a story where she is laughing on the inside that her daughter made a make-shift leash for a cat to go catch mice next door. Rather than yelling, laughing, or emoting, she concisely explains to her daughter not to do this to the cat. Kimberly is a supportive person, but a precise communicator.

On Day 1, she is frustrated with her daughter’s behavior while her husband is out of town. She “picked him up at the airport and told myself I wouldn’t start

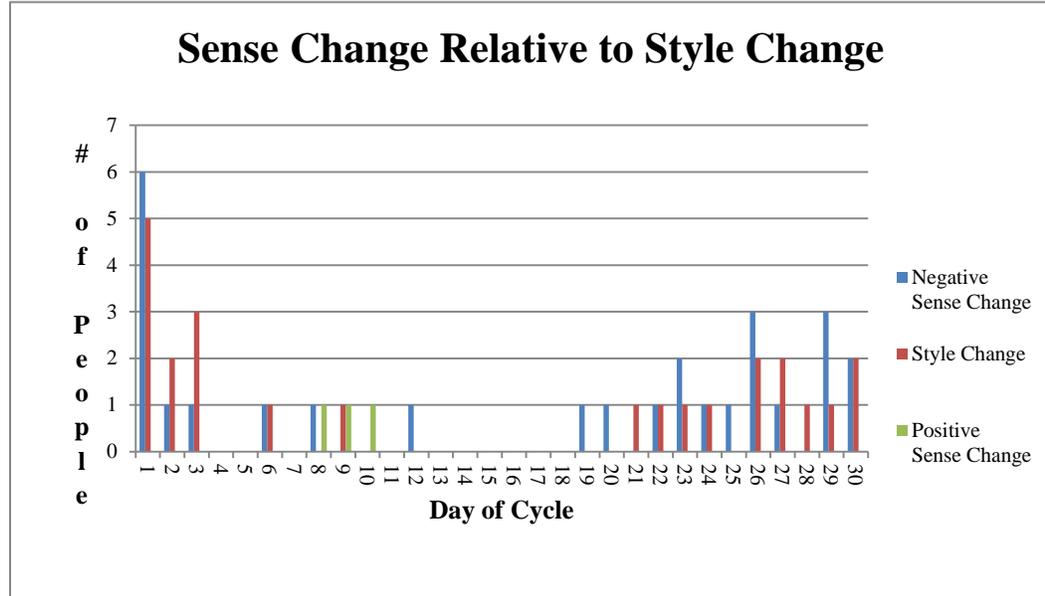
bitching right away, but he wasn't in the car 10 minutes when I started telling him. I feel like I am just spinning my wheels". While the difference is not as dramatic, she does move from explaining to a child why a behavior cannot occur to not even holding off ten minutes to, "start bitching" about a negative behavior.

While the style changes were evident in the analysis of the data, participants also noticed these shifts. During the validation process, the women did comment they recognized a change in their communication style. Several commented the journal process was very enlightening because they had not paid attention to this in the past.

**RQ2. Is there a relationship between sensory or skill change, as noted in the table, and communication style?**

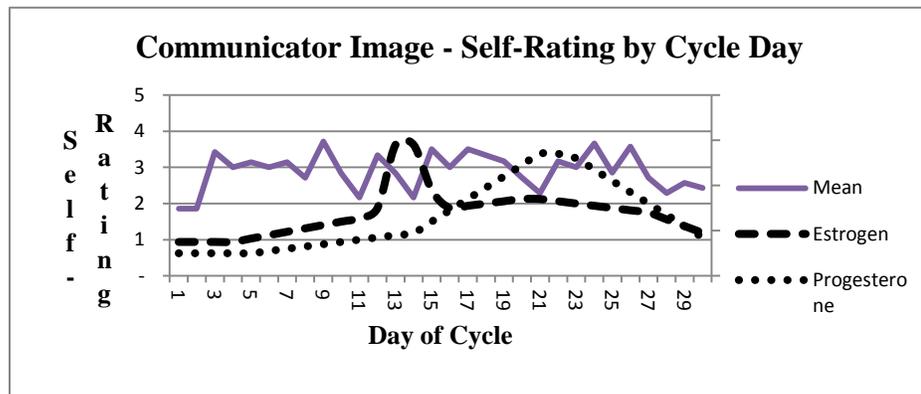
The results indicate an appearance of a relationship between sensory change and style change, particularly related to negative sensory changes. The most noticeable correlation is on Day 1 when 6 women reported a negative sensory change and 5 demonstrated a change in communication style. This affiliation is worthy of further research with a larger sample group.

Only one person noted positive sense changes in this survey and she had a noticeable style change on one day. Negative comments were written on several occasions however greater than or equal to two people commented on Days 1, 23, 26, 29, and 30. On Day 1, six women wrote a negative physical or sensory comment while five demonstrated a style change.



**RQ3. Do women notice a change in communicator image during the menstrual cycle?**

The minimum and maximum averages are on days one and two and day nine, respectively. Standard deviation for the monthly data set is 1.46. Days one and two represented a mean of 1.86 while day nine possessed a mean of 3.71. The highest count of zero ratings was on day two with a count of 3. The highest count of five ratings was on Days six, seven and nine with a count of 3.

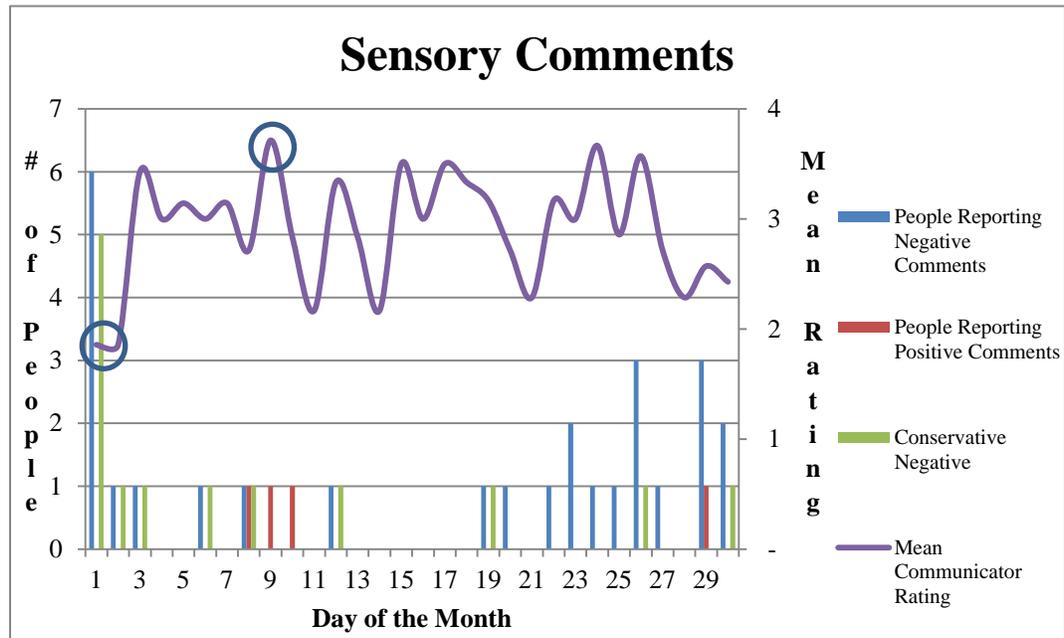


**RQ4. Is there a relationship between sensory or skill change, as noted in the table, and communicator image?**

There appears to be a relationship between communicator image and sensory or skill change. On Days one and two, out of a self-scoring range of 0-5, the mean communicator image score among the women was 1.86. These two days represent the lowest average scoring days of the month. On Day one, six out of seven women reported negative sensory, physical, skill, or emotional feelings. This was the highest reported number during the month. The highest average communicator image score was on Day nine at 3.71/5.0. There was one reported positive comment. There were only a total of four positive sensory comments reported from the entire sample throughout the entire month.

Each journal was reviewed for sensory comments. Negative and positive comments were counted and graphed against the cycle day as well as the mean communicator rating. The majority of day one negative comments included being “tired”. One borderline comment was included; Kimberly commented she felt like she, “was just spinning my wheels” (2010). Some of the comments included feeling, “sick”, which requires questioning, is the woman actually ill? To be conservative, a third column was graphed, excluding any comments noting “sick” or “doesn’t feel well”.

Day one and two have the lowest average rating with day one having the highest number of reported negative comments. Day nine had the highest average rating and included one reported positive sensory comment.



**RQ5. Can any communication patterns be discerned, relative to phase, among the group?**

While it is a small group I feel that some of the data is overwhelming enough to warrant further investigation. For example, six of the seven women note that they suffer from PMS so how much impact does that have on the variability in communication style? All women except one comments on sensory changes on Day one of her cycle. The focus is on the negative while the positive comments are only in one of seven journals. If participants were asked to focus on positive sensory changes, would there be more responses on Days 8 – 10 like Nicole’s journal?

Based on the limited results we can summarize several findings. The first and second day of the cycle represent the lowest average communicator image rating at 1.86. No other Days had a mean below a 2.0. Day one had the low

average communicator rating with the most communicator style changes. The highest rated communicator image day is the ninth at 3.71. One person reported positive sensory comments on Days 8, 9, and 10 and the same woman experienced a style change on Day 10. Of the six women noting sensory changes on Day one of the cycle, five exhibit stylistic changes that extend the parameters represented as her norm during the month. Expressive and/or emotional communicators seem to have larger fluctuations in style but perhaps it is because they are more animated by nature.

### **Discussion**

The purpose of this study was to learn more about the communibiological paradigm and investigate if there was potential application in female communication style as influenced by menstrual cycle. Based on the sample, there are indications that women experience communication style changes towards the end and beginning of the menstrual cycle. The style changes are visible on Days 26 through the 30 and again the first through third days. There is an evident spike in sensory changes on the first day of the menstrual cycle. The first and second days are also the lowest average communicator image ratings, potentially corresponding to typically low estrogen and progesterone dates in the menstrual cycle. The first day also had the highest amount of stylistic changes. The only positive sensory comments were on Days eight, nine and ten. Day nine represents the highest average communicator image score and increases in hormonal levels. There was one communication style change on Day ten that might be related to the day nine high score.

None of the women exhibited day-to-day, 100% replication of one communication style. Instead there are ranges. I found that compatible ranges, or common patterns for each woman, appeared to be Expressiveness & Emotionality and Niceness & Supportiveness. Preciseness seemed to lend itself to work-based communication and it would be interesting to see, for example, if Angela deviated more or had a greater range, if her focus was on communicating with friends and family, rather than co-workers. Kimberly, the other Preciseness-labeled communicator, did have a Supportive range when dealing with her husband in particular.

While these deviations may or may not be related to hormonal fluctuations, I think the three most interesting findings, as possibly related to hormones, are the high percentage of style change on day 1, the high percentage of negative sensory comments on days 1 and 2, and positive sensory commentary on Days 8 – 10, including a style change on day 10 for that same person. These style changes occur relative to the same day or dates as the highest and lowest average communicator image score. On Day 1, five of six classified women moved from fairly consistent styles to Threateningness (2), Emotionality (2), and Reflectiveness (1). While two of these styles, Threateningness and Emotionality, carry a negative connotation in general, it is not a dichotomous style guide. However, it was the negative attributes of these styles that presented themselves in the journal. For example, it might be considered positive to communicate in a worked-up, emotional method if the situation requires a sense of urgency. Threateningness could actually be a person firmly debating in an effort to learn an

opposing point of view. Reflectiveness might be a person contemplating quietly, turning inwards and taking more of a listening approach to communicating. In this case, Threateningness was represented by yelling, screaming, cross words. Emotionality represented strained and angered communication that was otherwise fairly placid and thought-out. Reflectiveness was a woman hiding in her room mocking herself for avoiding human contact to the point of dodging a phone call to reschedule a doctor's appoint. None of these behavioral or communicative changes would be viewed as positive.

These women are aware of the negative impact of, at minimum, Day 1 of their menstrual cycles. Both progesterone and estrogen are extremely low on Day 1 of the menstrual cycle. The average Communicator Image rating on Days 1 & 2 of the cycle were both 1.86 on a scale of 0 – 5. The next lowest Day was 2.17, a difference of 0.31. If we review all the average scores in ascending order, the next largest disparity is 0,17, which illustrates how dramatic an average of 1.83 really is. In addition, Day 1 had the most people recording negative physical, mental, emotional, or sensory comments. Including Michelle's journal, six of seven women had a complaint on Day 1. In general, these women feel awful, have a decreased self-image related to communicator image, utilize more negative communication styles, and they are aware of this change. I would propose that most women do not choose to feel and communicate worse and this would be a basis for further research to support the communibiological paradigm.

While only one woman reported positive physical, emotional, sensory comments, she noted these on Days 8 -10. On Day 10, the same woman moved

from Expressiveness to Supportiveness. Both Expressiveness and Supportiveness are not inherently negative styles, but the change is interesting. The implication is that there might be a positive correlation between the increase in progesterone and estrogen, after several days of low amounts, and the improved physical, emotional, sensory feelings impacting mood. The positive mood change could translate into a different communication style.

The patterns do not support or dispute any perspective because the survey group is too small to be statistically significant. Furthermore, the study was broadly designed to encapsulate areas where more myopic research might produce usable results. While the hormonal levels are low, the most negative comments are written, and the most stylistic changes are identified on day one, this is clearly offset by the small sample size and the large population of PMS sufferers. This can also be said of the positive implications on Days 8 – 10. However, there are indications that a relationship between physical, hormonal changes, result in communication style changes.

Based on the survey results I feel it is worthwhile to explore the relationship between hormone levels and communication style changes, as well as communicator image ratings. I think it would foster interesting results if a larger population self-rated over an extended period of time, perhaps six months, to see if there was a quantifiable and statistically significant change in perception. It is also worthwhile to compare more quantitative style tests, such as Norton's CSM, on a daily basis for a month to provide a more concrete look at style variations

relative to cycle date. Most importantly, future research should be more focused on one research question with a greater number of participants.

### **Limitations & Conclusions**

While I am excited that the survey produced results that point me in the right direction for future research I feel there are many opportunities for scrutiny in this study. Clearly, the greatest limitation of this research is the sample size. There is also the possibility that, while trying to maintain objectivity, because I am looking for variances, I am finding change that is too small to warrant notation. In addition, women responded differently to the questions as each had her own interpretation of what was being asked. This made it challenging to truly compare consistent data. With regard to selection of communication style, I felt there were more ranges of styles rather than specific styles. Some women appeared to be on the cusp of two styles. I do not know if it is because it is a more realistic version of communicating or a coding deficit on my part. Furthermore, the writing style played a part in the overall selection, and this could actually skew findings. Coding was very difficult and highly subjective because the wording was less significant than the context and interpretation. Communication styles seem to also change by role, which might lend support to Face Management Theory. For example, Kimberly was a Preciseness communicator at work and in writing but more Supportiveness when dealing with her husband. There is also the limited time span of data. Five of the women experienced a communication style change on day one of her cycle. However, these five women might have had extraordinary events they may not have written

down or simply a really good/bad day. Finally, how much bias is inherent due to translating an intrapersonal communication into an interpersonal analysis? After all, what we think is not necessarily what we speak. I would recommend that any future studies involving journaling for an extended period of time be more structured and provide compensation.

Preliminary conclusions indicate a relationship between menstrual cycle dates and changes in communication style. There is a defined difference on day 1 of the menstrual cycle which illustrates a high percentage of negative reported characteristics and stylistic changes. Many people joke about it being, “that time of the month” but the reality is that if a woman is cognizant that she is communicating inconsistently with her typical patterns, she can make educated decisions about how to manage the change. Furthermore, if she experiences a negative impact on day 1 and a positive impact later in the month, she may consider leveraging cyclical changes to her advantage by scheduling high priority meetings based on the more appropriate communication style. For example, if I have to present to a large group, I would be more apt to organize the event around Days 8 – 10 rather than day 1, in order to maximize my impact. However, not all events are on a controlled schedule. If a woman is aware that she exhibits negative change on day 1, simply knowing that information is beneficial. Imagine how future research might impact how we discuss the menstrual cycle. Young women are informed of the physical changes but insight into communication changes are not part of the education process.

The results of this study will be useful for future researchers interested in interpersonal, intrapersonal, gender communication, communibiological theory, and communication style. The pilot study indicates that women do fluctuate throughout the month. Since men's testosterone levels are more events related than cyclical, the physiological differences might lend themselves to additional communication differences. And if there is a difference between men's and women's monthly patterns, there would be a stronger implication that physical traits, in this instance cyclical changes, significantly contribute to communication output, or the communibiological paradigm.

### References

- Amen, D. (2004). *Images of human behavior: A brain SPECT atlas*. Newport Beach, CA: Mindworks Press.
- Bailey, J. M., Dunn, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twins sample. *Journal of Personality and Social Psychology*, 78, 524-536.
- Bandura, A. (1974). Behavior theory and the models of man. *American Psychologist*, 29(12), 859-869. doi:10.1037/h0037514.
- Beatty, M. J., Heisel, A. D., Hall, A. E., Levine, T. R., & La France, B. H. (2002). What can we learn from the study of twins about genetic and environmental influences on interpersonal affiliation, aggressiveness, and social anxiety?: A meta-analytical Study. *Communication Monographs*, 69, 1 - 18.
- Beatty, M. J., Marshall, L. A., & Rudd, J. E. (2001). A twin study of communicative adaptability: Heritability of individual differences. *Quarterly Journal of Speech*, 87, 366 - 377.
- Beatty, M., McCroskey, J., and Floyd, K. (2009). *Biological Dimensions of Communication: Perspectives, Methods, and Research*. Cresskill, NJ: Hampton Press, Inc.
- Beatty, M., McCroskey, J., & Heisel, A. (1998). Communication apprehension as temperamental expression: A communibiological paradigm. *Communication Monographs*, 65(3), 197. Retrieved from Communication & Mass Media Complete database.

- Beatty, M., McCroskey, J., & Pence, M., (2009). Communibiological Paradigm. In Beatty, M., McCroskey, J., and Floyd, K.(Eds.), *Biological Dimensions of Communication: Perspectives, Methods, and Research* (pp. 3-16). Creskill, NJ: Hampton Press, Inc.
- Clothier, Jeff (2004). *Biologic Substrate #2 – subcortical substrate*. Retrieved August 25, 2010 from <http://www.uams.edu/m2004/Behavioral%20Sciences/Biological%20Determinants/Biologic%20Substrate/Subcortical.htm>
- Condit, C. (2000). Culture and biology in human communication: Toward a multi-causal model. *Communication Education, 49(1)*, 7. Retrieved from Communication & Mass Media Complete database.
- de Vries, R., Bakker-Pieper, A., Siberg, R., van Gameren, K., & Vlug, M. (2009). The content and dimensionality of communication styles. *Communication Research, 36(2)*, 178-206. Retrieved from Communication & Mass Media Complete database.
- Ellis, L. & Ames, M. A. (1987). Neurohormonal functioning and sexual orientation: A theory of homosexuality-heterosexuality. *Psychological Review, 101*, 231-258.
- Floyd, K. & Roberts, J., (2009). Principles of endocrine system measurement in communication research.. In Beatty, M., McCroskey, J., and Floyd, K.(Eds.), *Biological Dimensions of Communication: Perspectives, Methods, and Research* (pp. 95-115). Creskill, NJ: Hampton Press, Inc.

- Gewirtz, J. L., & Pelaez-Nogueras, M. (1992). B. F. Skinner's legacy to human infant behavior and development. *The American Psychologist*, *47*(11), 1411. Retrieved October 30, 2010, from Research Library Core. (Document ID: 1510561).
- Gray, J. A., (1991). The neuropsychology of temperament. In J. Strelau & A. Angleitner (Eds), *Explorations in temperament* (pp. 105-128). New York: Plenum.
- Hampson, E., 1990a. Estrogen-related variations in human spatial and articulatory-motor skills. *Psychoneuroendocrinology*, *15*, 97– 111.
- Hampson, E., 1990b. Variations in sex-related cognitive abilities across the menstrual cycle. *Brain Cognition*, *14*, 26– 43.
- Hausmann, M., Slabbekoorn, D., van Goozen, S.H.M., Cohen-Kettenis, P.T., Gqntqrkqn, O., 2000. Sex hormones affect spatial abilities during the menstrual cycle. *Behavioral Neuroscience*, *114*, 1245– 1250.
- HOPES: The HOPES Brain Tutorial. (2004, April 29). Retrieved August 7, 2010, from: <http://www.stanford.edu/group/hopes/basics/braintut/ab5.html>
- Horvath, C. W. (1995). Biological origins of communicator style. *Communication Quarterly*, *43*, 217 – 227.
- Kearsley, G. The Theory into Practice Database. Retrieved October 30, 2010 from <http://tip.psychology.org/bandura.html>
- Kearsley, G. The Theory into Practice Database. Retrieved October 30, 2010 from <http://tip.psychology.org/skinner.html>

- Kimura, D., 1996. Sex, sexual orientation and sex hormones influence human cognitive function. *Current Opinion in Neurobiology*, 6, 259– 263.
- Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, 7, 193 – 203.
- Maki, P.M., Rich, J.B., Rosenbaum, R.S., 2002. Implicit memory varies across the menstrual cycle: Estrogen effects in young women. *Neuropsychologia*, 40, 518– 529.
- Mayo Clinic. (2009a, March 31). *Mayo Clinic: SPECT Scan*. Retrieved August 7, 2010, from Mayo Clinic website:  
<http://www.mayoclinic.com/health/spect-scan/MY00233>
- Mayo Clinic. (2009b, December 8). *Mayo Clinic: Premenstrual syndrome (PMS)*. Retrieved August 7, 2010, from Mayo Clinic website: <http://www.mayoclinic.com/health/premenstrual-syndrome/DS00134>
- McCroskey, J. C. (1998). *Why We Communicate the Ways We Do: The 1997 Carroll C. Arnold Lecture to the National Communication Association*. Boston: Allyn & Bacon. Retrieved August 25, 2010 from <http://www.jamescmccroskey.com/publications/monographs.htm>.
- McCroskey, J. C., & Beatty, M. J. (2000). The communibiological perspective: Implications for communication instruction. *Communication Education*, 49, 1-6. Retrieved August 20, 2010 from <http://www.jamescmccroskey.com/publications/periods.htm>.
- McCroskey, J., Heisel, A., & Richmond, V. (2001). Eysenck's BIG THREE and communication traits: Three correlational studies. *Communication*

*Monographs*, 68(4), 360. Retrieved from Communication & Mass Media Complete database.

McFadden, D., 1998. Sex differences in the auditory system. *Developmental Neuropsychology*, 14, 261– 298.

Merck. *Menstual Cycle*, Retrieved June 16, 2010, from *Merck Manuals Online Medical Library*: <http://www.merck.com/mmhe/sec22/ch241/ch241e.html>

Merck. *Merck: Brain*. Retrieved August 7, 2010, from:

<http://www.merck.com/mmhe/sec06/ch076/ch076b.html>

Mordecai, K., Rubin, L., & Maki, P. (2008). Effects of menstrual cycle phase and oral contraceptive use on verbal memory. *Hormones & Behavior*, 54(2), 286-293. doi:10.1016/j.yhbeh.2008.03.006.

Norton, R. (1983). *Communicator style: Theory, applications, and measures*. Beverly Hills, CA: Sage.

Neuroscience: The peaks and valleys of the menstrual cycle affect auditory response. (2003, August). *Women's Health Weekly*,41. Retrieved July 26, 2010, from Health Module. (Document ID: 381984351).

Patterson, M., (2009). Biology in theoretical context: A parallel process model of nonverbal communication. In Beatty, M., McCroskey, J., and Floyd, K.(Eds.), *Biological Dimensions of Communication: Perspectives, Methods, and Research* (pp. 139-177). Creskill, NJ: Hampton Press, Inc.

Popper, K.R., & Eccles, J.C. (1977). *The self and its brain*. New York: Springer.

- Postma, A., Winkel, J., Tuiten, A., van Honk, J., 1999. Sex differences and menstrual cycle effects in human spatial memory. *Psychoneuroendocrinology*, 24, 175–192.
- Reinisch, J. M. (1981). A prenatal exposure to synthetic progestins increases potential for aggression in humans. *Science*, 211, 1171 - 1173.
- Rubin, R., Palmgreen, P., Sypher, H., eds. (2009). *Communication research methods: A sourcebook*. New York:Routledge.
- Stein Carter, J. (2004). *Endocrine System*. Retrieved August 25, 2010 from UC-Clermont College: <http://biology.clc.uc.edu/courses/bio105/endocrin.htm>.
- Swenson, R. (editor, copyright holder) (2006). *Review of Clinical and Functional Neuroscience – Swanson: Chapter 11 – The Cerebral Cortex*. Retrieved August 25, 2010 from Dartmouth Medical School: [http://www.dartmouth.edu/~rswenson/NeuroSci/chapter\\_11.html](http://www.dartmouth.edu/~rswenson/NeuroSci/chapter_11.html).
- Walpurger, V., Pietrowsky, R., Kirschbaum, C., & Wolf, O. (2004). Effects of the menstrual cycle on auditory event-related potentials. *Hormones & Behavior*, 46(5), 600-606. doi:10.1016/j.yhbeh.2004.07.002.
- Walf, A. & Frye, C. (2006). A review and update of mechanisms of estrogen in the hippocampus and amygdala for anxiety and depression Behavior. *Neuropsychopharmacology*, 31(6), 1097-1111. Retrieved July 26, 2010, from ProQuest Psychology Journals. (Document ID: 1039540321).

**Appendix A** - Statement of Informed Consent

Title of Research Project: Impact of Menstrual Cycle on Communication Style

**Please read this consent document carefully before you decide to participate**

**in this study.**

**Purpose:** The purpose of this research project is to monitor communication style over one standard 30 day menstrual cycle.

**What you will be asked to do:** This research involves keeping a journal for 30 days, responding to one objective self-rating question, a one-on-one discussion of results, and a voluntary focus group meeting.

**Time required:** Assuming you will journal for ½ - 1 hour daily, plus a ½ - 1 hour meeting, plus a 1 hour group discussion it will take approximately 16.5-32 hours of time.

**Risks & Benefits:** The risk involved in this project is related to your ability to maintain a secure journal. A journal is a written account of events & feelings. If you lose your journal, it is stolen, or misplaced you risk unintentionally exposing these feelings to someone else. The benefit is self-awareness related to how you communicate. *Any illegal activity in your journals will not voluntarily be reported to authorities, but will be revealed only under request of State/Local/Federal authorities.*

**Compensation:** None.

**Confidentiality:** All records and data related to this research shall be confidential to the extent provided by law, and participants and journals will not be identified by name.

**Voluntary Participation:** Your participation in this project is voluntary; refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time.

**Contact for questions:** For additional information, you may contact Laura Moustis, Student Researcher at [REDACTED], or Dr. Jason Zingsheim, Project Director, [REDACTED] 708-235-7493.

**Agreement:** I have read the procedure described above. I voluntarily agree to participate in the procedure and have received a copy of the description. I verify I am at least 18 years old.

**Appendix B**

DATA COLLECTION

1. Number & Pseudonym (assigned): \_\_\_\_\_

2. Age/Birthdate: \_\_\_\_\_

3. # of Children: \_\_\_\_\_

4. Marital Status: \_\_\_\_\_

5. Current State or Province of Residence: \_\_\_\_\_

6. Race/Ethnic Background (please circle):

American – European descent

American – Middle Eastern descent

American – African descent

American – Native American or

Eskimo

American – Austral/Asian/Pacific Island descent

American – Hispanic or South

American descent

American – Multiple continental descents (Pls note) \_\_\_\_\_

Non-American – Please state country/continent of origin \_\_\_\_\_

7. Religious Beliefs & Degree of Participation: \_\_\_\_\_

8. Have you ever traveled outside the U.S.? (Circle One) Yes  
 No

9. Do you use oral, injected or patch contraception? (Circle One) Yes  
 No

10. Do you suffer from PMS? (Circle One) Yes  
 No

11. Annual Household Income (please circle):

- \$0 - \$30,000
- \$30,000 - \$60,000
- \$60,000 - \$90,000
- \$90,000 - \$120,000
- \$120,000 - \$250,000
- \$250,000 - \$1,000,000
- \$1,000,000+

12. Type of Community you are currently living in (please circle):

- Urban
- Suburb
- Rural
- Other \_\_\_\_\_

13. Education Level (please circle highest level completed):

- Did not complete High School/GED
- High School Diploma/GED
- 2 yr College degree (AA, AS, etc) or Trade School
- 4 yr College (BS, BA, BBS, etc)
- Masters level work
- Doctoral work

14. Are you employed (circle one)?      No      Yes      # of Hours per week on  
average\_\_\_\_\_

