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Women's Reproductive Experiences (REP) and Hormones: Patterns of Affective, Sexual, and Physical Well-being

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Women's Reproductive Experiences (REP) and Hormones: Patterns in Affective, Sexual, and Physical Well-Being

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Dissertation Abstract

Paradoxical menstrual cycle patterns in women's well-being (e.g., premenstrual syndrome [PMS] and negative experiences in the periovulatory phase) and sexual behavior (e.g., the periovulatory sociosexual tactic shift [PSTS]) have been found. Patterns in affect and sexuality may have evolved to co-occur if being "in the mood" facilitates sex. In this dissertation, the development of the Women's Reproductive Experiences (REP) Questionnaire and an initial psychometric evaluation is presented in Part 1 of Study 1 (n = 1943 women aged 16 to 74 years). The Women's REP separately measures negative and positive experiences associated with reproductive events across the lifespan in three domains: affective, sexual, and physical. In Part 2 of Study 1, evidence for reliability in factor structure (e.g., seven main scales) and internal consistency as well as concurrent validity is provided. Women who differ in reproductive status (e.g., pregnant, postpartum, menopausal, menstrual cycle phase, and hormonal contraceptive use), including estimated conception probability and sex hormone levels, also differ on the Women's REP scales. In Part 1 of Study 2 (n = 327 women of reproductive age), evidence for the test-retest reliability and further validity of the Women's REP is presented. Relationships with another newer measure, the Proceptive and Receptive Mating Strategies Scale (PARMSS), were also examined (Part 1). In Part 2 of Study 2, the two measures were used to examine co-variation in negative affective experiences (NA,) positive affective experiences (PA), and proceptivity across the periovulatory and premenstrual phases in naturally cycling women (n = 41). Support was found for the hypothesis that there are two groups of women who show opposing patterns of change differentiated by the phase in which they experience higher NA, lower PA, and lower proceptivity: (1) the premenstrual phase (a premenstrual syndrome, 61%) and (2) the periovulatory phase (a periovulatory syndrome, 39%). In line with the PSTS, women

who showed what is proposed to be a periovulatory syndrome (POS) were more sociosexually unrestricted than women who showed a PMS pattern. Overall, the two studies provide evidence that reproductive events are related to various negative *and positive* experiences, and that not all women show the classic PMS pattern of menstrual cycle experiences.

Keywords: Women's health, Reproductive events, Hormones, Menstrual cycle, Affect, Sexuality, Proceptivity

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Dedication

To my dad.

I used to not be able to imagine my life without your guidance and protection. Since then, thoughts of you – your hard work and dedication to us but also your bravery and perseverance in the end – have kept me going when I wanted to stop. Most of the beginning stages of this project were written as I sat near you. I wish I could have been more present for you. I know you wanted to see me graduate and I wish more than anything that would have happened. For these reasons and more, I dedicate not only this dissertation but also my entire doctoral degree to your legacy.

I miss you so much.

Leonard Bruce Teatero

1965 - 2012

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1:

General Literature Review and Introduction

Women's Reproductive Experiences (REP) and Hormones: Patterns in Affective, Sexual, and Physical Well-Being

Women's health and functioning across the lifespan may be affected by past and present reproductive events, from puberty to the menopausal transition. Theories suggest that psychological changes associated with natural reproductive events, including premenstrual syndrome (PMS), may be related to evolved adaptations through sexual selection (e.g. Reiber, 2008). As epitomized by the phrase "in the mood," there appears to be a link between affective and sexual experiences in general (Brown, Calibuso, & Roedl, 2011; Warner & Bancroft, 1988). Patterns in affect and sexuality may have evolved to co-occur if being in a good mood facilitates being in the mood for sex. While mild changes in negative affect, sexual functioning, and mating tactics during these hormone-related events are considered to be common, there is little literature on positively, as opposed to negatively, valenced shifts as well as whether there are relationships between shifts in affect and shifts in sexual mating behaviour. Therefore, research on symptoms associated with reproductive events, particularly those that occur among women of reproductive age (i.e., menstrual cycle phase and hormonal contraceptive [HC)] use), as well as hormones and mating strategies will be reviewed. Following that, the results of two relevant two-part studies are presented. In an attempt to further the understanding of hormone-related patterns in women's affective, sexual, and physical well-being, the two studies in this dissertation involved: (a) the development and psychometric examination of a comprehensive measure of women's reproductive experiences across the lifespan, and (b) an investigation of relationships between affect and sexual proceptivity across the menstrual cycle in non-users. This general introduction represents the comprehensive literature review that was completed prior to these two studies.

The rates of depression among girls and boys are nearly equal. However, epidemiological research suggests that there is a shift around mid-puberty to a 2:1 female to male ratio (e.g., Kessler et al., 1994). Furthermore, mixed episodes, bipolar II disorder, rapid cycling bipolar disorder, and seasonal affective disorder appear to be more common among women than men (Arnold, 2003). Between-sex variation in mood and affect has been hypothesized to be related, in part, to organizational and activational effects of steroidal sex hormones on the brain because such effects are largely responsible for sexual differentiation (Eckel et al., 2008; Steiner, Dunn, & Born, 2003).

In some women, recurrent mood disorders or emotional instability co-occur with reproductive events characterized by hormonal shifts across the lifespan. In fact, psychological changes across the menstrual cycle have been of interest to researchers and clinicians for centuries. In the 5th century B.C.E., Hippocrates alleged that retained menstrual flow could result in delusions, mania, and thoughts of suicide, among other symptoms (Dell & Svec, 2003). Changes in the hormonal milieu across the cycle are generally considered to underlie premenstrual syndrome (PMS), constellations of physical and psychological symptoms that appear just prior to, and remit following, the onset of menstruation[1] (Speroff & Fritz, 2005). On the other hand, controversy still exists about PMS or negative mood symptoms in the premenstrual phase (e.g., Chrisler & Caplan, 2002; Romans, Clarkson, Einstein, Petrovic, & Stewart, 2012). Research on negative and beneficial side effects of HC use[2] (i.e., suppression or

[1] In the present dissertation, use of the terms "PMS," "syndrome," "symptom," and "side effect" denote change across the cycle, with HC use, or with another reproductive event and not necessarily a disorder. There are no agreed upon, widely used criteria for PMS. The presence of only one adverse symptom (i.e., an increase in a negative affective, sexual, or physical experience) in the premenstrual phase is required by the American College of Obstetricians and Gynecologists (2000) and the World Health Organization (1987). However, it has been recommended that the diagnosis of a premenstrual disorder involve at least a prospective 30% increase in symptom severity or clinical impairment within the two weeks before menses (O'Brien et al., 2011).

[2] Psychological symptoms refers to both those induced by HC use overall (i.e., regardless of menstrual cycle phase) and those across the HC-induced cycle that may or may not be a direct result of HC use.

disruption of the natural menstrual cycle/fertility) has also been conducted for over 50 years (Kurshan & Epperson, 2006). As will be reviewed, however, "one's woman's low [may be] another's woman's high" (Kiesner, 2011, p. 68). That is to say, there appear to be paradoxical or bidirectional effects on well-being in subgroups of women, not only across the menstrual cycle, but also during other reproductive events, including HC use.

Research since the 1980s has consistently suggested that a substantial proportion of women (i.e., 40 to 80%) report at least some premenstrual symptoms (American Psychiatric Association [APA], 2000; Cunningham, Yonkers, O'Brian, & Eriksson, 2009; Logue & Moos, 1988). In 1987, a severe subtype of PMS, late luteal phase dysphoric disorder, was included in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-III-R;* APA). With the release of the *DSM-IV* (APA) in 1994, the label was changed to premenstrual dysphoric disorder (PMDD). It was included as a criteria set provided for further study with the suggestion that it should be diagnosed as a mood disorder not otherwise specified, and it has a prevalence rate of 3 to 8% (APA, 2000; Cunningham et al., 2009). In 2013, PMDD was classified as a distinct depressive disorder in the *DSM 5* (APA, 2013). The only other reproductive event included in the *DSM 5* is the peripartum period, which is considered to be an onset specifier of depressive, manic, and mixed episodes[3] as opposed to a distinct disorder (APA, 2013). Nonetheless, nearly all female reproductive hormone-related events or changes have been linked to psychological symptoms in subsets of women. For instance, 90% of the female population uses HCs in their lifetime and upwards of 40% of these women report experiencing adverse side effects, with emotional and sexual changes being among the primary reasons for discontinuing use (Oinonen

[3] This onset specifier included only the postpartum period and was not applicable to hypomanic episodes in the DSM-IV-TR (APA, 2000).

& Mazmanian, 2001a; Sanders, Graham, Bass, & Bancroft, 2001; Tilhonen, Leppäpen, Heikkinen, & Ahonen, 2008).

Changes in physical and mental health, including PMS, seem to exist on a continuum of severity from normal or minimal to clinical and impairing (Lopez, Compton, Grant, & Breiling, 2006; Steiner et al., 2003). In considering severity, it may be important to distinguish between mood and affect. Mood refers to pervasive emotional climate and is often used categorically to establish the presence or absence of a diagnosis. Affect reflects emotional weather or fluctuations over time (APA, 2000) and affords a more dimensional approach to research. The two main advantages of a dimensional approach are that it allows for the examination of a spectrum of change as well as both negatively valenced (e.g., elevated negative affect) and positively valenced (e.g., elevated positive affect) changes (Oinonen & Mazmanian, 2002). For example, some research indicates that negative affect and positive affect are independently related to health complaints and social activity, respectively (e.g., Watson, 1988). Even if mood and affect are bipolar dimensions, then both valences (e.g., negative affect and positive affect as opposed to just high negative affect and low negative affect) should be measured to avoid ceiling or floor effects (Green & Salovey, 1999) and to reduce the effects of bias in self-reports of psychological changes related to reproductive events (Meaden, Hartlage, & Cook-Karr, 2005). For instance, an assumption that seems to underlie a focus on negative experiences is that the presence of a given negative experience or negatively worded item on a questionnaire is synonymous with the absence of a related positive experience or positively worded item (e.g., Kiesner, 2011; cf., Meaden et al., 2005).

Physiology and Endocrinology

In order to examine how girls and women respond to hormonal changes across the lifespan, it is fundamental to have an understanding of the possible physiological and endocrinological mechanisms. Whether the effects of hormone-related events are organizational or activational can be ambiguous. In general, organizational changes tend to be permanent, an example being structural changes in the brain induced by hormone exposure. Activational changes refer to reversible effects that last only as long as the hormonal change is present, as appears to be the case with symptoms that co-occur with a reproductive event but subsequently remit (Phoenix, Goy, Gerall, &Young, 1959). Receptors for steroidal sex hormones exist in numerous tissues, including the brain. Therefore, the role of reproductive events and hormones in women's functioning should not be overlooked, consistent with sex-based medicine (Hampson & Young, 2008). Of particular relevance to this dissertation are events that occur during the reproductive years of a woman's life, namely the menstrual cycle and any HC use.

The menstrual cycle. The menstrual cycle is an infradian biological rhythm exclusive to female mammals, although only a few species overtly menstruate (Strassman, 1996). It consists of two co-occurring cyclic processes, the ovarian cycle and the endometrial cycle, and is regulated by four main hormones. Follicle-stimulating hormone (FSH) and luteinizing hormone (LH) are gonadotropins released by the anterior pituitary gland, while estrogen and progesterone are steroid hormones secreted by the ovaries, the female gonads. Progesterone is also secreted by the corpus luteum, a temporary structure formed after ovulation. The neuroendocrine component of the cycle is the hypothalamic-pituitary-ovarian (HPO) axis. The hypothalamus releases a neurohormone, gonadotropin-releasing hormone (GnRH), stimulating the secretion of gonadotropins that influence ovarian function, all of which involves feedback loops (Ferin,

Jewelewicz, & Warren, 1993). GnRH and the gonadotropins are released in ultradian pulses that change in frequency and amplitude across the cycle, altering the sensitivity of the HPO axis (Rasgon, Pumphrey, et al., 2003; Schnatz, 1985).

The ovarian cycle can be divided into three main phases: follicular, ovulatory, and luteal[4]. The follicular phase is considered to be days 1 to 13 of a 28-day cycle and is often described as containing shorter phases or sub-phases. More specifically, menstruation or menses consists of menstrual bleeding, days 1 to about 5, and low levels of estrogen, progesterone, LH, and testosterone but increasing levels of FSH. The periovulatory phase, characterized by peak levels of estrogen, testosterone, LH, and FSH levels, is approximately days 8 to 13 (or 21 to 16 days before the next onset of menstruation [-21 to -16]) (e.g., Garver-Apgar, Gangestad, & Thornhill, 2008). There is a small increase in progesterone just prior to ovulation (Hampson & Young, 2008). Ovulation, the release of an ovum from the fallopian tubes, typically occurs on day 14 (-15), after which there is a drop in reproductive hormones with the exception of progesterone. Lastly, the luteal phase tends to be 14 days in length from days 16 to 28 (-13 to -1). Levels of progesterone are increasingly high and reach peak levels during the mid-luteal phase (days 18 to 21 [-11 to -8]), estrogen levels are moderate with an increase in the mid-luteal phase, testosterone may increase slightly just before the estrogen rise, and FSH and LH levels are minimal. The premenstrual or late luteal phase can be defined as days 22 to 28 (-7 to -1), the end of which is marked by declining levels of both estrogen and progesterone (Speroff & Fritz, 2005; Stricker et al., 2006).

[4] It appears that the menstrual cycle can be divided/classified into between two and six meaningful phases, but that ovarian changes go through three main phases (Ferin et al., 1993). There is a striking lack of consistency in measurement across the relevant literature but most psychological studies differentiate between three or more general phases (menstrual, periovulatory, and luteal), even if they only examine two (e.g., Haselton & Gangestad, 2006; Oinonen, Klemencic, & Mazmanian, 2008; Sveinsdóttir & Bäckström, 2000).

A woman is born with approximately 400,000 follicles with ova, most of which undergo atresia over the lifespan. Folliculogenesis is the process within oogenesis whereby a follicle matures (Speroff & Fritz, 2005). A cohort of maturing follicles is selected during each menstrual cycle, stimulated by a rise in FSH that can occur 1 to 2 days before the start of menstruation, but typically only the dominant one ovulates. FSH also triggers the aromatization process of androgen to estrogen in the follicles, namely estradiol (E2) that then exerts an inhibitory effect on FSH but stimulates LH secretion. An LH surge initiates ovulation as well as the development of the residual follicle into the corpus luteum. Ovulation occurs 18 hours after peak LH levels or 36 hours after the beginning of the surge that lasts for about 48 hours in total. The corpus luteum produces progesterone and some estrogen. Unless the blastocyst is fertilized, the corpus luteum degenerates about 12 days after ovulation in a process called luteolysis. Reproductive hormones levels drop as the corpus luteum degenerates and the cycle begins again with menstruation (Ferin et al., 1993; Speroff & Fritz, 2005).

These ovarian and hormonal changes are coupled with four stages of uterine lining development. In humans, approximately 75% of the upper layers of the endometrium are sloughed off during the menstrual phase due to arterial constriction in the ischemic phase, which corresponds to the late luteal phase (Ferin et al., 1993). The endometrium begins to thicken and enlarge when stimulated by estrogen later in the follicular phase, the proliferative phase. The secretory or glandular phase begins after ovulation in preparation for fertilization and implantation of the blastocyst (i.e., pregnancy) or until the cycle restarts (Speroff & Fritz, 2005).

In research, reproductive events and hormonal changes are akin to naturally occurring experiments. By comparing phases of the menstrual cycle within women, the relative effects of changes in hormones on women's functioning can be examined. In addition, fertility or

conception probability, as modulated by the hormonal cascade of the cycle, can be estimated. It is clear that fecundity is dependent on ovulation[5]. However, women are most likely to become pregnant after intercourse in the preovulatory phase, particularly days 12 and 13 [-17 and -16] or the day before ovulation, as it takes time for sperm to travel to and penetrate an ovum (Havez, 1979; Wilcox, Dunson, Weinberg, Trussell, & Baird, 2001). The conception probability estimates for these two days have been found to be .084 and .086, while those of the rest of cycle range from < .0001 to .072 (Wilcox et al., 2001).

Variability in the length and regularity of the cycle, the occurrence and timing of ovulation, as well as hormone levels and fertility exist within- and between-women (e.g., Creinin Keverline, & Meyn, 2004; Venners et al., 2006). Peripheral effects of hormones on physiology such as vaginal mucus or basal body temperature, as well as hormone estimation, detection, or assays can be used to monitor the cycle (Stanford, White, & Hatasaka, 2002). Nonetheless, the average woman's menstrual cycles are regular such that they tend to be 24 to 35 (M = 29.5) days in length with a luteal phase that is consistently 13 ±1 days in length (Hampson & Young, 2008; Fehring, Schneider, & Raviele, 2006). In contrast, the length of the follicular phase is variable[6]. Thus, the first day of menstruation is considered to be day 1 of the cycle counting forward, while reverse or backwards counting (Jöchle, 1973) is more accurate for estimating the timing of phases other than the menstrual phase (see above; Hampson & Young, 2008).

[5] Note that women seem to spontaneously and inconspicuously ovulate in comparison to species that exhibit reflex ovulation (i.e., in response to a sensory trigger such as mating) or unconcealed estrus (e.g., heat and sexual swellings) (Jöche, 1979).

[6] Menstrual cycles less than 25 days in length tend to have follicular phases that are too short, less than 12 days, to support adequate follicular development. Thus, women with such cycles are typically anovulatory. Long cycles are often indicative of endocrine functioning that is relatively abnormal and associated with infertility (Hampson & Young, 2008). Also note that very short and long follicular phases may be associated with other health outcomes, including breast cancer, and lifestyle factors, such as previous OC use and weight (Jukic, Weinberg, Baird, & Wilcox, 2007).

Menstruation appears to be a relatively recent phenomenon in the evolutionary timeline of humans (Finn, 1994; 1996). There are two prominent hypotheses as to why the endometrial cycle and menses evolved. The first suggests that cyclic bleeding is an adaptation because it expels sperm-borne pathogens (Profet, 1993). In 1996, Strassman essentially debunked the anti-pathogen hypothesis as a review of the literature failed to support three basic predictions that follow from it, including that there should be more uterine pathogens before than after menses. Alternatively, evidence was provided to suggest that the endometrial cycle may be more physiologically efficient than continuously maintaining the uterus for pregnancy, and that menstrual bleeding is due to a design compromise that resulted in an inability to reabsorb all tissues. For instance, the metabolic rate of women tends to be 7% lower during the follicular phase compared to the luteal phase, which equates to a savings of about 6 days worth of food over four cycles (Strassman, 1996). Women's caloric intake appears to be highest in the luteal phase and lowest around ovulation, possibly because women "have better things to do than eat" when fertile (Fessler, 2003, p. 4). Although it is unclear precisely why women menstruate, as opposed to reabsorb all endometrial tissues as do most other species, it appears to be a byproduct of phylogeny given that endometrial regression but not menstrual bleeding per se may be more adaptive.

The average woman will menstruate less than 400 times (Speroff & Fritz, 2005; Strassman, 1997). Anthropological research suggests that modern women experience a higher number of menstrual cycles than did women in hunter-gatherer tribes, and possibly ancestors in the environment of evolutionary adaptiveness (EEA)[7]. This difference is likely due to an earlier age of menarche, hormonal contraceptive use, an older age at first pregnancy, a lower birthrate,

[7] This refers to the ancestral time in which a trait was naturally or sexually selected (i.e., spontaneous ovulation in this case) and therefore, the environment in which an evolved mechanism was adapted (Tooby & Cosmides, 2005).

and subsequently less time spent in lactational amenorrhea among Western women today (Strassman, 1999). A longer life expectancy and the evolution of menopause may also be contributing factors (see Kuhle, 2007 for a review of evolutionary hypotheses of menopause). However, research indicates that American women ovulate three times more frequently over a lifetime than women in a natural-fertility population, the Dogon of Mali tribe (Strassman, 1997). The incessant ovulation hypothesis (e.g., Eaton et al., 1994) has linked more frequent ovulation to the higher rates of reproductive cancers in Western women due the morphological effects of hormonal fluctuations on tissues, such as in the breast (Strassman, 1999). Although there are probably a number of factors involved (e.g., diet and environmental toxins), proponents of Darwinian medicine argue that a mismatch between the human genome, as selected in the EEA, and rapid cultural evolution has had a significant impact on physical and mental health. Moreover, some health "problems" may have adaptive origins (Eaton et al., 2002; Moalem, 2007; Nesse & Williams, 1994), such as the body's defenses of coughing and morning sickness in pregnancy (e.g., Flaxman & Sherman, 2000). Changes across the menstrual cycle, including PMS, may also be adaptations (or byproducts of other adaptations). Thus, HC use adds a level of complexity given that it alters the endogenous reproductive system through exogenous hormonal exposure.

Hormonal contraception. There are over 35 different preparations or brands of HCs available to women in Canada (Health Canada, 2011). Combined HCs consist of a synthetic estrogen, typically ethinyl estradiol, and one of numerous exogenous progestogens (i.e., progestins). Doses have been relatively low since 1985 and are probably at a minimum for effectiveness. HCs alter the HPO axis such that the production of endogenous reproductive hormones is suppressed (Speroff & Darney, 2010) and cyclic variability is often nullified

(Fleischman, Navarrete, & Fessler, 2010). Indeed, combined HC users tend to have lower levels of endogenous estrogen, progesterone, and testosterone than nonusers (e.g., Liening, Stanton, Saini, & Schultheiss, 2010), which may persist after discontinuation according to Fleishman et al. (2010). As a result, HCs usually inhibit ovulation, disrupt ovum transfer, alter the consistency of cervical mucus such that sperm penetration in hindered, and affect the functional activity of the fallopian tubes and uterus[8] (Speroff & Fritz, 2005). The efficacy of HCs in preventing pregnancy tends to be 99.7% to 99.9%, while their effectiveness ranges from 92% to 99.7% due to misuse (Speroff & Darney, 2010). (For detailed historical accounts of contraception for women, Jütte [2008)] and Marks [2001] are recommended.)

There are five main types of HCs. Oral contraceptives (OCs) are the most commonly used HCs in North American (Speroff & Fritz, 2005). Monophasic OCs consist of constant amounts of hormones, whereas triphasic OCs were designed to mimic hormonal changes across a 28-day menstrual cycle (Kahn & Halbreich, 2001). Most OCs combine estrogen and progesterone (i.e., combined OCs), but progestin-only "mini" pills are also on the market, and are to be taken for three weeks followed by one HC-free week in which withdrawal bleeding occurs. Transdermal patches and vaginal rings are combined HCs and need to be replaced every week or 3 weeks, respectively. Complicating matters further, combined HCs are now also packaged for extended cycle or continuous use (e.g., Seasonale), whereby women induce withdrawal bleeding at intervals of their choosing or experience amenorrhea. Finally, injections and hormonal intrauterine devices (IUDs) are progestin-only methods that last up to 3 months or 5 years, respectively, and are continuous HCs (Fisher & Black, 2007). Continuous methods may

[8] Not all HCs exert each of these contraceptive effects. More specifically, progestin-only contraceptives do not necessarily inhibit ovulation.

involve unpredictable break-through bleeding in some women, often early in use and due to effects of progestins on the endometrium (Speroff & Darney, 2010).

HCs appear to have various non-contraceptive side effects that can be both negative and positive. For instance, their use is associated with cardiovascular risks but reduced rates of endometrial and ovarian, but not cervical or breast, cancers (Speroff & Fritz, 2005). Although the effects of HCs on women's long-term health are largely unknown, it has been argued that HCs are promising candidates in the management of menstrual cycle and gynecological disorders such as PMS, endometriosis, and polycystic ovary syndrome (Speroff & Darney, 2010). Based on the incessant ovulation hypothesis, continuous HC use and more so the use of GnRH analogs may be safer for women than HC induced menstrual cyclicity (Strassman, 1999), particularly since HPO activity may resume in the pill-free week (van Heusden & Fauser, 1999). Coutinho and Segal (1991) suggested that HC use without withdrawal bleeding is healthier for women than either artificial or *natural* cycling (see also Thomas & Ellertson, 2000). If this is the case, the incessant ovulation hypothesis should perhaps be one of menstruation or cyclicity rather than ovulation per se, given that most of the research conducted to date has been on HC induced 28-day anovulatory cycles. Unfortunately, although HC formulations have various estrogenic, progestogenic, and androgenic effects, there is little research on the direct effects of the numerous exogenous hormones used in HCs as their levels are difficult to measure with available assays (Dickey, 2011).

Other reproductive events. Women have the potential to experience numerous reproductive events across the lifespan, from menarche to menopause. In addition to the menstrual cycle and HC use, many other events involve precipitous hormonal changes: puberty; abortion; miscarriage; pregnancy; the postpartum period; perimenopause; hormone replacement

therapy (HRT); and even in vitro fertilization procedures (Bloch et al., 2011). The hormonal changes involved in the other more common major lifetime reproductive events are outlined below for the purpose of comparison: puberty and menarche, pregnancy and postpartum, as well as perimenopause. As will become clear, symptoms or experiences during past reproductive events have been used as models or predictors of responses to current or succeeding reproductive experiences (e.g., Stone, 2011).

Among girls, puberty or sexual development usually begins with adrenarche, an increase in the production of adrenal androgens. An increase in gonadotropin secretion during sleep begins to occur approximately two years later, when aged 9 to 10 years. Maturation of ovarian follicles is stimulated by FSH, which leads to follicular development and the production of estrogen or gonadarche (Speroff & Fritz, 2005). Menarche marks the beginning of menstrual cyclicity and occurs around 12.5 years, an age that had been decreasing over time but appears stable now (Kaminski & Palmert, 2009). Cycles are normally irregular and anovulatory, and steroidal levels are relatively low, in the first five gynecologic years (Speroff & Fritz, 2005).

Pregnancy results in the development of the fetal-placental-maternal axis and the secretion of human chorionic gonadotropin (hCG). This hormone stimulates the corpus luteum to secrete increasing amounts of estrogen and progesterone until about the 10^{th} week of gestation, at which time the placenta is able to do so until parturition (Hendrick, Altshuler, & Suri, 1998). Estriol (E2) becomes the dominant estrogen, and testosterone levels are relatively high. Levels of hCG are lower in the second half of pregnancy (Speroff & Fritz, 2005). By the end of the third trimester of gestation, circulating estradiol has increased 50-fold, and circulating progesterone has increased 10-fold, from the maximum level across the menstrual cycle. Following delivery, induced by prostaglandins, these levels decrease to early follicular phase levels within one to

seven days (Bloch, Daly, & Rubinow, 2003). It takes about six to eight weeks for gonadotropin activity to resume and so the postpartum period is often characterized by hypogonadism and amenorrhea. Lactation can prolong these effects (Rubinow, Schmidt, Meltzer-Brody, & Harsh, 2009).

The perimenopausal transition begins about five years before menopause or climacteric, the cessation of the menstrual cycle, which has a typical age at onset of 46 to 51 years (Hampson & Young, 2008; Rubinow et al., 2009). One of the only objective markers of perimenopause is that menstrual cycles become unpredictable, and eventually anovulatory, due to atresia of ova across the lifespan and a lack of response to FSH by the remaining follicles. While cycle length and estrogen secretion may initially be long and elevated, respectively, gonadal hormone levels decrease substantially over time as the follicular phase shortens. There is also a switch to estrone (E3) as the dominant estrogen. In contrast, pituitary gonadotropin levels, particular FSH, are high throughout the transition and after menopause. Menopause can be surgically induced by the removal or ablation of both ovaries (Speroff & Fritz, 2005). Also, testosterone levels decrease across the lifespan, are relatively low by perimenopause, and decrease drastically with surgical menopause (North American Menopause Society, 2006).

In summary, puberty (the beginning of the gynecologic years) and the perimenopausal period (the end of the reproductive lifespan) are characterized by an increase in estrogen secretion as well as irregular menstrual cyclicity, and therefore, relatively low fertility. Pregnancy and parturition are associated with a lack of hormonal cyclicity. However, the former event involves very high levels of estrogen and progesterone, while the latter event involves hypogonadism. After climacteric, hormone levels are relatively low and stable.

Overall, it is clear that change (i.e., a decrease or increase) in reproductive hormone levels occurs with each reproductive event. It is also important to note that major social, personal, and lifestyle changes can be associated with each of these events as well (Speroff & Fritz, 2005). Thus, it is perhaps not coincidental that all reproductive events tend to involve some degree of physical and psychological symptoms. Furthermore, some women seem to experience specific symptoms at each event and may be more sensitive to certain types of hormone-related symptoms than other women (Steiner et al., 2003). These findings suggest that women may not reach each reproductive event, including menstrual cycles, with the same risk for symptoms as at past events. Risk may accumulate with the experience of hormonal changes or adverse events at each reproductive event, beginning with hormonal exposure in utero as suggested by digit ratio research (Manning, 2008; Oinonen, 2009; Oinonen & Bird, 2012; Stone, 2011). Given the precipitous hormonal changes at each reproductive event and that only a proportion of women experience related symptoms, such reproductive experiences may involve (hyper)sensitivity to normal physiological processes. While the symptoms or side effects associated with the menstrual cycle and HC use will be reviewed in depth below, those of the other main reproductive events across the cycle will be discussed in relation to the hormonal sensitivity hypothesis.

Symptoms and Side Effects

Symptoms or side effects associated with specific phases of the menstrual cycle or HC use are diverse. Over 200 adverse symptoms have been found to be associated with the cycle, particularly the premenstrual phase[9] (Dennerstein, Spencer-Gardner, & Burrows, 1984;

[9] Given limitations of some retrospective studies of PMS (see Longue & Moos, 1988; Rubinow et al., 1986), an attempt was made to review prospective studies wherein the menstrual cycle may or may not have been recognized as part of the study by participants. However, PMS has been demonstrated among women who were unaware of the study purposes (e.g., Gallant, Popiel, Hoffman, Chakraborty, & Hamilton, 1992).

Halbreich, 1997; Halbreich, Endicott, Schacht, & Nee, 1982). Moreover, mood, anxiety, somatoform, substance use, and personality disorders as well as numerous physical conditions have been found to worsen near the end of the cycle in some women (Dell, 2004). This phenomenon is referred to as premenstrual exacerbation. Psychiatric admissions, suicide attempts, and psychotic symptoms may increase during the late luteal phase as well (Choi, Kang, & Joe, 2001; Dogra et al., 2007; Targum, Caputo, & Ball, 1991). The concurrent diagnosis of PMS or PMDD and a major psychiatric or medical disorder has been termed premenstrual magnification (Endicott, 1993; Steiner et al., 2003), which may represent a subtype of affective disorder (Endicott, Halbreich, Schacht, & Nee, 1981). In addition to being relatively common among Western women, PMS is found worldwide (see Reiber, 2009 for a brief review).

One concern in the existing literature is the substantial variability across studies in what days constitute the premenstrual phase. While some researchers have suggested that PMS symptoms peak on day 26, or are highest during the last 3 days, of a standardized 28-day cycle (e.g., Metcalf et al., 1990), a paper by the International Society for Premenstrual Disorders (ISPMD) stated that symptoms occur during all or part of a *two-week* premenstrual phase (O'Brien et al., 2011). Defined in this way, the premenstrual phase and the luteal phase (which is typically 14 days in length after ovulation) can be interchangeable terms. For simplicity and consistency with past research, premenstrual phase will be used in the present dissertation in reference to the luteal phase (i.e., days 19 to 28).

Physical changes. Breast swelling and tenderness, abdominal cramps, water retention, nausea, and headaches are the most often cited physical symptoms of the premenstrual phase (American College of Obstetricians and Gynecologists, 2000; Speroff & Fritz, 2005). The *DSM* includes muscle or joint pain and weight gain as other physical symptoms of PMDD (APA,

2000; 2013), and gastrointestinal problems (Kiesner, 2009) as well as vasomotor symptoms (Speroff & Fritz, 2005) may occur. The physical side effects of HCs typically include symptoms similar to those of PMS. However, HC side effects can also include irregular spotting and rare but potentially lethal (e.g., increased risk of venous thrombosis) or long-term effects (e.g., bone density loss during use) (Speroff & Darney, 2010). Both the premenstrual phase and HC use have been associated with insufficient vaginal lubrication as well as negative changes in complexion in some woman (Speroff & Fritz, 2005; Cerel-Suhl & Yeager, 1999; Farage, Neill, & MacLean, 2009). On the other hand, the periovulatory phase and some HCs have been associated with increased sexual behavior and improved facial complexion (Bullivant et al., 2004; Wheeler & Malinak, 1991).

It is interesting that some of the physical symptoms or side effects associated with the menstrual cycle or HC use seem to relate to sexual functioning and appearance. These changes may affect women psychologically and be related to changes in sexuality and person perception that have also been demonstrated (see section on Hormones and Sociosexuality below). Thus, it seems possible that there are patterns of, or associations between, hormone-related changes in physical, affective, and sexual well-being.

Physical symptoms and side effects associated with reproductive events are beginning to be used as indicators of steroidal sensitivity in various tissues and as related to psychological changes (e.g., Bird & Oinonen, 2011). Physical symptoms may predict psychological vulnerabilities to hormonal changes (Kiesner, 2009; Kiesner & Pastore, 2010). However, it is important to note that menstrual cycle and HC-related affect changes also appear to be somewhat independent of somatic symptoms and so are unlikely to be merely indirect effects (Kiesner,

2009; Metcalf, Livesey, Wells, & Braiden, 1990; Oinonen & Mazmanian, 2001a). That is, there is evidence to suggest that hormonal changes may have *direct* effects on affect and mood.

Psychological changes. Some studies suggest that highs and lows of psychological symptoms are random or null across the menstrual cycle, but well-controlled longitudinal studies and literature reviews have revealed otherwise (Halbreich, 1995). Emotional symptoms of PMS-like change include irritability, depressed mood, tension, and nervousness, with prevalence rates ranging from 27 to 46% in a community sample of women (Angst, Sellaro, Stolar, Merikangas, & Endicott, 2001). Mood lability, anxiety, feeling overwhelmed or as though one has lost control, and restlessness (Dell, 2004), interpersonal sensitivity, somatization, obsessive-compulsive symptoms (Gonda et al., 2008), as well as feelings of insecurity and low self-esteem (Bloch, Schmidt, & Rubinow, 1997) may also increase in the premenstrual phase. Low sexual drive or arousal has been found to be a symptom of PMS as well (Dickerson, Mazyck, & Hunter, 2003; Steiner et al., 2005)[10]. Behavioural and cognitive changes tend to include impulsivity, aggression, crying, social withdrawal, fatigue, impaired concentration, sleep disturbance, food cravings, and decreased sexual activity (Dickerson et al., 2003).

HCs are often associated with PMS-like emotional and sexual side effects overall (i.e., regardless of phase) as well as across the pseudo-cycle of synthetic hormones and withdrawal bleeding (Oinonen, 2009). Decreased sexual desire, arousal, and activity are relatively common side effects of OC use (see Davis & Castaño, 2004, and Schaffir, 2006 for reviews; Tilhonen et al., 2008), as shown in research comparing users and nonusers (e.g., Wallwiener et al., 2010) as well as prospective (pre-post) studies (Graham, Bancroft, Doll, Greco, & Tanner, 2007; Graham, Ramos, Bancroft, Maglaya, & Farley, 1995; Sanders et al., 2001; Seal, Brotto, & Gorzalka,

[10] Women seeking treatment for PMS have also been found to have a relatively high rate (40%) of lifetime psychosexual dysfunction (e.g., inhibited sexual desire or excitement) (Chandraiah, Levenson, & Collins, 1991). However, there is at least one published case report of premenstrual hypersexuality (Riley, 1994).

2005). Although this effect seems to be related to the reduction in testosterone, it is only apparent in about 33% of users (Graham et al., 2007). Interestingly, Graham et al. (1995) found that women using progestin-only OCs did not show the decline in sexual functioning that was found in combined OC users.

In a systematic review, Oinonen and Mazmanian (2002) reported that all but one of 13 prospective studies with daily ratings of affect found differences between OC-users and non-users. However, results were largely inconsistent between the studies. The only reliable findings were that most OC users show less negative affect variability overall and less negative affect in the menstrual phase (i.e., beneficial effects), but that a subgroup of women experience adverse effects (see Kahn & Halbreich, 2001 and Kiesner, 2011 for similar conclusions).

At least eight relevant studies have been conducted since Oinonen and Mazmanian's (2002) review. According to Teatero, Oinonen, and Mazmanian (2015), five of these studies did not find differences in average levels of negative affect between the two groups. One study found that HC users reported more negative affect than nonusers, while another found that stable (i.e., long-time) OC users had lower negative affect scores than other OC users, progestin-only injection users, and nonusers. Two other, somewhat consistent findings were revealed. First, established (i.e., long-time) combined OC users appear to experience affect stability, which is in line with the survivor effect where early HC users who experience side effects will discontinue use or switch preparations, leaving a group without adverse effects (Oinonen & Mazmanian, 2002). Second, a subgroup of women seem to experience negative OC-related side effects on affect, which seems particularly true for women using progestin-only HCs. That is, there appear to be two patterns or types of HC side effects: those that are negatively valenced and those that are positively valenced (Teatero et al., 2015). Unfortunately, research on the emotional and

sexual side effects of HCs, and specific preparations, other than combined OCs is wanting (Kurshan & Epperson, 2006). Given that about 20% of unintended pregnancies are associated with discontinuation of HC use due to side effects (Kalmuss et al., 2008), it is important that research on HCs and HC side effects continues to advance.

Alternative Cyclic Patterns

According to Moos (1991), profiles of symptoms across the menstrual cycle allow for the examination of cyclic differences between and within women. The vast diversity of symptoms as well as clusters of symptoms has lead to the conclusion that there may be different patterns or types of menstrual cycle *syndromes* (Halbreich, 1995; Halbreich et al., 1982). Early on, Abraham and Reid each described four types of PMS differentiated by the duration of negative symptoms throughout the menstrual cycle (Abraham, 1980; Abraham, 1983; Abraham & Hargrove, 1980; Abraham & Lubran, 1981; Reid, 1983; Reid, 1985). For example, symptoms may persist into, or worsen in, the first few days of the menstrual phase (APA, 2013; see review in Romans, Clarkson, Einstein, Petrovic, & Stewart, 2012), which has prompted some authors to use the term perimenstrual syndrome (e.g., Angst et al., 2001). Moreover, in some women, menstruation is characterized by menorrhagia, dysmenorrhea, and coagulation (Speroff & Fritz, 2005), which are probably related to an increase in prostaglandins in the uterus (Halbreich, 1995). That is, in addition to PMS and PMMD, there may be other, perhaps more atypical, presentations of menstrual cycle-related problems (Bancroft, 1995). According to the APA (2000; cf., 2013), some women with PMDD also experience adverse symptoms during the periovulatory phase. Thus, a subset of women may have dysphoria that occurs in more than one menstrual cycle phase[11]. Overall, these findings indicate that there are individual differences in symptom patterns

[11] Also note that there is at least one case report of dysphoric symptoms entrained to the ovulatory phase (Hsiao & Lui, 2007; see Teatero et al., 2013).

across the cycle and thus, various phases of the menstrual cycle may be important in assessing psychological entrainments[12].

Reverse premenstrual syndrome. In 1982, Parlee identified what was later referred to as a reverse PMS-like pattern (Sveinsdóttir & Bäckström, 2000) among seven women. Depressed mood, fatigue, confusion, and hostility were lower in the premenstrual phase than the periovulatory phase. This alternative or atypical cyclic effect has also been labeled as pseudo-PMS (Reiber, 2009) and a mid-cycle pattern (Kiesner, 2011). For simplicity, and to be consistent with research on PMS, the label periovulatory syndrome (POS) will be used in the present dissertation. In a review of studies with daily ratings of mood across the menstrual cycle, Romans et al. (2011) determined that 18 of 47 identified studies (38%) did not find evidence of an overall affect of the cycle on negative affect. The same proportion of studies found an association between negative affect and the premenstrual phase as well as another phase of the cycle, the menstrual phase and a non-perimenstrual phase in 25 and 13% of studies respectively. A PMS only pattern was reported by 15%, while a "non-premenstral" (i.e., menstrual, postmenstrual, or perivoluatory) phase only pattern was reported by 9%, of studies.

Consistent with the research reviewed, Romans et al. (2012) tended to summarize results in terms of premenstrual versus menstrual or non-premenstrual and thus, did not delineate what studies may have found a POS pattern. Thus, several findings from the individual studies warrant mention. Data from Hardie (1997) suggests 18% of women who self-identified with PMS exhibited a POS pattern (i.e., adverse symptoms in the periovulatory phase) across at least one of two cycles, while only 19% of women showed PMS-like change. Another study found a premenstrual decrease from the follicular (preovulatory) phase in negative affect in 22%, a

[12] The majority of studies on changes across the cycle have focused on non-HC users and so, from this section forward it should be assumed that the results discussed are based on free-cycling women, unless stated otherwise.

premenstrual increase in 53%, and no change in 24% of women (Ross, Coleman, & Stojanovska, 2003). Overall, some women, including some of those reporting PMS, may actually be experiencing POS and research should consider this possibility. Given the differences in findings between studies, Romans and colleagues (2012) concluded that PMS does not seem to exist in the general population. However, five studies not included in the review by Romans et al., discussed below, also provide evidence of different menstrual cycle patterns in negative affect, namely PMS and POS.

First, one study prospectively evaluated 57 symptoms, including negative affect, in seven women seeking treatment for PMS, resulting in 246 symptoms that changed from the preovulatory (mid-follicular) to the premenstrual phase. Overall, there was enormous variability with 80% of such cases increasing and 20% decreasing (Sveinsdóttir & Reame, 1991). Second, Schnall Abrahamson, and Laird (2002; Study 1) found that 29% (n = 4) of women demonstrated a PMS pattern, 29% higher negative affect in a non-premenstrual phase, and 43% no change. Third, Reiber (2009) reported that the symptom scores of 21% women improved, while those of 79% worsened, from the preovulatory to luteal phase. Fourth, using longitudinal multilevel modeling (MLM), Kiesner and Pastore (2010) reported that 46% of variance in psychological symptoms across cycle phases was explained by a U-shaped pattern from menstrual to luteal but that correlations with physical symptoms varied in strength and direction (i.e., there was also significant individual variability in PMS symptoms, and associations between various PMS symptoms, across the cycle).

Most recently, Kiesner (2011) demonstrated that the majority of first-year female university students sampled showed a PMS pattern of change in depression/anxiety across two consecutive menstrual cycles (n = 130 of 213; 61%) but also that 13% showed the "paradoxical"

mid-cycle, POS pattern. Only 26% of women did not display significant cyclical change in daily self-ratings of symptoms. On the basis that the women who did not show a significant change had a higher mean depression/anxiety score than the women with the strongest PMS pattern, it was suggested that the latter group may experience more positive affect or well-being, particularly around ovulation. In other words, changes in negative versus positive affect across the cycle may be opposing, compensatory processes. A strength of the study was the examination of individual (random) longitudinal growth curve effects using MLM. However, the absence of negative symptoms is not necessarily the same as the presence of positive affect. Furthermore, Kiesner employed single items instead of scale measures with adequate psychometric properties.

It is clear that there is between-study variability in findings regarding the effects of the menstrual cycle on negative affect. Between-study variability in findings may be due to (a) chance if there are no true effects of the cycle or (b) differences between, and perhaps even within, women in experiences across the menstrual cycle over time. On the basis of the studies reviewed above in relation to the possibility of a POS pattern of a peak of negative symptoms around ovulation, the latter possibility seems to better represent women's self-reports of lived experiences regardless of underlying causes (e.g., genetics, hormonal changes, and sociocultural expectations) (Speroff & Fritz, 2005; King & Ussher, 2012).

Positively Valenced Symptoms[13]

Although changes in positive affect across the menstrual cycle were recognized as early as 1937 (McCance, Luff, & Widdowson), it is clear that biases towards examining negative

[13] This section has been developed into a separate manuscript by Teatero, Oinonen, Mazmanian, & Streutker (2015) on patterns of positive affect across the menstrual cycle. Some of the studies reviewed here were subsequently not included in Teatero et al. (2015) because they involved samples of women diagnosed with bipolar disorder and were instead included in a published systematic review of research on the effects of the menstrual cycle on bipolar disorder by Teatero, Mazmanian, and Sharma (2014). Nonetheless, the conclusions are similar, if not the same, across all three papers.

symptoms and the premenstrual period have pervaded the literature (Meaden et al., 2005; Romans et al., 2012). In the present review, positive symptoms are defined as phasic changes that are positively valenced, such as positive affect or sexual well-being, as opposed to a lack of negative symptoms (Sveinsdóttir & Bäckström, 2000). Early reviews suggested that positive affect (e.g., feelings of vigour, elation, or well-being) is: (a) highest in the follicular phase or mid-cycle (Dennerstein & Burrows, 1979), (b) reported in the premenstrual phase by women who complain of PMS (Abplanalp, Haskett, & Rose, 1980), and (c) perimenstrually elevated among 5 to 15% of women (Logue & Moos, 1988). However, only one of the reviews focused on prospective studies and was not based on women with PMS (n = 24 studies; Dennerstein & Burrows, 1979).

Parlee (1982) provided evidence suggesting that some woman may experience what was referred to as premenstrual elation syndrome. In 1984, Abraham called for the study of positive symptoms in the periovulatory phase, facetiously using the phrase postmenstrual syndrome. It was argued that previous research may have been somewhat misguided and that the portion of the menstrual cycle between menses and the premenstruum may be characterized by positive mood and enhanced mating effort. That is, positive affect may be associated with sexual proceptivity. In order to evaluate whether Abraham's suggestion (i.e., that positive symptoms warrant consideration) has had an impact on subsequent research, a systematic review of the literature on positive mood or affect across the menstrual cycle published since the last identified review (Logue & Moos, 1988) was conducted and is summarized below.

Thirty-one separate prospective studies of positive affect across the menstrual cycle were identified. Twenty-three of these studies involved daily self-ratings while the others included a testing session in each of at least two phases. Six studies did not include a periovulatory phase

(e.g., Davydov, Shapiro, & Goldstein, 2004; Hausman, 2005; Symonds, Gallagher, Thompson, & Young, 2004). Overall, nine studies (29%) did not find significant differences in mean levels of positive affect between phases (i.e., Abraham, Luscombe, & Soo, 2003; Almagor & Ben-Porath, 1991; Hausman, 2005; Mansfield, Hood, & Henderson, 1989; Meuwissen & Over, 1992, studies 1 and 2; Natale & Albertazzi, 2006; Oinonen & Mazmanian, 2001a; Shivakumar, Bernstein, & Suppes, 2008), while the remaining 23 studies (74%) found one of at least two different patterns of cyclical change.

For instance, one study suggested that a subgroup of women with PMDD may also experience positive symptoms in the premenstrual phase. In a sample of 180 participants, Rivera-Tovar, Pilkonis, and Frank (1992) identified a cluster of women (n = 10; 6%) with increased positive affect (i.e., efficiency, affection, and wellbeing), typically accompanied by physical symptoms like pain, bloating, and headache, during the premenstrual phase across two to three consecutive cycles. A large group (52%) experienced mean levels of adverse affective, physical and agitation as well as positive symptoms. This study suggests that positive affective changes may occur in the premenstrual phase among some women.

In contrast, 13 studies (42%) reported an overall peak in positive affect outside of the perimenstrual period (e.g., Aganoff & Boyle, 1994; Alonso, Loevinger, Muller, & Coe, 2004; Brown, Morrison, Larkspur, Marsh, & Nicolaisen, 2009; Boyle & Grant, 1992; Gallant, Hamilton, Popiel, Morokoff, & Chakraborty, 1991; Gallant et al., 1992; Graham, Janssen, & Sanders, 2000; Symunds et al., 2004). For example, although the sample size was only 12, O'Reilly, Cunningham, Lawlor, Walsh, and Rowan (2004) found that women reported being more composed and energetic on day 14 of the cycle (i.e., around ovulation) than during menses. López, Verdejo, Javier, Martin, and Gómez-Amor (2010) found that anovulation did not have an

effect on PMS symptoms (i.e., physical symptoms occurred regardless) but that only ovulatory cycles showed a peak in positive affect in the periovulatory phase. Among eight women with premenstrual dysphoria in another study (Eriksson et al., 2006), higher friendliness was reported 8 to 10 days after the onset of menstruation than in the premenstrual phase. Non-significant trends in the same direction were reported for happiness and energy. Positive affect was also positively related to serotonin precursor trapping in the brain.

Moreover, according to Metcalf and Livesey's (1995) findings, women with PMS exhibited a peak in mood on day 11 but a control group did not. Similarly, a unique study by Meaden et al. (2005) used 12 positively worded PMDD items, such as "felt optimistic," "liked myself," and "increased sex drive." Ratings on these items, from "not at all" to "very severe" were reverse coded to be in line with the 38 negatively valenced items also used. Most negatively valenced symptoms (e.g., "felt hopeless," "mood swings," "low sex drive," and "physical symptoms") were significantly higher than average in the days leading up to menstruation, peaked on day 0 of the cycle (i.e., the first day of bleeding), and were lowest on day 11. With the exception of increased sex drive, all positively valenced symptoms were rated higher (i.e., more negatively due to reverse scoring) overall within each phase and across the cycle than negatively valenced symptoms, and they also displayed more between-subject variance in scores. The results of this study suggest that positively valenced symptoms tend to cycle with negatively valences symptoms but in the opposite direction (i.e., they may negatively co-vary across the cycle). It appears that, in general, positive affect may be highest around ovulation. Overall, the 13 studies reviewed above suggest that positive affect may tend to peak in the periovulatory phase, when women happen to be the most fertile.

Eight additional studies (26%) found phase effects but at least two patterns of change (e.g., Schnall et al., 2002). Among women who self-identified with PMS, Sveinsdóttir and Reame (1991) determined that 45% of symptom decreases between days 4 to 12 of the follicular phase and the luteal phase were for positive symptoms. Ratings of bursts of energy, wellbeing, being in control, increased activity, and increased sexual desire seemed to decrease in severity across the cycle but there was considerable variability in symptom patterns. Likewise, in a community sample of women, positive symptoms tended to show a PMS pattern, whereby wellbeing was higher in the follicular phase, but also increased in the luteal phase in some cases (Sveinsdóttir & Bäckström, 2000).

Although Davydov et al. (2004) did not find an overall effect of phase on mean ratings of happiness, significant interactions with day (work-day vs. off-work day), personality, and arousal-related hormones were identified using MLM. Women who scored low on a measure of hostility were happier in the luteal phase (i.e., 5 to 10 days after the surge in LH) compared to the follicular phase (i.e., days 4 to 8 after the onset of the menstrual phase), but only on workdays. The *opposite* effect was observed among those high on hostility. In further analyses of data from the same sample, Davydov, Shapiro, Goldstein, and Chicz-DeMet (2005) found that happiness was highest in the luteal phase in women with high nighttime norepinephrine on non-work days, women with low daytime cortisol on work days, and women with high nighttime cortisol independent of day. In contrast, happiness was highest in the follicular phase for women in the opposite hormone groups, except for low nighttime cortisol. Among women with low daytime levels of norepinephrine and cortisol, happiness was elevated in the luteal phase (Davydov, Shapiro, Goldstein, & Chicz-DeMet, 2007). The authors suggested that menstrual cycle phase, namely changes in the level of estrogen, moderates emotional arousability depending on

individual differences and environmental conditions. That is, cyclic shifts may vary between and within women because they are context-contingent.

Four studies that found two patterns of change included only participants with bipolar disorder[14]. Significant phase effects (first seven days of cycle versus last seven days) were reported by 32 to 65% of women but there were no apparent patterns such that there was little consistency within women across more than one cycle (Rasgon, Bauer, Glenn, Elman, & Whybrow, 2003; Rasgon, Bauer, et al., 2005; Whybrow, Grof, Gyulai, Rasgon, Glenn, & Bauer, 2003; Leibenluft, Ashman, Feldman-Naim, & Yonkers, 1999). Group analyses in Rasgon et al. (2003) revealed that women's moods were more euthymic during the premenstrual phase.

Only one study used a measure of variance in daily ratings to examine changes in positive affect variability across the cycle. Oinonen and Mazmanian (2001a) found that positive, but not negative, affect variability was lower in the menstrual phase than the rest of the cycle. This finding suggests that positive affect was relatively more stable in the menstrual phase. Overall, it is clear that more research on possible patterns of positive affective experiences across the menstrual cycle is warranted.

Hormonal contraceptive status. Nine of the studies reviewed on positive affect across the menstrual cycle also examined differences between and cyclic effects within nonusers and OC users. In one study, HC users had higher levels of positive affect overall and in most phases of the menstrual cycle compared to nonusers (Almagor & Ben Porath, 1991). Conversely, five studies did not find a mean difference between the two groups across the menstrual cycle (Abraham et al., 2003; Boyle & Grant, 1992; Meuwissen & Over, 1992, Study 2; Natale & Albertazzi, 2006; Oinonen & Mazmanian, 2001a). Abraham et al. (2003) reported that

[14] It is of interest to note that there are 15 case reports of manic symptoms entrained to the perimenstrual phases as well as two other reports of onset in the periovulatory phase (see Teatero et al., 2013 for a review).

cheerfulness and happiness changed across the cycle among OC users but not nonusers; unfortunately, follow-up analyses as well as mean differences do not appear to have been reported. Brown et al. (2009) found that happiness was highest in the ovulatory phase for nonusers but highest in the follicular phase for combined HC users, and that progestin-only contraception disrupted typical relationships between sleep, exercise, and wellbeing. Sveinsdóttir and Bäckström (2000) reported that the two groups did not differ in symptom severity but that nonusers reported recurrent change (i.e., across more than one cycle) in more symptoms. In another study, OC users with bipolar disorder were not found to exhibit a phase effect in positive affect, while non-users did show such an effect (Rasgon, Bauer, et al., 2003). However, in a community sample of women, neither OC users nor nonusers exhibited cyclic changes in positive affect (Boyle & Grant, 1992; Meuwissen & Over, 1992, Study 2; Natale & Albertazzi, 2006). Lastly, triphasic users and first-time monophasic users had greater positive affect variability than monophasic users overall, and than long-time users in the menstrual phase (Oinonen & Mazmanian, 2001a). These results suggest that there is substantial variability in the experience of positive affect change across the pseudo-menstrual cycle in HC users and that research has not uncovered one consistent pattern.

Three additional studies warrant mention with respect to OC use and positive affect. Jarva and Oinonen (2007) found evidence of positive, but not negative, affect stabilization in OC users compared to nonusers and men. OC users displayed the least positive affect reactivity in overall response to the induction of positive affect, jealousy, social ostracism, and parenting feelings. Moreover, current OC users and early OC users showed more positive affect stabilization than previous users and long-time users, respectively. There were no effects of OC type or menstrual cycle phase. Among adolescents, Ott, Sayegh, Shew, and Fortenberry (2005)

found that OC users reported less positive affect than nonusers but Ott, Shew, Ofner, Tu, and Fortenberry (2008) found that stable OC users experienced more positive affect overall. In a longitudinal study of new OC users, positive affect variability was found to be relatively high in the weeks before they began using OCs. In contrast, positive affect variability was greater in the weeks during which discontinued OC users were still using OCs (Ott et al., 2008). These results are in line with the research on positive affect across the menstrual cycle such that there appear to be individual differences in the affective side effects of OC use.

Overall, the research reviewed thus far indicates that there is little evidence for the existence of only one menstrual cycle phase pattern for either negative or positive affect. It appears that there is substantial heterogeneity such that some free-cycling women experience no change, others a peak in positive or negative affect around ovulation, and still others a peak in positive or negative affect in the perimenstrual period. That is, there may be two phasic shifts in both negative and positive affect among subgroups of women. According to Pincus, Schmidt, Palladino, and Rubinow (2008), postmenstrual euphoric mood may be compensatory to negative affect in the premenstrual phase (like a rebound effect or opponent process). Unfortunately, little is known about what factors might differentiate women who experience different patterns in negative and positive affect (Davydov et al., 2004). These or similar patterns may also be seen among HC users given research on overall mean differences and cyclic changes in negative and positive affect between HC users and free-cyclers (e.g., Brown et al., 2009; Oinonen & Mazmanian, 2001a). However, very little research has examined why there may be different affect change patterns related to hormonal change.

There are methodological issues to consider as well. First, few of the studies on affect change across the cycle controlled for possible response biases or sets. Almost all of them

employed inclusion criteria for health and "normal" menstrual cycle characteristics, which may inadvertently exclude a disproportionate number of women who show relatively atypical affect change patterns. A wide variety of phase definitions and estimation procedures were employed. Also, at least seven studies on positive affect averaged women's ratings across multiple cycles (e.g., Mansfield et al., 1989; Metcalf & Livesey, 1995), reducing the probability of finding an effect if there is within-woman variability. Furthermore, some studies used bipolar visual analogue scales (e.g., Rasgon et al., 2005; Whybrow et al., 2003) despite recommendations that negative and positive affect should be measured independently (i.e., Meaden et al., 2005; Oinonen & Mazmanian, 2002; Watson, Clark, & Tellegen, 1988). It remains a possibility, however, that the conflicting results reflect a negative effect if positive affect does not truly shift across the menstrual cycle.

A final point of interest is that there do not appear to be many studies that have explored the possibility that some positive somatic symptoms may increase at a specific cycle phase. Exceptions seem to include skin complexion and physiological sexual arousal, both of which may be enhanced in the periovulatory phase (Graham et al., 2000; Farage et al., 2009; cf. Meuwissen & Over, 1992) and the former with combined OC use in women with acne (Lemay & Poulin, 2002). For instance, Battaglia et al (2008) showed that clitoral body volume was related to estrogen levels, highest in the periovulatory phase, and lowest in the premenstrual phase; uterine and clitoral arteries also had reduced resistances in the periovulatory phase, which may also be related to arousability. As mentioned previously, this cyclical associations between positive affective, sexual, *and* physical is an area worth exploring in view of research suggesting that women tend to perceive themselves as most attractive when in the periovulatory phase (e.g., Röder, Brewer, & Fink, 2009), and that the likelihood of a woman orgasming (a psychosexual

variable) may also be dependent on context, such as the physical attractiveness of her sexual partner (Puts, Welling, Burriss, & Dawood, 2011). Similar to emotional changes, it is possible that positive physical changes associated with the menstrual cycle may facilitate mating effort, at certain phases of the cycle. Thus, physical symptoms that enhance attractiveness, sexual receptivity, or sexual proceptivity, or that decrease one's need to spend time on other pursuits (reduced appetite or fatigue) may be adaptive at certain phases of the menstrual cycle.

Proximal Mechanisms

The number of proposed underlying factors for menstrual cycle mood change (i.e., PMS) and HC side effects is vast. First of all, it is probable that some women have a genetic predisposition for symptoms associated with specific reproductive events (Steiner et al., 2003). PMS and HC-related mood change are related to a personal or familial history of either condition (see review in Oinonen & Mazmanian, 2002) and it has been determined that menstrual cycle characteristics, including PMS, are heritable beyond personality traits (e.g., Kendler, Kakowski, Corey, & Neale, 1998; Miller et al., 2010). For instance, polymorphisms on the estrogen receptor (ER) genes seem to be related to the risk of psychological changes associated with reproductive events, as is apparent with other hormone-related pathologies such a female reproductive cancers (Ancelin, Scali, & Ritchie, 2007; Westberg & Erikkson, 2008; see Miller et al., 2010 for a review of other candidate genetic polymorphisms). Although Richards (2006) did not find evidence that ER alpha, androgen receptor, or serotonin transporter genes are involved in the expression of mood variability in premenopausal women, a genetic predisposition for altered neurotransmitter or hormonal activity or sensitivity to neuroendocrine changes seems particularly likely given that only a portion of women experience adverse psychological effects associated with reproductive events such as hormonal change across the menstrual cycle (Steiner et al., 2003).

Biological factors. Many of the physical symptoms associated with reproductive events can be linked to the physiological changes of the reproductive event, but the underlying mechanisms of the psychological symptoms are not as obvious. There have been no consistent biological abnormalities or differences associated with PMS or HC side effects. For instance, there do not appear to be consistent differences in estrogen, progesterone, testosterone, FSH, LH, or GnRH levels or oscillations across menstrual cycle phases between women with and without PMS (Steiner et al., 2003; see also Schmidt, Nieman, Danaceau, Adams, & Rubinow, 1998). Given that there have been some differences found at various phases, the follicular phase may be as important in the expression of PMS as the luteal phase. With respect to testosterone, different studies show normal, decreased, or elevated levels in women with PMS (see review in Rubinow et al., 2009), but it is clear that the estrogen in HCs increases the level of sex hormone-binding globulin and thereby, decreases the bioavailable testosterone (see Zimmerman, Eijkemans, Coelingh Bennink, Blankenstein, & Fauser, 2014 for a review and meta-analysis). Nonetheless, this finding may not be related to negative mood side effects (Young et al., 2007). Other systems that have been implicated in the hormonal modulation of symptoms are gamma-aminobutryic acid (GABA), serotonin, dopamine, and the hypothalamic-pituitary-adrenal (HPA) axis (Rubinow et al., 2009).

Overall, estrogen seems to have a positive effect on mood, including positive affect (Bäckström et al., 1983). It is associated with an increase in neuronal excitability, including serotonin and noradrenaline enhancing effects (Rubinow, Schmidt, & Roca, 1998). Conversely, progesterone appears to exert a negative effect on mood and cortical excitability. As an example, progesterone and its metabolites, namely allopregnanolone, modulate the GABA system, which is involved in excitability (Rapkin, Biggio, & Conas, 2006). However, natural progesterone is

relatively low in HC users and so there may be a withdrawal effect. Also, recent research suggests that the concentration of allopregnanolone has a nonlinear (quadratic) relationship with negative affect (Andréen et al., 2009). On this basis, Kurshan and Epperson (2006) proposed that the luteal phase and OCs may influence mood by altering the balance between cortical excitation and inhibition due to the paradoxical effects of estrogen priming in the periovulatory phase and increasing levels of progesterone in the luteal phase. Also, the results of a recent study suggest levels of serotonin in the premenstrual phase are positively correlated with estrogen as well as inversely related to negative affect but not significantly related to positive affect (Kikuchi et al., 2010).

As mentioned above, there is some evidence that the menstrual cycle may attenuate or magnify emotional arousability depending on moderating arousal-related factors, such as estrogen levels and stress. Davydov et al. (2005) found that HPA or sympatho-adrenomedullary (SAM) stress hormone levels interacted with phase of the menstrual cycle and occupational stress to predict changes in mood valence. Among healthy women (n = 203), high daytime (but not nighttime) HPA or SAM hormone levels were associated with higher ratings of stress (epinephrine, norepinephrine, and cortisol) and tiredness (epinephrine and norepinephrine) as well as lower ratings of happiness (epinephrine and norepinephrine). Women with relatively high daytime cortisol levels were less happy in the luteal phase (5 to 10 days after the LH surge and so, approximately days –10 to -5 in comparison to the follicular phase (approximately days 4 to 10), but only on work days as opposed to off-work days. In contrast, high nighttime cortisol levels were associated with higher happiness, and lower stress ratings in the luteal versus follicular phase independent of work/non-work day. Also, women with high levels of norepinephrine were happiest (on off-work days) and less tired in the luteal phase. These results

suggest that environmental stress, in this case occupational stress on work-days, and stress hormones may be implicated in the pathogenesis of psychological changes across the menstrual cycle. More specifically, the authors hypothesized that differences in physiological arousal may underlie mood valence such that down-regulated or up-regulated arousal results in negatively valenced mood states while mid-level arousal results in positively valenced mood states. For example, it was suggested that hyperarousal would be expected when stress, stress hormone, and estrogen levels are high. However, estrogen levels peak around ovulation with moderate levels in the mid-luteal phase, yet Davydov and colleagues measured only the latter phase in the study. Further research on individual differences in (or two opposing patterns of) change in affective valence between the periovulatory and luteal phases may be informative.

Neuroimaging studies are also promising in the search for some much-needed clarity as to the biological underpinnings of psychological changes associated with the menstrual cycle or HC use. For example, Rapkin et al. (2011) demonstrated that cerebellar activity reached a zenith in the premenstrual phase in women with PMDD but not healthy controls. Research has also shown that grey matter volumes are larger in HC users compared to nonusers in brain regions with a sexual dimorphism favouring women, including the prefrontal cortex (Pletzer et al., 2010). It is unclear whether these differences in brain structure are permanent (organizational) or plastic (activational) as they pertain to hormonal changes, which means that researchers may need to differentiate between current HC users, previous users, and never users (e.g., Oinonen, Jarva, & Mazmanian, 2008).

A zeitgeber theory of PMS has been proposed in that psychosocial stressors may disrupt biological rhythms and exacerbate emotional symptoms (e.g., Steiner, 1992). That is, there may be different biological vulnerabilities associated with the diversified manifestations of PMS

(Bancroft, 1995; Halbreich, 1997) that are dynamically evolving with life experiences and stress (Halbreich & Monacelli, 2004). These biopsychosocial models suggest that women's reproductive experiences may be dependent on not only biological/hormonal mechanisms but also attenuating or exacerbating psychosocial factors.

Hormonal sensitivity. Although the precise underlying biological mechanisms are not well understood, a consensus is emerging that hormonal sensitivity (i.e., hypersensitivity to normal fluctuations in reproductive hormones) underlies symptoms associated with reproductive events across the lifespan (Steiner et al., 2003). Many of the same physical and psychological symptoms occur across reproductive events (e.g., headaches, gastrointestinal problems, fatigue, breast tenderness, acne or skin blotches, vasomotor symptoms, changes in WHR and BMI, negative affect, mood lability, sexual changes, and sleep and appetite disturbances) (see review in Ancelin et al., 2007). As mentioned previously, the rates of depressive disorders begin to increase in women relative to men around menarche until menopause (Steiner et al., 2003). As an example of a possible relationship between symptoms at various reproductive events, some changes in the premenstrual phase of the menstrual cycle (e.g., PMS) are comparable to those associated with parturition. Both periods involve a dramatic drop in hormone levels and can involve different types of changes in mood or affect. The "baby blues" affect approximately 80% of new mothers, while a depressive episode in the postpartum period is seen in about 10 to 15% of women (APA, 2000). However, elation or hypomanic symptoms may occur in 10 to 18% of new mothers (Russell, 2009; e.g., Glover, Liddle, Taylor, Adama, & Sandler, 1994). Even mania and psychosis sometimes begin in the postpartum period and postpartum depression appears to be a recurrent disorder with an underlying bipolar diathesis (Sharma, 2005; Sharma, Smith, & Mazmanian, 2006). The finding that some women experience depression, while others may

experience hypomanic symptoms, following parturition seem to parallel mood symptoms in PMS and POS (i.e., adverse symptoms in the periovulatory phase), including among women with bipolar disorder (Teatero et al., 2014).

While some of the psychological symptoms of reproductive events may be reactive to somatic or psychosocial stress, Bloch et al. (2000) induced depressive symptoms in 63% of female participants with a history of postpartum depression, but none of the control group, by artificially dropping their estrogen and progesterone levels. These findings suggested that some, but not all, women are reliably mood-sensitive to sudden decreases in these hormone levels. In another seminal study, PMS-like symptoms were induced in healthy women with PMS but not those without PMS by first suppressing the menstrual cycle (and PMS) using leuprolide, a GnRH agonist, and then adding estradiol or progesterone (Schmidt et al., 1998). Given the different changes in sex hormones between reproductive events, hypersensitivity to normal abrupt changes, as opposed to a hypoestrogenic state (Arpels, 1996), may underlie what has been referred to as reproductive mood disorder(s) (Rapkin, Mikacich, & Moatakef-Imani, 2003; Payne, Tietelbaum Palmer, & Joffe, 2009). However, care should be taken by researchers and clinicans to distinguish between reproductive experiences versus disorders to avoid pathologizing physical and psychological changes at reproductive events that may characterize being a woman (i.e., are common and to be expected to some extent).

This hormonal sensitivity theory is supported by a growing body of literature on associations between negative affect or depression and reproductive events across the lifespan (Feld, Halbreich, & Karkun, 2005). At least five studies have examined pregnancy and the postpartum period in this regard. Current postpartum depression has been found to be associated with a history of premenstrual irritability (Sugawara et al., 1997), PMDD (Bloch, Rotenberg,

Koren, & Klein, 2005; 2006), adverse OC mood side effects, negative mood in the first 2 to 4 days postpartum (Bloch et al., 2005), a positive history of postpartum depression, and negative mood in the third trimester (Bloch et al., 2006) (but see Gregory, Masand, & Yohai, 2000 for non-significant relationships). Premenstrual irritability has also been shown to be related to psychological distress in pregnancy (Sugawara et al., 1997). Additionally, Russell (2009) reported that a history of abortion was associated with negative mood in the puerperal period.

More research has examined associations between distress during the menopausal transition and symptoms at past reproductive events. First, Stewart and Boydell (1993) determined that perimenopausal women with high distress were more likely to report a history of OC-related dysphoria, PMS, and postpartum depression, but not distress at pregnancy, cycle irregularity, or physical symptoms in general, than those with low distress. Becker, Orr, Kotlet, and Pines (2007), Gregory et al. (2000), Flores-Ramos, Heinze, and Silvestri-Tomassoni (2010), Richards, Rubinow, Daly, and Schmidt (2006), Steinberg et al. (2008), Stone (2011), and Wood and Mitchell (1996) reported similar results with respect to negative mood symptoms in the premenstrual and postpartum periods. In another study, history of PMS was a risk factor for vasomotor flashes, depressed mood, poor sleep, and decreased libido in the perimenopause period (Freeman, Sammel, Rinaudo, & Shend, 2004). Flores-Ramos et al. (2010) also found that earlier age at menarche, lower parity, and fewer miscarriages, but not OC side effects, were associated with perimenopausal depression. Conversely, two studies did not find that either PMS or postpartum mood change were predictive of perimenopausal depressive symptoms (Becker et al., 2007; Steinberg et al., 2008). These studies suggest that some women experience negative symptoms across various reproductive events. However, the only known study to examine past reproductive events as correlates of *prospective* menstrual cycle mood change is Haywood,

Slade, and King (2007). Results suggested that postpartum distress was not associated with subsequent premenstrual distress, with the exception of a trend for physical symptoms of PMS.

In contrast, only a few studies have examined associations between reproductive experiences with respect to positive affect. In 1982, Wood, Dery, and Most reported that age at menarche and negative recollections of menarche were uncorrelated with retrospective reports of negative affect across the most recent menstrual cycle. Contrary to expectations, positive recollections of menarche were correlated with negative affect in the premenstrual and menstrual phases. Later age at menarche was related to reports of positive affect at menarche and OC use was related to reports of negative affect at menarche. It is unfortunate that the study was limited to women's feelings at the onset of their first menstrual period as opposed to affect change associated with puberty. Wieck et al. (2003) found that women with a history of perinatal bipolar disorder demonstrated more dopaminergic receptor sensitivity in the luteal phase than controls and, in an unpublished study, Russell (2009) found that positive mood change in the postpartum period was associated with a negative history of abortion, positive mood change at puberty, as well as positive mood change in the premenstrual phase. These results are consistent with what would be expected on the basis of the theory that some women exhibit hormonal sensitivity that results in responses to changes in hormone levels in unique yet predictable ways. Overall, these studies suggest that further research is needed on associations between symptoms, including those that are positively valenced, across the menstrual cycle and those at past reproductive events in both parous and nulliparous women.

Although positive mood states do not seem to be particularly associated with perimenopause (Dennerstein, Lehert, & Guthrie, 2002), prospectively measured premenopausal positive affect, including a negative history of PMS, has been shown to be a significant predictor

of positive affect during the menopausal transition (Dennerstein, Lehert, Dudley, & Guthrie, 2001). Also, there is some evidence that depressed mood may resolve with the menopausal transition (Wood & Mitchell, 1996) as well as a case report of an 85-year-old women with seasonal depression since menopause who developed mania in response to HRT (Young, Moline, & Kleyman, 1997).

It is likely that a spectrum of hormonal sensitivity, and thus symptom severity, exists among women (Soares, 2010; Soares & Zitek, 2008; Stone, 2011). It has also been proposed that the effects of hormonal changes across the lifespan may be cumulative in those who are vulnerable (Ancelin et al., 2007; Deecher, Andree, Sloan, & Schechter, 2008). Women with a hypersensitivity to changes in reproductive hormones as well as a predisposition for various psychological changes (e.g., depression or bipolar disorder) may accumulate risk across the life span, with every reproductive event. That is, the pathogenesis of reproductive mood disorders may be related to electrophysiological kindling (Parry & Newton, 2001), which would have treatment implications such as a role for antiepileptics as suggested by a preliminary study of PMDD (Kayatekin, Sabo, & Halbreich, 2008).

Kindling. Kindling refers to the recurrent and progressive, from evoked to spontaneous, nature of recurrent disorders (e.g., from seizures to epilepsy). Post, Rubinow, and Ballenger offered a kindling hypothesis of affective illnesses, specifically bipolar disorder, in 1986. The general premise is that sensitization to both psychosocial stressors and disorder episodes affects neurobiology through genetic encoding over time (see Post, 1992 for a review of evidence relating to transduction). Indeed, early depressive and manic episodes seem to be more reactive to stress than those that occur further along in the course of the disorder. With respect to episode sensitization, research is clear that the frequency of mood episodes increases as well (Post, 2004)

but decreasing interepisode recovery intervals seem to be limited to the initial stages of the disorder (Goodwin & Jamison, 2007). Kindling and sensitization also seem to be implicated in increasing severity of episodes overtime (Post, 2007).

Although it does not appear that this hypothesis has been explicitly examined in PMS, several findings can be interpreted in a kindling context, including the associations of PMDD with older age at onset, lower age at menarche, symptoms at other reproductive events, and a history of depression (e.g., Bancroft, Rennie, & Dye, 1994). Risk of depression in general has been associated with earlier age at menarche, heavier menstrual flow and cycle irregularity in the first 5 gynecologic years, a history of abortions, and depression at other reproductive events (Graze, Nee, & Endicott, 1990; Harlow, Cohen, Otto, Spiegelman, & Cramer, 2004). There is also evidence that subgroups of women with bipolar disorders have preexisting menstrual cycle problems (Kenna, Jiang, & Rasgon, 2009) or mood change at two or more reproductive events (Gregory et al., 2000; McClure, Reich, & Wetzel, 1971; Payne et al., 2007), but it is unclear whether positively valenced changes kindle over time. An appropriate measure of whether models like kindling or incessant cyclicity are applicable to symptoms associated with hormonal sensitivity might be the estimated number of past reproductive events, including not only number of menstrual cycles (see Harlow et al., 2004 for null results) but also cumulative number of pregnancies and times one has switched HCs.

Unfortunately, the mechanisms of action for adverse and beneficial changes in negative affect and positive affect across the cycle may vary, but research has largely focused on mechanisms involved in adverse effects of negative affect. It does not appear that any such studies have looked at the prediction of sexual complaints and positive experiences across the menstrual cycle in premenopausal women. Whatever the mechanisms, it is clear that there are

individual difference variables associated with changes in affect across the cycle and with HC use.

Individual differences. There is a small body of recent literature on personality and PMS (see Miller et al., 2010 for a partial review). For example, there is a link between PMS and the tendency to (mis)attribute bodily sensations as emotions (Schnall et al., 2002). This finding was demonstrated for both negative and positive affect change such that women responsive to cues from their bodies showed various patterns in affect across the cycle, while other women did not display any phase effects (Study 1). Similarly, it has been suggested that neuroticism accounts for PMS and reproductive mood change (e.g., van den Akker, Eve, Stein, & Murray, 1995). However, neuroticism, arguably a dated term, and maladaptive cognitions are also associated with psychopathology in general and seem to mark one's propensity for negative affect (Ormel, Rosmalen, & Farmer, 2004), as opposed to being a factor that can discount the role of sensitivity or heritable susceptibility to physiological changes across the cycle (Miller et al., 2010). What is more, neuroticism was unrelated to PMS in women with other mood disorders in one study (Payne et al., 2009) and personality scores that relate to neuroticism have been shown to fluctuate across the cycle and change with OC use, including borderline personality disorder symptoms (DeSoto, Geary, Hoard, Sheldon, & Cooper, 2003). The extent to which personality variables are relevant to the expression of psychological changes across the cycle and with HC use requires further investigation.

PMS or PMDD is associated with earlier age of menarche, a history of depression, employment outside the home, less education, and smoking (Cohen et al., 2002). It is understudied as to whether menstrual cycle characteristics are related to PMS (Feld et al., 2005). However, Soares, Cohen, Ott, and Harlow (2001) found that women with PMDD and a history

of depression were less educated and had less frequent marital problems than women with PMDD and no such history. The two groups did not differ with respect to age at menarche, cycle regularity, parity, or smoking. One study found that moderate exercise was a protective factor for PMS but not for cyclicity in positive affect (Aganoff & Boyle, 1994). Moreover, relatively high body mass index (BMI), a measure of body fat and thus, a crude measure of circulating estrogen, may have a small to medium protective effect against negative mood (Ceballos, Hooker, & al'Absi, 2009), even across the menstrual cycle (Oinonen & Mazmanian, 2001b). This effect may be limited to women within the normal range of BMI measurements (cf., Barry, Pietrzak, & Petry, 2008).

Factors associated with OC-related negative affect change include a history of: depression, dysmenorrhea, and induced abortion (Segebladh, Borgström, Odlund, Bixo, & Sundström-Poromaa, 2009; Oinonen & Mazmanian, 2001a). Age of menarche does not seem to be as relevant (see review in Oinonen & Mazmanian, 2002). Even though HC use can alter women's BMI and waist-to-hip ratio (WHR), a measure of fat distribution and crude testosterone levels (Singh, 1993), there appears to be little research on WHR and menstrual cycle changes in affect. At the extremes, BMI and WHR are related to other menstrual cycle problems such as irregularity and polycystic ovary syndrome or hyperandrogenism (Speroff & Fritz, 2005).

Recent research involving sexually dimorphic proxy measures of androgen exposure or action suggest that there may also be preexisting hormonal differences between OC users and nonusers. Oinonen, Jarva, and Mazmanian (2008) found that OC users had a lower or masculinized second-to-fourth digit ratio (2D:4D), earlier age of menarche, a higher rate of hormonal disorders, greater medication and drug use, and a more unrestricted sociosexual orientation than never users. Conversely, BMI and WHR did not differ between groups. Overall,

this study suggests that OC users may have been exposed to more testosterone in utero as 2D:4D is a popular biomarker for *prenatal* exposure and its organizational effects (see Manning, 2008), and that this exposure may result in proclivities to OC use. Previous users had the most extreme traits, which may indicate that they are particularly vulnerable to OC side effects. Indeed, Oinonen (2009, Study 1) reported that low 2D:4D was associated with a self-reported history of OC-related increases in negative affect and discontinuation due to such concerns. In a second study, Oinonen found that 2D:4D and mid-phalangeal hair count, a putative measure of *current* androgen action or sensitivity, was associated with discontinuation due to various affect-related side effects. Having less mid-phalangeal hair was associated with side effects, which unlike the 2D:4D findings, suggests that women with a relatively feminine hair count are more likely to experience adverse OC side effects.

While extreme digit ratios and middle-phalangeal hair counts may be markers of vulnerability to changes in reproductive hormones, these variables have yet to be examined in relation to symptoms across the menstrual cycle. Further evidence for the plausibility of such associations comes from research suggesting that 2D:4D is negatively correlated with age of menarche (Manning & Fink, 2011; Matchock, 2008; but see Helle, 2010) and WHR (see Fink, Neave, & Manning, 2003), and positively related to fluctuating asymmetry (a measure of developmental instability and thus biological quality; Fink, Manning, Neave, & Grammer, 2004) in women. Among men, feminine 2D:4D has been shown to be positively associated with depression scores (Bailey & Hurd, 2005), fluctuating asymmetry (Fink et al., 2004), and BMI (Fink et al., 2003). Additionally, digit ratio has been shown to be related to a variety of estrogen- and androgen-related medical conditions among women, including breast cancer (Manning &

Leinster, 2001), cervical dysplasia (Brabin, Roberts, Farzaneh, & Fairbrother, 2008), and polycystic ovary syndrome (Cattrall, Vollenhoven, & Weston, 2005).

In summary, there are few robust findings with respect to the individual differences that may underlie menstrual phase or HC-induced psychological changes. The potential effects of personality characteristics and menstrual cycle characteristics are unclear. At this time, the best candidates of moderating or mediating variables appear to be biologically-based traits or anthropometric measures, namely a history of depression, age of menarche, WHR, BMI, mid-phalangeal hair count, and 2D:4D. It is interesting that Oinonen, Jarva, et al. (2008) reported links between OC use, 2D:4D, and sociosexuality given that there are several sexual selection theories about psychological changes associated with reproductive events, including PMS and reverse PMS (i.e., PMS-like symptoms in the periovulatory phase). These are discussed next.

Evolutionary Models

Darwinian or evolutionary approaches to psychology, psychiatry, and medicine propose that diseases and disorders have about six distal, as well as many possible proximal, causes. The six possible distal or evolutionary explanations include defenses, pathogens, modern environments relative to the EEA, genetics, trade-offs in human design, and the fact that evolution cannot make huge leaps and therefore, leaves legacies (Eaton et al., 2002; Keller & Miller, 2006; Nesse & Williams, 1994). There is an abundance of theories as to the evolution of mental disorders. One such model has placed sexually selected fitness indicators on a continuum from adaptive to an unattractive extreme, with mental disorders representing breakdowns in mating intelligence (Shaner, Miller, & Mintz, 2007). Three distinct evolutionary models of symptoms associated with the menstrual cycle have been published. Generally, evolutionary models fall into two categories: byproduct and adaptive hypotheses.

Byproduct hypotheses. According to the cyclic defense hypothesis, PMS is merely a byproduct of changes in immune system functioning. Doyle, Ewald, and Ewald (2007) proposed that symptoms in the luteal phase may often be an exacerbation of previously existing, possibly under-identified, infections due to a decrease in cell-mediated immunity with the rise in progesterone. In comparison, humoural immunity is enhanced at this time so a woman's immune system is less likely to destroy an embryo. Evidence cited in support of this hypothesis included that control of fungi, viruses, and intercellular bacteria is less optimal in the luteal phase and that antibiotic treatment may be better than placebo pills for PMS. The authors also indicated that the hypothesis may apply to pregnancy and the postpartum period as well as when taking HCs given that the side effects are similar to symptoms of PMS. The latter idea is plausible if synthetic progestins have effects on immunity but it does not take into account the fact that HCs tend to suppress endogenous levels of sex hormones. Overall, the cyclic defense hypothesis suggests that PMS is often the misdiagnosis or exacerbation of other chronic illnesses. The extent to which it applies to physical versus psychological changes is unclear.

In 2008, Rieber proposed that PMS is a byproduct of mating adaptations entrained to the menstrual cycle, particularly the preovulatory phase. That is, premenstrual symptoms may be a result of withdrawal from "positive physical and sociobehavioral states" that facilitate mating when a woman is more fertile earlier in the cycle (e.g., heightened self-perceived attractiveness). Reiber's model suggests that changes in negative affect may be compensatory[15] (i.e., a rebound effect) to changes in positive affect (recall that Kiesner, 2011 and Pincus et al., 2008 made similar interpretations of their findings). In support of this hypothesis, Rieber (2009) reported that women experience different menstrual cycle patterns of PMS-like symptoms that are

[15] The possibility of compensatory changes in negative and positive affect associated with reproductive hormones may be interpreted in the context of the opponent-process theory of emotion (Solomon & Corbit, 1974) where negative affect and positive affect are paired regulatory processes.

dependent on whether their current conditions are advantageous for reproduction. For instance, a subgroup of women was found to experience "pseudo-PMS" (i.e., a POS pattern) in what would normally be the fertile phase followed by less negative states prior to menstruation. The POS pattern was negatively associated with age and resources as well as positively associated with parity, conditions considered to unfavorable for having (more) children (Reiber, 2009). Based on these findings, a POS pattern may be an evolved form of birth control. Also, women with PMS reported fewer negative symptoms in the preovulatory phase than women without PMS. Positive states in the premenstruum were suggested to be related to women obtaining mate retention or material benefits from men in order to improve their conditions before reproducing. This model also implies there may be within-woman variability in menstrual cycle patterns over time as conditions change. Rieber (2008; 2009) did not review the research on changes in positive mood or affect across the cycle to support this byproduct hypothesis nor were any alternative explanations discussed, and only negative symptoms were measured. The omission of positively valenced items is problematic because, as mentioned previously, the absence of negative symptoms is not evidence of enhanced positive affect. Finally, if positive states are adaptive at different phases in this model, the compensatory states (i.e., symptoms of PMS) may also be functional at times.

There do not appear to be any explicit evolutionary explanations, namely byproduct hypotheses, of why some women have adverse HC side effects while others do not or may even experience beneficial side effects. However, it has been noted that HCs may disrupt psychological adaptations associated with the menstrual cycle (e.g., Brown et al., 2009). Not only do they moderate (attenuate or nullify) cyclic changes but they may impose conditions on the mind and body that do not correspond with women's evolutionary legacy. For instance, HC

users have been found to have altered mate preferences compared to free-cycling women (see Alvergne & Lummaa, 2009 and Roberts, Miner, & Shackelford, 2010 for reviews), including a greater preference for the scent of men who are genetically similar to them in the major histocompatibility (MHC) region. Given that the MHC genes are involved in immune functioning and HC alters women's mate preferences, HC use may affect relationship formation and maintenance as well as a couple's fecundity related to genetic similarity (Roberts, Gosling, Carter, & Petrie, 2008). Also, in 2011, combined OCs were found to be associated with: (a) relationship outcomes such as women's decreased attraction and sexual proceptivity to male partners met while using OCs (Roberts et al., 2012) as well as (b) reduced memory for details of an emotional story (Nielsen, Ertman, Lakhani, & Cahill, 2011). Overall, HC side effects might occur due to similar mechanisms that underlie menstrual cycle symptoms (Doyle et al., 2007) as well as being a byproduct of the mismatch between the EEA and advances in reproductive medicine, including deliberate means of suppressing endogenous hormone cyclicity.

Adaptive hypotheses. A third evolutionary explanation for PMS symptoms, particularly what is referred to as late luteal phase behavioural changes (LLBCs), suggests that these cyclical changes co-evolved with women's reproductive physiology insomuch as they increase reproductive success (Vieira, 2009). Consider, for example, the possibility that LLBCs may increase the likelihood of relationship dissolution among couples that have not conceived during the fertile phase of the menstrual cycle and are not well-matched. LLBCs may also elicit information about male partners' commitment and parenting qualities. Similarly, it has been suggested that dysphoric symptoms in the luteal phase, during pregnancy, and in the postpartum period might have evolved because they keep women out of harm's way when the survival of a child depends on them (Niculescu & Akiskal, 2000).

Abraham perhaps first articulated a hypothesis for changes in positive affect across the cycle in 1984 that suggested that postmenstrual elevation in mood may encourage behaviours that are reproductively advantageous. Although the possibility of compensatory changes in the preovulatory phase has been largely ignored in PMS research, Niculescu and Akiskal (2000) stated that "the initial euthymic phase leading to ovulation is conducive to mating. . ." (p. 1084). Also, it has been proposed that the genes for mania in bipolar disorder may have advantages for reproductive success as a result of increased sexual aggression or promiscuity as well as goal-directed behaviour (Nesse & Williams, 1994).

Hormones and Sociosexuality

Given that the evolutionary theories of affect change across the menstrual cycle suggest that such change is related to mating effort, research on hormones and mating strategies is relevant and will be reviewed here. In the area of psychoendocrinology, evolutionary psychologists tend to focus on differences between the sexes and changes across the cycle as related to sexual selection[16]. Parental investment, organizational and activational effects of hormones, and conception probability are expected to be modulating variables. For example, the time and effort men must put forth in conception and childbearing is less than that of women based on physiology (i.e., the sizes of the gametes and internal fertilization) and therefore, men tend to be less invested in offspring and more apt to engage in short-term mating. In contrast, women tend to be "choosy" (Baker & Bellis, 1995; Trivers, 1972). This sex difference in mating strategy has been found to be nearly universal across cultures (Schmitt, 2003; 2005).

Briefly, a mating strategy is a set of psychological adaptations, namely implicit decision rules, that organize and direct an individual's overall sexual and as such, reproductive efforts.

[16] It should be assumed that the results discussed in this section are based on healthy, heterosexual, and free-cycling women, unless otherwise noted.

Mating tactics are the specific actions and perceptual preferences that serve the purpose of fulfilling a strategy (Buss, 1998). The term sociosexuality is often used in reference to mating strategies (long-term versus short-term) and simply means the degree to which one is comfortable with, or willing to engage in, allosexual behaviours outside of attached and committed relationships, as opposed to allosexual behaviours with an individual romantic partner and autosexual behaviours. For example, the number of different sexual partners over time, extra-pair sexual interests and behaviours (e.g., cheating), and attitudes toward casual sex are considered to be features of sociosexuality. Traditionally, it been measured as an individual difference variable using the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991) on a bipolar continuum from restrictiveness to unrestrictiveness. Nonetheless, the overall consensus is that species have evolved a repertoire of context dependent (Buss & Schmitt, 1993), conditional (Gross, 1996), ecologically-contingent (Gangestad & Simpson, 1990), and mixed (Trivers, 1972) mating strategies[17]. Reiber (2009) referred to such models as facultative when discussing an evolutionary hypothesis of PMS.

Firstly, one's health and physical attractiveness, including BMI, WHR and fluctuating asymmetry, influences one's ability to attract a potential mate (i.e., the availability and quality of potential mates) and thus, men and women's mating strategy (Buss & Shackelford, 2008). The results of Oinonen, Klemencic, et al. (2008) and Swarmi, Miller, Furnham, Penke, and Tovée (2008) suggest that one's sociosexuality may influence perceptions of potential mates' attractiveness, health, fertility, and even BMI. Although sociosexual orientation has not typically been considered a health-related variable, it has been shown to be negatively correlated with disease prevalence across the world (Schaller & Murray, 2008), positively correlated with high-

[17] Although beyond the scope of present paper, it is important to note many evolved sexual mechanisms discussed are also supported by phylogenic research on nonhuman primates as well as vertebrates, and various evolutionary theories (see reviews in Thornhill & Gangestad, 2008 and Oinonen, Klemencic et al., 2008).

risk sexual behaviours (Seal & Agostinelli, 1994), and negatively associated with 2D:4D (e.g., Oinonen, Teatero, & Mazmanian, 2012). Although research on relationships between PMS-like cyclic changes and sociosexual strategies is very sparse, further evidence that mating strategies may affect or be affected by health includes the aforementioned research on sexual symptoms of PMS or side effects of HC use. Women with PMS may exhibit different mating strategies and preferences than women without PMS as suggested by Reiber's (2009) evolutionary theory of PMS as well as the reviewed research on the effects of HC use on mate selection. The possibility that changes in sexuality and mating tactics co-occur with, or as part of, menstrual cycle patterns such as PMS warrants exploration. For example, a general restrictive strategy may be a symptom or side effect of PMS-like changes across the cycle, perhaps even beyond changes in sex drive or arousability and physical well-being. That is, reproductive experiences and mating strategies may be related. Both cycle phase and HC use, and their associated symptoms, may affect relationship functioning and mating strategy (Roberts et al., 2012; Slade, Haywood, & King, 2009).

Secondly, sexual strategies theory (SST) suggests that women engage in short-term mating with the intention of developing long-term relationships (Buss & Schmitt, 1993). In contrast, the core tenet of the strategic pluralism model (SPM) is that there is considerable within-sex variation in the mating strategies of women due to trades-offs between good genes and good provider attributes in male partners (Simpson & Lapaglia, 2007). Support for the SPM comes from several lines of research. Only about 16% of the variance in seeking short-term partners is attributed to sex (Gangestad & Simpson, 2000); sociosexuality is associated with mate preferences (Simpson & Gangestad, 1992); and self-reported gender identity seems to account for more variance in sociosexuality and tactics like jealousy, than sex (Aylor & Dainton,

2004; Teatero, Mazmanian, & Oinonen, 2010a). In addition, the rate of cuckoldry may be higher than 10% (Diamond, 1992) and there is a body of research on changes in sexuality across the menstrual cycle[18]. Overall, it is clear that there is substantial within-sex variance in sociosexual tactics. Women do not consistently use the same sexual tactics. If hormonal mechanisms play a role in the likelihood of engaging in the various strategies, women using different strategies may differ hormonally, may differ in the likelihood of a mechanism being activated (i.e., different thresholds for activation), or may have different hormonal mechanisms to activate the strategies and tactics.

Periovulatory tactic shifts. Evolutionary research has suggested that the preovulatory phase is important because it is involved in reproductive adaptations. Overall, women tend to report greater extra-pair desire and behaviours (Gangestad, Thornhill, & Garver, 2002; Gangestad, Thornhill, & Garver-Apgar, 2005), and less commitment to their long-term partners (Jones et al., 2005) at peak fertility in the cycle (as compared to lower fertility phases). When evaluating men in the context of a short-term relationship, women's mate preferences at high fertility phases tend to shift towards signals of genetic quality. For example, there is a periovulatory peak in women's preferences for: behavioural displays of social presence and direct intrasexual competition (Gangestad, Simpson, Cousins, Garver-Apgar, & Christensen, 2004); the faces, bodies, and scent of symmetrical men (Little, Jones, Burt, & Perrett, 2007; Thornhill & Gangestad, 1999; Thornhill et al., 2003; cf., Oinonen & Mazmanian, 2007); and masculine men (Jones et al., 2005; Little, Jones, & Burriss, 2007; Penton-Voak & Perrett, 2000;

[18] Although the literature on mating strategies at other reproductive events is sparse, women may be least interested in short-term sexual relationships when pregnant, in the postpartum period, or when otherwise infertile (e.g., the premenstrual phase), which has been hypothesizes to be due to non-genetic benefits of having a stable partner (Jones et al., 2008).

Puts, 2005). Thus, women's sociosexuality seems to increase when around ovulation, when sex is most likely to result in conception.

In 2001, cyclical preferences for masculinity were reported to be moderated by self-reported gender identity such that the extent of the preference shift for masculine faces increased as a function of self-reported masculinity (Johnston, Hagel, Franklin, Fink, & Grammer, 2001). Scarbrough and Johnston (2005) also found that women with low 2D:4D as well as those low in femininity displayed a periovulatory shift towards greater attractiveness to masculine faces. In contrast, women with high 2D:4D as well as those high on femininity shifted towards a diminished preference for masculine faces near ovulation. Another line of research suggests that the magnitude of cyclic within-woman changes in reproductive hormones, namely greater changes in estrogen levels, predicts the magnitude of preferences for faces of men characterized by high testosterone (Roney, Simmons, & Gray, 2011).

Similarly, Oinonen, Klemencic, et al. (2008) reported preliminary evidence of a periovulatory sociosexuality tactic shift (PSTS). As measured by ratings of male faces, sociosexually restricted women shifted towards greater one-night stand interest during the periovulatory phase, the restricted PSTS pattern for simplicity. On the other hand, unrestricted women displayed a trend towards diminished interest in one-night stands, a shift towards restrictiveness at the periovulatory phase, and rated the faces as healthier than restricted women. This latter finding can be referred to as the *un*restricted PSTS pattern. Both general patterns are also seen in other species such as anthropoid primates (see Oinonen, Klemencic, et al., 2008 for partial reviews). Evolutionary models that may support the adaptiveness of the unrestricted pattern include the many fathers theory (Hrdy, 1979) and best-of-N theory (e.g., Dubois, Wajnberg, & Cezilly, 2004). Models that may support the adaptiveness of the restricted pattern

include the father-at-home theory (Alexander & Noonanm, 1979) and better-options theory (Dubois et al., 2004). That is, unrestricted women may take advantage of sperm competition and "good genes," in a different way than restricted women, such as by mating with relatively more men outside the fertile window in order to acquire resources or to choose the best possible mate. Reiber's (2008; 2009) byproduct theory of PMS might suggest that the unrestricted PSTS pattern occurs under conditions unfavorable to immediate reproduction, much like reverse PMS or POS (i.e. adverse symptoms in the periovulatory phase). Thus, unrestricted women would be most interested in extra-pair or uncommitted relationships when they are unlikely to become pregnant. In contrast, it may be more advantageous for restricted women to partner with one man but engage in extra-pair relationships around ovulation. Reiber's model might also suggest that the restricted PSTS pattern occurs under some conditions favourable to conception and parity.

With respect to possible differences between the two groups of women showing opposite periovulatory strategy shifts, Oinonen, Klemencic, et al. (2008) reported that the unrestricted pattern was related to energetic efficiency such that unrestricted women had a higher body weight, hip size, and waist size than restricted women. In contrast, the two groups did not differ in BMI, WHR, or FA (i.e., mate quality), age of menarche, sex drive, rate of coitus, or intelligence (mental rotation scores). Given that unrestricted women have been found to have a lower, more masculine 2D:4D than restricted women (Clark, 2004; Oinonen, Jarva, et al., 2008), the two menstrual cycle patterns of preference for male facial masculinity reported by Scarbrough and Johnston (2005) may be related to the PSTS findings. In line with the result of Scarbrough and Johnston, the unrestricted PSTS pattern seemed to be associated with a perceptual bias (i.e., different or relaxed cues when judging male fitness) that may facilitate strategy enactment (Oinonen, Klemencic, et al., 2008). Moreover, the unrestricted or low 2D:4D

pattern may be associated with irregular menstrual cyclicity, low paternal bonding, and a "good genes" mate choice strategy, while the restricted or high 2D:4D pattern may be associated with regular menstrual cyclicity, and a "good dad" mate choice strategy (Scarbrough & Johnston, 2005).

The results of Oinonen, Klemencic et al. (2008) and Scarbrough and Johnston (2005) seem to fit with those of Davydov et al. (2004), Kiesner (2011), and Reiber (2009) with respect to menstrual phase effects on negative and positive affect in subgroups of women. In this sense, sexual unrestrictiveness in the periovulatory phase with restrictiveness in the premenstrual phase, the most common PSTS in the existing literature, may be similar to a PMS-like pattern (i.e., high positive affect or low negative affect in the periovulatory, with the opposite pattern in the premenstrual, phase). Restrictiveness in the periovulatory, but unrestrictiveness in the premenstrual, phase (the restricted PSTS pattern) may be akin a POS (periovulatory syndrome) pattern (i.e., low positive affect or high negative affect on the periovulatory phase). The research findings reviewed above suggest that psychological changes across the menstrual cycle and associated perceptual biases or preferences may be mediated or moderated by the organizational effects of sex hormones (e.g., through prenatal and pubertal hormonal exposure with measurable effects on sociosexual orientation, 2D:4D, and other physical features) as well as conditional on individual differences and context (e.g., the attractiveness of oneself relative to one's current partner; Haselton & Gangestad, 2006; Pillsworth & Haselton, 2006).

Overall, the progression of research on hormones and sociosexuality parallels that of research on hormones and affect. In both areas, sex differences are robust, activational effects have been demonstrated, and individual differences, including possible organizational effects, appear to be important. Changes in affect as well as sociosexuality across the menstrual cycle

have been reported among healthy women, but at their extremes these changes may represent clinical disorders (e.g., PMDD) with evolutionary origins. Examining potential associations between women's health and mating tactics places findings from both fields in a larger distal context yet may lead to an improvement in proximate research, such as on etiology, diagnosis, and treatment (Reiber, 2009). As with PMS and POS, evidence is developing that phase effects on sociosexuality exhibit two opposing patterns in different women (i.e., unrestricted and restricted PSTS). An intriguing and hitherto unexplored possibility is that phasic changes in negative affect, positive affect, and mating tactics may be associated. That is, women who experience PMS (in the premenstrual phase) may also experience periovulatory peaks in positive affect and sociosexual unrestrictiveness; women who do not experience PMS may feel relatively good and be most unrestricted in the premenstrual phase and experience relatively more negative affect and restrictiveness in the periovulatory phase (see Kiesner, 2011; Pincus et al., 2009; Rieber, 2009 reviewed herein).

To further summarize the state of research on both PMS (or menstrual cycle changes in symptoms) and PSTS, there are at least three explanations for the possibility of two different types of cyclical shifts in affect and in mating tactics. First, the majority of women (or cycles) may display the same shifts (i.e., PMS-like changes and restricted PSTS), while an identifiable subgroup of other women may exhibit the opposing shifts (i.e., POS-like changes and unrestricted PSTS). Each shift may be adaptive for the women who display them as suggested by Reiber (2008; 2009), Oinonen, Klemencic, et al. (2008), and Vieira (2009). Second, the relatively less researched or perhaps less common hormone-related shifts (i.e., POS-like changes and unrestricted PSTS) may be byproducts of other evolutionary processes (Reiber, 2008). Third, mixed findings between studies may suggest that these two patterns are the result of

methodological or statistical artifacts and that the stated changes in affect and sociosexuality do not co-occur. There is, of course, a chance that the findings indicative of POS and unrestricted PSTS shifts are a result of Type I (i.e., false positive) statistical errors. However, this seems unlikely given the lines of evidence reviewed here indicate that there is appreciable between- and within-women variability in psychological shifts across the menstrual cycle as well as other reproductive events.

One area of concern in research on psychological menstrual cycle entrainments is that there are many methodological inconsistencies, which may introduce biases. For example, screening criteria (i.e., the requirement of normal cycle regularity and length; e.g., Gangestad, Thornhill, & Garver-Apgar, 2005; Reiber, 2009; Oinonen, Klemencic, et al., 2008) exclude a sub-group of women from the majority of research and it is possible that these women are those who (a) show alternative shifts such as POS or unrestricted PSTS patterns or (b) are particularly likely to experience variability across the cycle. Exemplifying this point, Kiesner (2011) found that 20% of women who declined participation in a menstrual cycle study did not have a regular menstrual cycle and Scarbrough and Johnston (2005) found that women who exhibited an atypical menstrual cycle pattern in the preference for male facial masculinity had more irregular cycles.

It is also a possibility that previous findings may have been confounded by other variables. For example, it has been theorized that women exhibit two (socio)sexualities: estrus around ovulation for genetic benefits and extended sexuality throughout the rest of the cycle for material benefits (Thornhill & Gangestad, 2008). However, past research did not separate women's receptive and proceptive mating strategies across the cycle, which are independent constructs, and the most widely used measure of sociosexuality (i.e., the SOI) was recently

revised by two independent research groups due to psychometric issues (Jackson & Kirkpatrick, 2007; Penke & Asendorpf, 2008). One concern was that mating strategies may be multidimensional (e.g., long- and short-term orientations may be enacted concurrently or conditionally). Thus, new measures assess both long-term and short-term orientations as well as receptivity and proceptivity. For instance, the Proceptive and Receptive Mating Strategies Scale (PARMSS) was recently developed and appears to be the first measure to separately assess receptivity and proceptivity on a common metric. As mentioned previously, very few researchers have examined the possibility that there is more than one pattern of dual (socio)sexuality across the cycle: restricted PSTS (i.e., a periovulatory peak/premenstrual trough in unrestricted/proceptive behaviour) and unrestricted PSTS (i.e., a periovulatory trough/premenstrual peak in unrestricted/proceptive behaviour).

Women may be relatively receptive across the cycle as male-initiated sexual activity has been shown to be stable (Bullivant et al., 2004). However, two studies found that women were most likely to agree to solicitations, such as giving out one's number and dancing at a nightclub, from men when in the periovulatory phase (Gueguen, 2009a/b). These findings may, in part, reflect the theory that women are more receptive and more active in their mating strategies when fertile. For instance, women appear to be more likely to go out to socialize when in the periovulatory phase (Haselton & Gangestad, 2006). They also are more likely to wear revealing clothing (Durante, Li, Haselton, 2008; Haselton, Mortezaie, Pillsworth, Bleske-Rechek, & Frederick, 2007) and to initiate sexual activity (Bullivant et al., 2004; Gangestad et al., 2002; Van Goozen et al., 1997) at that time.

Given that extra-dyadic proceptivity has been found to be related to sociosexuality (Seal, Agostinelli & Hannett, 1994) and previous research had not examined whether receptive and

proceptive sexual behaviour show different patterns across the cycle, (Phillips, 2015) examined this in a recent dissertation. It was proposed and some evidence was found for an expansion of the PSTS, following the development of and using the PARMSS. That is, Phillips found that there may be two patterns of sociosexual proceptivity across the cycle but that receptivity may generally peak around ovulation.

These findings seem to fit with evidence that ovulation is not completely concealed if evolved male strategies are associated with cues of fertility. Schwarz and Hassebruck (2008) showed that men rated women in the periovulatory phase as more attractive than other women, which may be strengthened by familiarity (e.g., among pair-bonded couples) (Çetinkaya Dural & Gülbeteki, 2010). Men also tend to prefer the gait, voices, and scent of women (e.g., Pipitone & Gallop, 2008; Provost, Quinsey, & Troje, 2008), and may engage in more mate retention tactics[19] (Gangestad et al., 2002; Haselton & Gangestad, 2006; Pillsworth & Haselton, 2006), around ovulation than at other times in the cycle. Interestingly, Miller, Tubur, and Jordon (2007) demonstrated that exotic dancers reported the most tip money per hour when in "estrus." The existence of two different patterns of women's proceptivity across the menstrual cycle may confuse male partners about unrestricted women's fertility status. At this stage, it is unknown whether the male partners of women who exhibit reverse PSTS (i.e., increased proceptivity in the luteal phase) display different cyclical changes in mate retention tactics (e.g., physical features and behaviour) than men whose female partners exhibit the seemingly more common pattern of increased proceptivity in the periovulatory phase.

A Link between Affect and Sociosexuality

[19] This finding is based on women's reports of their partners' behaviours and has yet to be verified in men.

As epitomized by the idiom "in the mood," affective well-being is linked with sexual well-being (Warner & Bancroft, 1988). In fact, one of the symptoms of clinically elevated mood is increased sexual behaviour (APA, 2013), and negative affect, including depression, is often associated with decreased libido[20] (Bodenmann & Ledermann, 2007). Through factor analysis, Sanders, Warner, Bäckström, and Bancroft (1983) demonstrated that wellbeing, consisting primarily of mood measures, accounted for 33% of the variance in self-reports of sexuality (i.e., sexual feelings and thoughts in general) and was highest in the preovulatory phase among women with and without PMS (for similar results see Dye, Warner, & Bancroft, 1995). In contrast, sexuality variance independent of mood (i.e., sexual feelings and thoughts as well as low energy ratings) increased in the mid-follicular phase, with non-PMS women possibly exhibiting another peak in the luteal phase (Bancroft, Sanders, Davidson, & Warner, 1983; see also Meaden et al., 2005). More recently, Brown et al. (2011) found that self-reports of libido and autosexual activity were highest in the preovulatory phases compared to the premenstrual phase in both sexually active and abstinent women. Allosexual activity demonstrated a similar pattern but was only significantly lower in the menstrual phase (but see Burleson, Travathan, & Gregory, 2002 and review in Brown et al., 2011 for opposing results with respect with auto- and allosexual activity). Moreover, Brown and colleagues (2011) found that sexuality variables were predicted by emotional factors. Positive affect variance independent of feelings of energy/creativity was positively associated with libido but negatively associated with autosexual and allosexual behaviour. When positive affect was partialled out, libido and energy/creativity were positively associated with autosexual behaviour, and the latter was also related to allosexual

[20] It is possible that the relationship between affect and sexual activity is bidirectional (Burleson, Trevathan, & Todd, 2007) and the latter may sometimes be used as a tactic to regulate the former. Moreover, according to the affective shift hypothesis, women tend to experience positive feelings following sex, specifically first-time intercourse, which is believed to facilitate long-term commitment (Haselton & Buss, 2001).

behaviour. These results are difficult to interpret since the findings pertaining to affect and sexuality were averaged across cycle phase (i.e., overall and not within or across phases). However, the authors concluded that the results support the role of at least two systems in women's sexual behaviour that are condition dependent: one related to mating and one related to attachment or affection.

With respect to PMS, one study reported that women with such a pattern of symptoms displayed an ovulatory peak in sexual interest, while women without PMS symptoms showed such a peak in the premenstrual phase (Van Goozen et al., 1997). Interestingly, Nowosielski, Drosdzol, Skrzypulec, and Plinta (2010) demonstrated that women with PMS (i.e., those with at least one premenstrual physical or emotional symptom that was not present around ovulation) reported less satisfaction from their sexual life and more sexual distress than women without PMS. The two groups did not differ with respect to having a regular partner, being sexually active, and frequency of sexual intercourse. While there were no differences in sexual satisfaction and distress between women with and without PMDD, the reported frequency of sexual intercourse was lower in women with PMDD and frequency of sexual intercourse was strongly correlated with satisfaction. These studies suggest that women with and without PMS may demonstrate opposing patterns of sexual interest across the cycle and that PMS is a risk factor for sexual dissatisfaction among women regardless of cycle phase.

Two additional areas of research warrant mention. First, experimental studies suggest that the induction of sad mood decreases genital or psychological arousal in response to erotic material in sexually healthy men and women (Kuffel & Heiman, 2006; Mitchell, DiBartolo, Brown, & Barlow, 1998). In addition, positive mood induction has been shown to increase subjective but not physiological measures of sexual arousal in women (ter Kuile, Both, & van

Uden, 2010). Thus, it is likely that affective changes that temporarily precede or occur concurrently with those in sexuality are important. For instance, Fortenberry at al (2005) found that prior day positive affect and same-day negative affect were positive and negative predictors, respectively, of coitus among female adolescents, while Burleson et al. (2007) found similar results in middle-aged women.

Since previous research on a mood-sex link has not differentiated between types of sexual interest or behaviour across the cycle (Brown et al., 2011), it remains unclear whether cyclic changes in mood and affect are associated with cyclic changes in mating tactics. Unfortunately, there also appears to be little research on relationships between sociosexual orientation and sexual functioning variables (e.g., drive, arousal, and orgasms). According to Simpson and Gangestad (1991), individual differences in SOI scores are *not fully* explained by variance in sex drive scores such that frequency of sex within committed relationships was uncorrelated, while frequency of sex in sexually inactive couples (i.e., extra-pair sex) was positively correlated, with SOI scores. However, as discussed by Penke and Asendorpf (2008), unrestricted sociosexual desire (in which the goal is an uncommitted relationship) is a part of general sexual desire that is condition-dependent and scores on the three scales of their revised SOI showed strong positive relationships with sex drive (cf., Ostovich & Sabini, 2004) and sensation seeking. Interestingly, all three of these variables tend to be sexually dimorphic with men scoring higher than women (e.g., Lippa, 2009; Wohlrab, Stahl, Rammsayer, & Kappeler, 2009). It is possible that someone who is unrestricted may not have the sex drive to enact the behavioural component of this short-term mating strategy (e.g., one could have unrestricted attitudes about sex but a relatively low number of past and expected sexual partners due to a lack of sexual interest), However, unrestricted attitudes and unrestricted behaviour are significantly

associated. Taken together, these findings indicate that sexual drive, and other components of sexual functioning, may co-vary with changes in mating strategies and it can be postulated that someone who is sociosexually unrestricted is also more unrestricted or less conservative in other ways as well, such as religiosity, attitudes toward premarital sex and pornography, and self-reported sexual excitability (as found by Simpson & Gangestad, 1991). Although Penke and Asendorpf (2008) replicated Simpson and Gangestad's (1991) finding that frequency of sex in the context of a committed relationship was not associated with sociosexuality, female- and male-initiated sexual activity (i.e., proceptivity and receptivity) should be investigated separately so as to avoid confounding relationships (Brown et al., 2011), as discussed above, if they are two different components of overall sex drive.

Research on jealousy, a mechanism of mate retention is another area of evolutionary research suggesting that affect and mating strategies co-vary (Buss, 2000). In line with findings on patterns of PMS and PSTS, the few studies on women's jealousy across the menstrual cycle have been inconsistent as to whether there is a particular phase in which jealousy peaks (Gaulin, Silverman, Phillips, & Reiber, 1997; Geary, DeSoto, Hoard, Skaggs-Sheldon, & Copper, 2001; Krug, Finn, Pietrowsky, Fehm, & Born, 1996; Teatero, Mazmanian, & Oinonen, 2010b). Taken together, these studies may suggest that there at least two cyclical patterns in jealousy such that different groups of women show peaks at different times in the cycle, or that there is no effect of phase on this affect-related variable. Although Gangestad et al. (2002) reported that mood did not change across the cycle while women's mating tactics did, individual items of possibly biased content were used (e.g., "felt happy *for no good reason*" [italics added]). Thus, further research using a variety of negative and positive affect items is needed.

With respect to HC use, Warner and Bancroft (1988) found that users of monophasic OCs were least likely to show variations in affective well-being and sexual desire compared to nonusers and triphasic OC users, but more likely to show peaks and troughs in well-being during the menstrual (i.e., non-OC) phase. Similarly, Graham and Sherwin (1993) concluded that the effects of triphasic OCs on mood and sexual interest are *dissociated* or decoupled such that co-variation across the cycle was negligible (see also Brown et al., 2006). Nonetheless, emotional and sexual side effects are the best predictors of discontinuing an HC (Sanders et al., 2001). As alluded to previously, HC users exhibit altered perceptual or preferential biases when rating potential suitors and, along with their partners, show attenuated changes in mating tactics across the cycle (e.g., Burriss & Little, 2006; Smith et al., 2009). Interestingly, the dose of estrogen in HCs seems to be positively correlated with jealousy as well as mate retention behaviours and HC users and their partners report a greater use of mate retention tactics than partners of nonusers (Cobey, Pollet, Roberts, & Buunk, 2010; Welling, Puts, Roberts, & Burriss, 2012). This research alludes to the possibility that HCs may disrupt or alter the relationships between negative affect, positive affect, and sociosexuality or mating tactics (see also Roberts et al., 2008, 2010, 2012).

Overall, some data indicate that being in a good mood increases the likelihood of exerting mating effort for women. It is also possible that some women may be less likely to go out when they are experiencing negative affect, including feelings of insecurity, low self-esteem, and unattractiveness, and perhaps engage in more mate retention (or dissolution) tactics instead (Buss, 2000; Vieira, 2009). More generally, changes in negative and positive affect may facilitate mating strategies by priming women for various tactics across the cycle. Affect stabilization across phases of the cycle, such as through the use of HCs, may impair or alter some women's sexual and relationship health by disrupting evolved mating strategies that are

contingent on context, such as cycle phase. Additionally, it is possible that similar relationships between emotional and sexual changes have evolved across other female reproductive events (e.g., pregnancy, the postpartum period, and menopause).

The Present Dissertation

The overall purpose of this dissertation was to add to the existing literature on affective, sexual, and physical experiences associated with reproductive and hormonal events and investigate the possibility that there are co-occurring patterns of such experiences across the menstrual cycle. An attempt to integrate research and theories in hormonal sensitivity, evolutionary medicine, and paradoxical, alternative, or different menstrual cycle shifts (e.g., periovulatory syndrome [POS] and sociosexual tactic shifting) has been made. It is clear that individual differences exist with respect to the effects of sex hormones on women's well-being. Given the variety of symptoms and changes that women experience, there is a striking lack of research on the clusters or subgroups of women who experience one of the two previously identified menstrual cycle patterns in either affect (but see Moos, 1991) or sociosexuality, as well as on compensatory, or opponent, positive and negative changes across the cycle (Pincus et al., 2008).

This dissertation was completed to address these gaps in the literature by examining the relationships between both negatively and positively valenced experiences, particularly with respect to affect and mating strategies. First, issues in the measurement of changes in affective, sexual, and physical experiences, as well as hormonal sensitivity, associated with reproductive events across the female lifespan led to the need for a new comprehensive measure: the Women's Reproductive Experiences (REP) Questionnaire. Second, given conceptual issues in the measurement of mating strategies, a newly developed measure of receptive and proceptive

mating behaviours, the PARMSS (see Phillips, 2015). The present dissertation includes two studies, each with two parts. In Study 1, the development of the Women's REP is presented and its initial psychometric properties assessed, namely factor structure and internal consistency reliability (Part 1) as well as concurrent validity (Parts 1 and 2). In Study 2, some of the findings of Study 1 were replicated, test-retest reliability as well as convergent and divergent validity for the Women's REP and PARMSS was assessed, and relationships between women's reproductive experiences and mating strategies were examined (Part 1). Subscales from the Women's REP and PARMSS were then used to examine patterns of change in affect and proceptivity between the periovulatory and premenstrual phases (Part 2).

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Chapter 2:

Study 1:

The Women's Reproductive Experiences (REP) Questionnaire:

Psychometric Findings

Abstract

This paper reports on the development and initial psychometric findings of the Women's Reproductive Experiences (REP) Questionnaire (Part 1) as well as differences between relevant groups on this measure (Part 2). The Women's REP was designed to measure both negative and positive experiences associated with reproductive events across the lifespan in three domains: affective, sexual, and physical. The impetus for its development came from research suggestive of a hormonal sensitivity syndrome in some women (a) at individual and (b) across reproductive events; (c) a dearth of research on positively valenced changes associated with such events; and (d) evidence of psychometric issues pertaining to measures used for individual events or syndromes. In Part 1, factor analysis indicated that the 134-item Women's REP includes seven main scales: Negative Affective Experiences, Negative Physical Experiences, Positive Affective and Physical Experiences, Sexual Problems – General, Sexual Problems – Relationship, Body Image Quality, and Sleep Quality. Fourteen main subscales and 13 supplementary subscales were also identified. The Women's REP demonstrated evidence of reliability in factor structure and internal consistency. Evidence of concurrent validity came from group differences in scale scores between women with and without self-reported current hormonal problems, hormonal contraceptive (HC) side effects, and premenstrual syndrome. In Part 2, women who differed in hormonal status (i.e., conception probability and estimated sex hormone levels; e.g., pregnant, postpartum, menopausal, menstrual cycle phase, and HC use) also differed in relevant ways on the scales. For example, pregnant women had high scores on a Progesterone-Related Experiences subscale. Overall, these data suggest that the Women's REP may be of use in research and clinical practice for elucidating between- and within-women patterns of affective, sexual, and physical responses to changes across the female lifespan.

The Women's Reproductive Experiences (REP) Questionnaire: Psychometric Findings

An extensive history of research exists on women's adverse experiences associated with reproductive events across the lifespan, from menarche to menopause. However, a gold standard in the measurement of these experiences over time has not yet emerged. Given the changes in hormone levels that occur during the various female reproductive events (Speroff & Fritz, 2005), it is perhaps not coincidental that all of these events are associated with psychological and physical changes. As examples, 49% of women who are of reproductive age report experiencing premenstrual syndrome (PMS; Direkvand-Moghadam, Sayehmiri, Delpisheh, & Sattat, 2014); about 40% of women who use hormonal contraception (HC) will experience adverse side effects (Oinonen, 2009; Sanders, Graham, Bass, & Bancroft, 2001; Tilhonen, Leppäpen, Heikkinen, & Ahonen, 2008); up to 80% of new mothers are affected by the "baby blues" (O'Hara & Wisner, 2014); half of all peripartum depressive mood episodes begin during pregnancy (APA, 2013); and women in the perimenopausal period may be more vulnerable to depressed mood than premenopausal women (Minuzzi, Frey, & Soares, 2012). As will be reviewed, measures of adverse symptoms or side effects have been developed for each of these reproductive events but there does not appear to be a measure that can assess both negative and positive experiences during all such events. This kind of measure might be useful for research on what has recently been described as hormonal sensitivity syndrome (HSS; Pope, Oinonen, Mazmanian, & Stone, 2015).

In an attempt to address this gap in the literature, the present paper reports on the development of what appears to be the first consolidated measure of experiences, symptoms, and side effects reported by women during events characterized by changes in reproductive status

and hormones: the Women's Reproductive Experiences (REP) Questionnaire. The two overall objectives for the study were to examine the (a) reliability and (b) validity of the measure. The initial psychometric evaluation of the Women's REP is presented in Part 1. In Part 2, mean level differences on Women's REP scores between women of various hormonal statuses were examined to further explore the concurrent validity of this new measure of experiences related to reproductive events and hormonal sensitivity.

More specifically, the Women's REP was designed to measure women's reports of affective, sexual, and physical experiences across the menstrual cycle, with HC use, during pregnancy, in the postpartum period, and throughout the menopausal transition. It is non-disorder and non-event specific and thus, may be applicable for use with women of all ages. The goal was to develop a questionnaire that included both the commonalities and unique or specific experiences of the main reproductive events for the purpose of assessing women's negatively and positively valenced responses to hormone-related changes. Many measures exist to evaluate some experiences associated with individual events, such as premenstrual distress, postpartum depression, and perimenopausal symptoms. These measures have been published or used in research or clinical practice (e.g., the Menstrual Distress Questionnaire [MDQ; Moos, 1991]; the Edinburgh Postpartum Depression Scale [EPDS; Cox, Holden, & Sagovsky, 1987]; and the Menopause-Specific Quality of Life Scale [MENQOL; Hilditch et al., 1996]). However, a review of the literature suggests there is a need for a comprehensive measurement tool for women's reproductive experiences that is neither disorder- nor event-specific.

The impetus for the development of a comprehensive questionnaire of women's reproductive experiences came from five sources: (a) research suggestive of hormonal sensitivity at individual events for some women; (b) a growing body of literature indicating that experiences

at a past reproductive event may be predictive of experiences at current or succeeding events; (c) a dearth of research on positively valenced changes that may be associated with reproductive events; (d) psychometric issues pertaining to measures used for individual events; and (e) as a result of the previous four points, the need to develop questionnaire items to measure women's experiences and symptoms at reproductive events in various Health, Hormones, & Behaviour Laboratory (HHAB Lab) research projects over the past 20 years (e.g., Bird, 2006, 2012; Oinonen, 1997, 2003; Richards, 2006, 2012; Russell, 2009; Stone, 2008, 2011; Teatero, 2009). These points will be discussed in more detail.

Hormonal Sensitivity Hypothesis

Although the precise underlying biological mechanisms are not well understood, a consensus is emerging that hormonal sensitivity (i.e., hypersensitivity to normal fluctuations in or levels of reproductive hormones) underlies the severity of symptoms and side effects associated with reproductive events across the lifespan (e.g., Brace & McCauley, 1997; Deecher et al., 2008; Oinonen, 2009; Oinonen & Mazmanian, 2002; Steiner, Dunn, & Born, 2003). While some of the psychological changes at these events may be reactive to somatic or psychosocial factors, some studies have provided strong evidence of hormonal sensitivity. For example, Bloch et al. (2000) induced depressive symptoms in 63% of female participants with a history of postpartum depression, but none of the control group, by artificially dropping their estrogen and progesterone levels. In another seminal study, PMS-like symptoms were induced in healthy women with PMS but not those without PMS by first suppressing the menstrual cycle (and PMS) using leuprolide, a GnRH agonist, and then adding estradiol or progesterone (Schmidt, Nieman, Danaceau, Adams, & Rubinow, 1998). These findings suggest that there are some women who are physically or affectively sensitive to changes in these hormone levels.

Given the hormonal changes associated with each reproductive event and that only a proportion of women experience affective (mood-related) symptoms or side effects, it seems that such experiences may involve sensitivity or hypersensitivity to normal psychophysiological processes among some women. Moreover, it is possible that a spectrum of hormonal sensitivity and thus, symptom severity, exists (Soares, 2010; Soares & Zitek, 2008). It has also been proposed that the effects of hormonal changes across the lifespan may be cumulative in those who are vulnerable (Ancelin, Scali, & Ritchie, 2007; Deecher, Andree, Sloan, & Schechter, 2008) and underlie what has been referred to as reproductive mood disorder(s) (Rapkin, Mikacich, & Moatakef-Imani, 2003; Payne, Tietelbaum Palmer, & Joffe, 2009). That is, women may not reach each reproductive event with the same risk for symptoms as at past events in a way that may be akin to kindling or sensitization (Parry & Newton, 2001; Post, 1992). Risk may accumulate with the experience of changes or symptoms at each reproductive event, beginning with hormonal exposure in utero as suggested by some digit ratio research (Oinonen, 2009; Oinonen & Bird, 2012). Interestingly, many of the same psychological and physical symptoms occur across the main female reproductive events (e.g., headaches, gastrointestinal problems, fatigue, breast tenderness, acne or skin blotches, vasomotor symptoms, changes in waist-to-hip ratio and body mass index, negative affect, mood lability, negative sexual changes, and sleep and appetite disturbances) (see review in Ancelin et al., 2007). These common experiences across reproductive events and a tendency for some women to experience symptoms at individual events provide support for the hormonal sensitivity hypothesis.

Past Reproductive Events

The hormonal sensitivity hypothesis is further supported by a growing body of literature on associations between symptoms, namely negative affect or depression, and reproductive

events across the lifespan (see Feld, Halbreich, & Karkun, 2005 for a review). These studies suggest that women who experience adverse affective symptoms with one event are more likely to experience similar symptoms at another event or other events (e.g., Flores-Ramos, Heinze, & Silvestri-Tomassoni, 2010; Payne et al., 2007; Stewart & Boydell, 1993; Sugawara et al., 1997; cf., Haywood, Slade, & King, 2007; Steinberg et al., 2008). For instance, Winkel, Einsle, Wittchen, and Martini (2013) found that women's retrospective ratings of a given premenstrual symptom, such as irritability/anger, were associated with current ratings of the corresponding symptom in early pregnancy. Stone, Mazmanian, Oinonen, and Sharma (2013) also reported evidence that physical symptoms at past reproductive events, particularly in the premenstrual phase, are predictive of physical symptoms during the menopausal transition. These types of associations provide evidence of HSS (Pope et al., 2015).

With increasing evidence that some women are relatively more sensitive to hormonal fluctuations and that experiences at one reproductive event tend to be related to those at another reproductive event, it may be particularly important to ensure that measurement instruments not only demonstrate good psychometric properties but can also be used with the majority of women regardless of age or current reproductive status. It may also prove beneficial to include a variety of reproductive experiences in such a measure given that there also appears to be heterogeneity in both (a) symptoms/side effects (as indicated by a review of the items on measures of experiences associated with individual events; see Method section) and (b) symptom associations (i.e., between various affective, sexual, and physical experiences) among women at individual events and across events (e.g., Greco, Graham, Bancroft, Tanner, & Doll, 2007; Kiesner & Pastore, 2010; Kiesner & Poulin, 2011; Lykins, Jannsen, & Graham, 2006; Warner & Bancroft, 1988). This approach would allow for the examination of experiences known to be associated

with one event at other reproductive events with which those experiences may not be directly related or have yet to be examined. That is, research has largely focused on correlations between similar or common affective symptoms across two or more reproductive events (see reviews in Stone et al., 2013 and Pope et al., 2015) but experiences that are relatively unique or specific to one event, pain during menstruation and nausea during pregnancy as examples, may also be related to different affective, sexual, and physical experiences at other events. Also, a comprehensive measure might help clarify what past symptoms or profiles of symptoms might be most predictive of those that occur at later reproductive events (Winkel et al., 2013).

Positively Valenced Experiences

In contrast to adverse or negatively valenced experiences, there have been few studies on positive or positively valenced experiences during each reproductive event (see Buttner, O'Hara, & Watson, 2012; Dennerstein, Lehert, & Guthie, 2002; King & Ussher, 2012; Meaden, Harlage & Corr-Karr, 2005; Oinonen & Mazmanian, 2002). Based on a continuum perspective, such affective experiences could range from positive affect to elation to mania (Oinonen & Mazmanian, 2001; Jarva & Oinonen, 2007). This is an intriguing area of potential research in view of evidence that the course of bipolar disorder among subgroups of women may be affected by the menstrual cycle (Teatero, Mazmanian, & Sharma, 2013), pregnancy (Sharma & Pope, 2012), and the postpartum period (Sharma et al., 2014). With respect to associations across reproductive events, the very few relevant findings are consistent with what would be expected based on the hormonal sensitivity hypothesis. Some women seem to respond to changes in hormone levels in unique yet predictable ways, such as by experiencing positive affect at two or more reproductive events (Dennerstein, Lehert, Dudley, & Guthrie, 2001; Russell, 2009). In contrast, an earlier study reported that positive recollections of menarche were correlated with

negative affect in the premenstrual and menstrual phases (Wood, Dery, & Most, 1982). Overall, further research is needed to examine associations between experiences, including those that are positively valenced, at the various reproductive events (see Warner & Bancroft, 1988 for early work in this area with respect to menstrual cycle phase).

Psychometric Issues

Most, if not all, of the studies that have examined associations among symptoms at the various reproductive events have used questionnaires (a) with unpublished psychometric properties (usually developed for the study; e.g., Flores-Ramos, Heinze, & Silvestri-Tomassoni, 2010; Stone et al., 2013; Winkel et al., 2013) or (b) that were not designed to measure reproductive experiences or for use with reproductive groups of women (e.g., the Center for Epidemiological Studies' Depression Scale [CES-D; Radloff, 1977]; Flores-Ramos et al., 2010; Freeman, Sammel, Rinaudo, & Shend, 2007). As Hunter (1992) indicated, hormonal and age-related changes among women may be confounded when regular measures of mood and health are used to assess reproductive experiences. For instance, a principal components analysis of a measure designed to assess mid-aged (perimenopausal) women's perceptions of emotional and physical symptoms, the Women's Health Questionnaire (WHQ), revealed that depressed mood was somewhat independent of sleep problems and sexual difficulties, which was in contrast to assumptions underlying the measurement of symptoms of depressed mood in general and suggested that relationships among women's reproductive experiences may differ from those of similar, but non-reproductive, experiences in the general population (Hunter, 1992). These findings indicate that questionnaires specifically designed to measure reproductive experiences may be more sensitive to changes as well as relationships between symptoms at an event and across events. In this sense, such measures may have face validity, relatively good measurement

validity, and sensitivity to experiences associated with hormonal changes than population-based measures of mood and health.

Other existing general (i.e., non-disorder) measures of symptoms for specific reproductive events predominantly pertain to the premenstrual phase, vary in content, and have poor (or unknown) psychometric properties (Haywood, Slade, & King, 2002; see also Buttner et al., 2012 for a brief review of similar limitations regarding measures used in research on the postpartum blues). For instance, many different measures for PMS are used in the literature, which has made results difficult to compare or aggregate in meta-analyses (Direkvand-Moghadam et al., 2014).

Moreover, the items on the most commonly used published measures of experiences specific to a reproductive event tend to be negatively worded such that adverse experiences are measured to the exclusion of any positively valenced changes (Meaden et al., 2010). Reproductive event questionnaires that do include positively worded items consist of only a select few such mood-related items (e.g., MDQ; Moos, 1991) and merely involve reverse scoring so as to reflect negatively valenced change (e.g., WHQ; Hunter, 1992; see also Meaden et al., 2005). However, a study on the structure of women's mood in the early postpartum period used the Daily Experiences Questionnaires (DEQ), which includes items from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and revealed two reliable factors: negative affect and positive affect (Buttner et al., 2012). Moreover, there is evidence from a brain imaging study that distinct regions of the brain are involved in negative and positive affective processing (Zheng, Li, and Pan, 2015). Even if affect is a bipolar dimension, then both valences (e.g., negative affect and positive affect as opposed to just high negative affect and low negative affect) should be measured to avoid ceiling or floor effects (Green & Salovey, 1999).

Finally, questionnaires developed based on the assumption that a given reproductive event is an adverse psychological and physical experience may result in data that can confirm but not disconfirm that assumption (Meaden et al., 2005). According to Meaden et al. (2005), "Further research . . . is needed to understand the apparently orthogonal differences in the positively and negatively worded items, and their relative accuracy and usefulness in describing the menstrual experience (p. 35)." In the present study, this point is applied to reproductive experiences more globally. Given evidence that some women report positively valenced reproductive experiences, existing measures may mask such phenomena by limiting and prescribing the range of experiences women are able to directly report (King & Ussher, 2012). As a result, measures of central tendency would suggest the experience of only negative changes or no changes at all in women. It may also be valuable to include equal numbers of negative and positive experiences in a questionnaire to consider response biases or sets (see O'Sullivan, Meyer-Bahlburg, & McKeague, 2006 for a non-reproductive/hormonal related measure of sexual self-concept in which negative and positive worded items were intentionally balanced).

The Present Study

In summary, a comprehensive measure of women's reproductive symptoms may be more sensitive to changes across and associations between the various reproductive events, which may also help clarify patterns of hormonal sensitivity. The Women's REP was designed to be novel in its assessment of: (a) three comprehensive domains of experiences (i.e., affective, sexual and physical), (b) both negative and positive experiences, and (c) experiences from the three domains that span the main reproductive events that a woman has the potential to experience across her lifespan. The present study details the development of the Women's REP and its initial psychometric findings, including factor structure, internal consistency reliability, and concurrent

validity (Part 1). Concurrent validity was also assessed by examining if scores on the scales of the Women's REP differ between women with and without self-reported current: hormonal problems, HC side effects, and PMS. In Part 2, possible relevant differences on the scales between women who differed in reproductive status (e.g., pregnant, postpartum, menopausal, menstrual cycle phase, and HC use), as well as estimated conception probability and sex hormones levels, were also examined.

Method

Participants

Overall, 2490 women participated in at least a portion of a study on "women's health experiences." The final full sample consisted of 1,934 women between the ages of 16 and 74 years. Demographic information for the full sample as well as a subsample of women of reproductive age (i.e., under the age of 44 years; e.g., World Health Organization, 2013) who reported that they were not pregnant, in the postpartum period, or perimenpausal (n = 1521) can be found in Table 2.1.

Participants were recruited from a Canadian university and the community but predominantly through the Internet. Methods of recruitment included posters, word of mouth, e-mails, and online postings and advertisements. The latter strategy was employed to increase both sample size and diversity. Research has suggested that web-based studies can provide valid data and perhaps more diverse and representative samples than specific participant pools, such as undergraduate students (e.g., Gosling, Vazire, Srivastava, & John, 2004; Thompson & O'Sullivan, 2013; 2015). University students received half of a bonus point as Psychology course credit for their participation and all volunteers were entered into four draws for $50 VISA gift cards.

Table 2.1

Means and Frequencies of Demographic Variables for the Full Sample and Subsample of Reproductive Age

Variable	Full sample (N = 1934)	Subsample of reproductive age[a] (n = 1521)
	M (*SD*)	
Age (years)	29.32 (10.49)	26.16 (6.79)
	n (%)	
Ethnic background		
European (e.g., Caucasian/white)	1306 (67.5)	1028 (67.6)
African/black	265 (13.7)	195 (12.8)
Hispanic/Latino	138 (7.1)	109 (7.2)
Asian	83 (4.3)	73 (4.8)
Other (e.g., multi-racial)	81 (4.2)	61 (4.0)
Native/Aboriginal	27 (1.4)	25 (1.6)
East Indian	18 (0.9)	15 (1.0)
Unspecified	9 (0.5)	8 (0.5)
Middle Eastern	7 (0.4)	7 (0.5)
Continent of residence		
North America	1871 (96.4)	1466 (96.4)
Asia	22 (1.1)	20 (1.3)
Europe	22 (1.1)	19 (1.2)
Australia	10 (0.5)	8 (0.5)
Unspecified	7 (0.4)	6 (0.4)
South America	2 (0.1)	2 (0.1)
Relationship status		
In a relationship	1264 (65.4)	977 (64.2)
Single (no primary partner)	658 (34.0)	537 (35.3)
Other (e.g., divorced)	9 (0.5)	4 (0.3)
Unspecified	3 (0.2)	3 (0.2)
Reproductive status[b]		
Free-cycling (i.e., non-HC users)	1053 (60.3)	962 (63.3)
Hormonal contraceptive (HC) use	536 (30.7)	529 (34.8)
Non-hormonal intrauterine device use	29 (1.7)	28 (1.8)
Pregnant	25 (1.4)	-
Postpartum	24 (1.4)	-
Perimenopasual	109 (4.5)	-

[a]Women under the age of 44 years who were not pregnant, in the postpartum period, or perimenopausal. [b]Women who reported being in more than one reproductive group were excluded. Thus, each group is independent.

Other than age (16 years or older), there were no initial inclusion or exclusion criteria in order to obtain a large sample of women across various stages of the lifespan with a variety of reproductive experiences. However, 556 women were excluded from the analyses for one or more of the following five reasons: (a) "other" sex (e.g., gender dysphoria) (n = 7); (b) unreported age (n = 25); (c) reported age was out of range or implausible (n = 5); (d) responses to current reproductive events were implausible (e.g., selected *yes* to currently being pregnant, postpartum, and perimenopausal) (n = 2); (e) missing more than 6 (4.8% of) the Women's REP items (n = 521); and (f) response set was visually detected by the author (e.g., selected *not at all* to all Women's REP items) (n = 5).

Materials

Participants were given an electronic questionnaire that consisted of three sections: demographics, health background, and the Women's REP (see Appendix A for the consent form, questionnaire, and debriefing form of the present study). Demographic items included age, ethnic background, country of residence, and relationship status. The health background section included items developed by the researchers pertaining to past and current reproductive events (i.e., pregnancy, postpartum, and perimenopause) as well as other indicators of hormonal status such as menstrual cycle regularity and length, date of last and expected date of next menstrual period, and HC use. Participants indicated whether they thought that they had ever had any of the following general conditions (*never*, *past*, or *present*): a hormonal problem or disorder, HC side effects, PMS, mood problems during pregnancy, and mood problems during the postpartum period. The questionnaire took about 15 to 30 minutes for most women to complete.

Women's Reproductive Experiences (REP) Questionnaire. Based on the results of this study, the 134-item Women's REP consists of both negatively and positively valenced

experiences that constitute seven main scales, 14 main subscales, and 13 supplementary subscales. As will be demonstrated, the main scales include a mix of negatively and positively valenced items (with reverse scoring as appropriate), while the subscales tend to consist of only negative or positive experiences items.

The items of the Women's REP were generated through, or adapted from, experiences included in gynecological reference materials; reproductive symptoms or side effects in the reviewed literature; anecdotal reports from previous research participants; the criteria for PMDD, depression, and bipolar disorder (APA, 2000); and questionnaire items developed for past studies in the HHAB Lab. These latter measures included the OC Side Effects Questionnaire (OCQ; Oinonen & Bird, 2012), the Pregnancy Experiences Questionnaire (PEQ) (Stone et al., 2013), the Postpartum Physical Symptoms Questionnaire (PPSQ; Stone et al., 2013), and the Postpartum Elation Scale (Russell, 2009). A visual item analysis of the following existing measures, specific to individual reproductive events, was also completed: the MDQ (Moos, 1991), the Menstrual Joy Questionnaire (Chrisler, Johnston, Champagne, & Preston, 1994), the Daily Record of Severity of Problems (Endicott & Harrison, 1990), the EPDS (Cox et al., 1987), and the MENQUOL (Hilditch et al., 1996). Since changes in sexual functioning are commonly associated with reproductive events (e.g., Clayton, Clavet, McGarvey, Warnock, & Weiss, 1999), items pertaining to the sexual response cycle (i.e., sexual desire or drive, arousal, and ability to orgasm) were generated based primarily on information about sexual dysfunctions (APA, 2000), Clayton and Hamilton (2010), and the OCQ (Oinonen & Bird, 2012). All of the measures that were reviewed are widely used or have demonstrated some satisfactory psychometric data.

The Women's REP was developed to consist of items from three domains consistent with existing questionnaires and research: affective (68 items), sexual (20 items), and physical (46 items) experiences. Each item was rated on a 5-point scale from 0 (*Not at all*) to 4 (*Extreme*) based on one's experiences over the past 48 hours. An attempt was made to include a positively valenced item, or at least a one-dimensional opposing positively worded experience, for every negatively valenced item, resulting in a "negative" content scale and a "positive" content scale for each domain (resulting in six initial domain scales). In the physical domain, an example is "joint or muscle stiffness" as a negative symptom and "joint or muscle agility" as a positive symptom. In the affective domain, an example is "mood lability (mood swings)" and "mood stability (consistent mood)." In the sexual domain, an example is "disinterest in masturbation (alone)" and "desire/drive for masturbation (alone)." While five pairs of items, such as "breast size increase" and "breast size decrease" did not necessarily have an obvious negative or positive valence, they were included as supplementary items descriptive of directional change. The 134 Women's REP items listed by their rationally developed domain content scales can be found in Table 2.2.

Instructions provided to participants for completing the Women's REP were as follows: "Below is a list of physical, emotional, and sexual experiences that can be positive or negative. Please indicate the extent to which you have experienced each item in the past 48 hours (i.e., over the past 2 days). If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity." Note that no reference was made to a specific hormonal status or reproductive event. The Women's REP items specific to having a current primary partner were not administered to women who selected that they were single. Such items were presented prior to the other items (at the end of

Table 2.2

Items of the Women's Reproductive Experiences (REP) Questionnaire by Proposed Domain Content Scales

Negative Affective Experiences (k = 30)	Positive Affective Experiences (k = 30)	Negative Physical Experiences (k = 21)	Positive Physical Experiences (k = 21)	Negative Sexual Experiences (k = 10)	Positive Sexual Experiences (k = 10)	Supplementary Experiences[c] (k = 12)
Loneliness	Connectedness/support	Joint or muscle stiffness	Joint or muscle agility (i.e., ease of movement)	Disinterest in sexual activity with others (excluding primary partner)[a]	Interest in sexual activity with others (excluding primary partner)[a]	Feeling bigger than usual [physical]
Anxiety or worry	Mental relaxation/calm	Unhappy with weight	Content with weight	Difficulty becoming aroused with others or the thought of others (excluding primary partner)[a]	Easy to become aroused with others or the thought of others (excluding primary partner)[a]	Feeling thinner than usual [physical]
Mood lability (mood swings)	Mood stability (consistent mood)	Breakthrough bleeding/spotting	Less breakthrough bleeding/spotting			Breast size decrease [physical)]
Crying	Smiling	Headaches/ migraines	Clear-headedness			Breast size increase [physical]
Fatigue/lack of energy	Energized/active	Acne/pimples	Clear complexion/skin			Sleeping more than usual [affective]
Not enough sleep	Content with amount of sleep	Facial skin discoloration (i.e., colour blotches on face)	Even facial skin tone	Difficulty having an orgasm with others or the thought of others (excluding primary partner)[a]	Easy to have an orgasm with others or the thought of others (excluding primary partner)[a]	Sleeping less than usual [affective]
Disrupted sleep	Uninterrupted (peaceful) sleep		Physical health			Decreased appetite [affective]
Difficulty falling asleep	Ease falling asleep	Sweating	Stomach comfort			Increased appetite [affective]
Unhappy with appetite	Content with appetite	Abdominal cramps or discomfort	Sense of physical wellbeing	Disinterest in masturbation (alone)	Interest in masturbation (alone)	Food aversions [affective]
Feeling down, sad, or depressed	Feeling happy, elated, or euphoric	Nausea or vomiting	A strong back	Difficulty becoming aroused for masturbation (alone)	Easy to become aroused for masturbation (alone)	Food cravings [affective]
Low self-esteem	High self-esteem	Backache	General physical comfort	Difficulty having an orgasm through masturbation (alone)	Easy to have an orgasm through masturbation (alone)	
Poor judgment or irrational	Good judgment or rational	General aches and pains	Strong and nimble legs	Pain/discomfort during sexual activity	Pleasure/comfort during sexual activity	
Impulsivity	Thoughtfulness	Leg cramps	Healthy digestion		Sexual desire/drive for primary partner[b]	
Restlessness	Excitement and enthusiasm	Heartburn or indigestion	Comfort in breast area			
Difficulty concentrating	Focused	Painful or tender breasts	Pleased with breast size			
Unsociable/desire to be alone	Sociable/desire to be around others	Unhappy with breast size	Hydrated			
Impairment in work or school	Achievement/productivity in work or school		Calm intestinal track			
Lack of interest or enjoyment in usual activities	Interest or enjoyment in usual activities					
Feeling out of control	Feeling in control					
Not feeling like self	Feeling like self					

Negative Affective Positive Affective Negative Physical Positive Physical Negative Sexual Positive Sexual Supplementary

Experiences (k = 30)	Experiences (k = 30)	Experiences (k = 21)	Experiences (k = 21)	Experiences (k = 10)	Experiences (k = 10)	Experiences[c] (k = 12)
Unhappy with food preferences	Content with food preferences	Bloating/swelling	Healthy bowel movements	Disinterest in sexual activity with primary partner[b]	Easy to become aroused with primary partner[b]	Eating more than usual [affective]
Unhappy with food intake	Content with food intake	Flatulence/gassy	Regular bowel movements	Difficulty becoming aroused with primary partner[b]	Easy to have an orgasm with primary partner[b]	Eating less than usual [affective]
Negative thoughts about the future (pessimism)	Looking forward to a bright future (optimism)	Diarrhea	Decrease in facial hair	Difficulty having an orgasm with primary partner[b]		
Emotional irritability/sensitivity	Emotional calmness/stability	Constipation	Vaginal lubrication			
Self-blame/self-critical	Feeling competent/capable	Facial hair growth				
Feeling unoriginal or plain	Feeling great or special	Vaginal dryness				
Clumsiness/minor accidents	Physical grace/motor coordination					
Jealous of other women	Pleased with self compared to other women					
Avoidant of intimacy/affection	Affectionate/intimate with others					
Concern about body shape/size	Pleased with body shape/size					

Note. k = number of items.

[a]Items reflect sexual experiences outside of a romantic relationship regardless of relationship status, including general sexual desire and activity involving another person or the thought of someone for single women and sexual desire and activity involving a person other than one's primary partner (e.g., fantasy, infidelity, or polyamory) for women in a relationship [b]Items applicable to, and only administered to, participants who reported that they were in a relationship. [c]The valences of these items are not necessarily negative or positive. Labels in square parentheses refer to purported general content domains.

the demographics section). All items of the Women's REP were presented in the same random order (i.e., the items from the various scales were intermixed) for all participants (see Appendix A).

Procedure

The study received approval from the relevant institutional and departmental research ethics boards. Potential participants were directed to an Internet link for the questionnaire. All data were collected through a secure Internet database (www.surveymonkey.com). As an added precaution, optional enhanced security (Secure Sockets Layer [SSL]) was purchased to encrypt all responses. Identifying information for prize draws was collected through a separate link in the debriefing form at the end of the questionnaire to preserve anonymity.

Data Screening

About 0.53% of data points (i.e., items x participants) were missing from the possible 248,192 data points of the Women's REP. Based on missing value analysis and examination of both raw and descriptive data, there were no clear patterns in the missing data and thus, the data were considered to be missing at random. Given that no variable or participant was missing more than 5% of data points, it was expected that any procedure for handling missing data would be equivalent. Thus, all analyses were conducted with missing data estimated by item means, a conservative approach (Tabachnick & Fidell, 2007). Prior to each of the main analyses, the data were screened for errors, missing values, univariate and multivariate outliers ($\pm z \geq 3.29$ and $p <$ .001 criterion, respectively; Tabachnick & Fidell, 2007), and the assumptions of the statistical tests employed.

As sample sizes increased, some item ratings and scores on the scales of the Women's REP tended to be slightly positively skewed and include several slight univariate and

multivariate outliers. Given these findings, all main analyses were conducted with and without any outlying cases. There were no substantive differences in results. Thus, the former analyses are presented and no transformations were conducted given that some deviation from normality and outliers are expected in large samples. The assumption of linearity was also met based on graphical checks.

The assumptions of homogeneity of variance-covariance matrices and homogeneity of error variances were assessed using Box's M test and Levene's test for MANOVAs and ANOVAs, respectively. Likely due to large and unequal group sizes (Tabachnick & Fidell, 2007), these tests were significant for some analyses. To further assess these assumptions in the relevant analyses, (a) random samples of relatively large groups were selected to even out group sizes for the MANOVAs as recommended by Tabachnick and Fidell (2007); (b) robust tests of equality of means (i.e., Brown-Forsythe *F*-tests and Games-Howell pairwise comparisons) were conducted; (c) non-parametric tests (i.e., Kruskal-Wallis tests and Mann-Whitney pairwise comparisons) were conducted; and (d) Hartley's F_{max} ratio was considered as suggested by Field (2009). All of these results (not presented) were consistent with those obtained with the presented parametric tests, there were no identifiable patterns of variances by group size, and the ratio of the largest group variance to the smallest group variance tended to be close to one. In fact, Box's test of homogeneity of variance-covariance matrices can be disregarded if sample sizes are equal (Field, 2009). Thus, these findings indicate that the presented MANOVA and ANOVA results are robust.

Part 1:

Factor Structure, Reliability, and Concurrent Validity of a New Measure: The Women's Reproductive Experiences (REP) Questionnaire

In Part 1, the factor structure of the Women's REP was examined and scores on the resulting scales and subscales were determined. It was expected that the empirically derived scales would correspond well to the rationally derived content domain scales that were formed in the development of the measure. Differences in these scores between women with and without self-reported current general hormonal problems, HC side effects, and PMS were then examined. It was expected that women who self-identified with such hormonal problems would have negatively valenced scores that would be high and positively valenced scores that would be low compared to their unaffected counterparts. Such results would provide initial evidence of concurrent validity for the measure.

Data Reduction and Analysis

Factor analyses. A series of exploratory factor analyses was conducted for the full sample of women (N = 1934; k [number of items] = 128) as well as the following subsamples: women in a relationship who responded to the relationship items of the Women's REP (n = 1263; k = 134), women not in a relationship (n = 658; k = 128), women of reproductive age (n = 1621; k = 128), and women of reproductive age in a relationship (n = 976; k = 134). One woman who indicated that she was in a relationship did not complete the relationship items of the Women's REP and was thus, excluded from the relevant subsamples. According to Streiner (1994), there should be at least 100 participants overall and five participants per variable for a factor analysis. These criteria were met for all factor analyses conducted. For each sample, a principal components analysis was first conducted to assess for multicollinearity, the

factorability of the correction matrix, and the number of factors to extract. The number of factors was estimated using the scree plot and eigenvalues greater than 1, as well as parallel analysis using syntax from O'Connor (2000). The final number of factors extracted was based on the rules of parsimony and interpretability (Tabachnick & Fidell, 2007). Principal axis factor extraction with direct oblimin rotation was then performed on the items. A pattern matrix coefficient cutoff of .32 for inclusion of an item in interpretation of a factor was considered (Tabachnick & Fidell, 2007). However, items that loaded at least .25 on a factor were also included in the factors, as they can be considered salient in a large sample (Kline, 1994).

Concurrent validity analyses. Factor (scale) scores were computed for each participant by averaging item ratings for the purposes of examining the descriptive statistics and concurrent validity of the Women's REP. A series of one-way MANOVAs and ANOVAs were conducted to examine group differences in Women's REP scores. Independent variables were women's reports (yes/no) of *current*: hormonal problems, HC side effects, and PMS (total *n*s = 1910, 525, and 335 due to missing data and inclusion criteria noted below). Twenty-four, four, and three women did not respond to these items, respectively.

Results

Factor structure. For each factor analysis detailed below, the factorability of the correlation matrix was determined to be adequate. There were numerous significant correlations above .30 among the items, most of the values in the negative anti-image correlation matrix were small, and Kaiser's measure of sampling adequacy was above 0.60. While the determinants of the correlation matrices were less than .0001, the smallest eigenvalue was not dangerously close to one and the largest squared multiple correlation (SMC) between items was not dangerously

close to 1 (Tabachnick & Fidell, 2007). Overall, these results indicated that multicollinearity was not a threat.

Full sample of women. Six factors were extracted for the 128-item version of the Women's REP (i.e., excluding six items specific to being in a relationship) because any additional factors consisted of few loadings above .32 and items of seemingly mixed content. An examination of the scree plot suggested six factors, while the eigenvalue greater than one criterion and parallel analysis suggested 25 and 15 factors, respectively. The results of the factor analysis can be found in Table 2.3. Items were ordered and grouped by loading (pattern coefficient) size to facilitate interpretation. All of the Women's REP items loaded on a factor with a minimum coefficient of .25. An interpretative label was given to each factor and can be found in the first row of the table. As demonstrated above the diagonal in Table 2.4, oblique rotation suggested that the factors were modestly correlated at most. However, the factor solution provided a more simple structure than when an orthogonal rotation was requested. Oblique rotation was used in all subsequent analyses. All factors were internally consistent such that the SMCs ranged from .88 to .95. The factor solution accounted for 36% of variance (similar to O'Sullivan et al., 2006).

The interpretive labels given to the factors were based on item content. Secondary interpretative labels were based on the direction (negative or positive) of factor loadings. The six factors, in order of variance explained, were Negative Affective Experiences (corresponding to the negative affective experiences content scale); Positive Affective and Physical Experiences (a combination of the positive affective experiences and physical experiences content scales); Sexual Experiences or Sexual Problems – General (negative and positive items from the general sexual experiences domain); Body Image Experiences or Body Image Quality (positive and

Table 2.3

Items (and Pattern Coefficients) of the Women's REP and Variance Explained by Factors with Proposed Interpretative Labels for the Full Sample

Negative Affective Experiences (k = 16)	Positive Affective and Physical Experiences (k = 43)	Positive and Negative Sexual Experiences – General (Sexual Problems – General) (k = 14)	Positive and Negative Body Image Experiences (Body Image Quality) (k = 15)	Negative Physical Experiences[a] (k = 31)	Positive and Negative Sleep Experiences (Sleep Quality) (k = 9)	Positive and Negative Sexual Experiences – Relationship (Sexual Problems – Relationship) (k = 6)
Feeling down, sad, or depressed (.64)	Clear-headedness (.66)	Easy to become aroused for masturbation (alone) (-.67)	Unhappy with weight (-.75)	Painful or tender breasts (.49)	Difficulty falling asleep (-.69)	Easy to become aroused with primary partner (-.76)
Negative thoughts about the future (pessimism) (.60)	Good judgment or rational (.66)	Disinterest in masturbation (alone) (.65)	Concern about body shape/size (-.73)	Bloating/swelling (.46)	Disrupted sleep (-.69)	Difficulty becoming aroused with primary partner (.77)
Self-blame/self-critical (.52)	Feeling capable/competent (.64)	Easy to have an orgasm through masturbation (alone) (-.63)	Feeling bigger than usual (-.71)	Abdominal cramps or discomfort (.45)	Not enough sleep (-.68)	Sexual desire/drive for primary partner (-.74)
Low self-esteem (.52)	Excitement and enthusiasm (.64)	Desire/drive for masturbation (alone) (-.61)	Pleased with body shape/size (.61)	Nausea or vomiting (.45)	Sleeping less than usual (-.67)	Disinterest in sexual activity with primary partner (.67)
Loneliness (.52)	Physical grace/motor coordination (.62)	Easy to become aroused with others or the thought of others (excluding primary partner) (-.59)	Content with weight (.60)	Sleeping more than usual (.42)	Content with amount of sleep (.58)	Difficulty having an orgasm with primary partner (.56)
Not feeling like self (.50)	Feeling like self (.62)	Easy to have an orgasm with others or the thought of others (excluding primary partner) (-.55)	Unhappy with food intake (-.59)	Breakthrough bleeding/spotting (.42)	Easy falling asleep (.57)	Easy to have an orgasm with primary partner (-.56)
Feeling out of control (.48)	**Feeling in control (.62)**	Disinterest in sexual activity with others (excluding primary partner) (.52)	Unhappy with appetite (-.51)	Constipation (.42)	Restlessness (-.50)	[Avoidant of intimacy/affection (.52)]
Mood lability (mood swings) (.48)	Smiling (.61)	Difficulty becoming aroused for masturbation (alone) (.51)	**Eating more than usual (-.49)**	Backache (.41)	Uninterrupted (peaceful) sleep (.42)	[Affectionate/ intimate with others (-.36)]
Emotional irritability/ sensitivity (.47)	Sense of physical wellbeing (.61)	Sexual desire/drive for others (-.50)	Food cravings (-.46)	Leg cramps (.41)	Fatigue/lack of energy (-.33)	[Physical pleasure/comfort during sexual activity (-.34)]
Unsociable (desire to be alone) (.47)	Interest or enjoyment in usual activities (.60)	Difficulty having an orgasm with others (.48)	**Content with food intake (.43)**	Heartburn or indigestion (.40)		
Anxiety or worry (.46)	Healthy digestion (.60)	Difficulty having an orgasm through masturbation (alone) (.47)	**Content with appetite (.42)**	Food aversions (.40)		
Feeling unoriginal or plain (.46)	**Looking forward to a bright future (optimism) (.59)**		**Increased appetite (-.35)**	Impulsivity (.40)		
Lack of interest or enjoyment in usual activities (.42)	Thoughtfulness (.58)		**Feeling thinner than usual (.35)**	Breast size increase (.39)		
Crying (.41)	**Emotional calmness/stability (.56)**		Jealous of other women (-.30)	Flatulence/gassy (.38)		
Difficulty concentrating (.41)	Focused (.55)		**Unhappy with food preferences (-.27)**	Diarrhea (.38)		
Poor judgment or irrational (.39)	Calm intestinal track (.54)			**General aches and pains (.38)**		
	High self-esteem (.54)			Clumsiness/minor accidents (.37)		
	Healthy bowel movements (.54)			**Impairment in work or school (.36)**		
	Mental relaxation/calm (.53)			Acne/pimples (.35)		
	Feeling, happy, elated, or euphoric (.52)			Breast size decrease (.34)		
	Strong and nimble legs (.52)			Sweating (.34)		
	Sociable (.50)			Pain/discomfort during sexual activity (.34)		
	Hydrated (.50)			Facial skin discoloration (i.e., colour blotches on face) (.34)		
	Regular bowel movements (.49)					
	Connectedness/support (.49)					
	A strong back (.49)					
	Comfort in breast area (.49)					
	Mood stability (consistent mood) (.48)					
	Achievement/productivity in work or school (.47)					

Negative Affective Experiences (k = 16)	Positive Affective and Physical Experiences (k = 43)	Positive and Negative Sexual Experiences – General (Sexual Problems – General)[a] (k = 14)	Positive and Negative Body Image Experiences (Body Image Quality) (k = 15)	Negative Physical Experiences[b] (k = 31)	Positive and Negative Sleep Experiences (Sleep Quality) (k = 9)	Positive and Negative Sexual Experiences – Relationship (Sexual Problems – Relationship) (k = 6)
	Even facial skin tone (.47) **Content with food preferences (.46)** **Feeling great or special (.45)** General physical comfort (.44) Clear complexion/skin (.44) **Pleased with self compared to other women (.43)** Energized/Active (.41) Affectionate/intimate with others (.41) Joint or muscle agility (i.e., ease of movement) (.40) Pleased with breast size (.39) Stomach comfort (.39) Physical pleasure/comfort during sexual activity (.35) Vaginal lubrication (.31) Physical health (.25)	Difficulty becoming aroused with others or the thought of others (excluding primary partner) (.42) Avoidant of intimacy/affection (.31) Vaginal dryness (.23)		Joint or muscle stiffness (.33) Headaches/migraines (.32) Decreased appetite (.31) Facial hair growth (.28) Unhappy with breast size (.27) Decrease in facial hair (.27) Less breakthrough bleeding/spotting (.26) Eating less than usual (.25)		
% variance explained in the full sample (and subsample) of women[b]						
17.93 (17.50)	8.74 (2.15)	3.10 (3.46)	2.61 (2.58)	2.23 (7.92)	1.76 (1.73)	(1.90)

Note. Women's REP = Women's Reproductive Experiences Questionnaire. k = number of items. Results were based on principal axis factor analyses, oblique rotation with Kaiser normalization. Factors 1 through 6 were based on the full sample (N = 1934) of women. Factor 7, in addition to factors 1 through 6, was reflected in the subsample of women in a relationship (n = 1263). Bolded items represent items that loaded greater than .25 on two factors in the full sample (i.e., cross-loaded) but are listed under the factor with which they had the strongest pattern coefficient. No item cross-loaded on more than two factors. Items in square parentheses represent items from the factor analysis in the full sample that loaded on Factor 7 in the subsample factor analysis.

[a]Pattern coefficients for these items were negative in direction. They have been reversed in the presentation of the results for ease of interpretation. [b]Total variance explained = 36% in the full sample and 37% in the subsample of women in a relationship.

Table 2.4

Main Factor Correlation Matrices of the Women's REP in the Full Sample and Subsample of Women in Relationship

Factor	1	2	3.	4	5	6	7
1. Negative Affective Experiences	1	-.09	.14	-.19	.28	-.28	
2. Positive Affective and Physical Experiences	-.19	1	-.20	.20	.07	-.26	
3. Sexual Problems – General	.15	-.13	1	-.07	.12	-.16	
4. Body Image Quality	-.24	.14	-.05	1	-.23	.26	
5. Negative Physical Experiences	.28	.15	.08	-.23	1	.29	
6. Sleep Quality	-.31	.22	-.10	.25	-.24	1	
7. Sexual Problems – Relationship	.22	-.25	.27	-.08	.05	-.20	1

Note. Women's REP = Women's Reproductive Experiences Questionnaire. Correlation coefficients for the full sample (N = 1934) are presented above the diagonal, while those for the subsample of women in a relationship (n = 1263) are below the diagonal. Factor 7 is not presented for the full sample because a subsample of women was not in a relationship and thus, six items of the Women's REP did not apply to them.

negative items from the affective experiences and physical experiences domains); Negative Physical Experiences (corresponding to the negative physical experiences content scale); and Sleep Experiences or Sleep Quality (positive and negative items from the affective experiences domain).

Seventeen (13%) of the items were complex such that they loaded above .25 on two factors. These items were retained on the factor with which they loaded the most or fit best with respect to content for the purposes of future research (bolded in Table 2.3). Six of these items were from the Positive Affective Experiences factor, all of which loaded to a lesser extent on Negative Affective Experiences, as might be expected. Eight complex items were related to eating or body image, all of which loaded to some extent on Body Image Experiences. One of these items ("Pleased with self compared to other women") loaded higher on Positive Affective Experiences. Three loaded on Positive Physical Experiences, three loaded on Negative Physical Experiences, and one ("Unhappy with food preferences") loaded on Sleep Experiences. Of the remaining complex items, "General aches and pains" also loaded on Sleep Experiences, "Impairment in work or school" also loaded on Negative Affective Experiences, and "Poor judgment or irrational" also loaded on Negative Physical Experiences. Overall, these results indicate that the eating- and body image-related items of the Women's REP may cut across content domains.

Relationship status subsamples. Among women in a relationship (n = 1263), seven factors were found to provide the optimal solution for all 134-items of the Women's REP, which accounted for 37% of variance overall. The scree plot suggested six to eight factors, while the eigenvalue greater than one criterion and parallel analysis suggested 27 and 16 factors respectively. The six factors found in the above factor analysis of the full sample were

represented (pattern coefficients not presented). As seen in Table 2.3, the seventh factor was interpreted as "Sexual Experiences – Relationship" as it consisted of the six items specific to women with a primary partner. All factors were internally consistent such that the SMCs ranged from .87 to .94. As seen below the diagonal in Table 2.4, the seven factors were weakly correlated.

The order of the factors Positive Affective and Physical Experiences and Negative Physical Experiences, in terms of variance explained, was reversed from the factor analysis in the full sample to the subsample of women in a relationship. The directions of the loadings were also reversed for Negative Physical Experiences (from negative to positive loadings) and Body Image Experiences (from positive to negative loadings). Seventeen items (13%) loaded on a different factor in the full sample than in this subsample. Eight items differed from positive loadings on the Positive Affective and Physical Experiences factor to negative loadings on the Negative Affective Experiences factor. All of these items were from the Positive Affective Experiences domain (e.g., "Feeling great or special"). Two items from the Body Image Experiences factor (e.g., "Feeling thinner than usual"), one item from the Negative Physical Experiences factor ("Impairment in work or school"), and one item form the Sleep Experiences factor ("Fatigue/lack of energy) also switched to the Negative Affective Experiences factor among women in a relationship. "Vaginal dryness" changed from General Sexual Experiences to Negative Physical Experiences and "Content with appetite" changed from Body Image Experiences to Positive Affective and Physical Experiences. The remaining three differences are parenthesized (squared) in Table 2.3.

To examine whether women in a relationship might drive or account for the six-factor structure of the 128-item Women's REP in the full sample, a factor analysis was conducted in

the subsample of single women (n = 658). The scree plot for this subsample suggested six to seven factors, while the eigenvalue criterion and parallel analysis suggested 28 and 12 factors respectively. Six factors were extracted. The six factors were consistent in item content with those found in the full sample and the subsample of women in a relationship (data not presented). Fifteen items (12%) loaded on different factors in the full sample than in this subsample, most of which were items related to either eating/body image experiences or sexual/romantic experiences. The former items tended to load on the Body Image Experiences factor in the full sample but a physical or sleep factor in this subsample (e.g., "Unhappy with food preferences"). Two of the sexual/romantic items without reference to a context (e.g., "Vaginal lubrication") loaded on the Positive Affective and Physical Experiences factor in the full sample but the Sexual Problems – General scale in this subsample, while one other such item showed the opposite pattern. All factors were internally consistent (SMCs = .89 to .96). The solution accounted for 38% of variance.

Subsample of reproductive age. In this subsample (n = 1521), the six factors found in the full sample were represented based on item loadings (data not presented), accounting for 37% of variance. Five items (4%) loaded on different factors in the full sample than in this subsample. "Vaginal dryness" moved from General Sexual Experiences to Negative Physical Experiences, "Impairment at work or school" changed from Negative Affective Experiences to Negative Physical Experiences, "Feeling thinner than usual" changed from Body Image Experiences to Negative Physical Experiences, "Fatigue/lack of energy" changed from Sleep Experiences to Negative Affective Experiences, and "Poor judgment or irrational" changed from Negative Affective Experiences to Negative Physical Experiences. All factors were internally consistent (SMCs = .87 to .96).

Among women of reproductive age in a relationship (n = 976), a seven-factor solution accounted for 38% of variance (k = 134). All seven factors from the corresponding analysis in the full sample of women in a relationship were represented. Seven items (5%) loaded on different factors in the full sample than in this subsample. Six of these items loaded on the Positive Affective and Physical Experiences factor in this subsample as opposed to the Negative Affective Experiences factor. One item changed from the Negative Affective Experiences factor to the Body Image Quality factor. The seven factors were internally consistent (SMCs = 0.86 to 0.94).

Subfactor analyses. In order to examine the possibility of subfactors within the seven identified factors of the Women's REP, a factor analysis of the items included in each main factor was conducted for the full sample of women or the subsample of women in a relationship. Among women in a relationship, the SMC of the item "Difficulty having an orgasm with primary partner" was suggestive of multicollinearity and thus, this item was excluded from the factor analysis of the Sexual Problems – Relationship items. The Negative Affective Experiences factor was found to be one-dimensional. All other results with interpretative labels for the subfactors can be found in Table 2.5. Fourteen subfactors were identified. The two subfactors of the Positive Affective and Physical Experiences items were labeled Positive Affective Experiences and Positive Physical Experiences. The four main factors that consisted of both negative and positive experiences (i.e., Sexual Problems – General, Body Image Quality, Sleep Quality, and Sexual Problems – Relationship) were found to have negative and positive subfactors. These were labeled: Positive Sexual Experiences – Self (consisting of positive masturbation items only); Positive Sexual Experiences – Others (positive sexual items involving others or the thought of others [not including one's primary partner]); Negative Sexual Experiences – General

Table 2.5

Items (and Pattern Coefficients) of the Women's REP and Variance Explained by Main Subfactors with Proposed Interpretative Labels for the Full Sample

Positive Affective and Physical Experiences		Sexual Problems – General			Body Image Quality		Negative Physical Experiences			Sleep Quality		Sexual Problems – Relationship	
Affective Experiences (k = 26)	Physical Experiences (k = 17)	Positive Sexual Experiences – Self (k = 3)	Positive Sexual Experiences – Others (k = 3)	Negative Sexual Experiences – General (k = 8)	Negative Body Image Experiences (k = 8)	Positive Body Images Experiences (k = 7)	Hormonal Symptoms (k = 22)	Decreased Appetite (k = 2)	General Aches and Pains[a] (k = 7)	Negative Sleep Experiences (k = 6)	Positive Sleep Experiences (k = 3)	Positive Sexual Experiences – Relationship (k = 3)	Negative Sexual Experiences – Relationship (k = 3)
Feeling, happy, elated, or euphoric (.92) Feeling great or special (.81) Emotional calmness/ stability (.77) Excitement and enthusiasm (.73) High self-esteem (.73) Looking forward to a bright future (optimism) (.71) Feeling in control (.71) Smiling (.70) Mental relaxation/ calm (.69) Feeling capable/competent (.66) Feeling like self (.61) Interest or enjoyment in usual activities (.57) Achievement/ productivity in work or school (.56) Connectedness /support (.55) Energized/ Active (.56) Clear-headedness (.53) Focused (.53)	Calm intestinal track (.76) Healthy digestion (.70) Healthy bowel movements (.62) Strong and nimble legs (.53) Regular bowel movements (.50) Stomach comfort (48) Comfort in breast area (.47) Physical grace/motor coordination (.44) Content with food preferences (.43) Clear complexion/ skin (.42) Even facial skin tone (.39) Hydrated (.37) Pleased with breast size (.34) A strong back (.32) Vaginal lubrication (.30) Joint or muscle agility (i.e., ease of movement) (.25) Physical health (.21)	Easy to have an orgasm through masturbation (alone) (.83) Easy to become aroused for masturbation (alone) (.85) Desire/drive for masturbation (alone) (.59)	Easy to become aroused with others or the thought of others (excluding primary partner) (.76) Sexual desire/drive for others (excluding primary partner) (.78) Easy to have an orgasm with others or the thought of others (excluding primary partner) (.53)	Difficulty having an orgasm with others or the thought of others (excluding primary partner) (.66) **Disinterest in sexual activity with others (excluding primary partner) (.60)** Difficulty becoming aroused with others or the thought of others (excluding primary partner) (.57) **Difficulty becoming aroused for masturbation (alone) (.54)** Avoidant of intimacy/affection (.51) **Disinterest in masturbation (alone) (.50)** **Difficulty having an orgasm through masturbation (alone) (.48)** Vaginal dryness (.32)	Eating more than usual (.78) Increased appetite (.74) Food cravings (.69) Unhappy with food intake (.68) Unhappy with appetite (.68) **Feeling bigger than usual (.48)** Unhappy with food preferences (.43) Jealous of other women (.36)	Content with weight (.79) Pleased with body shape/size (.78) Unhappy with weight (-.66) Content with food intake (.50) **Concern about body shape/size (-.50)** Content with appetite (.47) Feeling thinner than usual (.33)	Painful or tender breasts (.50) Bloating (.50) Breast size increase (.47) Breakthrough bleeding/ spotting (.45) Less breakthrough bleeding/ spotting (.43) Food aversions (.42) Abdominal cramps or discomfort (.42) Nausea or vomiting (.38) Flatulence/ gassy (.37) Breast size decrease (.36) Unhappy with breast size (.36) Acne/pimples (.36) Facial skin discoloration (i.e., colour blotches on face) (.35) Sleeping more than usual (.34) Clumsiness/ minor accidents (.33) Pain/ discomfort during sexual activity (.32)	Decreased appetite (.83) Eating less than usual (.80)	General aches and pains (.83) Joint or muscle stiffness (.69) Backache (.64) Heartburn or indigestion (.37) Leg cramps (.31) Headaches (.28) Constipation (.25)	Restlessness (.74) Not enough sleep (.66) Fatigue/lack of energy (.66) Disrupted sleep (.64) Sleeping less than usual (.59) Difficulty falling asleep (.59)	Easy falling asleep (.68) Content with amount of sleep (.52) Uninterrupted/ peaceful sleep (.55)	Easy to become aroused with primary partner (.98) Sexual desire/drive for primary partner (.64) Easy to have an orgasm with primary partner (.58)	Disinterest in sexual activity with primary partner (.94) Difficulty becoming aroused with primary partner (.53) [Difficulty having an orgasm with primary partner]

Positive Affective and Physical Experiences		Sexual Problems – General			Body Image Quality		Negative Physical Experiences			Sleep Quality		Sexual Problems – Relationship	
Affective Experiences (k = 26)	Physical Experiences (k = 17)	Positive Sexual Experiences – Self (k = 3)	Positive Sexual Experiences – Others (k = 3)	Negative Sexual Experiences – General (k = 8)	Negative Body Image Experiences (k = 8)	Positive Body Images Experiences (k = 7)	Hormonal Symptoms (k = 22)	Decreased Appetite (k = 2)	General Aches and Pains[a] (k = 7)	Negative Sleep Experiences (k = 6)	Positive Sleep Experiences (k = 3)	Sexual Experiences – Relationship (k = 3)	Negative Sexual Experiences – Relationship (k = 3)
	Mood stability (consistent mood) (.48) Sociable (.48) Thoughtfulness (.40) Pleased with self compared too other women (.43) Sense of physical wellbeing (.48) Affectionate/ intimate with others (.47) Physical pleasure/c Comfort during sexual activity (.40) **Good judgment or rational (.35)** General physical comfort (.33)						Impulsivity (.32) Decrease in facial hair (.31) Sweating (.31) Impairment in work or school (.29) Diarrhea (.28) Facial hair growth (.27)						
% variance explained[b]													
32.16	3.86	29.89	10.74	8.90	34.42	10.51	21.00	3.89	2.78	40.06	6.17	54.25	9.51

Note. Women's REP = Women's Reproductive Experiences Questionnaire. k = number of items. Results were based on principal axis factor analyses, oblique rotation with Kaiser normalization. There was one factor (Negative Affective Experiences) that did not result in any subfactors and was thus, considered to be one-dimensional. Subfactors 1 through 12 were based on the full sample (N = 1934). Subfactors 13 and 14, in addition to subfactors 1 through 12, were reflected in the sample of women in a romantic relationship (n = 1263). Bolded items represent items that loaded greater than .25 on more than one subfactor in the full sample (i.e., cross-loaded) but are listed under the subfactor with which they had the strongest pattern coefficient. Item in square parenthesis was excluded from the factor analysis due to multicollinearity.

[a]Pattern coefficients for these items were negative in direction. They have been reversed in the presentation of the results for ease of interpretation. [b]Total variance explained for each main factor is the sum of the variance explained by the relevant subfactors.

(negative masturbation and sexual items involving others or the thought of others [not including one's primary partner]); Negative Image Experiences; Positive Body Image Experiences; Negative Sleep Experiences; Positive Sleep Experiences; Positive Sexual Experiences – Relationship; and Negative Sexual Experiences – Relationship. The Negative Physical Experiences items constituted three subfactors labeled Hormonal Symptoms, Decreased Appetite, and General Aches and Pains.

The items of the main subfactors were further analyzed until each supplementary subfactor was considered one-dimensional (see Table 2.6). The Positive Affective Experiences main subfactor was found to further divide into a Positive Affect subfactor and an Elation subfactor. The items of the Positive Physical Experiences subfactor also constituted General, Skin, Digestion, and Breast Experiences supplementary subfactors. The items of the Sexual Problems – General subfactor consisted of a Negative Sexual Experiences – Others subfactor and Negative Sexual Experiences – Self subfactor. The Positive Body Image Experiences subfactor further divided into Negative Weight Experiences, Positive Appetite Experiences, and Positive Weight Experiences subfactors. The Hormonal Experiences items consisted of two subfactors, which appeared to correspond to Testosterone-Related Experiences such as "acne/pimples" and "facial hair growth," and Progesterone-Related Experiences, such as "painful or tender breasts" and "food aversions."

Scoring and Internal Reliability

A schematic overview of the structure of the Women's REP based on the factor analysis results can be found in Figure 2.1. The means, standard deviations, and internal reliability (Cronbach's alphas of the standardized items) for the main factors, main subfactors, and supplementary subfactors, which will now be referred to as the (main) scales, (main) subscales,

Table 2.6

Items (and Pattern Coefficients) of the Women's REP and Variance Explained by Supplementary Subfactors with Proposed Interpretative Labels for the Full Sample

Positive Affective and Physical Experiences						Sexual Problems – General		Body Image Quality			Negative Physical Experiences	
Positive Affective Experiences		Positive Physical Experiences				Negative Sexual Experiences – General		Positive Body Image Experiences			Hormonal Symptoms	
Positive Affect (k = 19)	Elation (k = 7)	– General (k = 10)	Pos Skin Exps (k = 2)	Pos Digestion Exps[a] (k = 3)	Pos Breast Exps[a] (k = 2)	– Others (k = 5)	– Self[a] (k = 3)	Neg Weight Exps (k = 2)	Pos Appetite Exps (k = 2)	Pos Weight Exps (k = 3)	Testosterone-Related Exps (k = 13)	Progesterone-Related Exps[a] (k = 9)
Clear-headedness (.89) Feeling like self (.78) Good judgment or rational (.74) Feeling in control (.70) Mood stability (consistent mood) (.68) Sense of physical wellbeing (.64) Interest or enjoyment in usual activities (.62) Pleased with self compared too other women (.62)	Feeling, happy, elated, or euphoric (.65) Affectionate/ intimate with others (.56) Connectedness/ support (.55) Feeling great or special (.53) Physical pleasure/ comfort during sexual activity (.52) Achievement/ productivity in work or school (.43) Energized/ active (.43)	Strong and nimble legs (.68) Stomach comfort (.48) Joint or muscle agility (i.e., ease of movement) (.48) Physical grace/motor coordination (.47) **Calm intestinal track (.37**) Hydrated (.28) A strong back (.39) Physical health (.28) **Content with food preferences (.28)** Vaginal lubrication (.25)	Even facial skin tone (.81) Clear complexion /skin (.79)	Healthy bowel movements (.90) Regular bowel movements (.79) Healthy digestion (.50)	Comfort in breast area (.68) Pleased with breast size (.65)	Disinterest in sexual activity with others (excluding primary partner) (.75) Difficulty becoming aroused with others or the thought of others (excluding primary partner) (.62) Difficulty having an orgasm with others (excluding primary partner) (.61) Avoidant of intimacy/ affection (.42)	Difficulty becoming aroused for masturbation (alone) (.84) Difficulty having an orgasm through masturbation (alone) (.74) **Disinterest in masturbation (alone) (.36)**	Concern about body shape/ size (.91) Unhappy with weight (.69)	Content with appetite (.81) Content with food intake (.79)	Pleased with body shape/ size (.66) Content with weight (.64) Feeling thinner than usual (.35)	Facial skin discoloration (i.e., colour blotches on face) (.60) Acne/pimples (.54) Clumsiness/ minor accidents (.49) Unhappy with breast size (.47) Impairment in work or school (.44) Sweating (.39) Flatulence/ gassy (.37) Sleeping more than usual (.36) Facial hair growth (.33)	Breast size increase (.64) Painful or tender breasts (.61) Bloating (.40) Abdominal cramps or discomfort (.34) Nausea or vomiting (.34) Breakthrough bleeding/ spotting (.34) **Food aversions (.32)** Decrease in facial hair (.23) Less breakthrough bleeding/ spotting (.18)

Positive Affective and Physical Experiences						Sexual Problems - General		Body Image Quality			Negative Physical Experiences	
Positive Affective Experiences		Positive Physical Experiences				Negative Sexual Experiences – General		Positive Body Image Experiences			Hormonal Symptoms	
Positive Affect (*k* = 19)	Elation (*k* = 7)	– General (*k* = 10)	Pos Skin Exps (*k* = 2)	Pos Digestion Exps[a] (*k* = 3)	Pos Breast Exps[a] (*k* = 2)	– Others (*k* = 5)	– Self[a] (*k* = 3)	Neg Weight Exps (*k* = 2)	Pos Appetite Exps (*k* = 2)	Pos Weight Exps (*k* = 3)	Testosterone-Related Exps (*k* = 13)	Progesterone-Related Exps[a] (*k* = 9)
Feeling capable/ competent (.60) Smiling (.58) Mental relaxation/calm (.56) Excitement and enthusiasm (.55) Looking forward to a bright future (optimism) (.53) High self-esteem (.51) Sociable (.50) Emotional calmness/ stability (.49) Focused (.43) Thoughtfulness (.36) General physical comfort (.36)						Vaginal dryness (.22)					Breast size decrease (.33) Impulsivity (.30) Pain/ discomfort during sexual activity (.26) Diarrhea (.25)	
% variance explained[b]												
43.58	5.04	29.67	8.60	6.93	6.49	39.96	13.93	48.81	16.01	13.47	23.24	5.93

Note. Women's REP = Women's Reproductive Experiences (REP) Questionnaire. *k* = number of items. Pos = Positive. Exps = Experiences. Results were based on principal axis factor analyses, oblique rotation with Kaiser normalization based on the full sample (*N* = 1934) and presented as a function of main factor (line 1), main subfactor (line 2), and supplementary subfactor (line 3). Bolded items represent items that loaded greater than .25 on more than one subfactor (i.e., cross-loaded) but are listed under the subfactor with which they had the strongest pattern coefficient.

[a]Pattern coefficients for these items were negative in direction. They have been reversed in the presentation of the results for ease of interpretation. [b]Total variance explained for each main subfactor is the sum of the variance explained by the relevant supplementary subfactors.

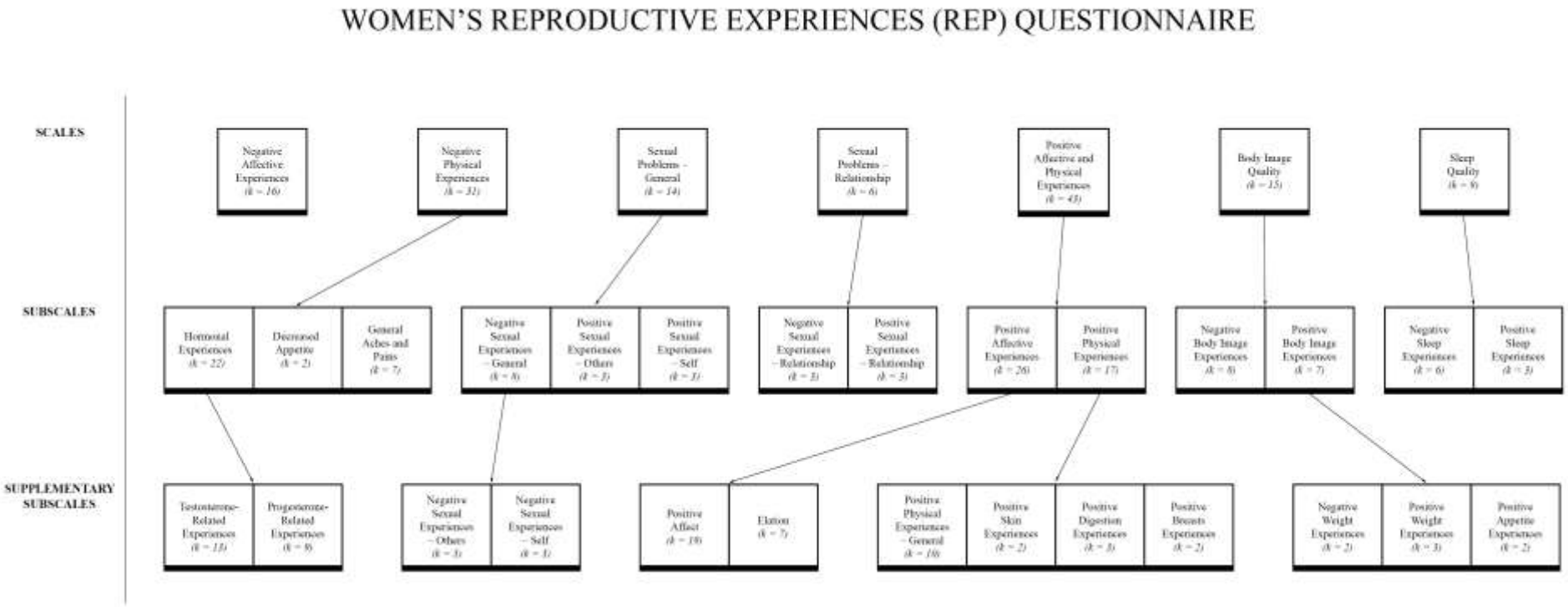

Figure 2.1. Schematic overview of the structure of the Women's REP scales, subscales, and supplementary subscales. *k* = number of items. There are seven main scales, one of which is only applicable to women in a relationship. Six of these scales have subscales. There are 14 main subscales, two of which are only applicable to women in a relationship. Five of these subscales have supplementary subscales. Some scales and subscales consist of both negatively and positively worded items (e.g., Sexual Problems – General, Sexual Problems – Relationship, Body Image Quality, and Sleep Quality) and thus, some items are reverse scored in computing overall scores.

and supplementary subscales, can be found in Table 2.7. These data were examined for the full sample and four overall reproductive status groups whose experiences, symptoms, and side effects the questionnaire was developed to measure: women of reproductive age, pregnant women, women in the postpartum period, and perimenopausal women. Scores were calculated by first reverse scoring any items, if applicable, and taking the mean item rating for each scale or subscale. For example, the main scale Sexual Problems – General consists of both negatively and positively valanced items. The latter had negative pattern coefficients in the factor analysis results and were thus, reverse scored for this scale. The reliability data suggested that the scales and subscales of the Women's REP demonstrate strong internal consistency in each group (i.e., > .70; Murphy & Davidshofter, 2005). For the main scales, the estimates ranged from 0.83 to 0.95 in the sample and subsample with more than 100 women and 0.73 to .96 in the smaller subsamples (see Table 2.7).

Concurrent Validity

Mean scores on the Women's REP were examined between groups of women reporting different current hormone-related problems: (1) hormonal problems, (2) HC side effects, and (3) PMS when in the premenstrual phase (all yes/no; see Tables 2.8 to 2.10). If applicable, participants were also asked about current mood problems while pregnant or in the postpartum period. Twenty-one pregnant women (84%) reported current mood problems during their pregnancy and seven women in the postpartum period (29%) reported current mood problems in the six months since the birth of their child. However, these subsample sizes were too low for examination of group differences.

Table 2.7

Means and Internal Consistency Estimates of the Women's REP Scale and Subscale Scores by Full Sample and Reproductive Status Subsamples

Variable	Full sample (N = 1934)		Subsample of reproductive age (n = 1521)		Pregnant subsample (n = 25)		Postpartum subsample (n = 24)		Perimenopausal subsample (n = 109)	
	M (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α
Scales										
Negative Affective Experiences (k = 16)	2.40 (0.88)	0.94	2.42 (0.88)	0.94	2.38 (0.81)	0.91	2.27 (0.96)	0.95	2.22 (0.77)	0.92
Negative Physical Experiences (k = 31)	1.88 (0.52)	0.89	1.88 (0.52)	0.89	2.11 (0.47)	0.80	1.89 (0.41)	0.80	1.78 (0.48)	0.88
Sexual Problems – General (k = 14)	2.71 (0.75)	0.84	2.69 (0.74)	0.83	2.53 (0.78)	0.82	2.99 (0.80)	0.85	2.95 (0.84)	0.89
Sexual Problems – Relationship[b] (k = 6)	2.23 (0.90)	0.85	2.20 (0.88)	0.85	1.98 (0.89)	0.89	2.34 (1.04)	0.86	2.70 (1.10)	0.89
Positive Affective and Physical Experiences (k = 43)	2.80 (0.63)	0.95	2.80 (0.64)	0.95	2.88 (0.50)	0.90	2.78 (0.73)	0.96	2.75 (0.59)	0.95
Body Image Quality (k = 15)	3.07 (0.75)	0.87	3.08 (0.76)	0.88	2.80 (0.60)	0.75	2.99 (0.76)	0.86	3.15 (0.75)	0.89
Sleep Quality (k = 9)	3.09 (0.86)	0.85	3.10 (0.87)	0.85	2.74 (0.97)	0.89	2.90 (0.75)	0.73	3.01 (0.87)	0.86
Subscales										
Hormonal Symptoms (k = 22)	1.83 (0.52)	0.84	1.84 (0.51)	0.84	2.07 (0.49)	0.74	1.79 (0.38)	0.69	1.63 (0.45)	0.84
Decreased Appetite (k = 2)	1.72 (0.96)	0.79	1.75 (0.97)	0.79	1.32 (0.68)	0.70	1.61 (0.95)	0.86	1.61 (0.80)	0.66
General Aches and Pains (k = 7)	2.09 (0.77)	0.78	2.04 (0.76)	0.78	2.45 (0.65)	0.56	2.29 (0.72)	0.68	2.28 (0.78)	0.78
Negative Sexual Experiences – General (k = 8)	2.11 (0.82)	0.78	2.09 (0.80)	0.77	2.03 (0.90)	0.80	2.40 (1.01)	0.86	2.31 (0.96)	0.84
Negative Sexual Experiences – Relationship[b] (k = 3)	1.98 (0.95)	0.75	1.95 (0.93)	0.73	1.70 (0.81)	0.74	2.13 (1.10)	0.78	2.36 (1.18)	0.81
Negative Body Image Experiences (k = 8)	2.33 (0.88)	0.84	2.34 (0.88)	0.84	2.90 (0.73)	0.69	2.34 (0.96)	0.85	2.14 (0.88)	0.87
Negative Sleep Experiences (k = 6)	2.60 (0.97)	0.84	2.59 (0.97)	0.85	3.01 (1.03)	0.84	2.18 (0.66)	0.73	2.66 (1.01)	0.89
Positive Sexual Experiences – Others (k = 3)	2.33 (1.10)	0.81	2.36 (1.11)	0.80	2.41 (1.09)	0.63	1.97 (1.06)	0.84	2.86 (1.13)	0.82
Positive Sexual Experiences – Self (k = 3)	2.66 (1.19)	0.84	2.67 (1.20)	0.84	3.17 (1.24)	0.83	2.47 (1.17)	0.79	2.36 (1.13)	0.85
Positive Sexual Experiences – Relationship[b] (k = 3)	3.51 (1.00)	0.79	3.55 (0.98)	0.78	3.74 (1.04)	0.84	3.45 (1.11)	0.72	2.96 (1.18)	0.87
Positive Affective Experiences (k = 26)	2.85 (0.72)	0.95	2.85 (0.73)	0.95	2.98 (0.59)	0.90	2.86 (0.83)	0.96	2.77 (0.67)	0.94
Positive Physical Experiences (k = 17)	2.81 (1.07)	0.84	2.80 (1.07)	0.85	2.76 (1.08)	0.68	2.83 (1.10)	0.86	2.85 (1.10)	0.85
Positive Body Image Experiences (k = 7)	2.39 (0.83)	0.74	2.41 (0.84)	0.82	2.46 (0.70)	0.68	2.21 (0.75)	0.76	2.33 (0.79)	0.80
Positive Sleep Experiences (k = 3)	2.48 (0.95)	0.67	2.49 (0.98)	0.69	2.24 (1.05)	0.86	2.74 (0.89)	0.39[a]	2.37 (0.89)	0.59
Supplementary Subscales										
Testosterone-Related Experiences (k = 13)	1.92 (0.56)	0.76	1.94 (0.56)	0.76	2.00 (0.58)	0.72	1.89 (0.46)	0.59	1.78 (0.53)	0.76
Progesterone-Related Experiences (k = 9)	1.70 (0.58)	0.72	1.71 (0.57)	0.71	2.18 (0.59)	0.57	1.65 (0.42)	0.49	1.42 (0.43)	0.68
Negative Sexual Experiences – Others (k = 5)	2.13 (0.85)	0.67	2.10 (0.83)	0.66	2.11 (0.87)	0.61	2.49 (1.12)	0.83	2.38 (0.99)	0.73
Negative Sexual Experiences – Self (k = 3)	2.08 (1.08)	0.75	2.08 (1.07)	0.75	1.88 (1.24)	0.85	2.24 (1.03)	0.64	2.21 (1.14)	0.79

	Full sample (N = 1934)		Subsample of reproductive age (n = 1521)		Pregnant subsample (n = 25)		Postpartum subsample (n = 24)		Menopausal subsample (n = 109)	
	M (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α	*M* (*SD*)	α
Supplementary Subscales										
Negative Weight Experiences (k = 2)	3.01 (1.32)	0.84	3.00 (1.33)	0.85	2.98 (1.48)	0.90	3.13 (1.19)	0.85	2.96 (1.25)	0.82
Positive Affect (k = 19)	2.84 (0.75)	0.94	2.83 (0.76)	0.94	2.93 (0.62)	0.89	2.88 (0.84)	0.95	2.84 (0.71)	0.94
Elation (k = 7)	2.87 (0.80)	0.81	2.90 (0.80)	0.81	3.13 (0.70)	0.68	2.82 (0.87)	0.85	2.58 (0.79)	0.81
Positive Physical Experiences – General (k = 10)	2.67 (0.62)	0.76	2.67 (0.63)	0.77	2.69 (0.53)	0.51	2.59 (0.60)	0.69	2.62 (0.55)	0.70
Positive Skin Experiences (k = 2)	2.56 (1.05)	0.78	2.53 (1.05)	0.79	2.28 (1.16)	0.81	2.63 (0.90)	0.31	2.83 (1.00)	0.70
Positive Digestion Experiences (k = 3)	3.02 (0.94)	0.80	3.04 (0.94)	0.80	3.09 (0.95)	0.82	2.75 (0.96)	0.78	2.84 (0.88)	0.76
Positive Breast Experiences (k = 3)	2.81 (1.07)	0.62	2.80 (1.07)	0.63	2.76 (1.08)	0.70	2.83 (1.10)	0.73	2.86 (1.10)	0.69
Positive Weight Experiences (k = 3)	1.97 (0.84)	0.65	2.01 (0.85)	0.67	1.78 (0.74)	0.69	3.13 (1.19)	0.57	1.77 (0.78)	0.62
Positive Appetite Experiences (k = 2)	2.43 (1.00)	0.77	2.43 (1.00)	0.78	2.91 (0.99)	0.55	2.26 (1.24)	0.92	2.46 (1.03)	0.82

Note. Women's REP = Women's Reproductive Experiences (REP) Questionnaire. k = number of items. The subsamples are mutually exclusive.
[a]The item "Easy falling asleep" was reverse scored for the reliability analysis among women in the postpartum period due to a negative correlation between this item and the other items contributing to the subscale. The interitem correlations suggested that women in the postpartum period who reported being relatively less content with their amount of sleep as well as less uninterrupted/peaceful sleep also reported having an easier time falling asleep. These results seem to make sense in the context of caring for an infant. [b]ns = 1263, 976, 22, 20, and 70 women in a relationship, respectively.

Table 2.8

Summary of Means and ANOVAs for the Women's REP Scales and Subscales by Current Hormonal Problem Group (Yes/No) in the Full Sample

Dependent variable	*M (SD)*		*F* (1, 1908)	*p*	Partial η^2
	Yes (*n* = 338)	No (*n* = 1572)			
Scales					
Negative Affective Experiences	2.82 (0.94)	2.31 (0.84)	96.89	< .001***	.05
Negative Physical Experiences	2.10 (0.58)	1.84 (0.50)	71.63	< .001***	.04
Sexual Problems – General	2.86 (0.83)	2.68 (0.73)	15.94	< .001***	.01
Sexual Problems – Relationship[a]	2.39 (0.92)	2.20 (0.89)	7.82	.005**	.01
Positive Affective and Physical Experiences	2.61 (0.54)	2.84 (0.64)	36.56	< .001***	.02
Body Image Quality	2.82 (0.78)	3.13 (0.73)	46.88	< .001***	.02
Sleep Quality	2.82 (0.87)	3.14 (0.84)	43.23	< .001***	.02
Subscales					
Hormonal Symptoms	2.02 (0.56)	1.79 (0.50)	57.40	< .001***	.03
Decreased Appetite	1.83 (1.08)	1.70 (0.93)	5.19	.023*	.003
General Aches and Pains	2.41 (0.84)	2.41 (0.84)	75.55	< .001***	.04
Negative Sexual Experiences – General	2.33 (0.91)	2.06 (0.79)	29.66	< .001***	.02
Negative Sexual Experiences – Relationship[a]	2.10 (0.98)	1.95 (0.94)	4.88	.027*	.01
Negative Body Image Experiences	2.57 (0.94)	2.28 (0.86)	29.85	< .001***	.02
Negative Sleep Experiences	2.93 (0.98)	2.53 (0.95)	49.82	< .001***	.03
Positive Sexual Experiences – Others	2.27 (1.07)	2.34 (1.11)	44.15	.358	.00
Positive Sexual Experiences – Self	2.60 (1.21)	2.67 (1.19)	0.89	.347	.00
Positive Sexual Experiences – Relationship[a]	3.33 (1.04)	3.55 (0.99)	8.50	.004**	.004
Positive Affective Experiences	2.62 (0.65)	2.89 (0.73)	39.56	< .001***	.02
Positive Physical Experiences	2.65 (1.02)	2.83 (1.07)	9.32	.002**	.01
Positive Body Image Experiences	2.12 (0.80)	2.45 (0.82)	44.15	< .001***	.02
Positive Sleep Experiences	2.32 (0.90)	2.51 (0.96)	11.46	.001**	.01
Supplementary Subscales					
Testosterone-Related Experiences	2.16 (0.61)	2.01 (0.84)	74.27	< .001***	.04
Progesterone-Related Experiences	1.82 (0.65)	1.67 (0.56)	19.23	< .001***	.01
Negative Sexual Experiences – Others	2.37 (0.91)	2.08 (0.83)	32.53	< .001***	.02
Negative Sexual Experiences – Self	2.27 (1.17)	2.04 (1.06)	12.47	< .001***	.01
Negative Weight Experiences	3.49 (1.31)	2.91 (1.30)	56.57	< .001***	.03
Positive Affect	2.61 (0.67)	2.89 (0.76)	40.28	< .001***	.02
Elation	2.67 (0.77)	2.91 (0.81)	24.77	< .001***	.01
Positive Physical Experiences – General	2.57 (0.53)	2.69 (0.64)	9.78	.002**	.01
Positive Skin Experiences	2.36 (1.02)	2.60 (1.05)	13.98	< .001***	.01
Positive Digestion Experiences	2.83 (0.99)	2.05 (0.92)	16.76	< .001***	.01
Positive Breast Experiences	2.64 (1.02)	2.84 (1.07)	9.32	.002**	.01
Positive Weight Experiences	1.79 (0.81)	2.01 (0.84)	18.71	< .001***	.01
Positive Appetite Experiences	2.24 (0.96)	2.47 (1.00)	15.29	< .001***	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
[a]*n* = 224 and 1029 (df = 1, 1251) women in a relationship, respectively.
*p < .05. **p < . 01. ***p < .001.

Table 2.9

Summary of Means and ANOVAs for the Women's REP Scales and Subscales by Current Hormonal Contraceptive (HC) Side Effects (Yes/No) among HC Users of Reproductive Age

Dependent variable	*M (SD)*		*F* (1, 523)	*p*	Partial η^2
	Yes (*n* = 157)	No (*n* = 368)			
Scales					
Negative Affective Experiences	2.61 (0.87)	2.26 (0.83)	18.63	< .001***	.03
Negative Physical Experiences	1.97 (0.51)	1.81 (0.49)	11.36	.001**	.02
Sexual Problems –General	2.74 (0.72)	2.66 (0.73)	1.37	.242	.003
Sexual Problems – Relationship[b]	2.25 (0.86)	2.04 (0.77)	3.40	.022*	.01
Positive Affective and Physical Experiences	2.74 (0.60)	2.89 (0.64)	6.10	.014*	.01
Body Image Quality	2.85 (0.76)	3.14 (0.74)	17.67	< .001***	.03
Sleep Quality	3.04 (0.90)	3.16 (0.86)	2.22	.137	.004
Subscales					
Hormonal Symptoms	1.96 (0.54)	1.77 (0.49)	15.65	< .001***	.03
Decreased Appetite	1.68 (0.91)	1.71 (1.03)	0.09	.765	.000
General Aches and Pains	2.09 (0.68)	1.97 (0.71)	3.31	.069[†]	.01
Negative Sexual Experiences – General	2.16 (0.77)	2.03 (0.79)	3.07	.080[†]	.01
Negative Sexual Experiences – Relationship[b]	2.07 (0.94)	1.77 (0.82)	9.31	.002**	.03
Negative Body Image Experiences	2.60 (0.90)	2.67 (0.86)	16.44	< .001***	.03
Negative Sleep Experiences	2.68 (0.97)	2.52 (0.96)	2.74	.098[†]	.01
Positive Sexual Experiences – Others	2.30 (1.14)	2.30 (1.09)	0.001	.979	.000
Positive Sexual Experiences – Self	2.65 (1.21)	2.68 (1.21)	0.06	.813	.000
Positive Sexual Experiences – Relationship[b]	3.57 (0.97)	3.69 (090)	1.38	.241	.004
Positive Affective Experiences	2.77 (0.69)	2.96 (0.72)	7.86	.005**	.02
Positive Physical Experiences	2.76 (1.03)	2.90 (1.12)	1.90	.168	.004
Positive Body Image Experiences	2.12 (0.80)	2.47 (0.84)	10.39	.001**	.02
Positive Sleep Experiences	2.48 (1.02)	2.54 (0.96)	0.52	.470	.001
Supplementary Subscales					
Testosterone-Related Experiences	2.04 (0.57)	1.86 (0.53)	11.98	< .001***	.02
Progesterone-Related Experiences	1.85 (0.62)	1.65 (0.54)	14.46	< .001***	.03
Negative Sexual Experiences – Others	2.21 (0.83)	1.99 (0.78)	8.59	.004**	.02
Negative Sexual Experiences – Self	2.07 (1.03)	2.09 (1.08)	0.05	.829	.000
Negative Weight Experiences	3.33 (1.28)	2.90 (1.34)	11.70	.001**	.01
Positive Affect	2.74 (0.72)	2.92 (0.75)	7.05	.008**	.01
Elation	2.86 (0.78)	3.06 (0.77)	7.26	.007**	.01
Positive Physical Experiences – General	2.62 (0.58)	2.70 (0.65)	2.04	.154	.004
Positive Skin Experiences	2.57 (1.06)	2.59 (1.09)	0.06	.802	.000
Positive Digestion Experiences	3.03 (0.90)	3.10 (0.91)	0.76	.385	.001
Positive Breast Experiences	2.76 1.03)	2.90 (1.12)	1.90	.168	.004
Positive Weight Experiences	1.85 (0.83)	2.05 (0.87)	6.22	.013*	.01
Positive Appetite Experiences	2.31 (1.02)	2.46 (0.99)	2.71	.100	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
[b]*n* = 114 and 256 (df = 1, 367) women in a relationship, respectively.
[†]$p < .10$. *$p < .05$. **$p <. 01$. ***$p < .001$.

Table 2.10

Summary of Means and ANOVAs for the Women's REP Scales and Subscales by Current Premenstrual Syndrome (PMS) among Free-Cycling Women of Reproductive Age in the Premenstrual Phase

Dependent variable	*M (SD)*		*F* (1, 333)	*p*	Partial η^2
	Yes (*n* = 128)	No (*n* = 207)			
Scales					
Negative Affective Experiences	2.77 (0.89)	2.25 (0.82)	30.31	< .001***	.08
Negative Physical Experiences	1.99 (0.56)	1.78 (0.47)	13.58	< .001***	.04
Sexual Problems – General	2.73 (0.82)	2.62 (0.72)	1.59	.208	.01
Sexual Problems – Relationship[b]	2.46 (1.01)	2.22 (0.89)	3.37	.068[†]	.02
Positive Affective and Physical Experiences	2.65 (0.56)	2.85 (0.65)	7.66	.006**	.02
Body Image Quality	3.00 (0.77)	3.16 (0.69)	3.87	.050[†]	.01
Sleep Quality	2.80 (0.85)	3.14 (0.79)	13.02	< .001***	.04
Subscales					
Hormonal Symptoms	1.93 (0.54)	1.74 (0.46)	11.44	.001**	.03
Decreased Appetite	1.89 (1.09)	1.66 (0.89)	4.32	.038*	.01
General Aches and Pains	2.23 (0.85)	1.95 (0.70)	10.48	.001**	.03
Negative Sexual Experiences – General	2.19 (0.85)	2.02 (0.77)	3.54	.061[†]	.01
Negative Sexual Experiences – Relationship[b]	2.21 (1.03)	1.97 (0.93)	2.91	.089[†]	.01
Negative Body Image Experiences	2.42 (0.86)	2.24 (0.83)	3.63	.058[†]	.01
Negative Sleep Experiences	2.93 (0.96)	2.51 (0.93)	15.59	< .001***	.05
Positive Sexual Experiences – Others	2.43 (1.15)	2.47 (1.13)	0.10	.752	.000
Positive Sexual Experiences – Self	2.66 (1.27)	2.67 (1.14)	.001	.938	.000
Positive Sexual Experiences – Relationship[b]	3.29 (1.12)	3.54 (1.01)	2.87	.092[†]	.01
Positive Affective Experiences	2.64 (0.64)	2.91 (0.74)	11.89	.001**	.03
Positive Physical Experiences	2.63 (1.05)	2.82 (1.04)	2.69	.102	.01
Positive Body Image Experiences	2.33 (0.88)	2.47 (0.78)	2.32	.129	.01
Positive Sleep Experiences	2.28 (0.99)	2.44 (0.91)	2.25	.135	.01
Supplementary Subscales					
Testosterone-Related Experiences	2.05 (0.60)	1.85 (0.53)	10.54	.001**	.03
Progesterone-Related Experiences	1.76 (0.58)	1.58 (0.48)	7.98	.005**	.02
Negative Sexual Experiences – Others	2.20 (0.91)	2.05 (0.83)	2.34	.127	.01
Negative Sexual Experiences – Self	2.18 (1.10)	1.97 (0.98)	3.19	.075[†]	.01
Negative Weight Experiences	3.10 (1.28)	2.85 (1.27)	2.98	.085[†]	.01
Positive Affect	2.62 (0.65)	2.91 (0.75)	12.57	<.001***	.04
Elation	2.71 (0.73)	2.95 (0.84)	7.09	.008**	.02
Positive Physical Experiences – General	2.65 (0.62)	2.65 (0.64)	0.00	.987	.000
Positive Skin Experiences	2.38 (0.94)	2.60 (1.04)	3.91	.049*	.01
Positive Digestion Experiences	2.97 (0.90)	3.08 (0.95)	1.22	.270	.004
Positive Breast Experiences	2.63 (1.05)	2.82 (1.04)	2.69	.102	.01
Positive Weight Experiences	1.98 (0.87)	2.00 (0.76)	0.03	.872	.000
Positive Appetite Experiences	2.29 (1.00)	2.51 (1.02)	3.55	.061[†]	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
[b] *n*s = 84 and 126 (df = 1, 208) women in a relationship, respectively.
[†] $p < .10$. *$p < .05$. **$p <. 01$. ***$p < .001$.

Current hormonal problems. In the full sample, 338 of 1910 women (18%) reported having a current hormonal problem or disorder (in general). The combined six DVs (i.e., main scales of the Women's REP excluding the Sexual Problems – Relationship scale) differed by current hormonal problem group in a MANOVA, F (6, 1927) = 2.18, $p < .001$, partial $\eta^2 = .07$. A summary of the group means and the results of all follow-up ANOVAs can be found in Table 2.8. ANOVAs revealed that the two groups differed on each of the seven main scales. Women with a current hormonal problem had relatively higher Negative Affective Experiences, Negative Physical Experiences, Sexual Problems - General, and Sexual Problems – Relationship scores; as well as lower Positive Affective and Physical Experiences, Body Image Quality, and Sleep Quality scores. These group differences are illustrated in Figure 2.2.

The combined 12 main subscale scores (excluding the relationship subscales) differed by current hormonal problem group, F (12, 1897) = 11.20, $p < .001$, partial $\eta^2 = .06$. The combined 13 supplementary subscale scores also differed by group, F (13, 1896) = 9.63, $p < .001$, partial $\eta^2 = .06$ as did the combined two Sexual Experiences – Relationship subscale scores, F (12, 1250) = 4.28, $p = .014$, partial $\eta^2 = .01$. Using ANOVAs, the groups differed on 12 of the 14 main subscales and all 13 individual supplementary subscales (see Table 2.8). Women with a current hormonal problem had significantly higher scores on all negative experiences subscales as well as lower scores on most positive experiences subscales. Exceptions were the Positive Sexual Experiences – Self and Positive Sexual Experiences – Others scores, for which differences were not significant but in the expected directions.

Current HC side effects. Among women of reproductive age who reported that they were using an HC, 157 women (30%) reported current HC side effects. The combined six main scale scores significantly differed by group, F (6, 518) = 4.53, $p < .001$, partial $\eta^2 = .05$. A summary of

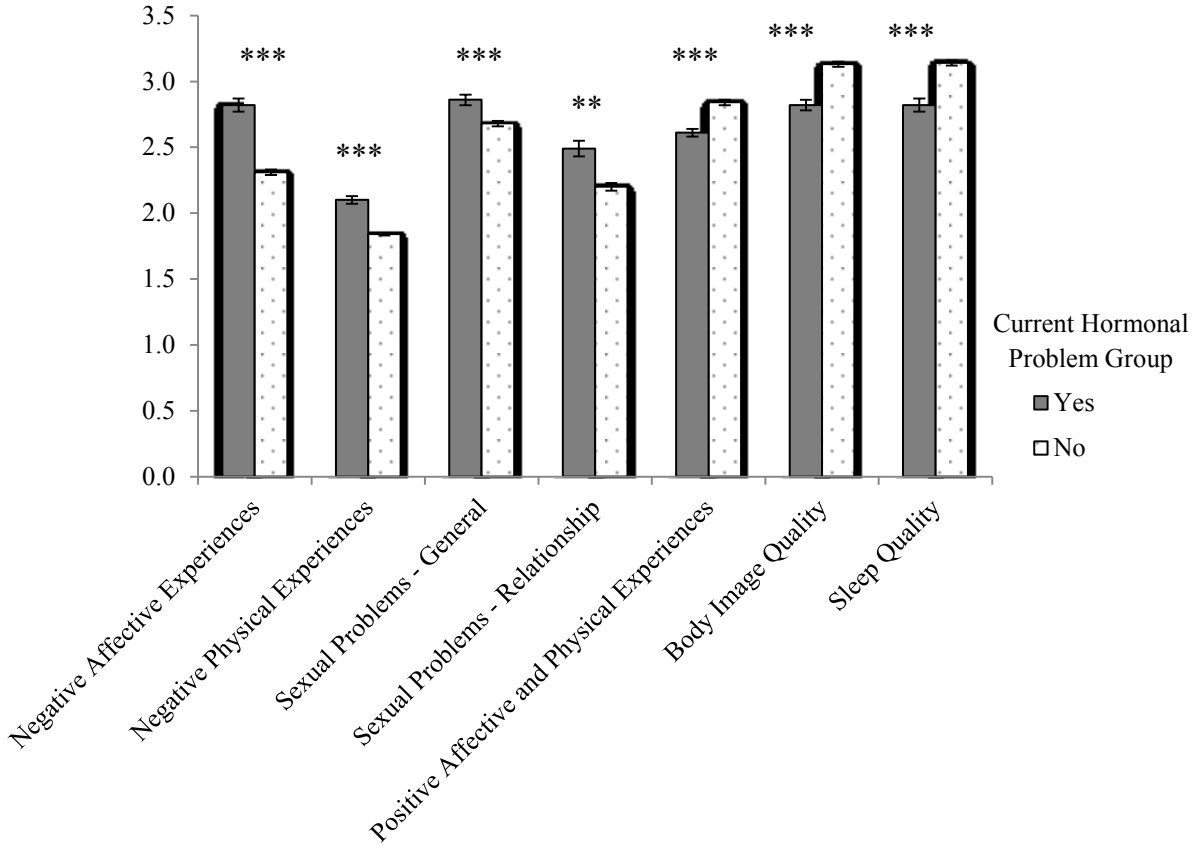

Figure 2.2. Mean scores on the main scales of the Women's Reproductive Experiences (REP) Questionnaire as a function of current hormonal problem group (yes/no; *n*s[a] = 157 and 368, respectively). Error bars represent standard error of the mean.
[a]*n*s = 114 and 256 women in a relationship, respectively.
$^{**}p < .01$. $^{***}p < .001$.

the means and follow-up ANOVA results can be found in Table 2.9. Women with HC side effects had higher Negative Affective Experiences and Negative Physical Experiences scores as well as lower Positive Affective and Physical Experiences and Body Image Quality scores than women without HC side effects. The women with HC side effects also had higher Sexual Problems – Relationship scores. Group differences were not found for Sexual Problems – General or Sleep Quality. These results can be seen in Figure 2.3.

The combined 12 main (non-relationship) subscales differed as a function of HC side effects group, F (12, 512) = 2.57, p = .003, partial η^2 = .06. The combined 13 supplementary subscale scores, F (13, 511) = 2.94, p < .001, partial η^2 = .07, and combined two Sexual Experiences – Relationship subscale scores, F (2, 366) = 5.18, p = .006, partial η^2 = .03, also differed by group. Using ANOVAs, the groups differed on five of the 14 main subscales and seven of the 13 supplementary subscales (see Table 2.9). With respect to the main subscales, women with HC side effects had significantly higher Hormonal Symptoms, Negative Sexual Experiences – Relationship and Negative Body Image Experiences scores as well lower Positive Affective Experiences and Positive Body Image Experiences scores than women without HC side effects. Mean scores did not significantly differ as a function of group on the General Aches and Pains, Decreased Appetite, sexual experiences, Positive Physical Experiences, or sleep experiences subscales.

On the supplementary subscales, women with HC side effects had significantly higher Testosterone-Related Experiences, Progesterone-Related Experiences, Negative Sexual Experiences – Others, and Negative Weight Experiences scores as well as lower Positive Affect, Elation, and Positive Weight Experiences scores than their counterparts without side effects.

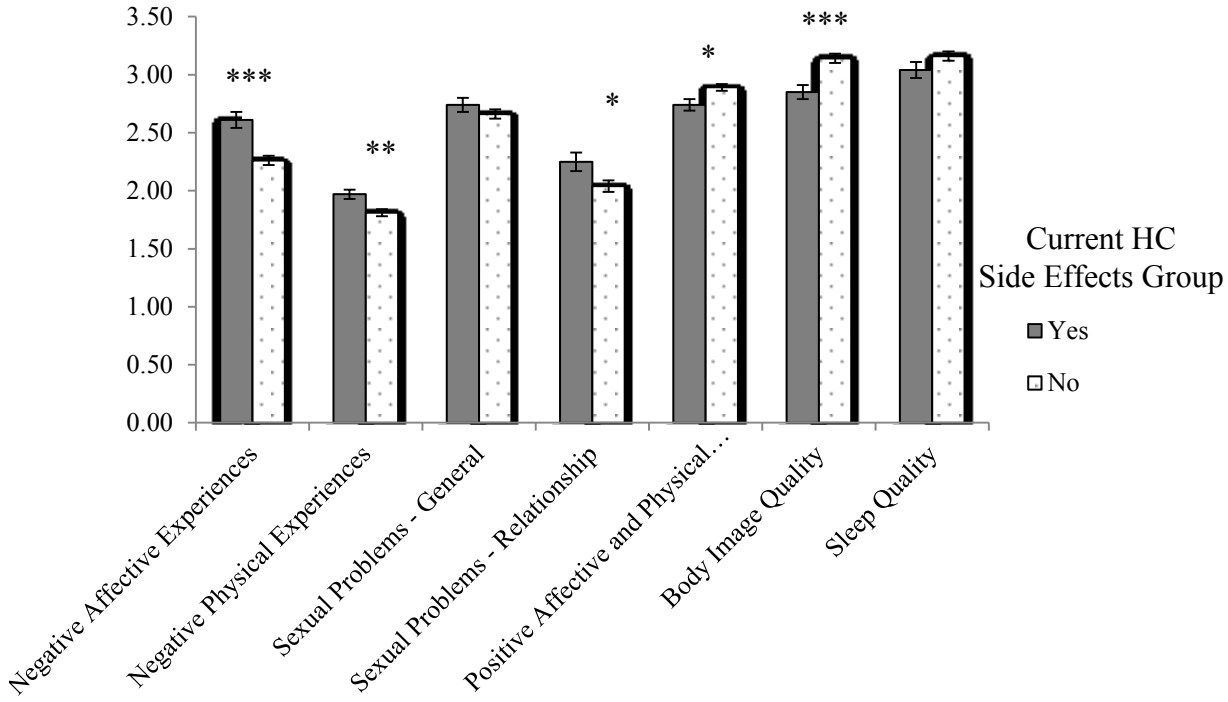

Figure 2.3. Mean scores on the main scales of the Women's Reproductive Experiences (REP) Questionnaire as a function of current hormonal contraceptive (HC) sides effects (yes/no; *n*s[a] = 157 and 36, respectively) among HC users of reproductive age. Error bars represent standard error of the mean.
[a]*n*s = 114 and 256 women in a relationship, respectively.
*$p < .05$. **$p < .01$. ***$p < .001$.

There were no group differences on Negative Sexual Experiences – Self and the positive physical experiences supplementary subscales.

Current PMS. Four hundred (43%) of 922 women who were of reproductive age, not using an HC or non-hormonal intrauterine device (IUD), and experiencing menstrual cyclicity reported that they currently experience PMS when in the premenstrual phase. To better assess group differences between women who do versus do not experience PMS, only women who were within the premenstrual phase of their cycle (i.e., 1 to 10 days before their next expected menstrual period; O'Brien et al., 2011) when they completed the Women's REP were examined further. Overall, 128 women with, and 207 women without, self-reported PMS were in the premenstrual phase at the time of study participation. The combined six DVs representing the non-relationship main scales differed by group, F (6, 328) = 5.42, $p < .001$, partial $\eta^2 = .09$ (see Table 2.10 for the means and ANOVA results). Women in the premenstrual phase who reported having PMS had higher Negative Affective Experiences and Negative Physical Experiences scores as well as lower Positive Affective and Physical Experiences and Sleep Quality scores than non-PMS women in the premenstrual phase (see Figure 2.4). Sleep Quality and sexual problems scores did not significantly differ as a function of group.

The combined main non-relationship subscales differed by current PMS group in a MANOVA, F (12, 322) = 2.37, $p = .006$, partial $\eta^2 = .08$, as did the combined supplementary subscales, F (13, 321) = 2.77, $p = .001$, partial $\eta^2 = .10$. The combined two Sexual Experiences – Relationship subscale scores did not significantly differ between the groups, F (2, 207) = 1.68, $p = .190$, partial $\eta^2 = .02$. ANOVAs revealed that the groups differed on five of each type of

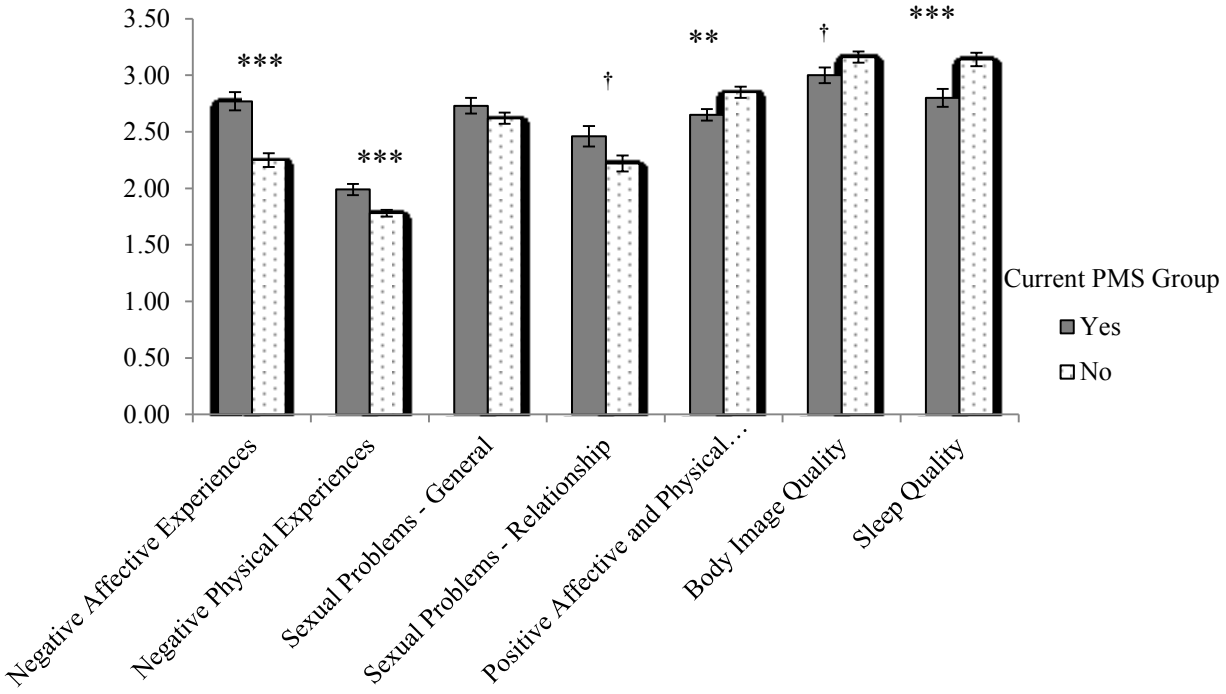

Figure 2.4. Mean scores on the main scales of the Women's Reproductive Experiences (REP) Questionnaire as a function of current premenstrual syndrome (PMS; yes/no; *n*s[a] = 128 and 207, respectively) group among free-cycling women of reproductive age in the premenstrual phase. Error bars represent standard error of the mean.
[a]*n*s = 84 and 126 women in a relationship, respectively.
[†]$p < .10$. **$p <. 01$. ***$p < .001$.

subscale (main and supplementary). Women in the premenstrual phase who also reported PMS had higher Hormonal Symptoms, Decreased Appetite, General Aches and Pains, and Negative Sleep Experiences scores as well as lower Positive Affective Experiences scores than those who did not report PMS. Positive Physical Experiences, Positive Sexual Experiences – Others, Positive Sexual Experiences – Self, Positive Body Image Experiences, and Positive Sleep Experiences scores did not differ as a function of PMS group.

On the supplementary subscales, there were significant effects of group for Testosterone-Related Experiences, Progesterone-Related Experiences, Positive Affect, Elation, and Positive Skin Experiences, such that the PMS group had higher negative and lower positive scores than the non-PMS group. Overall, the results were similar when strict inclusion criteria were applied to the cycle-related analyses (i.e., only women with regular/predictable menstrual cycles of 25 to 35 days were included).

Discussion

The purpose of Part 1 of the present paper was to examine the factor structure and initial psychometric properties of the Women's REP, a new comprehensive measure of women's affective, sexual, and physical experiences during reproductive events such as the menstrual cycle, pregnancy, the postpartum period, and the perimenopausal transition. The results indicate that overall the Women's REP consists of seven scales that are internally consistent and demonstrate some evidence of concurrent validity. These seven scales correspond well to the rationally derived content domain scales that emerged during the development of the measure. Scores on the scales and subscales of the Women's REP differed between women who self-reported (yes/no) current hormonal problems, HC side effects, and PMS in the present study. Overall, women who reported these hormone-related problems also reported some more negative

and some less positive experiences on the measure than women currently unaffected by these conditions.

The results suggest that there may be value in measuring both negative and positive experiences that are relevant to reproductive events. Given that Negative Affective Experiences and Positive Affective and Physical Experiences were found to be orthogonal, this study is consistent with research suggesting that negative and positive affect should both be examined, even in the context of reproductive events such as the premenstrual phase (Meaden et al., 2012) and the postpartum period (Buttner et al., 2012). The present study extends this finding that is quite robust in the mood literature to other types of experiences (e.g., sexual, physical, body, and sleep-related). Similar findings have also been reported for a measure of sexual self-concept for adolescent girls such that factor analysis revealed a positively valanced sexual arousability scale and a negative sexual affect scale (as well as a sexual agency scale; O'Sullivan et al., 2006).

The inclusion of positive experiences in the present study also revealed group differences both within and across reproductive events. For example, women who did and did not report current HC side effects differed on Positive Body Image Experiences and Positive Weight Experiences whereas women with and without PMS did not differ in these areas. The PMS groups differed on Positive Skin Experiences whereas the HC side effect groups did not. It is also noteworthy that the Sexual Experiences – General, Body Image Quality, Sleep Quality, and Sexual Experiences – Relationship scales were found to have separate negative and positive subscales. The Women's REP appears to be the only multidimensional measure of women's reproductive symptoms that comprehensively assesses both negative and positive experiences.

Interestingly, mean scores on the physical and sleep-related positive experiences subscales, consisting primarily of positively worded items, tended to be similar (not significantly

different) between women with and without HC side effects or women with and without PMS. This finding is difficult to explain in light of the significant group differences on the corresponding negative experiences subscales. However, it may help to provide some support for the validity of self-reports of both HC side effects and PMS. It suggests that women reporting these experiences do not have a response bias whereby they simply present themselves more negatively or less positively on all items. Women who did and did not report current HC side effects significantly differed on Negative Sexual Experiences – Relationship, Negative Sexual Experiences – Others, Negative Body Image Experiences, and Negative Weight Experiences whereas women with and without PMS did not differ in these areas. The PMS groups differed on Decreased Appetite, General Aches and Pains, Negative Sleep Experiences whereas the HC side effect groups did not. These different patterns of experiences on the Women's REP provide some evidence for the validity of the findings.

It is possible that women may report more extreme experiences on negatively versus positively worded items (but see Meaden et al., 2005), as might be suggested by the fact that the hormonal problems groups significantly differed on all scales and subscales except two of three positive sexual experiences subscales. However, the women who reported having a hormonal problem or disorder were likely a heterogeneous and perhaps more severe group compared those who reported HC side effects or PMS specifically. If so, such differences might account for the relatively high number of significant differences between the hormonal problem groups. That is, scores on the positive scales and subscales may only be low or high in extreme conditions (e.g., low positively valenced scores may be indicative of high severity of a woman's condition, such as a hormonal disorder).

The subscales consisting of purely negatively or positively valenced items were statistically independent and so, directly opposite co-variation (i.e., low negative, high positive or vice versa) cannot always be assumed. On one hand, this finding may suggest that positive experiences are strengths, which women with and without various self-reported HC or premenstrual problems have to a similar extent. It is also possible that the ratio of negative to positive experiences is relevant. This might be the case if women interpret a lack of positive experiences as negative experiences or the presence of positive experiences as a lack of negative experiences. This possibility could be examined in future research.

The present study is one of the first to suggest that women's overall affective, sexual, and physical experiences consist of seven distinct factors and that they can be measured at various points across the lifespan using the same questionnaire for each reproductive event. According to Tabachnick and Fidell (2007), a good factor analysis is one that makes sense. Interpretability seems to be a strength of the present study such that the results of the factor analyses (Tables 2.3, 2.5, and 2.6) fit with the content domains originally developed (Table 2.2) and make sense in the context of experiences relevant to women. For example, although a "body image" factor was not hypothesized a priori (as might be the case in confirmatory factor analysis), the exploratory results were highly suggestive of such an internally consistent and seemingly face valid scale. This finding fits with what is known about the importance of appearance, weight, and dietary habits in women's lives and evidence that body image may be affected by hormones and HC use (e.g., Bird et al., 2012; Klump et al., 2015; Racine et al., 2012).

A potential weakness of the Women's REP is the complexity of the items pertaining to eating and body image, which tended to load on two factors. However, in the final solution, it would appear that the eating items, which seemed most relevant to body image and weight,

loaded most strongly on the Body Image Quality scale, while items pertaining to decreased appetite in particular formed a separate subscale of the Negative Physical Experiences scale. It has been suggested that complex items could be deleted in questionnaire development (Tabachnick & Fidell, 2007). However, the fact that these items were relevant across more than one domain may also suggest that they are particularly important to women's functioning. The decision to continue to include such items was also related to evidence that hormones play a role in eating, body image, and weight (Klump, Raccine, Hildebrandt, Burt, & Neale, 2014).

Similarly, some differences in factor loadings from the full sample to the subsample of women in a relationship may suggest that items related to sexual- or romantic-experiences without reference to a context (e.g., "Vaginal lubrication," "Avoidant of intimacy/affection," and "Physical pleasure/comfort during sexual activity") may be too general in content. For instance, the items designed for the sexual experiences domain were mostly in regards to sexual experiences in three contexts: "with others or the thought of others," "through masturbation (alone)," or "with a primary partner." It is possible that the former more general items should be presented within each context or removed in a subsequent version of the Women's REP. Another potential limitation of the Women's REP that will be considered in future iterations is the lack of a consistency or a response bias scale.

This first study presents the development of the Women's REP, a measure with potential value for assessing women's reproductive experiences in both research and clinical practice. Given that exploratory factor analysis is one of the first steps of scale development and applicable to theory development, one of the next steps might be to conduct a confirmatory factor analysis of the Women's REP to test the scales and subscales found here. While the present study included a very large number of women with a variety of reproductive experiences,

the ratio of the number of items to subsample size for pregnant, postpartum and perimenopausal women was too low for separate factor analyses. Future research should also examine whether the empirical structure of the Women's REP is consistent across other samples of women in general, women of reproductive age, pregnant women, women in the postpartum period, and perimenopausal women or women mid-aged (45 to 65 years as per Hunter, 1992).

Part 2:

Reproductive and Hormonal Status Differences on the Women's Reproductive Experiences (REP) Questionnaire

For Part 2, the possibility that women who differ in reproductive/hormonal statuses may also differ on the Women's REP was examined. Relevant reproductive and hormonal status differences on the Women's REP would be further evidence for concurrent validity of the scales and subscales of the measure. The following types of groups were examined: (a) reproductive status groups (free-cycling women, copper IUD users, OC users, other HC users, pregnant women, postpartum women, and menopausal women); (b) cycle regularity groups in free-cycling women (ammenorheic, irregularly cycling, and regularly cycling women); and (c) menstrual phase groups (menstrual, periovulatory, and premenstrual) in each of (i) free-cycling women, (ii) OC users, and (iii) other HC users.

The main goal was to explore whether the Women's REP scores would differ between reproductive and hormonal status groups in relevant ways for the purposes of assessing concurrent validity, rather than examining specific directional group differences per se. Thus, given the large number of possible differences (due to the number of scales and subscales and for some analyses, the number of groups), some general predictions or expectations regarding group differences on the main scales were made for the sake of simplicity. First, pregnant, postpartum,

and menopausal women may have some relatively extreme scores on the Women's REP since these events are associated with more extreme or eventful reproductive, hormonal, and lifestyle changes than free-cycling or copper IUD, OC, and HC use (Speroff & Fritz, 2005). In particular, it was expected that pregnant, postpartum, and menopausal women would, for the most part, have relatively high negative experiences scores (i.e., Neagtive Affective Experiences, Negative Physical Experiences, Sexual Problems – General, Sexual Problems – Relationship scale and subscale scores) and low positive experiences scores (i.e., Positive Affective and Physical Experiences, Sleep Quality, and Body Quality scale and subscale scores). It was also predicted that regularly cycling women and women in the periovulatory phase would have lower negative experiences scores and higher positive experiences scores than non-regularly cycling women and women in the menstrual and premenstrual phases, respectively. These predictions were based on research suggesting that fertility, estrogen, and testosterone tend to have positive effects, while progesterone generally has negative effects, on well-being and sexual behavior (see Bäckström et al., 1983; Rapkin, Biggio, & Concas, 2006; Roney & Simmons, 2013; Rubinow, Schmidt, & Roca, 1998). Menstrual cycle phase group differences were predicted to be attenuated in OC and HC users compared to free-cycling women (e.g., Graham & Sherwin, 1993; Oinonen & Mazmanian, 2002). Also, among free-cycling women, estimates of conception probability (Wilcox, Dunson, Weinberg, Trussell, & Baird, 2001) and reproductive hormone levels (estrogen, progesterone, testosterone, luteinizing hormone [LH], and follicle-stimulating hormone [FSH]; Puts, 2006) were examined in relation to the Women's REP scores. It was predicted that negatively valenced scales would be negatively related, while positively valanced scales would be positively related, to conception probability, estrogen, testosterone, LH, and

FSH estimates. For progesterone level, estimates were expected to be positively related to negative experiences scales and negatively related to positive experiences scales.

Data Reduction and Analysis

A series of one-way MANOVAs and ANOVAs were conducted to examine differences in women's experiences as a function of a number of reproductive and hormonal groups. Dependent variables were the Women's REP (a) scale, (b) subscale, and (c) supplementary subscale scores. Significant MANOVAs were followed up with univariate ANOVAs and pairwise comparisons. For each of eight MANOVAs, the overall results and conclusions did not change substantially when Bonferroni correction was applied[21], given that all significant analyses were at the level of $p < .001$, or when discriminant function analysis was employed to predict group membership from Women's REP scores. Thus, the uncorrected results are presented.

Reproductive status groups. For the purpose of comparing reproductive status groups, only women who were exclusively in one of seven naturally formed groups were included in analyses involving the full sample of women: free-cyclers (i.e., no non-hormonal IUD or HC use; final $n = 1053$), copper IUD users ($n = 29$), OC users[22] ($n = 360$), other HC users[23] ($n = 176$), pregnant women ($n = 25$), postpartum women ($n = 24$), and menopausal women ($n = 79$). Thus, 58 women were excluded. Also, women who reported that they were going, or went,

[21] Including the MANOVAs in Part 1, Bonferroni correction involved a family-wise alpha of .05 with a significance level of $p < .006$ for each separate MANOVA. Results and conclusions also did not change substantially when the correction was applied for each MANOVA to the subsequent ANOVAs and to the pairwise comparisons tests, separately.

[22] Women using monophasic ($n = 254$) and triphasic ($n = 93$) OC preparations did not differ on the combined six main scales of the Women's REP, $F(6, 340) = 0.90$, $p = .496$, partial $\eta^2 = 0.02$, nor did women using preparations containing first, second, third, and fourth generation progestins (ns = 71, 107, 135, and 34), $F(18, 1020) = 0.60$, $p = .940$, partial $\eta^2 = 0.01$. Women who reported "continuous" OC use (i.e., use longer than the typical 28-day induced cycle length whereby withdrawal is skipped for a period of time; $n = 93$) did not differ on the combined scales from non-continuous users ($n = 265$), $F(6, 351) = 1.57$, $p = .155$, partial $\eta^2 = 0.03$. Thus, these groups of women were combined to form an OC user group.

[23] Women using an injected contraceptive ($n = 41$), a contraceptive patch ($n = 16$), a hormonal IUD ($n = 86$), or a vaginal ring ($n = 32$) did not differ on the combined six main scales of the Women's REP, $F(6, 18) = 1.23$, $p = .229$, partial $\eta^2 = 0.04$. Thus, these women were combined to form an "other" (than OC) HC user group.

through menopause but were less than 44 years of age (n = 18) or still experiencing menstrual cyclicity (n = 12) were excluded from these analyses. The purpose was to form a more homogenous group of women who were in the menopausal, rather than perimenopausal, period as defined by age (i.e., mid-aged) and a lack of menstrual cyclicity, regardless if menopause was induced surgically or reached naturally (Shifren & Gass, 2014). Sample sizes were too low to permit group analyses by stages of reproductive aging through the perimenopausal transition (Harlow et al., 2012).

Menstrual cycle regularity groups. From the full sample of women, those under the age of 44 years were considered to be of reproductive age and included in any subsequent analyses. Ninety women did not meet this criterion. Women who were pregnant, postpartum, perimenopausal, using HCs, or did not complete the menstrual cycle regularity item (n = 7) were also excluded from the analyses of regularity. This left a total of 955 free-cycling women. Of these, the 31 women who reported that they "*never have [a] period*" or "*have not had [a] period in the past three months*" were considered to be amenorrheic. Another 349 women reported that their periods were irregular (i.e., "*I get my period and some months I don't*") and 575 reported regular periods (i.e., "*I usually get my period within two to three days of when I expect it*" or "*My period is like clockwork; the same number of days elapse between periods*").

Menstrual and pseudo- cycle phase groups. In the subsample of women of reproductive age, the forward and backward counts of the day of each participant's menstrual or HC-induced pseudo- cycle in which she completed the questionnaire was determined (see Hampson & Young, 2008). These counts are made from women's estimates of the date of the start of their last (most recent) and next predicted menstrual or withdrawal bleeding period. Given that the midcycle LH peak just prior to ovulation typically occurs 15 days prior to a free-

cycling woman's next menstrual period (Hampson & Young, 2008; e.g., Treloar et al., 1967), the distance between the dates each woman completed the study and her estimated LH peak was determined in days (D_{LH}). Expected equivalents in a standardized 28-day cycle were then calculated as per Puts (2006). If $D_{LH} < 0$, then $D_{LH(28)} = D_{LH}\,[13 / (c - 15)]$, where c is a woman's menstrual cycle length. If $D_{LH} \geq 0$, then $D_{LH} = D_{LH(28)}$. This method assumes that most variability in cycle length occurs in the follicular phase (i.e., from the first day of menses to the LH peak; Schnatz, 1985).

Using these standardized day of cycle estimates, women were grouped into the following phases: menstrual (day 1 to 7 if menstrual or withdrawal bleeding), periovulatory (day 9 to 15 if not bleeding), and premenstrual (day 19 to 28 if not bleeding; see O'Brien et al., 2011). These phases were chosen based on previous research and theory and because they maximally differ in the probability of conception (as recommended by Gilversleeve, Hasleton, & Fales, 2014). Conception probability (Wilcox et al., 2001) was estimated for each woman based on forward day count using actuarial data, as was the probability of being in the fertile phase around ovulation (Wilcox et al., 2000; values obtained from A. J. Wilcox, personal communication, December 11, 2012). In addition, sex hormone level estimates were assigned according to $D_{LH(28)}$ (estradiol, progesterone, testosterone, LH, and FSH; see Puts, 2006; values obtained from D. A. Puts, personal communication, October 23, 2014).

Among free-cycling women, the 31 women considered to be amenorrheic were excluded from analyses of menstrual cycle phase. Menstrual cycle day could not be estimated for an additional 46 women due to a lack of, or inconsistent, self-reported menstrual cycle information. Of the remaining 879 women, 171 completed the study outside of the three target phases and were thus, excluded from the cycle phase group comparisons, but included in supplementary

correlational analyses. In total, 167 women were in the menstrual phase, 206 in the periovulatory phase, and 335 in the premenstrual phase.

Among all types of HC users, 68 reported that they had not experienced menses for at least three months and were thus, also excluded from analyses of pseudo-cycle phase. Menstrual cycle day could not be estimated for an additional 25 OC and other HC users due to a lack of, or inconsistent, menstrual cycle information. Of the remaining 436 women, 97 completed the study outside of the three target phases. Final group sample sizes for the menstrual, periovulatory, and premenstrual phases were: 67, 82, 108 for OC users and 19, 25, 38 for HC users, respectively.

Results

Reproductive status groups. A summary of the means as well as ANOVA and pairwise comparison results in this section can be found in Table 2.11. The combined six main scale scores (Sexual Problems – Relationship examined separately) significantly differed between groups in a MANOVA, F (36, 10434) = 2.95, $p < .001$, partial $\eta^2 = .01$. There was a significant main effect of group for Negative Affective Experiences, Sexual Problems – General, Sexual Problems – Relationship, and Sleep Quality but not Positive Affective and Physical Experiences scores. Negative Physical Experiences and Body Image Quality scores were not significantly different between the groups.

As seen in Figure 2.5, with respect to Negative Affective Experiences, Copper IUD users appeared to have the highest, while the menopausal group had the lowest, scores, but the mean difference was not significant, $p = .071$. There were significant differences between other groups with OC users having lower scores than the free-cycling group and other HC users, ps = .013 and .009. The menopausal group also had the lowest Negative Physical Experiences scores in comparison to pregnant women, who had the highest score, $p = .005$. For Sexual Problems –

Table 2.11

Summary of Means and ANOVAs for the Scales and Subscales of the Women's REP by Reproductive Status Group in the Full Sample of Women

Dependent variable	*M* (*SD*)							*F* (6, 1739)	*p*	Partial η^2
	Free-cycling (*n* = 1053)	Copper IUD (*n* = 29)	OC (*n* = 360)	HC (*n* = 176)	Pregnant (*n* = 25)	Postpartum (*n* = 24)	Menopausal (*n* = 79)			
Scales										
Negative Affective Experiences	2.43[ab] (0.89)	2.54 (0.84)	2.30[ac] (0.84)	2.51[cd] (0.88)	2.38 (0.81)	2.27 (0.96)	2.19[bd] (0.73)	2.95	.025*	.01
Negative Physical Experiences	1.88[a] (0.54)	1.91 (0.45)	1.83[b] (0.48)	1.92[c] (0.54)	2.11[abd] (0.47)	1.89 (0.41)	1.77[cd] (0.44)	1.96	.069[†]	.01
Sexual Problems – General	2.69[ab] (0.74)	2.38[ac] (0.77)	2.72[c] (0.71)	2.64[fg] (0.77)	2.53[hi] (0.78)	2.99[dfh] (0.80)	3.02[begi] (0.85)	4.35	< .001***	.02
Sexual Problems – Relationship[l]	2.26[abc] (0.92)	2.13[d] (0.77)	2.13[ae] (0.81)	2.08[bf] (0.82)	1.98[g] (0.89)	2.34[h] (1.04)	2.81[cdefgh] (1.03)	5.19	< .001***	.03
Positive Affective and Physical Experiences	2.78[a] (0.64)	2.95 (0.53)	2.86[a] (0.61)	2.80 (0.67)	2.88 (0.50)	2.78 (0.73)	2.74 (0.59)	1.27	.269	.004
Body Image Quality	3.10[a] (0.76)	2.97 (0.78)	3.11[bc] (0.74)	2.95[ab] (0.78)	2.80[cd] (0.60)	2.99 (0.76)	3.15[d] (0.73)	1.85	.086[†]	.01
Sleep Quality	3.10[abc] (0.86)	3.06 (0.94)	3.24[adef] (0.85)	2.91[bd] (0.87)	2.74[ce] (0.97)	2.90 (0.75)	3.00[f] (0.83)	4.30	< .001***	.02
Subscales										
Hormonal Symptoms	1.83[ab] (0.52)	1.89[c] (0.54)	1.81[de] (0.49)	1.87[f] (0.54)	2.07[adg] (0.49)	1.79 (0.38)	1.62[bcefg] (0.41)	3.57	.002**	.01
Decreased Appetite	1.75[a] (0.95)	1.67 (1.05)	1.69 (0.96)	1.69 (1.05)	1.32[a] (0.68)	1.61 (0.95)	1.64 (0.84)	1.12	.348	.004
General Aches and Pains	2.07[abc] (0.79)	2.03[d] (0.73)	1.95[aefg] (0.68)	2.14[h] (0.74)	2.45[bde] (0.65)	2.29[f] (0.72)	2.30[cg] (0.74)	4.42	< .001***	.02
Negative Sexual Experiences – General	2.10[a] (0.81)	1.87[be] (0.77)	2.06[cf] (0.78)	2.10[d] (0.81)	2.03 (0.90)	2.40[ef] (1.01)	2.38[abcd] (0.99)	2.73	.012*	.01
Negative Sexual Experiences – Relationship[l]	1.99[a] (0.96)	1.85[b] (0.72)	1.89[c] (0.88)	1.84[d] (0.88)	1.70[e] (0.81)	2.13 (1.10)	2.47[abcde] (1.16)	3.65	.001**	.02

Dependent variable	*M* (*SD*)							*F* (6, 1739)	*p*	Partial η^2
	Free-cycling (*n* = 1053)	Copper IUD (*n* = 29)	OC (*n* = 360)	HC (*n* = 176)	Pregnant (*n* = 25)	Postpartum (*n* = 24)	Menopausal (*n* = 79)			
Subscales										
Negative Body Image Experiences	2.31[ab] (0.88)	2.42[c] (0.90)	2.30[de] (0.85)	2.48[adfg] (0.93)	2.90[bcethı] (0.73)	2.33[h] (0.96)	2.14[gı] (0.82)	3.36	.003**	.01
Negative Sleep Experiences	2.59[abc] (0.98)	2.75 (0.98)	2.44[ade] (0.92)	2.81[bd] (0.98)	3.01[ce] (1.03)	2.74 (0.89)	2.67 (0.97)	4.05	< .001***	.01
Positive Affective Experiences	2.82[a] (0.74)	2.98 (0.58)	2.92[a] (0.69)	2.85 (0.77)	2.98 (0.59)	2.86 (0.83)	2.76 (0.67)	1.44	.194	.01
Positive Physical Experiences	2.78 (1.06)	2.97 (1.01)	2.88 (1.07)	2.83 (1.13)	2.76 (1.08)	2.83 (1.10)	2.86 (1.10)	0.53	.787	.002
Positive Sexual Experiences – Others	2.37[a] (1.10)	2.74[bcd] (1.24)	2.25[be] (1.12)	2.41[f] (1.06)	2.41 (1.09)	1.97[c] (1.06)	1.97[adef] (0.90)	3.23	.004**	.01
Positive Sexual Experiences – Self	2.67[abc] (1.19)	3.14[adef] (1.17)	2.55[dgh] (1.18)	2.84[gı] (1.24)	3.17[bhjk] (1.24)	2.47[ej] (1.67)	2.28[cfik] (1.09)	4.16	< .001***	.01
Positive Sexual Experiences –Relationship[l]	3.47[abc] (1.03)	3.58[d] (0.94)	3.63[ae] (0.91)	3.67[bf] (0.92)	3.74[g] (1.04)	3.45[h] (1.11)	2.85[cdefgh] (1.09)	5.22	< .001***	.03
Positive Body Image Experiences	2.42 (0.84)	2.28 (0.79)	2.30 (0.84)	2.48 (0.93)	2.46 (0.70)	2.21 (0.75)	2.34 (0.81)	1.02	.408	.004
Positive Sleep Experiences	2.47[a] (0.95)	2.67 (1.08)	2.62[abcd] (0.97)	2.35[b] (0.94)	2.23 (1.05)	2.18[c] (0.66)	2.35[d] (0.88)	2.88	.008**	.01
Supplementary Subscales										
Testosterone-Related Experiences	1.93[a] (0.58)	2.02 (0.48)	1.89 (0.52)	1.97[b] (0.58)	2.00 (0.58)	1.89 (0.46)	1.79[ab] (0.50)	1.44	.196	.01
Progesterone-Related Experiences	1.69[ab] (0.56)	1.70[cd] (0.60)	1.70[de] (0.56)	1.72[fg] (0.61)	2.18[acdfhı] (0.59)	1.65[hj] (0.42)	1.37[bdegıj] (0.46)	7.68	< .001***	.03
Negative Sexual Experiences – Others	2.13[ab] (0.84)	1.91[cd] (0.82)	2.02[ef] (0.79)	2.10[gh] (0.85)	2.11 (0.87)	2.49[aceg] (1.11)	2.45[bdfh] (1.03)	3.79	.001**	.01
Negative Sexual Experiences – Self	2.06 (1.08)	1.80[a] (0.86)	2.10 (1.08)	2.08 (1.05)	1.88 (1.24)	2.25 (1.03)	2.27[a] (1.18)	1.01	.416	.003
Negative Weight Experiences	2.98 (1.32)	3.31 (1.37)	2.96 (1.33)	3.18 (1.34)	2.98 (1.48)	3.13 (1.19)	2.89 (1.24)	1.07	.379	.004

Dependent variable	*M* (*SD*)							*F* (6, 1739)	*p*	Partial η^2
	Free-cycling (*n* = 1053)	Copper IUD (*n* = 29)	OC (*n* = 360)	HC (*n* = 176)	Pregnant (*n* = 25)	Postpartum (*n* = 24)	Menopausal (*n* = 79)			
Supplementary Subscales										
Positive Affect	2.82 (0.76)	2.95 (0.79)	2.88 (0.73)	2.82 (0.79)	2.93 (0.62)	2.88 (0.84)	2.84 (0.71)	0.55	.772	.002
Elation	2.82[ab] 0.81)	3.07[c] (0.62)	2.91[ad] (0.83)	2.91[e] (0.83)	3.13[f] (0.70)	2.82 (0.89)	2.54[bcdef] (0.79)	6.05	< .001***	.02
Positive Physical Experiences – General	2.66[a] (0.63)	2.92[abcd] (0.49)	2.69[b] (0.61)	2.65[c] (0.65)	2.69 (0.53)	2.59 (0.60)	2.61[d] (0.57)	1.10	.357	.004
Positive Skin Experiences	2.52[a] (1.04)	2.48 (0.90)	2.59 (1.07)	2.58 (1.09)	2.28[b] (1.16)	2.63 (0.90)	2.83[ab] (1.06)	1.55	.160	.01
Positive Digestion Experiences	3.01 (0.96)	3.13 (0.79)	3.09 (0.96)	3.02 (0.92)	3.09 (0.95)	2.75 (0.96)	2.87 (0.88)	1.17	.318	.004
Positive Breast Experiences	2.78 (1.06)	2.97 (1.01)	2.88 (1.07)	2.83 (1.13)	2.76 (1.08)	2.83 (1.10)	2.86 (1.10)	0.54	.787	.002
Positive Weight Experiences	2.01[a] (0.85)	1.95 (0.58)	2.01[b] (0.84)	1.94 (0.89)	1.78 (0.74)	1.74 (0.70)	1.78[ab] (0.82)	1.63	.379	.004
Positive Appetite Experiences	2.44[a] (1.00)	2.36[b] (1.03)	2.47[c] (0.98)	2.31[d] (1.01)	2.91[abcdef] (0.99)	2.26[e] (1.24)	2.41[f] (1.01)	1.58	.149	.01

Note. Women's REP = Women's Reproductive Experiences (REP) Questionnaire. OC = oral contraception. IUD = intrauterine device. HC = hormonal contraception other than oral contraception. Within rows, each subscript letter "a" through "k" denotes a significant pairwise comparison at $p < .05$.

[l] *n*s = 647, 24, 257, 118, 22, 20, and 51 (df = 6, 1132) women in a relationship, respectively.

[†] $p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

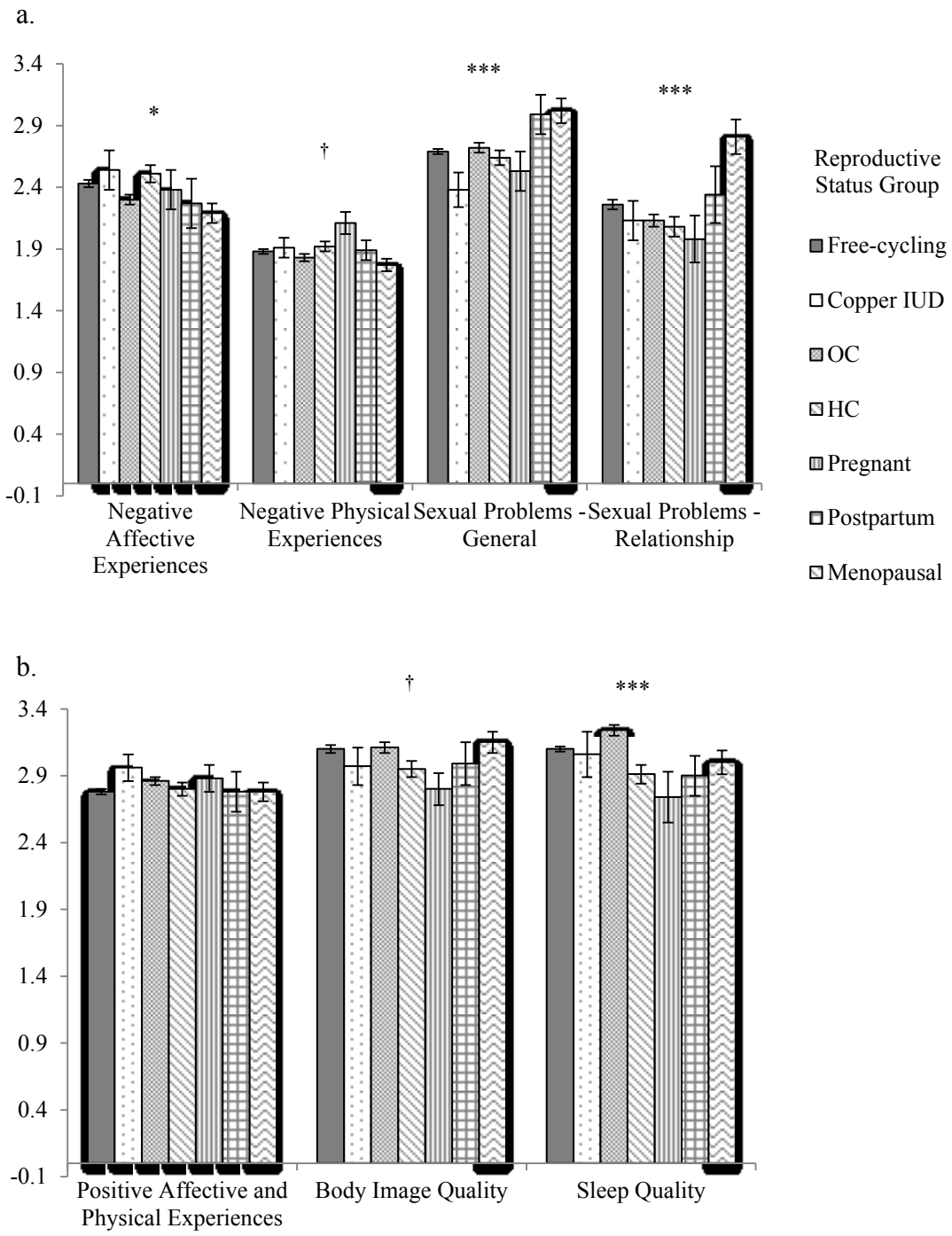

Figure 2.5. Mean scores of the main scales of the Women's Reproductive Experiences (REP) Questionnaire as a function of reproductive status group for (a) negatively valenced scales and (b) positively valenced scales (*n*s = 1053, 29, 360, 176, 25, 24, and 79, respectively[a]). Errors bars represent standard error of the mean. Specific notes refer to the significance of overall ANOVAs for group differences.

[a]*n*s = 647, 24, 257, 118, 22, 20, and 51 women in a relationship.

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

General, the copper IUD had significantly lower scores than the menopausal group, $p < .001$. With respect to Body Image Quality, pregnant women had the lowest mean score, significantly different than the highest mean score, which was found in the menopausal group, $p = .044$. Sleep Quality scores were significantly higher in the OC group than the pregnant group, $p = .005$. While the ANOVA was not significant, there was a significant pairwise comparison between free-cycling and OC using women on Positive Affective and Physical Experiences (free-cycling < OC).

Among women in a relationship, there was a significant effect of group for mean Sexual Problems – Relationship scores. Menopausal women had higher scores than pregnant women as well as the HC, copper IUD, OC, and free-cycling groups, *p*s = .048 to < .001. The free-cycling group had higher scores than the OC and HC groups, *p*s = .045 and .043.

Main subscales. The combined 12 main non-relationship subscale scores differed by group, F (72, 10398) = 2.84, $p < .001$, partial $\eta^2 = .02$. There was also a significant effect of group for 10 of all of the main subscales (see Table 2.11). There was no effect of group for Decreased Appetite, Positive Affective Experiences, Positive Physical Experiences, and Positive Body Image Experiences.

Pairwise comparisons revealed that pregnant women had the highest Hormonal Symptoms scores compared to the free-cycling, OC, and menopausal groups, *p*s = .018 to < .001, while menopausal women had the lowest scores compared to the free-cycling, OC, and copper IUD groups, *p*s = .014 to < .001. General Aches and Pains scores were lower among OC users than any other group, *p*s = .036 to < .001, while pregnant women appeared to have the highest mean score, *p*s = .043 to < .001. With respect to Negative Sexual Experiences – General, the menopausal group had the highest mean score, significantly higher than the lowest mean score

(copper IUD users), $p = .004$. On the Negative Body Image Experiences subscale, pregnant women scored higher than all of the other groups, ps = .046 to < .001. The HC group also scored higher than the menopausal, OC, and free-cycling groups, ps = .025 to .005. On the Negative Sleep Experiences scale, the OC group had the lowest score compared to the free-cycling, HC, pregnant, and menopausal groups, ps = .053 to < .001, while the pregnant group appeared to have the highest mean score, ps = .032 to .005.

With respect to the Positive Sexual Experiences – Others subscale, copper IUD users had the highest mean score compared to the OC, pregnant, and menopausal groups, ps = .021 to .001. Menopausal women appeared to have the lowest scores, ps = .041 to .001. On the Positive Sexual Experiences – Self subscale, the pregnant and copper IUD groups had higher scores than free-cycling, OC, postpartum, and menopausal women, ps = .042 to .001, with the menopausal women again appearing to have the lowest scores. OC users had significantly higher Positive Sleep Experiences scores than all groups, ps = .053 to .002, except copper IUD users (who had the highest overall scores), $p = .782$.

There was also a significant effect of group on the combined two subscale scores of the Sexual Problems – Relationship scales, F (12, 2264) = 2.77, $p = .001$, partial $\eta^2 = .01$. Both Negative Sexual Experiences – Relationship and Positive Sexual Experiences – Relationship scores differed by group. Menopausal women also had higher Negative Sexual Experiences – Relationship scores than pregnant, HC, copper IUD, OC, and free-cycling groups but not postpartum women, ps = .008 to < .001. Menopausal women had lower Positive Sexual Experiences – Relationship scores than the pregnant, postpartum, HC, copper IUD, OC, and free-cycling groups, ps = .024 to < .001. Free-cycling women had lower scores than the OC and HC groups, ps = .034 to < .001.

Supplementary subscales. The combined 13 supplementary subscale scores differed by group, F (78, 10392) = 2.86, $p < .001$, partial $\eta^2 = .02$. There was a significant effect of group on Progesterone-Related Experiences and Negative Sexual Experiences – Others but not for Testosterone-Related Experiences and Negative Sexual Experiences – Self. Pairwise comparisons showed that the pregnant group had the highest Progesterone-Related Experiences scores compared to all other groups, ps = .002 to < .001. The menopausal group had lower scores than all other groups on this subscale, ps = .035 to < .001. The postpartum group and the perimenopausal group had higher Negative Sexual Experiences – Others scores than free-cycling, OC, HC, and copper IUD groups, ps = .035 to < .001.

Summary. Overall, the largest group differences across the scales and subscales tended to be between three groups: pregnant, menopausal, or OC using women. Pregnant women had comparatively high mean Negative Physical Experiences, Progesterone-Related Experiences, and Elation scores as well as low mean Sexual Problems – Relationship, Body Image Quality, and Sleep Quality scores. Menopausal women had the lowest Negative Affective Experiences, Negative Physical Experiences, Progesterone-Related Experiences and Elation scores but highest Body Image Quality scores. They had relatively high Sexual Problems – General and – Relationship scale and subscale scores as well. The postpartum group also had relatively high Sexual Problems scores and low Sleep Quality scores. OC users had the lowest Negative Affective Experiences scores and highest Sleep Quality scores. The scores of the remaining free-cycling, copper IUD, HC, and women tended to be mid-range. Lastly, when differences were significant, OC users had better (i.e., less negative or more positive) scores than non-users and other HC users.

Menstrual cycle regularity groups. A summary of the means as well as ANOVA and pairwise comparison results for the amenorrheic, irregularly cycling, and regularly cycling groups can be found in Table 2.12. The combined six main non-relationship scale scores significantly differed between cycle regularity groups, F (12, 1896) = 6.58, p < .001, partial η^2 = .04. All seven individual main scales also differed as a function of group.

As seen in Figure 2.6, amenorrheic women and irregularly cycling women generally had higher scores on all of the negative experiences scales and lower scores on all the positive experiences scales than regularly cycling women, ps = .002 to < .001 (exceptions were Sexual Problems – General and Sexual Problems – Relationship, for which only the differences between irregularly and regularly cycling women were significant, ps = .016 and .015). The amenorrhea group also had higher Negative Affective Experiences scores and lower Body Image Quality scores than irregularly cycling women, ps = .002.

Main subscales. The combined 12 main non-relationship subscale scores significantly differed between cycle regularity groups, F (24, 1884) = 4.06, p < .001, partial η^2 = .05. Positive Sexual Experiences – Others and Positive Sexual Experiences – Self did not significantly differ by group in ANOVAs. Significant overall group effects were found for 11 non-relationship and relationship subscales (see Table 2.12).

Pairwise comparisons indicated that the amenorrhea and irregularly cycling groups had higher scores on all of the negative experiences subscales and lower scores on all of the positive experiences subscales than the regularly cycling group, ps = .048 to < .001. The difference between the amenorrhea group and the regularly cycling group was not significant for Decreased Appetite, p = .369. The amenorrheic group had higher Negative Body Image Experiences and lower Positive Body Image Experiences than the irregularly cycling group, ps = .002 and .025.

Table 2.12

Summary of Means and ANOVAs for the Scales and Subscales of the Women's REP by Menstrual Cycle Regularity Group in Women of Reproductive Age

	M (SD)			*F* (2, 952)	*p*	Partial η^2
Dependent variable	Amenorrhea (*n* = 31)	Irregular (*n* = 349)	Regular (*n* = 575)			
Scales						
Negative Affective Experiences	3.13[ab] (0.76)	2.62[ac] (0.92)	2.30[bc] (0.86)	24.21	< .001***	.05
Negative Physical Experiences	2.08[a] (0.52)	2.02[b] (0.58)	1.81[ab] (0.50)	20.01	< .001***	.04
Sexual Problems – General	2.85 (0.72)	2.77[a] (0.74)	2.65[a] (0.74)	3.61	.028*	.01
Sexual Problems – Relationship[d]	2.47 (0.87)	2.39[a] (0.95)	2.18[a] (0.89)	3.30	.038*	.01
Positive Affective and Physical Experiences	2.48[a] (0.47)	2.65[b] (0.62)	2.87[ab] (0.65)	16.47	< .001***	.03
Body Image Quality	2.53[ab] (0.88)	2.97[ac] (0.73)	3.20[bc] (0.76)	18.88	< .001***	.04
Sleep Quality	2.70[a] (0.84)	2.95[b] (0.85)	3.19[ab] (0.86)	11.60	< .001***	.02
Subscales						
Hormonal Symptoms	2.06[a] (0.49)	1.96[b] (0.56)	1.77[ab] (0.49)	16.42	< .001***	.03
Decreased Appetite	1.82 (1.04)	1.98[a] (1.05)	1.66[a] (0.89)	12.17	< .001***	.03
General Aches and Pains	2.23 (0.80)	2.23[a] (0.84)	1.95[a] (0.74)	15.23	< .001***	.03
Negative Sexual Experiences – General	2.35[a] (0.80)	2.20[a] (0.82)	2.04[ab] (0.79)	5.64	.004**	.01
Negative Sexual Experiences – Relationship[d]	2.28 (1.10)	2.07 (1.02)	1.95 (0.92)	1.74	.153	.01
Negative Body Image Experiences	2.93[ab] (1.00)	2.42[ac] (0.90)	2.24[bc] (0.85)	12.20	< .001***	.01
Negative Sleep Experiences	3.04 (0.93)	2.74[a] (0.99)	2.49[a] (0.97)	10.51	< .001***	.02
Positive Affective Experiences	2.46[a] (0.56)	2.69[b] (0.71)	2.92[ab] (0.75)	14.85	< .001***	.03
Positive Physical Experiences	2.40[a] (0.91)	2.59[b] (1.06)	2.91[ab] (1.06)	11.92	< .001***	.02
Positive Sexual Experiences – Others	2.42 (0.96)	2.31 (1.05)	2.41 (1.14)	0.93	.398	.002
Positive Sexual Experiences – Self	2.55 (1.09)	2.64 (1.17)	2.68 (1.21)	0.30	.739	.001
Positive Sexual Experiences – Relationship[d]	3.33 (1.03)	3.33[a] (1.05)	3.58[a] (1.00)	4.34	.015*	.01
Positive Body Image Experiences	1.92[ab] (0.90)	2.27[ac] (0.80)	2.56[bc] (0.86)	18.64	< .001***	.04
Positive Sleep Experiences	2.19 (0.86)	2.34[a] (0.94)	2.54[a] (0.96)	6.49	.002**	.01
Supplementary Subscales						
Testosterone-Related Experiences	2.67[a] (0.51)	2.07[b] (0.62)	1.86[ab] (0.54)	19.40	< .001***	.04
Progesterone-Related Experiences	1.75 (0.60)	1.80[a] (0.60)	1.65[a] (0.54)	7.82	< .001***	.02
Negative Sexual Experiences – Others	2.35[a] (0.92)	2.24[b] (0.87)	2.05[ab] (0.82)	6.93	.001**	.01
Negative Sexual Experiences – Self	2.34 (1.08)	2.13 (1.05)	2.03 (1.10)	1.88	.154	.004
Negative Weight Experiences	3.87[ab] (1.32)	3.22[ac] (1.31)	2.76[bc] (1.30)	21.14	< .001***	.04

		M (SD)		*F* *(2, 952)*	*p*	Partial η^2
Dependent variable	Amenorrhea (n = 31)	Irregular (n = 349)	Regular (n = 575)			
Supplementary Subscales						
Positive Affect	2.44 (0.53)	2.68[a] (0.74)	2.91[a] (0.78)	14.67	< .001***	.03
Elation	2.52 (0.76)	2.72[a] (0.79)	2.93[a] (0.82)	10.61	< .001***	.02
Positive Physical Experiences – General	2.49 (0.44)	2.57[a] (0.60)	2.71[a] (0.66)	6.80	< .001***	.01
Positive Skin Experiences	2.24 (1.15)	2.35[a] (0.97)	2.59[a] (1.06)	7.20	< .001***	.02
Positive Digestion Experiences	2.82 (0.95)	2.85[a] (0.94)	3.11[a] (0.95)	8.38	< .001***	.02
Positive Breast Experiences	2.40 (0.91)[a]	2.59[b] (1.06)	2.91[ab] (1.06)	11.92	< .001***	.02
Positive Weight Experiences	1.67[ab] (0.93)	1.90[ac] (0.80)	2.12[bc] (0.88)	10.03	< .001***	.02
Positive Appetite Experiences	2.01[ab] (0.90)	2.21[ac] (0.97)	2.55[bc] (1.03)	7.18	.001**	.02

Note. Women's REP = Women's Reproductive Experiences Questionnaire. Within rows, each subscript letter "a" through "c" denotes a significant pairwise comparison at $p < .05$.
[d]ns = 17, 205, 357 (df = 2, 576) women in a relationship, respectively.
*$p < .05$. **$p < .01$. ***$p < .001$.

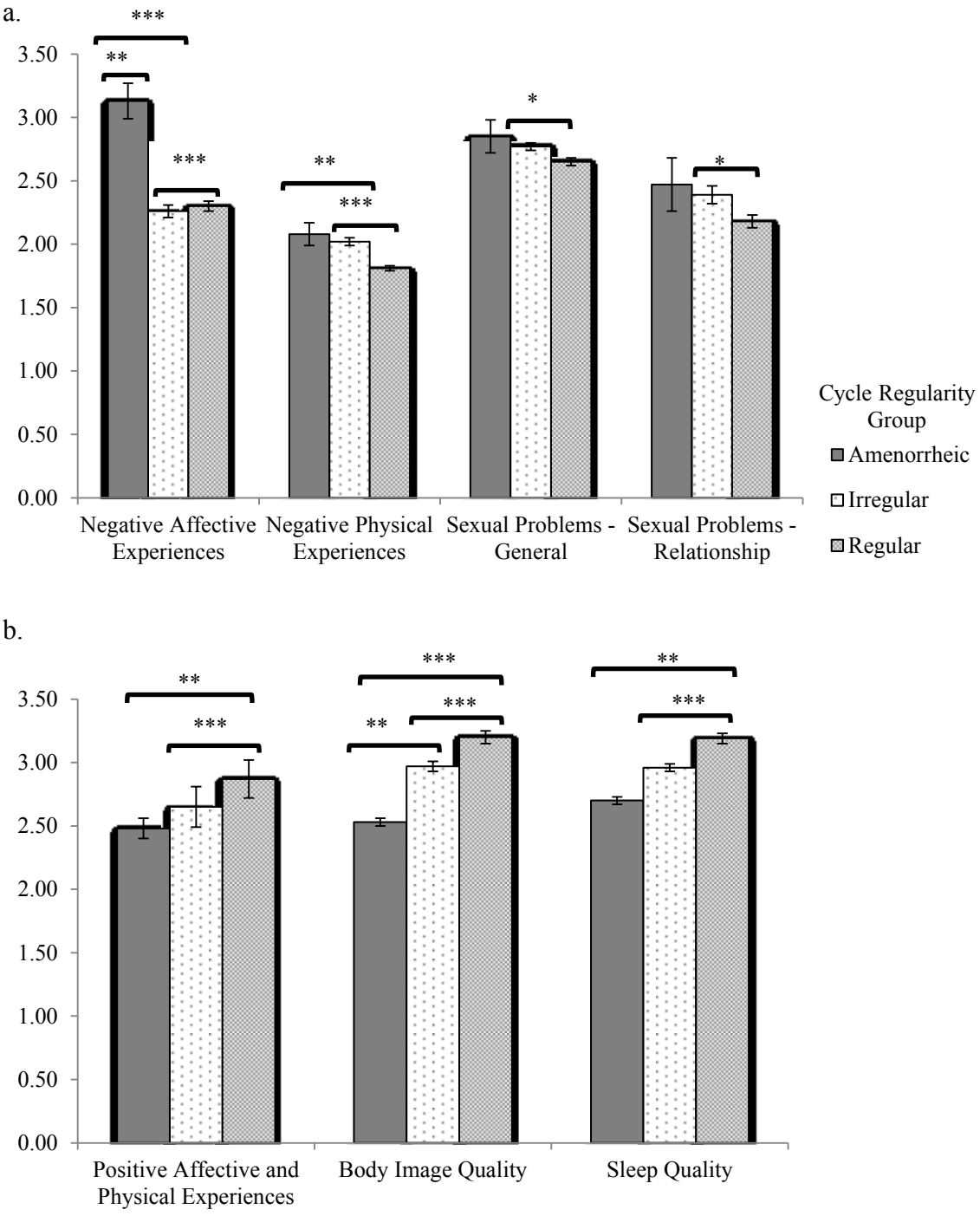

Figure 2.6. Mean scores as a function of cycle regularity group for (a) negatively valenced scales and (b) positively valenced scales (*ns*[a] = 31, 349, and 575, respectively). Errors bars represent standard error of the mean.

[a]*n*s = 17, 205, and 357 women in a relationship, respectively.

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

Among women in a relationship, the combined two Sexual Problems – Relationship subscales scores significantly differed between the groups, F (4, 1152) = 2.52, p = .039, partial η^2 = 0.01. The three cycle regularity groups did not differ on Negative Sexual Experiences – Relationship in an ANOVA, whereas the Positive Sexual Experiences – Relationship subscale did show a group effect. Pairwise comparisons revealed that the irregularly cycling group had lower scores than the regularly cycling group, p = .005.

Supplementary subscales. The combined 13 subscale scores significantly differed by group, F (26, 1882) = 3.50, p = < .001, partial η^2 = .05. ANOVAs did not reveal a group effect for Negative Sexual Experiences – Self, but the groups differed on all of the other 12 separate scales (see Table 2.12). Pairwise comparisons revealed that irregularly cycling women had higher negatively valenced scores and lower positively valenced scores than regularly cycling women on all subscales, ps = .001 to < .001. The ammenorheic group tended to have higher negative experiences scores and lower positive experiences scores compared to the regularly cycling group for all subscales, ps = .098 to < .001. The ammenorheic group also had a higher mean Negative Weight Experiences score than irregularly cycling women, p = .008.

Summary. Results revealed that regular cycling women generally showed less negative and more positive symptom or experience scores across the scales and subscales than the other two groups, particularly irregularly cycling women. On the Testosterone-Related Experiences and Progesterone-Related Experiences subscales, regularly cycling women tended to have the lowest scores, while irregularly cycling women had the highest score on the former scale. It is noteworthy that, of all the 34 scales (7 main scales, 14 subscales, and 13 supplementary subscales), there were only four scales on which the three menstrual cycle regularity groups did

not differ (i.e., Negative Sexual Experiences – Relationship, Negative Sexual Experiences – Self, Positive Sexual Experiences – Others, and Positive Sexual Experiences – Self subscales).

Menstrual cycle phase groups. Preliminary reliability analyses were first conducted for researcher estimates of day in cycle (forward count, backward count, and phase group based on standardized day) as well as conception probability and hormone level estimates. In addition to the author, who estimated cycle day counts for all women, a research assistant did counts for a subset of the women (n = 234). The data suggested good inter-rater reliability (single-measures): forward count, r_I = .88, 95% CI [.85, .91], p < .001; and backward count, r_I = .90, 95% CI [.87, .92], p < .001. When participants were grouped by cycle phase (menstrual, perivovulatory, premenstrual, and outside target phases), the inter-rater reliability was found to be high as well, κ = .86, 95% CI [.81, .91], p < .001.

The three phase groups significantly differed as would be expected in mean standardized day of cycle (menstrual: n = 167; M = 3.47, SD = 1.71; periovulatory: n = 206; M = 11.85, SD = 1.87; premenstrual: n = 335; M = 23.70, SD = 2.97); as well as estimates of conception probability (menstrual: M = .003, SD = 0.01; periovulatory: M = 0.06, SD = 0.03; premenstrual: M = 0.02, SD = 0.03); estradiol levels in pg/ml (menstrual: M = 86.34, SD = 7.11; periovulatory: M = 197.70, SD = 46.40; premenstrual: M = 154.43, SD = 37.28); progesterone levels in ng/ml (menstrual: M = 0.45, SD = 0.07; periovulatory: M = 0.85, SD = 0.51; premenstrual: M = 9.37, SD = 3.95); testosterone levels in pg/ml (menstrual: M = 274.88, SD = 25.45; periovulatory: M = 365.07, SD = 36.51; premenstrual: M = 287.70, SD = 38.53); LH levels in mlU/ml (menstrual: M = 12.03, SD = 067; periovulatory: M = 21.95, SD = 12.86; premenstrual: M = 10.92, SD = 8.95); and FSH levels in mlU/ml (menstrual: M = 10.39, SD = 0.61; periovulatory: M = 10.50, SD = 4.50; premenstrual: M = 8.55, SD = 3.23); Fs (2, 705) = 147.57 to 42.03, ps < .0001, partial η^2s =

.30 to .92. Estimates of the probability that a woman was in the fertile window of the periovulatory phase were also significantly different between phase groups (menstrual: $M = 0.01$, $SD = 0.01$; periovulatory: $M = 0.27$, $SD = 0.12$; premenstrual: $M = 0.17$, $SD = 0.10$), F (2, 705) = 369.57, $p < .0001$, partial $\eta^2 = .51$. Also, the estimates of conception probability and reproductive hormones were correlated in directions that would be expected (see Table 2.13). These findings provide evidence of the reliability and validity of the coding/classification of participants' menstrual cycle days.

A summary of all of the univariate ANOVA results for the Women's REP scores as a function of the menstrual cycle phase groups can be found in Table 2.14. The combined six non-relationship main scale scores significantly differed between menstrual cycle phases in the MANOVA, F (12, 1402) = 3.37, $p = < .001$, partial $\eta^2 = .03$. There was a significant main effect of group for four of the scales (Negative Affective Experiences, Body Image Quality, Negative Physical Experiences, and Sleep Quality).

As seen in Figure 2.7, Negative Affective Experiences and Negative Physical Experiences scores were highest in the menstrual phase group compared to the other two groups, ps = .010 to < .001. Body Image Quality and Sleep Quality scores were highest in the periovulatory phase group compared to the other groups, ps = .070 to < .001.

Among women in a relationship, there was no significant group effect for Sexual Problems – Relationship scores. However, although not significantly different, the mean score of women in the periovulatory phase appeared lower than that of women in the premenstrual phase, $p = .067$.

Table 2.13

Correlations between Conception Probability and Hormone Level Estimates among Free-Cycling Women of Reproductive Age (n = 879)

Variable	CP	E	P	T	LH	FSH
CP	1					
E	.58***	1				
P	-.13***	.37***	1			
T	.59***	.60***	-.03	1		
LH	.37***	.46***	-.25***	.61***	1	
FSH	.16***	.04	-.54***	.42***	.86***	1

Note. CP = conception probability. E = estradiol. P = progesterone. LH = luteinizing hormone. FSH = follicle-stimulating hormone.
***$p < .001$.

Table 2.14

Summary of Means and ANOVAs for the Scales and Subscales of the Women's REP by Menstrual Cycle Phase Group among Free-Cycling Women of Reproductive Age

	M (*SD*)			*F* (2, 705)	*p*	Partial η^2
Dependent Variable	Menstrual (*n* = 167)	Periovulatory (*n* = 206)	Premenstrual (*n* = 335)			
Scales						
Negative Affective Experiences	2.67[ab] (0.95)	2.30[a] (0.92)	2.45[b] (0.88)	7.86	< .001***	.02
Negative Physical Experiences	2.07[ab] (0.56)	1.80[a] (0.51)	1.86[b] (0.52)	12.68	< .001***	.04
Sexual Problems – General	2.76 (0.68)	2.69 (0.76)	2.67 (0.76)	0.82	.440	.002
Sexual Problems – Relationship[d]	2.24 (0.91)	2.13 (0.86)	2.31 (0.95)	1.69	.186	.01
Positive Affective and Physical Experiences	2.72 (0.66)	2.83 (0.66)	2.77 (0.63)	1.27	.281	.004
Body Image Quality	2.96[a] (0.82)	3.24[ab] (0.72)	2.10[b] (0.73)	6.50	.002**	.02
Sleep Quality	3.05 (0.94)	3.21[a] (0.80)	3.01[a] (0.83)	3.58	.028*	.01
Subscales						
Hormonal Symptoms	2.06[ab] (0.55)	1.76[a] (0.50)	1.81[b] (0.50)	18.50	< .001***	.05
Decreased Appetite	1.82 (1.03)	1.76 (0.90)	1.75 (0.97)	0.30	.744	.001
General Aches and Pains	2.14[a] (0.77)	1.95[a] (0.74)	2.06 (0.77)	3.23	.040*	.01
Negative Sexual Experiences – General	2.16 (0.79)	2.06 (0.84)	2.09 (0.81)	0.67	.510	.002
Negative Sexual Experiences – Relationship[d]	1.97 (1.00)	1.91 (0.88)	2.07 (0.98)	1.08	.340	.01
Negative Body Image Experiences	2.56[ab] (0.92)	2.14[ac] (0.83)	2.31[bc] (0.84)	11.27	< .001***	.03
Negative Sleep Experiences	2.69[a] (1.08)	2.44[ab] (0.90)	2.67[b] (0.96)	3.57	.011*	.01
Positive Affective Experiences	2.72[a] (0.76)	2.90[a] (0.77)	2.81 (0.72)	2.50	.083[†]	.01
Positive Physical Experiences	2.78 (1.08)	2.81 (1.02)	2.75 (1.05)	0.27	.762	.001
Positive Sexual Experiences – Others	2.30 (1.04)	2.31 (1.11)	2.45 (1.13)	1.60	.203	.01
Positive Sexual Experiences – Self	2.60 (1.14)	2.66 (1.21)	2.67 (1.19)	0.23	.798	.001
Positive Sexual Experiences – Relationship[d]	3.50 (0.96)	3.66[a] (0.94)	3.44[a] (1.06)	1.99	.138	.01
Positive Body Image Experiences	2.43 (0.92)	2.55 (0.83)	2.42 (0.82)	1.54	.216	.004
Positive Sleep Experiences	2.53 (1.00)	2.50 (0.92)	2.38 (0.94)	1.79	.168	.01
Supplementary Subscales						
Testosterone-Related Experiences	2.09[ab] (0.62)	1.88[a] (0.57)	1.92[b] (0.57)	7.41	.001**	.02
Progesterone-Related Experiences	2.00[ab] (0.58)	1.56[a] (0.50)	1.65[b] (0.52)	33.51	.001**	.09
Negative Sexual Experiences – Others	2.02 (0.84)	2.06 (0.92)	2.11 (0.86)	1.29	.276	.001
Negative Sexual Experiences – Self	2.09 (1.08)	2.07 (1.15)	2.05 (1.03)	0.06	.942	.000

	M (*SD*)			*F* (2, 705)	*p*	Partial η^2

Dependent Variable	Menstrual (n = 167)	Periovulatory (n = 206)	Premenstrual (n = 335)			
Supplementary Subscales						
Negative Weight Experiences	3.03 (1.41)	2.79 (1.32)	2.94 (1.28)	1.64	.194	.01
Positive Affect	2.71[a] (0.79)	2.89[a] (0.79)	2.80 (0.73)	2.45	.087[†]	.01
Elation	2.75 (0.82)	2.91 (0.85)	2.86 (0.80)	1.98	.139	.01
Positive Physical Experiences – General	2.67 (0.65)	2.66 (0.62)	2.65 (0.63)	0.07	.936	.000
Positive Skin Experiences	2.43 (1.06)	2.62 (1.04)	2.51 (1.01)	1.52	.221	.004
Positive Digestion Experiences	3.06 (0.92)	2.99 (0.94)	3.04 (0.93)	0.35	.708	.001
Positive Breast Experiences	2.78 (1.09)	2.81 (1.02)	2.75 (1.05)	0.27	.762	.001
Positive Weight Experiences	2.12 (0.93)	2.08 (0.86)	1.99 (0.85)	1.47	.232	.01
Positive Appetite Experiences	2.37 (1.01)	2.57 (0.96)	2.43 (1.10)	2.14	.194	.01

Note. Women's REP = Women's Reproductive Experiences (REP) Questionnaire. Within rows, each subscript letter "a" through "c" denotes a significant pairwise comparison at $p < .05$.

[d]ns = 100, 128, and 210 (df = 2, 435) women in a relationship respectively.

[†]$p < .10$. *$p < .05$. **$p < .01$.

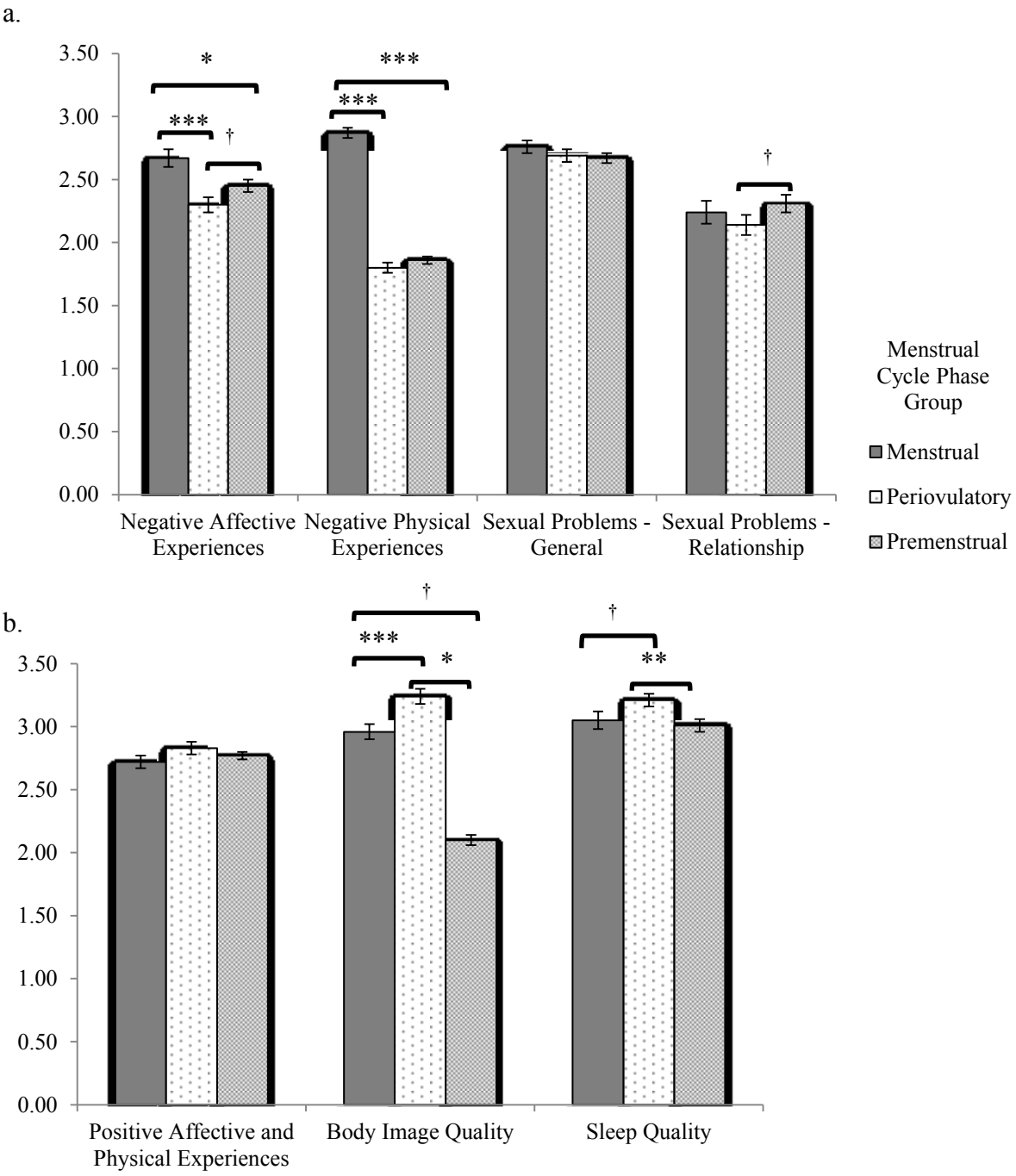

Figure 2.7. Mean scores for the main scales of the Women's Reproductive Experiences (REP) Questionnaire as a function of menstrual cycle phase group for (a) negatively valenced scales and (b) positively valenced scales (*ns*[a] = 167, 206, and 335, respectively). Errors bars represent standard error of the mean.

[a]*n*s = 100, 128, and 210 women in a relationship, respectively.

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

Main subscales. The combined 12 main non-relationship subscale scores differed by group, F (24, 1390) = 3.33, $p < .001$, partial $\eta^2 = .05$. Univariate ANOVAs indicated a significant effect of group on four of these 12 subscales: Hormonal Symptoms, General Aches and Pains, Negative Body Image Experiences, and Negative Sleep Experiences (see Table 2.14). The group effect was not significant for Positive Affective Experiences scores.

Pairwise comparisons indicated that Hormonal Symptoms, General Aches and Pains, and Negative Body Image Experiences, and Negative Sleep Experiences scores were all higher in the menstrual phase group than the periovulatory phase group, ps = .012 to < .001. Scores on the Negative Body Images Experiences and Negative Sleep Experiences were also higher among women in the premenstrual phase compared to the periovulatory phase, ps = .024 and .006.

Among women in a relationship, there was no significant group effect for the combined Sexual Problems – Relationship subscale scores, F (4, 870) = 1.15, $p = .331$, partial $\eta^2 = .01$. However, pairwise comparisons showed that women in the periovulatory phase had significantly higher Positive Sexual Experiences – Relationship scores than women in the premenstrual phase (see Table 2.14).

Supplementary subscales. The combined 13 supplementary subscales differed by menstrual cycle phase group, F (26, 1388) = 3.79, $p < .001$, partial $\eta^2 = 0.07$. There were significant univariate group effects for Testosterone-Related Experiences and Progesterone-Related Experiences (see Table 2.14). Pairwise tests showed that both Testosterone-Related Experiences and Progesterone-Related Experiences scale scores were higher in the menstrual phase compared to the other two phases, ps = .001 to < .001.

Conception probability and hormone estimates. As seen in Table 2.15, conception probability was related in the directions that would be expected for all of the main scale scores.

Similarly, both estrogen and testosterone were positively related to the positively valenced scales and negatively related to the negatively valenced scales. Although not significant, correlations with both the Sexual Problems – General and – Relationship scores tended to be in the predicted directions. LH and FSH estimates were positively related to Sleep Quality scores. Progesterone estimates were negatively related to Sleep Quality. Relationships between all subscales and the conception probability as well as hormones estimates are also found in Table 2.15.

Summary. Scores on negatively valenced scales, including Testosterone-Related and Progesterone-Related Experiences tend to be highest among women in the menstrual phase compared to periovulatory phase. They also tend to be negatively related to conception probability, estrogen, testosterone, LH, and FSH level estimates and positively related to progesterone level estimates. Means for the premenstrual phase group appeared to the middle of the other two groups, although differences were often not significant. In general, group differences on positively valenced scales were also not significant. Exceptions included Positive Sleep Experiences and Positive Sexual Experiences – Relationship scores, which were higher in the periovulatory versus premenstrual phase group. Also, positively valanced scales tended to be positively correlated with conception probability, estrogen, testosterone, LH, and FSH level estimates and negatively correlated with progesterone level estimates. Lastly, the specific positive physical experiences scales and sexual experiences scales (positive or negative, general or relationship specific) were not significantly related to estimates of conception probability and reproductive hormones.

Pseudo-cycle phase groups. Among OC users, the effect of cycle phase group on the combined six non-relationship scales was not significant, F (12, 500) = 1.08, p = .378, partial η^2 = .03 (ns = 67 women in the menstrual phase, 82 in the periovulatory phase, and 18 in the

Table 2.15

Correlations of the Women's REP Scales and Subscales with Conception Probability and Hormone Level Estimates among Free-Cycling Women of Reproductive Age (n = 879)

Variable	CP	E	P	T	LH	FSH
			Scales			
Negative Affective Experiences	-.10**	-.09**	.01	-.13**	-.04	-.01
Negative Physical Experiences	-.12**	-.11**	-.03	-.12**	.01	.03
Sexual Problems – General	-.03	-.05	-.04	-.03	-.04	.03
Sexual Problems – Relationship[a]	-.07	-.06	.04	-.05	-.05	-.05
Positive Affective and Physical Experiences	.06[†]	.06[†]	.01	.10**	.001	.06
Body Image Quality	.11**	.11**	-.02	.09*	.09*	.04
Sleep Quality	.07*	.03	-.10**	.07*	.08*	.08*
			Subscales			
Hormonal Symptoms	-.12***	-.12**	-.04	-.12***	-.04	.05
Decreased Appetite	-.01	.01	-.004	-.02	-.02	.02
General Aches and Pains	-.10**	-.08*	-.003	-.11**	-.05	-.004
Negative Sexual Experiences – General	-.03	-.05	-.02	-.03	.02	.03
Negative Sexual Experiences – Relationship[a]	-.06	-.04	.05	-.04	-.04	-.05
Negative Body Image Experiences	-.13***	-.11**	.01	-.09**	-.06[†]	-.01
Negative Sleep Experiences	-.08*	-.05	.08*	-.08*	-.07*	-.05
Positive Affective Experiences	.07*	.08*	.01	.11**	.06	.05
Positive Physical Experiences	.01	-.003	-.02	.05	.01	.03
Positive Sexual Experiences – Others	.001	.02	.06[†]	-.02	-.03	-.05
Positive Sexual Experiences – Self	.02	.03	.04	.05	.01	-.002
Positive Sexual Experiences – Relationship[a]	.07	.07	-.03	.05	.05	.04
Positive Body Image Experiences	.06[†]	.07[*]	-.03	.06[†]	.09**	.08*
Positive Sleep Experiences	.02	-.03	-.09**	.03	.07*	.10**
			Supplementary Subscales			
Testosterone-Related Experiences	-.08*	-.06[†]	-.01	-.07*	-.02	.04
Progesterone-Related Experiences	-.15***	-.17***	-.08*	-.17**	-.07*	.05
Negative Sexual Experiences – Others	-.05	-.06	-.03	-.04	.01	.02

Variable	CP	E	P	T	LH	FSH
Supplementary Subscales						
Negative Sexual Experiences – Self	-.001	-.02	-.01	-.01	.02	.02
Negative Weight Experiences	-.06†	-.09**	.001	-.06†	-.07*	-.01
Positive Affect	.07*	.07†	-.003	.11**	.06	.04
Elation	.06†	.09**	.04	.09**	.06	.03
Positive Physical Experiences – General	.03	.004	-.003	.05	.05	.07*
Positive Skin Experiences	.05	.08*	.01	.03	.05	.01
Positive Digestion Experiences	.002	.02	.05	.04	.02	.02
Positive Breast Experiences	.01	-.003	-.02	.05	.01	.03
Positive Weight Experiences	.02	.04	-.04	.04	.08*	.19**
Positive Appetite Experiences	.06†	.04	-.05	.03	.06†	.06†

Note. Women's REP = Women's Reproductive Experiences (REP) Questionnaire. CP = conception probability (based on cycle regularity). E = estradiol. P = progesterone. T = testosterone. LH = luteinizing hormone. FSH = follicle-stimulating hormone.

[a]*n* = 532 women in a relationship.

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

premenstrual phase). The effect of phase group on Sexual Problems – Relationship scores was not significant either, F (2, 182) = 0.28, p = .759, partial η^2 = .003. Among other HC users, the combined six scores also did not significantly differ by cycle phase groups in the MANOVA, F (12, 150) = 1.04, p = .413, partial η^2 = .08 (ns = 19 women in the menstrual phase, 25 in the periovulatory phase, and 38 in the premenstrual phase). Among HC users in a relationship, Sexual Problems – Relationship did not significantly differ between the three cycle phase groups, F (2, 52) = 1.01, p = .371, partial η^2 = .04. Due to the non-significant MANOVA results, means for the pseudo-cycle phase in OC and other HC users are not presented and follow-up ANOVAs were not examined.

Discussion

The main purpose of Part 2 was to examine differences between reproductive and hormonal status groups on the scores of the Women's REP as potential evidence of concurrent validity for the measure. Given that pregnancy, postpartum, and menopause tend to be associated with more extreme or eventful reproductive, hormonal, and lifestyle changes, it is perhaps njot surprising that women in these groups had some relatively high and low scores on the scales compared to free-cycling, copper IUD users, OC users, and other HC users. The largest group differences tended to be between pregnant and menopausal women, very distinct hormonal events. Pregnant women had scores indicative of adverse physical experiences, including Progesterone-Related Experiences, and poor sleep quality. Pregnant women also had scores indicative of elation and negative body image experiences as well as low negative and high positive sexual experiences in the contexts of a primary relationship and masturbation (alone). This might suggest that they were excitedly awaiting the arrival of their babies, struggling with the changes to their bodies that accompany pregnancy, and content with their sex lives, things

one might expect when expecting (Murkoff & Mazel, 2008). Women in the postpartum period reported negative body image experiences and poor (low positive) sleep experiences as well but also, negative sexual experiences, which seems to make sense in the context of having recently given birth (e.g., Barrett, Pendry, Peacock, Victor, Thakar, & Manyonda, 1999). In this study, menopause, a time of typically low and stable reproductive hormone levels, was associated with low scores on many negative experiences scales with the exception of scores indicative of more negative and less positive sexual experiences. These results are also consistent with what is known about the menopausal versus perimenopausal period (e.g., Burri, Hilpert, & Spector, 2015; Hilditch et al., 1996). Lastly, OC users had better (i.e., less negative or more positive) scores than non-users (see Oinonen & Mazmanian, 2002; Sanders et al., 2001) and other HC users, who tended to have scores in the middle of the groups (as did copper IUD users). This study appears to be unique in its comparison of these four groups of women based on HC status. Overall, effect sizes of significant reproductive status group differences in the full sample were small, ranging from .01 to .03.

For women of reproductive age, it was expected that regularly cycling women and women in the periovulatory phase would have lower negative experiences and higher positive experiences scores than non-regularly cycling women and women in the menstrual and premenstrual phases. Similarly, it was predicted that negative experiences scores would be negatively related, while positive experiences scores would be positively related, to conception probability, estrogen, testosterone, LH, and FSH estimates. Progesterone estimates were expected to show the opposite relationships. Some support was found for each of these predictions. In particular, regularly cycling women appeared to have better health and quality of life, both low negative and high positive experiences, than amenorrheic and irregularly cycling

women. In general, this finding is consistent with previous health and well-being research, including on polycystic ovarian syndrome (e.g., Harlow, Cohen, Otto, Spiegelman, & Cramer, 2004; Jacobs, Boynton-Jarrett, & Harville, 2015; McCook, Bailey, Williams, Anand, & Rame, 2015; Weller & Weller, 2002). However, it is noteworthy that of all the between-subjects analyses conducted in Part 2 of Study 1, the number of significant findings were, and the effect sizes (.01 to .05) tended to be, largest when examining the Women's REP scales as a function of cycle regularity. Thus, the Women's REP appears particularly useful in assessing the health benefits or sequelae of the presence or absence of cycle regularity.

With respect to the menstrual cycle, it is first worth noting that this study appears to be one of the first to provide data on interrater reliability for estimates of cycle day and phase. The results suggested that the reliability of a given rater would be .88, providing some support for day and phase classifications. Overall, negative experiences tended to be high among women who were menstruating compared to women in the periovulatory phase, with women in the premenstrual phase having scores in the middle of these groups. Effects sizes ranged from .01 to .09. These results suggest that menses, a time of menstrual bleeding and relatively low hormone levels, may be associated with negative affective and physical experiences to the same or a greater extent than the phase that is commonly conceptualized as symptomatic or adverse, the premenstrual phase (see Romans et al., 2012 for a relevant review). In contrast, positive or less negative experiences, namely those related to positive affect, body image, and sleep, tended to be higher among women in periovulatory phase compared to the other two phases. It is possible that results would be different in a sample of women experiencing clinically significant changes across the cycle however.

The results pertaining to menstrual cycle phase were specific to free-cycling women

given that, as expected, OC and HC users showed attenuated non-significant phase group differences (see also Graham & Sherwin, 1993). The latter finding may be suggestive of positive effects and stabilization effects of HCs on well-being, at least among those who do not discontinue due to adverse side effects (Jarva & Oinonen, 2007; Oinonen & Mazmanian, 2001; Oinonen & Mazmanian, 2002; Sanders et al., 2001).

Correlations between the scales and both estimates of conception probability and sex hormones were generally as expected but small in size (|.07 to .19|). It is important to note that a limitation of such estimates is that they involve potential unsystematic sources of error or noise, which may reduce the likelihood or strength of relationships (Garver-Apgar, Gangestad, & Thornhill, 2008; Puts, 2006), which is a reason why both phase group (between-subjects) and correlational analyses were examined. It was surprising, however, that scores on the Testosterone-Related and Progesterone-Related Experiences subscales were negatively related to conception probability and hormone levels. Combined with the finding that the latter scores were highest in pregnant women compared to most other women, the results pertaining to menstrual cycle data suggest that scores on these scales likely reflect changes in testosterone or progesterone levels or extreme levels (low or high as opposed to just high). These findings seem to support the appropriateness of the labels involving the term "related" given to these two subscales (as opposed to just "testosterone experiences," for example, which implies high hormone levels).

Interestingly, while the negative experiences scales and subscales showed significant differences across all group comparisons, the positive affective, sexual, and physical scales and subscales tended to show fewer significant or ubiquitous findings (between groups and across group comparisons, respectively) and thus, perhaps specificity in results. As mentioned in Part 1,

it is possible that the non-significant findings represent true negative group differences. These findings may suggest that positive experiences are strengths that women have even when experiencing negative symptoms or they may be the result of sociocultural bias toward negative experiences (e.g., Christler et al., 1994; cf., Gallant, Hamilton, Popiel, Morokoff, & Chakraborty, 1991). For instance, women may not notice changes in positive experiences as readily as adverse ones (cf., Meaden et al., 2005) and when they do notice such changes, it may suggest that the condition is relatively high in severity or strength. Another explanation might be that there are different patterns of well-being in response to reproductive events (see Bancroft, 1995; Warner & Bancroft, 1988; Davydov, Shapiro, & Goldstein, 2004; Kiesner, 2011; Reiber, 2009; Teatero et al., 2013; Teatero, Oinonen, Mazmanian, & Streutker, 2015). For example, some postpartum women experience low mood, some elation, and still others, no appreciable change in affective experiences (see reviews in Bloch et al., 2000; O'Hara & Wisner, 2014; Pope, Sharma, & Mazmanian, 2014). If they exist, such patterns would be masked by analyses of average differences or changes, which may be a weakness of cross-sectional studies in general. This possibility is examined in Study 2 with respect to menstrual cycle shifts. Overall, the inclusion of positively valenced items and scales may help identify areas of strong, normal, or particularly poor functioning in women who are having negative experiences.

Similarly, the measurement of specific facets and subscales (e.g., of sexuality, including one's autosexuality, socio- or allosexuality, and primary relationship) in one measure seems useful. For example, sexual experiences with someone other than a romantic relationship partner and pertaining to masturbation constituted separate factors from sexual experiences with a primary partner. This finding might suggest that if a woman's score on the Sexual Problems – Relationship scale is indicative of sexual problems but the Sexual Problems – General score is

not, the negative experiences or lack of positive experiences may be due to relationship issues rather than biological dysfunction. In this sense, patterns of scores on this measure may be useful for self-help and treatment recommendations.

Although the effect of group or association for many significant analyses was consistent with expectations or other research, only a small amount of variance in Women's REP scores tended to be explained. This finding may be accounted for by the self-report and non-clinical nature of the groups, or perhaps by the facts these groups were formed naturally in the data and none of them were recruited according to their negative (or positive) symptoms and experiences. Specifically the recruitment of groups of women who are having current hormone-related difficulties (e.g., perimenopausal symptoms that tend to be treated with hormone-replaced therapy, postpartum depression, and postpartum hypomania/psychosis group) would likely result in the Women's REP explaining more variance in the group differences. An examination of the means within the reproductive and hormonal groups suggested that scores on the Women's REP tended to be in the *mild* to *moderate* range with respect to the level of negative and positive experiences, as would be expected in a community sample. Also related to Part 1 of this study, confirmation of reproductive/hormonal status or condition diagnosis as opposed to self-report may be important in future research given that some women who report PMS do not prospectively demonstrate it (e.g., Longue & Moos, 1988; Rubinow et al., 1986) and given the survivor effect, women using HCs in cross-sectional studies may differ from previous users who discontinued due to adverse side effects (Sanders et al., 2001). The latter point is actually consistent with OC users reporting some better reproductive experiences than non-users in the present study.

It is also likely that (a) preexisting differences between women who do or do not

experience an elective reproductive event such as using an HC and pregnancy (e.g., Bancroft, Sherwin, Alexander, & Davidson, & Walker, 1991; Oinonen, Jarva, & Mazmanian, 2008) and (b) sociocultural expectations and lifestyle changes at the various reproductive events affect cross-sectional differences between hormonally relevant groups. Regardless, the group differences presented here provide evidence for the concurrent validity for Women's REP. Large effect sizes would not be anticipated in this community study because the magnitude of the reproductive experiences of the women represented is low as demonstrated by the sample means.

Overall, this study is one of the first to provide strong evidence that reproductive events are related to various negative *and positive* experiences. In taking a continuum-based perspective, the term "experiences" was used in the Women's REP instead of "symptoms," which tends to be used in reference to adverse rather than positive symptoms. This was done to use less clinical or pathologizing language that better reflects the lived experiences of women in the general population across their adult lives (King & Ussher, 2012). A future step in research on the Women's REP might be to invite women to provide feedback regarding the reading level, language/labels, and user-friendliness of the measure.

Conclusions

This study provides some evidence of the reliability and concurrent validity of the Women's REP, a questionnaire that can be used with women of all ages to examine affective, sexual, and physical reproductive experiences. The Women's REP is unique in its assessment of not only negatively but also positively valenced experiences. It also appears to be distinct in its assessment of broad areas of reproductive experiences (i.e., the main scales; e.g., Negative Physical Experiences) to specific areas of functioning (i.e., the main and supplementary subscales; e.g., Decreased Appetite, General Aches and Pains, Testosterone-Related

Experiences, and Progesterone-Related Experiences). Based on the strengths of the Women's REP, it is anticipated that it has potential for use by researchers and clinicians with non-clinical and clinical populations. Although it is not a disorder-specific scale, it may have utility as a screening measure with 134 items that can be completed in about 20 minutes and in assessing differences between women's (e.g., the extent to which cycle regularity affects functioning) as well as change over time (e.g., across the menstrual cycle, before and after pregnancy, during the menopausal transition, and pre- and post- hormone use or treatment). Factor analysis revealed seven scales, 14 subscales, and 13 supplementary subscales that correspond reasonably well to rationally derived content domains and were internally consistent. Scores on these scales and subscales may also help lead to clarification of patterns of experiences and symptoms at a given reproductive event, associations among the reproductive events, and thus, HSS (hormonal sensitivity syndrome).

The results of both Part 1 and Part 2 should be considered in the context of several limitations and strengths of the present study. Although the sample was recruited predominantly from the Internet community (as opposed to a random sample), the number of participants was large, over 1900. Also, the sample was diverse, varying widely in age, ethnicity, continent of residence, and reproductive experiences/events across the female lifespan, as planned. Most relevant studies are specific to one limited period of time in a woman's life (e.g., Buttner et al., 2012, postpartum period; Stone et al., 2013, perimenopause) or consist of university samples of relatively young women (i.e., free-cycling or HC using women of reproductive age e.g., Haywood et al., 2007; Kiesner, 2011; cf., Meaden et al., 2005). Limitations might include that the various groups and experiences examined herein were based on self-report alone (e.g., see O'Sullivan, 2008) and a measure of response bias or set was not used. However, women's self-

reports of conditions such as current hormonal disorders, HC side effects, and PMS are arguably important (and reflective of their lived experiences; King & Ussher, 2012). The proportions of women who reported reproductive/hormonal statuses or experiences are likely representative of women from the online community given that online studies have been found to provide valid data (e.g., Gosling et al., 2004). In addition, participants who appeared to exhibit a response set (based on a thorough examination of the raw data by the author) were excluded and in general, the study results were not consistent with a negative or positive response bias to the items of the Women's REP.

Overall, women who differed in current hormonal problems, HC side effects, PMS, reproductive status, cycle regularity, cycle phase, conception probability estimates, and sex hormone estimates differed on relevant scales of the Women's REP. Further study and refinement of the measure is warranted. The test-retest reliability, further evidence of concurrent validity, construct validity, and menstrual cycle-related change of the Women's REP will be assessed in a separate longitudinal study (see Study 2 of this dissertation). The results reported herein are important in that they provide evidence of the usefulness of such a comprehensive measure as well as of the scales that may represent women's reproductively related or hormonally mediated experiences across the adult lifespan.

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Chapter 3:

Study 2:

Not in the Mood Tonight?

Patterns in Menstrual Cycle-Related Affective Experiences and Sexual Proceptivity

Abstract

Research and theory suggest that there may be paradoxical menstrual cycle patterns in both women's affective well-being (e.g., premenstrual syndrome [PMS] and negative symptoms around ovulation) and mating tactics (e.g., the ovulatory shift and the periovulatory sociosexual

tactic shift [PSTS] hypotheses). Patterns in affect and sexuality may have evolved to co-occur if being in a good mood facilitates being "in the mood" for sex. There is a dearth of evolutionary and prospective research on this possibility, particularly that which includes all of negative affect (NA), positive affective (PA), and sexual experiences. Part 1 of this paper reports on the psychometric properties as well as between- and within-women relationships between two new measures: The Women's Reproductive Experiences (REP) Questionnaire and the Prospective and Receptive Mating Strategies Scale (PARMSS). Both questionnaires demonstrated good test-rest reliability and evidence of concurrent, convergent, and divergent validity (Part 1; $n = 327$). In Part 2, within-women patterns of NA, PA, and sexual proceptivity across the periovulatory and premenstrual phases among naturally cycling women ($n = 41$) were examined. Support was found for the existence of two groups who show opposing patterns of change differentiated by the phase in which they experience higher NA, lower PA, and lower proceptivity: (1) a PMS pattern in 61% of women and (2) what is proposed to be a periovulatory syndrome (POS) trajectory among 39% of women. Consistent with the PSTS theory and accumulating evidence (e.g., three other studies), women who showed the POS pattern were more unrestricted than women who showed a PMS pattern. Future research should continue to examine the possibility of at least two phenotypes of psychosexual change across the menstrual cycle. A focus on diversity in women's reproductive experiences may help prevent pathologization of normal female experiences.

Not in the Mood Tonight?

Patterns in Menstrual Cycle-Related Affective and Sexual Proceptivity

In health research, an emerging theme with respect to reproductive and hormonal experiences is variability between women. From menarche to menopause, different women seem

to have different affective, sexual, and physical responses (i.e., symptoms, side effects, and experiences) to the same reproductive events (Kiesner & Poulin, 2012). These differences have been found for both the strength and valence (positive or negative) of women's experiences (Bancroft & Graham, 2011; Kiesner, 2011). Unfortunately, negative experiences and among women of reproductive age, the premenstrual phase are often the focus of this type of research, to the neglect of positive experiences and the periovulatory phase (Meaden, Hartlage, & Cook-Karr, 2005). What appears to be the only measure of women's negative and positive experiences designed for use across the adult lifespan, the Women's Reproductive Experiences Questionnaire (Women's REP), was shown to have good psychometric properties (Study 1 herein) and thus, may have potential for delineating patterns of experiences across the menstrual cycle.

Interestingly, in evolutionary research, there is some evidence of differences between women as well as within-women plasticity in mating strategies (e.g., paradoxical menstrual cycle shifts among different women). As an example of the latter phenomenon, one study found that two groups of women shifted away from their primary restricted or unrestricted sociosexual orientation around ovulation (Oinonen, Klemencic, & Mazmanian, 2008). In this type of research, the focus (i.e., the independent variable) is generally women's naturally cycling fertility[24], which is maximal around ovulation, and sexuality (as the dependent variable) rather than health and well-being per se. A recently developed measure, the Proceptive and Receptive Mating Strategies Scales (PARMSS; Phillips, 2015), appears to be the only comprehensive measure of both receptive and proceptive sexuality using a common metric and was designed from an evolutionary perspective. Receptivity and proceptivity seem to be separate constructs

[24] It should be noted that the majority of the research reviewed on changes across the menstrual cycle in affective, sexual, and physical experiences was conducted with women not using hormonal contraception (HC) given that HCs suppress fertility and are also associated with different patterms of experiences among women (see Bancroft & Graham, 2011 for a review).

and may have confounded previous findings on mating strategies and tactic changes. Overall, the PARMSS has shown some evidence of reliability and validity in a single study (n = 63; Phillips, 2015; Study 1) and has been used in examining relevant patterns of menstrual cycle shifts (n = 23; Phillips, 2015; Study 2). One of the goals of the present study was to address the need for additional psychometric and menstrual cycle data for the PARMSS.

In an effort to combine, and address gaps in, the areas of health and evolutionary research, the present paper further examines the psychometric properties, namely test-retest reliability, construct validity, and interrelationships of these two new measures (Part 1). Also in Part 1 of the present study, analyses involving differences between women of various reproductive and hormonal status groups from Study 1 of this dissertation were replicated to further examine the concurrent validity of the Women's REP and explore differences between the groups on the PARMSS. In Part 2, the possibility of different within-women menstrual cycle patterns in negative affective experiences, positive affective experiences, and proceptivity was investigated. Overall, as will be detailed below, the rationale for conducting this study came from fairly discrete areas of research indicating various menstrual-cycle related patterns of: (a) negative reproductive experiences; (b) positive reproductive experiences; and (c) mating tactics; as well as (d) co-variation of, or links between, affective and sexual experiences.

Negative Reproductive Experiences

Over 200 different adverse symptoms associated with the menstrual cycle, particularly the premenstrual phase, have been identified since the 5th century B.C.E. (see Dell & Svec, 2003; Halbreich, 1997). Research since the 1980s has consistently suggested that a substantial

proportion of women worldwide (i.e., 40 to 80%) report at least some mild premenstrual symptoms (Cunningham, Yonkers, O'Brian, & Eriksson, 2009; Reiber, 2009; but see Romans et al., 2012). Premenstrual syndrome (PMS involves at least one adverse physical or psychological experience that appears in the *two weeks prior* to, and remits following, the onset of menstruation (American College of Obstetricians and Gynecologists, 2000; O'Brien et al., 2011). Examples of such psychological and physical experiences include mood lability, low mood, and low sex drive as well as breast swelling and tenderness, abdominal cramps, and headaches (Speroff & Fritz, 2005). These findings suggest that the relatively high levels of progesterone in the premenstrual phase may be related to an increase in negative affective, sexual, and physical experiences. While no one specific hormone or hormonal profile has been consistently associated with PMS symptoms (see Andréen et al, 2009), there is evidence that changes in the hormonal milieu across the menstrual cycle may have direct effects on psychological experiences even though psychological and physical symptoms tend to be associated (e.g., Kiesner, 2009). Overall, the term PMS is often controversially used in reference to non-clinical experiences (Chrisler & Caplan, 2002; Romans et al., 2012).

Given that women become more at risk for depressive disorders around menarche until menopause, one factor proposed to underlie negative experiences associated with the menstrual cycle as well as other reproductive events across the lifespan is hormonal sensitivity. It is generally agreed that some women are more psychologically or physically sensitive to changes in, or levels of, sex hormones such that they experience an increase or decrease in adverse experiences (see Bloch et al., 2000 and Schmidt, Nieman, Danaceau, Adams, & Rubinow, 1998 for seminal studies). Given that negative experiences at the various reproductive events tend to be associated, it has also been proposed that the effects of hormonal changes across the lifespan

may underlie what has been referred to as reproductive mood disorder(s) (e.g., Payne, Tietelbaum Palmer, & Joffe, 2009) and hormonal sensitivity syndrome (HSS; Pope, Oinonen, Mazmanian, & Stone, 2015). For some women, symptoms may go through a process of kindling or sensitization across reproductive events (Parry & Newton, 2001), beginning with prenatal exposure in utero as suggested by digit ratio research (Oinonen, 2009; Oinonen & Bird, 2012). That is, reproductive experiences may depend on organizational (permanent) and activational (acute) effects of hormones. A likely explanation for these findings is genetic predisposition for altered neurotransmitter activity or sensitivity to neuroendocrine changes given that only a portion of women experience some adverse effects associated with reproductive events such the premenstrual phase (Steiner, Dunn, & Born, 2003; Gillings, 2014).

In fact, with respect to proximal differences between women with and without PMS, there have been few, if any, robust findings (see Miller et al., 2010). For instance, there have been no consistent biological markers identified (Steiner et al., 2003). Some studies have found that PMS or premenstrual dysphoric disorder is associated with earlier age at menarche (AAM), less education, working outside the home, being married or cohabitating, less frequent marital problems, and parity whereas others have not found such significant differences between women with and without these problems (e.g., Cohen et al., 2002; Reiber, 2009; Sanders, Warner, Bäckström, & Bancroft, 1983; Soares, Cohen, Ott, & Harlow, 2001; Warner & Bancroft, 1988). Overall, more research is needed on individual differences and cyclic shifts in negative experiences, particularly with respect to quantifying hormonal sensitivity along a continuum of severity.

It is intriguing that while health research has largely focused on PMS, other cyclic patterns of negative experiences have also been reported in the literature since the 1980s (e.g.,

Abraham, 1980). This fact has led some researchers and clinicians to suggest that there are menstrual cycle syndromes (Halbreich, 1995) and a variety of menstrual cycle-related problems (Bancroft, 1995). Essentially, there has also been notable variability in results between and within retrospective, between-subjects, qualitative, and prospective reports on negative experiences and the cycle (Warner & Bancroft, 1988; Teatero, Mazmanian, & Sharma, 2014; Romans, Clarkson, Einstein, Petrovic, & Stewart, 2012). In particular, it has been suggested that, "one's woman's low is another's woman's high" (Kiesner, 2011, p. 68). The results of at least ten prospective studies have suggested that some negative experiences may peak around ovulation for some women (Hardie, 1997; Kiesner & Poulin, 2012; Kiesner & Pastore, 2010; Parlee, 1982; Ross, Coleman, & Stojanovska, 2003; Sveinsdóttir & Reame, 1991; Van Goozen, Wiegant, Endert, Helmond, & Van de Poll, 1997), which has been referred to as a reverse PMS (Sveinsdóttir & Bäckström, 2000), pseudo-PMS (Reiber, 2009), and a mid-cycle (Kiesner, 2011) pattern.

For example, Kiesner (2011) demonstrated that the majority of first-year female university students sampled showed a PMS pattern of change in depression/anxiety across two consecutive menstrual cycles (n = 130 of 213) but also that 13% showed a paradoxical peak in the periovulatory phase. Only 26% of women did not display significant change in daily self-ratings of symptoms. On the basis that the women who did not show a significant change had a higher mean depression/anxiety score than the women with the strongest PMS pattern, it was suggested that the latter group may experience more positive affect or well-being, particularly around ovulation. In other words, changes in negative versus positive affect across the cycle may be opposing compensatory processes.

Similarly, while it has commonly been shown that headaches increase in the menstrual phase in some women, there are a few studies indicative of a mid-cycle (periovulatory) pattern of headaches. In fact, 51% and 16% of women in Kiesner and Martin (2013) showed menstrual and mid-cycle headache patterns, respectively. These patterns were significantly associated with the patterns of depression/anxiety previously identified by Kiesner (2011) such that 54% of women who exhibited the menstrual or mid-cycle patterns of headaches also exhibited the premenstrual or mid-cycle patterns, respectively, of depression/anxiety. In a third report, Kiesner (2013) found that the PMS group from the 2011 study retrospectively reported more hard alcohol use and less negative affective and sleep responses to alcohol use compared to the paradoxical mid-cycle group.

As outlined by Kiesner and Martin (2013), sampling and measurement bias in previous research has tended to preclude the identification of *patterns* of symptom changes across the menstrual cycle by: (a) excluding women who do not report PMS; (b) using perimenstrual-specific measures; and (c) only considering one average pattern in a sample of women thereby overlooking individual differences. A strength of Kiesner (2011) was the examination of individual (random) longitudinal growth curve effects using multilevel level modeling (MLM). However, the absence of negative affect is not necessarily the same as the presence of positive affect (Watson, 1988). Furthermore, single items of depression/anxiety, instead of scale measures with adequate psychometric properties, were employed. Thus, further examination of negative *and* positive experiences across the cycle seems warranted.

Positive Reproductive Experiences

Although changes in positive affect across the menstrual cycle were recognized as early as 1937 (McCance, Luff, & Widdowson), it is clear that biases towards a focus on changes in

negative experiences and the premenstrual period have pervaded the literature (Meaden et al., 2005). Early reviews of research on positive changes across the cycle suggested that well-being tends to be highest around ovulation (e.g., Dennerstein & Burrows, 1979; cf., Abplanalp, Haskett, & Rose, 1980). In 1982, Parlee showed that some woman may experience what was referred to as premenstrual elation syndrome and in 1984, Abraham called for the study of positive symptoms in the periovulatory phase, facetiously using the phrase postmenstrual syndrome.

A recent review of 26 prospective studies of positive affective experiences across the cycle (Teatero, Oinonen, Mazmanian, & Streutker, 2015) indicated that eight of these studies (31%) did not find significant differences in mean levels of positive affect between phases (e.g., Abraham Luscombe, & Soo, 2003). Twelve studies (46%) reported a peak in positive experiences outside of the premenstrual phase, typically around ovulation (e.g., López, Verdejo, Javier, Martin, & Gómez-Amor, 2010). The results within each of the remaining six studies (23%) revealed more than one pattern of change, namely paradoxical shifts among different women or cycles. Unfortunately, the one study that was able to identify different groups of women who exhibited specific patterns of experiences across the cycle only included women with PMDD (Rivera-Tovar, Pilkonis, & Frank, 1992).

However, in a series of reports using MLM, Davydov and colleagues (2004; 2005; 2007) found that personality (anger expression, anxiety, and hostility), stress hormone levels, and work- versus non-work day moderated changes in affect valence (i.e., happiness, sadness, anxiety, stress, or tiredness) across the cycle. The authors proposed that down-regulated or up-regulated physiological arousal might result in negative affective experiences, while mid-level arousal results in positive affective experiences. Relatedly, women with high emotional

sensitivity to bodily cues showed paradoxical patterns in negative and positive affect across the cycle, while other women did not display any phase effects (Schnall, Abrahamson, & Laird, 2002, Study 1) and biopsychosocial theories of PMS suggest that psychosocial stressors may disrupt biological rhythms and alter affective experiences (e.g., Steiner, 1992). These reports indicate that there may be different biological vulnerabilities associated with the diverse manifestations of experiences, both negative and positive, across the cycle (Bancroft, 1995) that are dynamically evolving with life experiences and stress (Halbreich & Monacelli, 2004). That is, cyclic shifts in experiences may vary between- and within-women (between-cycles) because they are dependent on genetics and current biological, psychological, and social conditions.

Overall, the psychoendocrinological research reviewed thus far indicates that there is evidence for more than one menstrual cycle pattern of reproductive experiences (see Teatero, Mazmanian, & Sharma, 2014 for a review with similar conclusions on the effects of the cycle on bipolar disorder). That is, there may be two phasic shifts in both negative and positive affect among subgroups of women. According to Pincus, Schmidt, Palladino, and Rubinow (2008), postmenstrual (periovulatory) euphoric mood may be compensatory to negative affect in the premenstrual phase like a rebound effect or opponent process. Thus, the hormonal sensitivity hypothesis may apply to both the strength/magnitude *and* the direction/valence of women's reproductive experiences (Kiesner, 2011). That is, some women may show increased negative experiences or decreased positive experiences, other women may show decreased negative experiences or increased positive experiences, and still others no changes related to the same hormonal event (e.g., menarche, HC use, pregnancy, the postpartum period, and perimenopause). In fact, while estrogen generally seems to have a positive effect on women's emotional well-being, estrogen, progesterone, and testosterone have all been found to have paradoxical effects

on different women (Andréen et al., 2009; Graham, Bancroft, Doll, Greco, & Tanner, 2007; Schmidt et al., 1998). These findings also suggest that researchers and clinicans should distinguish between reproductive experiences versus disorders to avoid pathologizing affective, sexual, and particularly physical changes at reproductive events that may be normal responses among all women to some extent.

In consideration of methodological issues, however, it is clear that most of the studies reviewed on negative and positive affect change across the cycle did not control for possible response biases or sets. Almost all of them employed inclusion criteria for health and "normal" menstrual cycle characteristics, but a wide variety of phase definitions and estimation procedures as well as measures or individual ratings were employed (see also Romans et al., 2012). For example, some studies on positive affect averaged women's reports across multiple cycles, reducing the probability of finding an effect if there is within-woman variability. It is a possibility, of course, that conflicting results between- and within- studies reflect a null or negative effect. Use of a new psychometric test designed to comprehensively measure women's negative and positive reproductive, including not only affective but also sexual (including relationship) and physical experiences, the Women's REP, may help clarify patterns of phasic change across the cycle and associated hormonal sensitivity.

It is noteworthy that there do not appear to be many studies in this area of research that examine the possibility that some positive, rather than only negative, *physical* experiences or changes take place across the cycle. Exceptions seem to include skin complexion and physiological sexual arousal, both of which may be enhanced in the periovulatory phase (e.g., Graham, Janssen, & Sanders, 2000; Farage, Neill, & MacLean, 2009). This is an area worth exploring in view of research on mating strategies reviewed next. Both positive and negative

changes in affective, sexual, and physical symptoms may influence attractiveness, sexuality, and time spent on other pursuits (e.g., eating and sleeping) across the cycle, which may be adaptive from an evolutionary perspective (Fessler, 2003).

Sociosexuality

In evolutionary psychology, a focus of psychoendocrinological research tends to be changes across the menstrual cycle, often referred to as the ovulatory cycle instead, as related to sexual selection. Importantly, a mating strategy, typically called one's sociosexual orientation or sociosexuality, is considered to be a set of implicit psychological mechanisms that manage an individual's overall sexual and reproductive efforts (Belsky, Steinberg, & Draper, 1991). On average, men tend to be more apt to engage in more unrestrictive (short-term) sexual pursuits and to initiate sexual activity than women, who tend to be more sociosexually restrictive, preferring sex in the context of long-term relationships (Schmitt, 2005; Vanier & O'Sullivan, 2011). These psychological differences may ultimately have evolved in relation to differences in parental investment due to sex differences in physiology (Trivers, 1972) for example but may also be related to or maintained in modern society by proximal biological, psychological, and social factors, such as sexual scripts (see O'Sullivan & Vannier, 2013; Thompson & O'Sullivan, 2012). However, it is also generally agreed that most species have evolved conditional mixed mating strategies, across and within the sexes. In fact, flexibility in this regard appears to be more advantageous than fixedness (Gowaty, 2013; Milich, Bahr, Stumpf, & Chapman, 2014).

Recent research is suggestive of opposing within-sex mating strategy phenotypes (Wlodarski & Dunbar, 2015; Wlodarski, Manning, & Dunbar, 2015). Based on three samples, both sociosexual orientation and second-to-forth digit ratio (2D:4D) appeared to be bimodally distributed in each sex, as opposed to normally distributed continuums (Wlodarski & Dunbar,

2015). That is, on average, men tend to be more sociosexually unrestricted and have higher 2D:4Ds than women (about 58 versus 47%) but both sexes show two phenotypes in these traits: (a) short-term (i.e., unrestricted or high prenatal androgen exposure) and (b) long-term (i.e., restricted or low prenatal androgen exposure) mating orientations (see also Jackson & Kirkpatrick, 2007). According to Wlodarski and Dunbar (2015), these two competing strategies may have evolved due to frequency-dependent selection such that the value of each strategy is inversely related to its frequency in the population and the extent that it is pursued is dependent on the fitness benefits for an individual.

The fact that significant differences have been found between individuals low and high in sociosexuality (and in 2D:4D) supports the notion of two mating strategy phenotypes. For instance, sociosexuality has been shown to be correlated with attractiveness, gender role or identity (self-perceived masculinity), alcohol expenditure, and mate preferences such as for attractiveness and social visibility (Clark, 2004; Teatero, 2009). One's mating strategy may not only depend on genetics and personal characteristics but also environmental context (e.g., disease prevalence; Schaller & Murray, 2008) and organizational and activational effects of hormones (e.g., prenatal testosterone exposure and reproductive events across the lifespan; see Gangestad, Thornhill, & Garver-Apgar, 2005). Moreover, there appears to be more variance in mating strategies within than between the sexes (Gangestad & Simpson, 2000). According to this strategic pluralism model as well as the dual mating hypothesis, women have developed a repertoire of tactics: (a) estrus around ovulation to obtain good genes through short-term sexual relationships (including with others than their primary partners) when fertile and (b) extended sexuality during the rest of the cycle to maintain good fathers and resources for their children through long-term romantic relationships (Pillsworth & Haselton, 2006). Given that mating

strategies seem to be multidimensional (e.g., long- and short-term orientations may be enacted concurrently or conditionally), measures have been developed to assess both long-term and short-term orientations as well as receptivity and proceptivity.

Overall, in opposition to health research, evolutionary research has tended to focus on the positive or increased experiences in the periovulatory phase. Some research has supported the ovulatory shift hypothesis that women are more attracted to indicators of genetic quality in men, particularly masculinity, in the periovulatory phase (see Gildersleeve, Haselton, & Fales, 2014 for a meta-analysis). Interestingly, women's attractiveness and sexual motivation (e.g., desire for men other than their partners and proceptivity) have also been found to be enhanced around ovulation (see review in Haselton & Gildersleeve, 2015).

However, in general, there have been inconsistent results between prospective studies on cyclic changes in women's mating tactics (Pillsworth, Haselton, & Buss, 2004; see Wood, Kressel, Joshi, & Louie, 2014 for a meta-analysis that did not find evidence of a significant effect of cycle phase on mate preferences). In fact, in both meta-analyses cited, there was statistically significant variability in the effect sizes of phasic shifts in mate preferences (i.e., Gildersleeve et al., 2014; Wood et al., 204) and, according to Wood and Carden (2014), over 30% of the effects were in directions opposite to the ovulatory shift hypothesis. Moreover, both the strength and direction of between-women and within-women effects of menstrual cycle phase on sexuality and mate preferences have been shown to be moderated by biological, personal, and contextual variables. Some of these moderating variables include the magnitude of cyclic within-women changes in estrogen (Roney, Simmons, & Gray, 2011), attractiveness (Haselton & Gangestad, 2006); masculinity (Johnston, Hagel, Franklin, Fink, & Grammer, 2001); as well as partner attractiveness and relationship satisfaction (Larson, Pillsworth, & Haselton, 2012;

Pillsworth, Haselton, & Buss, 2004). For example, Pillsworth et al. (2004) found that estimates of conception probability were positively related to general sexual desire but only among women in a relationship. Also among these women, the relationship between conception probability and desire for someone other than one's current partner strengthened as a function of relationship length. Among single women, the relationship between conception probability and sexual desire was not significant but appeared negative in direction.

There has also been some conflicting evidence with respect to direct hormonal predictors of women's sexual motivation. While testosterone has generally been thought to be positively related to sociosexuality (see Edelstein, Chopik, & Kean, 2011 for a partial review), levels of this hormone do not appear to be related to within-cycle changes in sexual desire and behaviour and while estrogen appears to be positively related to sexual behaviour, progesterone appears to inhibit desire and proceptivity across the cycle (Roney & Simmons, 2013). Interestingly, progesterone has also long been known to facilitate sexual behavior, particularly after estrogen priming, in some species, such as rats (Nelson, 2005) and different women have been shown to have decreased or increased sexual interest to the same hormonal changes across various reproductive events (e.g., Schmidt et al., 1998; Graham et al., 2007). Thus, although rarely considered in past research (but see Oinonen, Klemencic, et al., 2008), it is possible that different women show paradoxical hormone-related shifts in sociosexuality.

For example, Scarbrough and Johnston (2005) found that women with low (masculine) 2D:4Ds as well as those low in femininity displayed a periovulatory shift towards greater attractiveness to masculine faces. In contrast, women with high 2D:4Ds as well as those high on femininity shifted towards a diminished preference for masculine faces. This finding is relevant

in view of the fact that low 2D:4D has been shown to be related unrestrictiveness (e.g., Clark, 2004).

However, only two known studies have identified specific groups of women who exhibit different menstrual cycle patterns of sociosexuality. In 2008, Oinonen, Klemencic, et al. (2008) found preliminary evidence of two patterns of the ovulatory shift (i.e., two context-dependent phenotypes of mating strategy tactics): the periovulatory sociosexual tactic shift (PSTS). As measured by ratings of male faces, restricted women shifted towards greater one-night stand interest during the periovulatory phase. Unrestricted women displayed a trend towards diminished interest in one-night stands, a shift towards restrictiveness at the periovulatory phase, and generally rated the male faces as healthier than restricted women. In 2015, Phillips replicated the PSTS in her dissertation such that women high and low in sociosexuality exhibited different patterns of self-reported proceptivity (i.e., likelihood of initiating sexual activity rather than merely being receptive to it). This effect was strongest in women who were exclusively heterosexual (i.e., reported that they had no degree of same-sex attraction). Phillips used a newly developed psychometric test unique in its measurement of both proceptivity and receptivity separately, the PARMSS, which may help clarify patterns of phasic change in sexuality across the cycle. As suggested by Wallen (1990), due to extended receptivity across the cycle (i.e., the continuous possibility of receptivity), sexual initiation may be the best indicator of women's sexual motivation.

With respect to evolution, the restricted PSTS pattern may have emerged more recently than the unrestricted pattern given that unrestrictiveness appears to have been a relatively common strategy of our ancestors. Both general patterns are also seen in other species such as anthropoid primates (Oinonen, Klemencic, et al., 2008). Evolutionary models that may support

the adaptiveness of the unrestricted pattern include the many fathers theory and best-of-N theory. Models that may support the adaptiveness of the restricted pattern include the father-at-home theory and better-options theory (see Oinonen, Klemencic, et al., 2008 for partial reviews). That is, unrestricted women may take advantage of sperm competition and "good genes" by mating with relatively more men outside the fertile window in order to acquire resources or to choose the best possible mate. In contrast, it may be more advantageous for restricted women to partner with one man but engage in other sexual relationships around ovulation with "good genes" men.

Overall, it seems plausible that if there are two phenotypes (i.e., overall strategies) among women that they would involve paradoxical menstrual cycle shifts in mating tactics. If this were the case, unrestricted and restricted women would be expected to show two different cyclic patterns of sociosexuality, as demonstrated by Oinonen, Klemencic et al. (2008). For instance, evolutionary researchers have generally agreed that women tend to be more restrictive than men but exhibit a shift towards indicators of unrestrictiveness around ovulation, indicators that unrestricted women prefer more overall than restricted women. This means that women low and high in short-term mating orientation appear to be pursuing different strategies and thus, may show different tactics, such as in proceptive attitudes and behaviours, across the menstrual cycle (Phillips, 2015). Further study of the PSTS is needed.

Affective Experiences and Sexuality

In clinical research, there is a robust link between mood disorder and sexual dysfunction. One of the symptoms of clinically elevated mood is increased sexual behavior (APA, 2013) and depression is often associated with decreased sexual functioning (Bodenmann & Ledermann,

2007). Given the idioms "in the mood" and "not in the mood tonight" in reference to proceptive and receptivity sexual behaviour, respectively, a review of the literature suggests that surprisingly little research has been conducted on non-clinical affective experiences and sexuality (see Warner & Bancroft, 1988 for an early study). In general, negative affect seems to be related to decreased, and positive affect to increased, sexuality. This has been demonstrated through cross-sectional (e.g., Brown, Calibuso, & Roedl, 2011; Wiebe, Brotto, & MacKay, 2011); experimental (e.g., mood induction; see also Verhaeghe & Enzlin 2013); and prospective (e.g., menstrual cycle; Meaden et al., 2005; Sanders et al., 1983, cf., Graham & Sherwin, 1993) studies. However, a few studies have shown some women (10 to 23%) report a paradoxical increase in sexual functioning with low mood (Lykins, Janssen, & Graham, 2006; Graham, Sanders, Milhausen, & McBride, 2004). Such a positive correlation between negative affective experiences and sex may be particularly strong among individuals with sexual addiction (Bancroft & Vukadinovic, 2004). Thus, the relationship between negative affect and sexual behaviour may be bidirectional (Burleson, Trevathan, & Todd, 2007).

Overall, affective experiences seem to involve two independent but at times, co-varying valences (i.e., negative and positive; e.g., Study 1). Similarly, sexuality appears to be driven by a number of dual processes (e.g., restrictiveness and unrestrictiveness, receptivity and proceptivity, sex/mating and attachment/affection, and sexual excitation and inhibition (e.g., Bancroft, Graham, Janssen, & Sanders, 2009; Brown et al., 2011). Research on menstrual cycle fluctuations in affect and sexuality does not always make these distinctions when examining between- and within-women differences (Brown et al., 2011) and such research is either associated with a health or evolutionary perspective as opposed to both. However, according to the affective shift hypothesis in evolutionary psychology, women's positive affect tends to

increase following sex to perhaps facilitate long-term commitment (Haselton & Buss, 2001). Also, the results of the few studies on jealousy, an affective experience and a tactic of mate retention (Buss, 2000), across the menstrual cycle have been inconsistent (Teatero, 2009). Despite these findings, studies on changes in women's mating tactics across the cycle have not attempted to account for possible changes in affect (cf., Gangestad et al., 2002). Further research is needed on affect and sex across the cycle, particularly from a combined health and evolutionary lens.

However, evolutionary models of PMS as adaptive or as a byproduct of adaptive changes in positive experiences across the cycle have been put forth (see Gillings, 2014 for a brief review). Vieira (2009) hypothesized that negative premenstrual experiences co-evolved with women's reproductive physiology because they increase reproductive success. For instance, it is possible that PMS may: increase the likelihood of relationship dissolution among couples that have not conceived during the fertile phase of the menstrual cycle and are not well matched; help women assess their partners' commitment and parenting qualities; or increase male ardour during his partner's next fertile phase (Gillings, 2014). Similarly, it has been suggested that symptoms during the premenstrual phase, during pregnancy, and in the postpartum period may have evolved because they keep women out of harm's way when the survival of a fertilized embryo or child depends on them (Niculescu & Akiskal, 2000). The empirical support for these hypotheses seem minimal and weak (Gillings, 2014).

Another model suggests that PMS is a byproduct of adaptions around ovulation, such as increased well-being and sexual proceptivity, around ovulation that facilitate mating and fertilization (cf., the cyclic defense hypothesis; Doyle, Ewald, & Ewald, 2007). That is, after the fertile periovulatory phase of a woman's cycle, she may experience lowered positive affect and

sexuality as a negative state (Reiber, 2008). In support of this model, Reiber (2009) reported evidence that women experience different menstrual cycle patterns of PMS that are dependent on whether their current conditions are advantageous for reproduction. Some women (21%) had higher scores on a measure of PMS in the periovulatory phase, while all others had higher scores in the premenstrual phase. Symptom scores in the periovulatory phase were negatively associated with age and resources (income) as well as positively associated with parity, conditions considered to be unfavorable for having (more) children. Premenstrual positive states were suggested to be related to women obtaining mate retention or material benefits from men in order to improve their conditions before reproducing. Consistent with this model, it has been found that women with PMS show a periovulatory peak in sexual interest (while women without PMS show a peak in the premenstrual phase; Van Goozen et al., 1997) and women with PMDD report a lower frequency of intercourse and less sexual satisfaction overall compared to other women (Nowosielski, Drosdzol, Skrzypulec, & Plinta, 2010). Women with a PMS pattern may be sociosexually restricted overall but further research is needed as no results were found when the key terms "premenstrual syndrome," "premenstrual symptoms," "sociosexuality," and "mating strategy" were entered into *PsychINFO*.

It is worth noting that, based on group comparisons (as opposed to symptom load correlations), Reiber (2009) found that women with PMS tended to have more children than women who had relatively high symptom scores around ovulation. However, positive experiences were not examined. The omission of positively valenced changes is problematic because, as mentioned previously, the absence of negative experiences is not necessary evidence of enhanced positive affect. Thus, if positive states are adaptive at different phases of the cycle, it is possible that the compensatory states (i.e., negative experiences) might also be functional at

times (Viera, 2009). Clearly, additional study of different patterns in cyclical affect and sexuality change is needed.

The Present Study

To summarize, there are numerous reasons to consider the possibility that (a) negative affective experiences, positive affective experiences, and sexuality co-vary in predictable ways in general and that (b) there may be more than one pattern of relationships between negative affective experiences, positive affective experiences, and sociosexual unrestrictiveness or proceptivity across the menstrual cycle (see Table 3.1 for an overview of related evidence and theories related to [b]). Thus far, researchers have tended to separately examine these variables and to report which menstrual cycle phase *on average* each of these three variables is highest or lowest. As originally posed by Reiber (2009), perhaps the question should be at what phase of *a woman's* cycle will well-being (i.e., low bad mood, high good mood, or proceptivity for sex) be evolutionarily advantageous? For some or seemingly most women, optimal well-being in the periovulatory phase may be part of the enactment of a typically restricted mating strategy or related to being in conditions favourable to reproduction and raising viable offspring. Good mood in the most fertile phase of the cycle may be conductive to mating, the likelihood of sex, and thus, fertilization. For other women, it may be more adaptive to be feeling one's best in the premenstrual phase, when one is not menstruating nor particularly fertile, as a tactic that is part of a typically unrestricted strategy or related to being in conditions unfavourable to child bearing

Table 3.1

Evidence and Theories Related to Paradoxical Menstrual Cycle Shifts in Affective Experiences and Sociosexuality

Evidence	Relevant Theories
Negative Affective Experiences	

1. Various retrospective, between-subjects, and qualitative reports of menstrual cycle shifts among women (Halbreich, 1995; Warner & Bancroft, 1988; Teatero et al., 2014) 2. Paradoxical experiences between women at other reproductive events (e.g., increased versus decreased negative affect as a side effect of hormonal contraceptive use; see Kiesner, 2011) 3. Inconsistent cyclic peaks in phases between different prospective studies (see Romans et al., 2012 for a review) 4. Moderators of the strength/direction of cyclic shifts within studies (Kiesner & Pastore, 2010; e.g., emotional sensitivity to bodily cues; Schnall et al., 2002) 5. Identification of groups of women who exhibit different/paradoxical shifts across the cycle (within studies; e.g., Kiesner, 2011; Reiber, 2009)	• Hormonal sensitivity hypothesis (Steiner et al., 2003) • Biopsychosocial theories (e.g., Bancroft, 1995; Halbreich, 1997) • Byproduct model (Reiber, 2009)
Positive Affective Experiences	
1. Various retrospective, between-subjects, and qualitative reports of menstrual cycle shifts among women (e.g., King & Ussher, 2013; Warner & Bancroft, 1988) 2. Paradoxical experiences between women at other reproductive events (e.g., postpartum depression versus elation; Sharma et al., 2006) 3. Inconsistent cyclic peaks in phases between different prospective studies (see Teatero, et al., 2014 and Teatero et al., 2015 for reviews) 4. Moderators of the strength/direction of cyclic shifts within studies (e.g., personality and stress hormones; Davydov et al., 2007) 5. Identification of groups of women who exhibit different/paradoxical shifts across the cycle (Rivera-Tovar et al., 1992)	• Hormonal sensitivity hypothesis as applied to strength and *valence* (Kiesner, 2011) • Adaptation model (Reiber, 2009)
Sociosexuality	
1. Two within-sex phenotypes of mating strategies based on sociosexuality and digit ratio: restricted and unrestricted (Wlodarski et al., 2015). 2. Mean differences between women low and high in sociosexuality (e.g., attractiveness; Clark, 2004), suggesting two different overall strategies in the population. 3. Qualitative reports of various menstrual cycle shifts by different women (e.g., King & Ussher, 2013)	• Frequency-dependent selection (see Wlodarski & Dunbar, 2015) • Strategic pluralism model and dual mating hypothesis (Simpson & Gangestad, 2000; Pillsworth & Haselton, 2006a)

Evidence	Relevant Theories
Sociosexuality	

4. Inconsistent phase differences and cyclic shifts across both between-subjects and prospective studies (e.g., Woods et al., 2014) 5. Significant variability in the meta-analytic effect sizes of cyclic shifts in mate preferences (Haselton et al., 2014; Woods et al., 2014), suggesting one trajectory of change may not adequately describe the effects of the menstrual cycle 6. Moderators of the strength/direction of phase differences and cyclic shifts within studies (e.g., self- and partner attractiveness; Haselton & Gangestad, 2006) 7. Identification of groups of women who exhibit different/paradoxical patterns across the cycle: Periovulatory sociosexual tactic shift (PSTS; Oinonen, Klemencic, et al., 2008; Phillips, 2015) • Restricted women shifts towards unrestrictivness/proceptivity • Unrestricted women shift towards restrictiveness/proceptivity	• Restricted pattern: father-at-home theory of concealed ovulation; good genes sexual section; sperm competition theory (see Oinonen, Klemencic, et al., 2008) • Unrestricted pattern: Sexual strategies theory; many-fathers theory of concealed ovulation (see Oinonen, Klemencic, et al., 2008)

and rearing. Good mood and sex in the premenstrual phase might have been conducive to mate retention and resource acquisition without as much risk of pregnancy in the environment of

evolutionary adaptiveness (i.e., among our ancestors; Reiber, 2009; Oinonen, Klemencic, et al., 2008).

In Part 1 of the present study, an examination of the psychometric properties and relationships between the scales of two new measures relevant to the intersection of women's health and reproduction/mating is presented: the Women's REP and the PARMSS. An attempt was also made to replicate evidence of the validity of the Women's REP from a study of its initial psychometric properties (Study 1) by examining scores on this measure as a function of: self-reported current hormonal problems in general, HC use, HC side effects, and PMS. In Part 2, prospective patterns of menstrual cycle shifts in negative affective experiences, positive affective experiences, and proceptivity were investigated using scales from the Women's REP and PARMSS.

Method

Participants

As detailed below, the Time 1 sample for Part 1 of this study consisted of 327 women of reproductive age who met inclusion criteria. Demographic information for the Time 1 sample as well a subsample of free cycling women who met criteria for menstrual cycle phase analyses for Part 2 of the study can be found in Table 3.2. In total, 629 women between the ages of 16 and 71 years (M = 23.95, SD = 7.78) participated in the screening portion of the study. These women resided in eight different countries but predominantly North America (96.8%).

Volunteers were recruited from a university campus, the local community, and the Internet community to participate in a study of "hormones and sociosexuality." Some students

Table 3.2

Means and Frequencies of Demographic Variables for the Full Time 1 Sample and Menstrual Cycle-Related Subsample

Variable	Full sample (N = 327)	Subsample (n = 42)
	M (*SD*)	
Age (years)	22.73 (5.26)	22.92 (5.43)
	Frequencies (%)	
Ethnic background		
European (e.g., Caucasian/white)	293 (89.6)	38 (90.5)
Native/Aboriginal	14 (4.3)	1 (2.4)
African/black	6 (1.8)	-
Asian	3 (0.9)	1 (2.4)
East Indian	3 (0.9)	2 (4.8)
Other (e.g., multi-racial)	3 (0.9)	-
Middle Eastern	2 (0.6)	-
Hispanic/Latino	2 (0.6)	-
Unspecified	1 (0.5)	-
Country of Residence		
Canada	305 (93.3)	40 (95.2)
United States	18 (5.5)	2 (4.8)
Other (e.g., unspecified)	4 (1.2)	-
Local Community		
Yes	187 (57.2)	24 (57.1)
No	140 (42.8)	18 (42.9)
Relationship Status		
In a relationship	199 (60.9)	19 (45.2)
Single (no primary partner)	100 (30.6)	16 (38.1)
Status changed[a]	28 (8.6)	7 (16.6)
Reproductive Status[b]		
Hormonal contraceptive (HC) use	175 (53.5)	-
Free-cycling (i.e., non-HC users)	134 (41.0)	42 (100)
Status changed[c]	17 (5.2)	-
Non-hormonal intrauterine device use	1 (0.31)	-

[a]Reported relationship status changed from Screening to Time 1 or Time 1 to Time 2 (i.e., switched from single to in a relationship, vice versa, or from one partner to another). [b]Only free-cycling women were included in the menstrual cycle-related subsample. [c]Reported reproductive status changed across Screening to Time 1 or Time 1 to Time 2 (i.e., switched from free-cycling to HC use, vice versa, or from one HC to another).

were eligible to receive bonus points for participation towards their final grade in an applicable course. Other participants (i.e., those not eligible for bonus points) were offered nominal

remuneration as modest incentive to participate. All participants were entered into a prize draw for each stage of the study in which they took part. A variety of recruitment methods were used: posters and brochures; in-class announcements; e-mails and word of mouth; booths at local community events; as well as multi-media (i.e., newspaper and Internet) advertisements. Internet recruitment included social media, free participant pools, and other relevant websites. This strategy was used to maximize both sample size and diversity (see Gosling, Vazire, Srivastava, & John, 2004; Study 1 of the present dissertation). All volunteers were eligible to participate in Stage 1 in order to assess whether they met criteria for Stages 2 and 3, which involved a prospective menstrual cycle design.

Materials

All questionnaires and forms for this study referred to below can be found in Appendix B.

Screening Questionnaire (SQ). At Stage 1**,** volunteers completed an initial online questionnaire through the Internet to assess whether they met criteria for the prospective portion of the study and to gather information on participants' current health. Overall, the SQ had four main sections: demographics (e.g., age, education, and occupational status), health background (e.g., personal and familial history of medical and psychiatric conditions), relationships and sexuality (e.g., romantic and sexual history), as well as past and present reproductive experiences (including menarche/puberty [e.g., age at menarche in years], the menstrual cycle, HC use, pregnancy [e.g., number of times pregnant], the postpartum period, and the menopausal transition). General items and ratings were developed by the Health, Hormones, and Behaviour Laboratory (HHAB Lab; particularly Oinonen, 1997; Oinonen, 2003; Phillips, 2015; Stone, 2011; and Teatero, 2009) or for the purposes of the larger project. Dependent on a woman's

reproductive experiences across the lifespan, this questionnaire took most women about 40 minutes to complete.

Similar to Study 1, participants indicated whether they had ever been diagnosed or treated for any of following general conditions (*never*, *past*, or *present*): a hormonal problem or disorder, HC side effects, and PMS. Also of relevance to the present study, women provided ratings (starting at 1) of: (a) how often they drink alcohol on a 5-point scale from *never or rarely* to *almost everyday*; (b) sensitivity to hormone changes and to alcohol on a 5-point scale from *very slightly or not at all* to *extremely*; (c) current physical health, emotional health, and sexual functioning separately on a 9-point scale from *very unhealthy* to *very healthy*; (d) frequency of masturbation on a 9-point scale from *never* to *at least once a day*; and likelihood (percentage change) of having sex with someone for the first time without using a condom on an 11-point scale from *0%* to *100%*; and (e) rate of pubertal development compared to others their age on a 5-point scales from *much younger* to *much older.*

The SQ also consisted of the following specific scales that were used to examine response biases and help establish the validity of the Women's REP and PARMSS in the present study: the Kinsey Scale (Kinsey, Pomeroy, & Martin, 1948); the Sociosexual Orientation Inventory-Revised (SOI-R; Penke & Asendorpf, 2008); the Brief Reproductive Experiences Scale (B-REP) for past and present reproductive events (developed as an ultra brief complement to the Women's REP below); and the Infrequency (INF) as well as Negative Impression Management (NIM) and Positive Impression Management (PIM) scales of the Personality Assessment Inventory (PAI) (Morey, 2007). The Neuroticism scale of the short-form Eysenck Personality Questionnaire-Revised (EPQ-R; Eysneck, Eysneck, & Barrett, 1985) was also included in the SQ. All of these measures are described in more detail below.

Kinsey Scale. The Kinsey Scale is a widely used 6-point continuum of self-reported sexual orientation from 1 (*exclusively heterosexual*) to 6 (*exclusively homosexual)* (Kinsey et al., 1948) and the option of X (*asexual*). The option of *Other (please describe)* was added to the scale for the present project due to anecdotal reports from previous participants (Teatero, 2009). There is evidence that sexual orientation measured in this way, as opposed to with three categories (heterosexual, bisexual, homosexual), may moderate associations such as between 2D:4D and sexual orientation (Grimbos, Daywood, Burriss, Zucker, & Puts, 2010) as well as 2D:4D, *socio*sexual orientation (Oinonen, Teatero, & Mazmanian, 2011), and shifts in sexuality across the menstrual cycle (Phillips, 2015).

Sociosexual Orientation Inventory-Revised (SOI-R). *In* 2008, Penke and Asendorpf revised the original SOI (Simpson & Gangestad, 1991) to consist of three 3-item sociosexual subscales: behaviour, attitude, and desire. The items were chosen based on a series of pilot studies and are all rated on 9-point scales. The behavioural estimates range from *0* to *20 or more* partners. The response format (from 1 to 9) for the attitude subscale ranges from *strongly disagree* to *strongly agree*, while that for the desire subscale is from *never* to *at least once a day*. Higher scores on the full scale and each aggregated subscale reflect more sexual unrestrictiveness versus restrictiveness. Internal consistencies have been shown to range from .85 to .87. A sex difference has been most apparent in the desire subscale and least apparent in the behaviour subscale, and all scales seem to have predictive validity (Penke & Asendorpf, 2008).

Brief Reproductive Experiences (B-REP) Ratings. The B-REP is a 6-item scale created for the present study to very briefly measure the overall experiences of women in regards to events characterized by changes in sex hormones. It was designed based on and as a complement to the Women's REP. Participants first indicated whether or not they had experienced a given

reproductive event. Ratings of the effects of each applicable reproductive event (in general) are then requested for four domains (i.e., physical health, mood, sexual functioning, and relationship interests), ranging from 1 (*not at all*) to 5 (*extremely*). Each item was phrased negatively (e.g., "negative effects on my mood") as well as positively (e.g., "positive effects on my mood") to assess both negative and positive experiences. Four additional items pertain to possible changes in relationship interests (i.e., an increase and decrease in short-term and long-term relationship interest). This retrospective/cross-sectional measure was included for the following reproductive events: puberty (excluding the items pertaining to sexual functioning and relationships), the premenstrual phase, HC use, pregnancy, and the postpartum period. The sets of single-item ratings that were used in the present study to help validate the Women's REP and/or further examine the possibility of groups of women who show different menstrual cycle patterns in affect and sexuality were the B-REP – HC Ratings and B-REP – Premenstrual Phase Ratings.

Personality Assessment Inventory (PAI). Although self-report data is often necessary in studies that involve internal thoughts, attitudes, and emotions, it can sometimes be affected by response biases or styles. The INF, NIM, and PIM scales of the PAI were included to appraise the validity of participants' responses (Morey, 2007). Items are rated on a four-point scale from *false, not at all true* (a score of zero) to *very true* (a score of three). The INF scale consists of four items that are implausible and therefore, extremely unlikely to be endorsed (i.e., infrequent) and four items that should have extremely high endorsement rates. Total scores on this scale can range from 0 to 24, with a score of 9 or above indicative of non-purposeful (e.g., careless or random) responding. NIM and PIM are each made up of nine items that are associated with an unfavourable/negative or favourable/positive response style, respectively. Scores on each of these scales can range from 0 to 27. People who score high on NIM (i.e., a score of 13 or above)

may be attempting to present themselves negatively or malinger. People who score high on PIM (i.e., 23 or above) may be attempting to present themselves positivity or in a socially desirable manner. While the NIM and PIM scales have been shown to have moderate internal consistency estimates and high test-retest reliability estimates, the INF scale has expectedly demonstrated low internal consistency estimates and moderate test-retest reliability due to the nature of the items. All three scales appear to have good construct validity (Morey, 2007).

Neuroticism. The Neuroticism scale of the short-form ESQ-R consists of 12 true/false items (e.g., "Does your mood often go up and down?") with an internal consistency of .80 among women (Eysenck et al., 1985). According to Eysneck et al. (1985), neuroticism (i.e., higher scores) reflects overall emotionality and, like many other traits, has strong genetic as well as biological components (e.g., sympathetic nervous system reactivity).

Phase Questionnaire (PQ). There were two identical online PQs that were administered via the Internet (e-mail) across the equivalent of one menstrual cycle. This questionnaire had two sections: current health (e.g., reproductive status updates and experiences) as well as relationships and sexuality (e.g., relationship updates, sexual activity, and mating strategies). General health, sexuality, and perception items were developed by the HHAB Lab for the present study or for the purposes of the larger project. Participants were asked (or scheduled) to complete each PQ at roughly the same time (i.e., morning, afternoon, or evening) either in the lab or online in a location of their choosing. Participants were instructed to reflect on the past 48 hours when responding to the items in the PQ so as to better capture experiences during the targeted phases. On average, the PQ took approximately 40 minutes to complete.

The PQ consisted of the following specific scales (described below): the Women's Reproductive Experiences Questionnaire (Women's REP; developed in Study 1); the

Multidimensional SOI (M-SOI; Jackson & Kirkpatrick, 2007); the Proceptive and Receptive Mating Strategies Scale (PARMSS) (adapted from Phillips, 2015); and the INF (infrequency) scale of the PAI (Morey, 2007). Eight other variables that were used as validity measures (for the Women's REP or PARMSS) or included as part of a larger program of research were: neuroticism (Eysneck et al., 1985; see Screening Questionnaire section[25]); the Positive and Negative Affect Schedule (PANAS; Watson et al.1988); the Multidimensional Jealousy Scale (MJS; Pfeiffer & Wong, 1989); the Pinney Sexual Satisfaction Inventory (Pinney, Gerrard, & Denney, 1987); and the Perceived Relationship Quality Components Inventory; PRQC; Fletcher, Simpson, & Thomas, 2000) as well as perceived partner mate retention tactics (Pillsworth & Haselton, 2006); the Mating Intelligence (IQ) Scale (O'Brien et al., 2009); and the brief Empathizing Quotient (EQ) and Systemizing Quotient (SQ) scales (Manning, Baron-Cohen, Wheelwright, & Fink, 2010). In addition, women were asked to rate both themselves and their if applicable, partners (starting at 1) on traits such as attractiveness, masculinity, and femininity from *not at all* to *extremely*, self-attractiveness relative to their partner (if applicable) from *less attractive* to *more attractive*, as well as to indicate how many times they had initiated, a partner had initiated, or they had both equally had initiated sexual activity. The latter set of items was measured twice, once for sexual activity with anyone (other than a current romantic relationship partner) and once for sexual activity with one's romantic relationship partner (if applicable). Similar to Roney and Simmons (2013) and Vannier and O'Sullivan (2011), these estimates were used to derive receptivity (number of times initiated by partner) and proceptivity (number of times initiated by self or both self and partner) scores.

[25]In the PQ, the Neuroticism scale was presented in Likert-type scale format from 0 (*not at all true*) to 6 (*extremely true*), as opposed to true/false format, in order to maximally capture potential variance in scores over time.

Women's Reproductive Experiences (REP) Questionnaire. The Women's REP was developed in Study 1 to consolidate the measurement of the various symptoms or side effects of events characterized by changes in sex hormones. More specifically, this measure was designed to measure both negative and positive experiences women may have across the menstrual cycle, with HC use, during pregnancy, in the postpartum period, and the perimenopausal transition. In Study 1, the measure demonstrated good internal consistency among women of reproductive age, pregnant women, postpartum women, and menopausal women (.73 to .95 for the main scales) and evidence of concurrent validity (i.e., women of different reproductive and hormonal status also differed in expected ways on relevant scales). Goals of the present study were to reexamine the internal consistency and concurrent validity as well as examine the test-retest reliability, construct validity, as well as any menstrual cyclicity in scores on the Women's REP.

The Women's REP was designed to consist of items from three domains: affective (68 items), sexual (18 items), and physical (48 items). Experiences are rated on a 5-point scale from 0 (*not at all*) to (*extreme*). It includes a positively valenced item, or at least a one-dimensional opposing positive symptom, for every negatively valenced item. In Study 1, factor analysis revealed seven scales, 14 subscales, and 13 supplementary subscales that were consistent with the rationally derived domains and modestly intercorrelated. An overview of the scales and subscales of the Women's REP can be found in Table 3.3. One scale and two subscales consist of items only applicable to women in a relationship, while all other sexuality items reflect experiences with others (including merely the thought of others) or masturbation (alone). Scores

Table 3.3

Structure of the Women's Reproductive Experiences (REP) Questionnaire Scales and Subscales

Scales	Subscales	Supplementary Subscales
Negative Affective Experiences		
Negative Physical Experiences	Hormonal Symptoms	Testosterone-Related Experiences
		Progesterone-Related Experiences
	Decreased Appetite	
	General Aches and Pains	
Sexual Problems – General	Negative Sexual Experiences – General	Negative Sexual Experiences – Others[a]
		Negative Sexual Experiences – Self
	Positive Sexual Experiences – Others[a]	
	Positive Sexual Experiences – Self	
Sexual Problems – Relationship[b]	Negative Sexual Experiences – Relationship[b]	
	Positive Sexual Experiences – Relationship[b]	
Positive Affective and Physical Experiences	Positive Affective Experiences	Positive Affect
		Elation
	Positive Physical Experiences	Positive Physical Experiences – General
		Good Skin
		Healthy Digestion
		Comfort with Breasts
Body Image Quality	Negative Body Image Experiences	
	Positive Body Image Experiences	Negative Weight Experiences
		Positive Weight Experiences
		Positive Appetite Experiences
Sleep Quality	Negative Sleep Experiences	
	Positive Sleep Experiences	

Note. Some scales and subscales consist of both negatively and positively worded items (e.g., Sexual Problems – General, Sexual Problems – Relationship, Body Image Quality, Positive Body Image Experiences, and Sleep Quality) and thus, some items are reverse scored in computing overall scores.

[a]Sexual experiences outside the context of a romantic relationship regardless of relationship status, including general sexual desire and activity involving another person or the thought of someone for single women and sexual desire and activity involving a person other than one's primary partner (e.g., fantasy, infidelity, or polyamory) for women in a relationship. [b]Applies to women in a relationship only.

are obtained by reverse scoring items as necessary and summing across (sub)scale items. Higher scores indicate more negative or positive experiences in the past two days.

Multidimensional Sociosexual Orientation Inventory (M-SOI). Jackson and Kirkpatrick (2007) created the M-SOI based on Simpson and Gangestad's (1991) SOI. It includes three scales: short-term mating orientation (STMO; 10 items), long-term mating orientation (LTMO; seven items), and previous sexual behaviour (PSB; three items). Internal consistency was shown to be .95, .88, and .83, respectively (Jackson & Kirkpatrick, 2007; see also Phillips, 2015). In the present study, the 9-point rating scales from the SOI-R were used for all items (Penke & Asendorpf, 2008; see Screening Questionnaire section), as opposed to 7-point scales and numerical estimates (Jackson & Kirkpatrick, 2007). The M-SOI and SOI-R overlap in content such that five of the nine items of the latter are included in the former. The three additional sociosexual desire items from the SOI-R were also included in the PQ. While the SOI-R is purported to measure the classical construct of sociosexuality, from restricted to unrestricted, the M-SOI involves separate scales for long-term (restricted) and short-term (unrestricted) mating strategies.

Higher scores on LTMO and STMO reflect a greater propensity for that particular strategy. The PSB items are specific to how many partners of the *opposite sex* the respondent has had, which Jackson and Kirkpatrick (2007) converted to z-scores prior to aggregation. For the present study, reference to the opposite sex was removed from these items to be inclusive and consistent with previous SOI research (Simpson & Gangestad, 1991; Penke & Asendorpf, 2008) and *z*-scores were not used for calculating scores due to the repeated-measures design. Although Jackson and Kirkpatrick (2007) found that the scales were moderately correlated among men, the

expected sex difference in STMO scores was observed (i.e., men > women) and men's mate preferences were related to the STMO and LTMO scales. These findings suggest that the scale emonstrated some validity. The M-SOI was included in the present study as the subscales are theoretically meaningful and showed further evidence of validity in distinguishing between restricted and unrestricted women in a recent HHAB Lab study (Phillips, 2015).

Proceptive and Receptive Mating Strategies Scale (PARMSS). The PARMSS was developed in Phillips (2015) to measure proceptive and receptive sexual behaviours in imaginary situations: potential long- and short-term relationships as well when evaluating photographs of potential mates. The PARMSS appears to be the first comprehensive measure of both proceptive and receptive behaviours using a common metric (i.e., items that are similar but reflective of proceptivity or receptivity in the same scenario). Although Phillips used three specific vignettes in addition to picture ratings, participants in the present study were provided with a definition of a short- and then a long-term relationship adapted from Little and colleagues (e.g., Little, Jones, & Burriss, 2007) and the asked to respond to 16 items adapted from the PARMSS for both relationship types. The items were posed in a proceptive (e.g., "Ask this a person for their phone number") and receptive (e.g., "Give this person your phone number if asked") manner, all following the phrase phrase "how likely are you to . . ." (presented once at the beginning). Participants responded on a 9-point scale from 1 (*not likely at all*) to 9 (*extremely likely*). Two scores were calculated by aggregating the eight items for each of the following four subscales: Receptivity – Long-Term (LT), Proceptivity – LT, Receptivity – Short-Term (ST), and Proceptivity – ST.

Also, a picture-rating task was adapted from Oinonen (2003) and Phillips (2015). Participants were presented with four photographs of the opposite sex one at a time and rated

each of the photos using the PARMSS items. These photos were selected from a pool of 35 photos of men, from previous research in the HHAB lab and sources on the Internet, that women had previously rated as being relatively high on social visibility (i.e., attractiveness and social status; Phillips, 2015). Photos were similar in frame to passport photos and of men with a neutral or smiling expression. Photos of only attractive men were used to reduce the possibility of floor effects in the PARMSS item ratings (such as might be the case if male photos were perceived as undesirable in terms of mating-relevant attributes like masculinity; e.g., Thompson & O'Sullivan, 2013). Each photo was accompanied by the same brief instructions for participants to imagine that the person in the photo is now their age and the 16 items of the PARMSS as well as several other trait ratings on the same 9-point scale, including attraction to the person as a long-term and as short-term partner. Scores were calculated by averaging the applicable picture ratings across photos for two subscales: Receptivity – Picture Ratings (PR) and Proceptivity – PR. Thus, overall, six scores were used from the PARMSS, two from the picture ratings and four from the vignette ST/LT ratings.

Higher scores on the six subscales reflect greater propensity for that particular mating behaviour. In Phillips (2015), the items or scores of the PARMSS demonstrated good internal consistency (.70 to. 92) and test-retest reliability (.76 to .88) as well as evidence of convergent and divergent validity (e.g., scores were correlated with the STMO scale of the M-SOI). This measure was included in the present study primarily to examine changes in proceptivity across the menstrual cycle in relation to changes in the Women's REP and to further assess its psychometric properties.

Positive and Negative Affect Schedule (PANAS). The PANAS is a 20-item measure of both positive and negative affect (Watson et al., 1988). It consists of adjectives that are rated on a

scale from 1 (*very slightly or not at all*) to 5 (*extremely*) based on the extent to which the respondent has felt that way in the past 48 hours (i.e., over the past two days). The two scales have been shown to be weakly negatively correlated, ranging from -.12 to -.23, with internal consistency of .90 for positive affect and .87 for negative affect (Watson et al., 1988). It has been found to have adequate validity and is one of the most widely used measures of its kind (e.g., Oinonen & Mazmanian, 2001).

Multidimensional Jealousy Scale (MJS). Pfeiffer and Wong's (1989) MJS is a self-report measure consisting of three eight-item scales: cognitive, emotional, and behavioural romantic jealousy. Respondents are instructed to think of a person (referred to as "X") with whom they are having, or have recently had, a relationship while responding to the items. The cognitive items are statements that reflect suspicions of threat to a partnership, particularly those involving a rival. The emotional items are hypothetical jealousy-evoking situations to which one indicates how she would feel on a scale from 1 (*very pleased*) to 7 (*very upset*). However, it has been noted that asking whether one is very pleased that his or her partner is engaging in behaviour that could be construed as infidelity may result in a ceiling effect (Teatero, 2009) and so the anchors were changed to *not at all upset* and *extremely upset* for the present study. The behavioural scale consists of detective and protective behaviours. On the cognitive and behavioural scales, respondents are asked to rate how often they engage in each item on a scale from 1 (*never*) to 7 (*all the time*). Overall, higher scores reflect more pathological jealousy.

According to Pfeiffer and Wong (1989) the three scales of the MJS are orthogonal, albeit modestly correlated. The one- to two-month test-retest reliability was reported to be .75 for the cognitive, .82 for the emotional, and .34 for the behavioural scale. Evidence for concurrent validity comes from a positive relationship between the MJS and a one-dimensional measure of

relationship jealousy. Moreover, the MJS is related to jealousy of sexual infidelity, love, liking, and happiness in theoretically consistent ways, showing convergent and discriminant validity (Pfeiffer & Wong, 1989). Internal consistencies of the scales have been found to range from .88 (behavioural) to .94 (emotional) among women (Teatero, 2009). The MJS was included in the present study as a validity measure that represents an affect-related variable specific to relationship health (Buss, 2000).

Pinney Sexual Satisfaction Inventory (PSSI). General sexual satisfaction as well as sexual satisfaction with one's current partner (if applicable) were assessed by the PSSI (Pinney et al., 1987). This measure consists of 14 and 10 items, respectively. All items are rated on a 7-point scale from *strongly disagree* (score of 1) to *strongly agree* (score of 7). Items include "I am satisfied with the frequency with which I have sexual intercourse" and "I wish my partner were more romantic when we make love." The ratings are summed across the applicable subscale. Total scores can range from 14 to 98 with higher scores indicative of sexual satisfaction. According to Pinney and colleagues, the PSSI appears to have high internally consistency with a Cronbach's alpha of .92 as well as concurrent validity. This scale was included as a validity measure for the sexual subscales of the Women's REP.

Perceived Relationship Quality Components (PRQC) Inventory. The PRQC Inventory is an 18-item measure of six components of a romantic relationship: relationship satisfaction, commitment, intimacy, trust, passion, and love (Fletcher et al., 2000). Each item (e.g., How satisfied are you with your relationship?) is rated on a seven-point scale from *not at all* to *extremely*. Internal consistency estimates ranged from .74 (trust) to .96 (committment) across two studies. Confirmatory factor analysis indicated that the six first-order subscale model was appropriate as well as one second-order factor (i.e., relationship quality). This measure appears

to have face validity and was used to assess the relationships between relationship quality and each of: affective, sexual, and physical reproductive experiences; receptivity; and proceptivity. The items from the passion and love scales were inadvertently excluded from the questionnaire.

Other self-report measures. Several other measures were included for the purposes of a larger program of research. These included seven items assessing perceived partner mate retention tactics from Pillsworth and Haselton (2006) that constitute two scales (solicitousness [α = .92] and jealousy [α = .85]); 11 items from Gangestad et al. (2002) that measure in-pair and extra-pair desire and behaviour (both α = .85; Teatero, 2009); the Mating IQ Scale (O'Brien et al., 2009); The Mating IQ Scale; and the brief EQ and SQ (Manning et al., 2010). The Mating IQ scale, a measure of intelligence as it pertains to mating success, was first published by Geher and Kaufman (2007). The second version of the scale consists of 20 items for women (and 20 similar but different items for men; O'Brien et al., 2009). The concept of mating IQ is relatively new and more empirical studies are needed but it refers to the extent to which one enacts an overall mating strategy that is adaptive for one's sex based on evolutionary theory. Full scale scores range from 0 to 100, with higher scores reflecting greater mating IQ. Among undergraduate students, O'Brien et al. (2009) found that the 5-point Likert scale format had moderate internal consistency (α = .57 for women) but that total scores were associated with more lifetime sexual partner in men and an earlier age of first sexual intercourse in women, variables that may represent (within-sex) decisions from an evolutionary perspective.

Finally, the brief EQ and SQ measure the extent to which one possesses empathizing abilities (the desire to understand others, much like theory of mind; women > men) and systemizing abilities (the drive to understand systems; men > women), respectively. Both scales consist of the 10 most sexually dimorphic items from the full-scale measures (Manning et al.,

2010). Ratings from 0 (*definitely agree*) to 4 (*definitely disagree*) are summed across each scale with higher scores reflecting the ability to systemize or empathize. Differences in these abilities seem to be related to prenatal androgen exposure as well as endogenous reproductive hormone levels (Teatero & Netley, 2012).

Body measurements. The following health-related body measurements were obtained in Stages 2 and 3 during laboratory sessions (if applicable) after completion of the PQ: digit lengths, mid-phalangeal hair counts, grip strength, height, weight, as well as waist and hip circumference. Mitutoyo Electronic Digital Calipers (Model MIT-500-171) were used to directly measure the lengths of the digits, from tip to basal crease to .01 mm, on the left and right hands. The ventral surfaces of participants' hands were also scanned onto a secure desktop computer using a Hewlett Packard (HP) Scanjet. Mid-phalangeal hairs on each digit were counted by sight using a 5X aspheric 2" medical magnifying lens at the most appropriate angle according to hair colour and length as per Oinonen (2009). A digital scale was used to measure weight in kilograms. A Dynatron Hydraulic Hand Dynamometer was used to assess grip strength in kgs force, while all additional measurements were taken using a measuring tape in meters. A random subset of participants had their measurements taken by a second research associate to assess interrater reliability. Direct digit lengths, mid-phalangeal hair counts, height and weight, and waist and hip circumference were used in the present study to calculate digit ratios, mid-phalangeal hair count, BMI, and WHR, respectively. The other measurements will be used as part of a larger program of research.

Digit ratio (the ratio of the second finger to the fourth finger [2D:4D] as per Manning et al., 1998; see also Oinonen, 2009 and Teatero, 2009) and total number of mid-phalangeal hairs (MPH; as per Westlund, Oinonen, Mazmanian, &, Bird, 2015) for both the left and right hands

were calculated 2D:4D and MPH count are sexually dimorphic proxy measures of prenatal androgen exposure and current androgen action or sensitivity, respectively. BMI, a crude estimate of body fat and possibly circulating estrogen levels (see Oinonen & Mazmanian, 2001b), was calculated based on height and weight (kg/m^2) and WHR, an estimate of body fat distribution and crude circulating testosterone levels, was determined by dividing waist by hip circumference (Singh, 1993). The repeatability estimates of these measures in the present study were adequate and significant at $p < .001$: right 2D:4D, r_I (94) = .86, 95% CI [.79, .90]; left 2D4D, r_I (94) = .77, 95% CI [.67, .84]; mean 2D:4D, r (94) = .88, 95% CI [.83, 92]; right mid-phalangeal hair count, r (94) = .85, 95% CI [.78, .90]; left mid-phalangeal hair count, r (94) = .95, 95% CI [.92, .97]; mean mid-phalangeal hair count, r (94) = .94, 95% CI [.91, .96]; BMI, r_I = .82, 95% CI [.74, .88]; WHR, r (92) = .84, 95% CI [.77, .89]. The intraclass correlation between BMI based on self-report height and weight and measured BMI was r_I (113) = .88, 95% CI [.79, .93], $p < .001$. The inter-rater reliability estimates were also assessed to be good: right 2D:4D, r_I (9) = .76, 95% CI [.27, .94], $p = .002$; left 2D4D, r_I (9) = .83, 95% CI [43, .95], $p = .001$; mean 2D:4D, r_I (9) = .89, 95% CI [.65, .97], $p < .0001$; right mid-phalangeal hair count, r_I (9) = 1.00, 95% CI [.99, 1.00], $p < .001$; left mid-phalangeal hair count, r_I (9) = .94, 95% CI [.78, .98], $p < .0001$; mean mid-phalangeal hair count, r_I (9) = .98, 95% CI [.93, 1.00], $p < .001$; BMI, r_I (9) = .98, 95% CI [.92, 1.00], $p < .0001$; WHR, r_I (9) = .95, 95% CI [.81, .99], $p < .001$.

Daily Questionnaire (DQ). A DQ consisting of the PANAS (see Phase Questionnaire section) as well as eight other items designed to briefly measure health status (e.g., whether a respondent was menstruating and whether a respondent had obtained a luteinizing hormone (LH) surge detection test result [if applicable]) as well as relationship and sexual behaviour (e.g., whether the respondent engaged in any sexual activity in the past 24 hours). As part of a larger

study, the DQs will allow for the calculation of variance in mood (i.e., mood stability) across the cycle (e.g., Oinonen & Mazmanian, 2002), which can then be compared with women's reports of mood swings or affective sensitivity, and for the prediction of next day responses based on previous day responses (e.g., Burleson et al., 2007). In the present study, health status items from the DQ were used as measures of menstrual cycle phase.

Measures of menstrual cycle phase. From the SQ, the following items were initially used to to schedule testing dates and to categorize data into phases: reported average menstrual cycle length, cycle regularity, day of the last menstrual period (LMP), the expected date of next menstrual period (NMP), and LH detection test results (if applicable). The following information was later used to verify whether participants were scheduled precisely into the target phases: (a) the questions "Are you menstruating today?" and "If yes, for how many days have you been menstruating?" from the PQs and DQs; (b) e-mail follow-up with participants regarding the actual date of their predicted NMP; (c) LH detection test results (if applicable); and (d) hormonal assays (if applicable). Free-cycling women who participated in lab sessions used urinary LH surge detection strips. The strips were professional grade with sensitivity of about 25 mlU/ml and specificity greater than 98%. According to Stanford, White, and Hatasaka (2002), LH strips measure the rise in LH that tends to occurs 24 hours prior to, and thus are an accurate prospective marker of, ovulation. Participants were not initially told which hormone the strips were intended to test. Volunteers began testing 18 days prior to the reported start of their NMP and they tested daily for about 5 days or until a positive result (i.e., two coloured bands present on a strip; see Procedure for further details). The DQ included two items pertaining to the test results. If and when a positive test result was obtained (yes or no item), participants were asked

to provide a confidence rating from 0 (*0% confident*) to 8 (*100% confident*). Hormonal assays were also completed among a subset of women.

Hormonal assays. Saliva samples were collected from free-cycling women during the PQ administrations for the subset of participants who completed the PQs in the lab. This was done using the saliva sample package provided to them at each lab session. Participants were asked to refrain from eating, smoking, exercising, brushing their teeth, wearing chapstick or lipstick, and drinking anything but water for one hour prior to attending a lab session. Participants were asked to rinse their months with chilled bottled water, which was provided, prior to beginning the PQ. A test tube was to be filled with about 2 mL of saliva over the course of completing the PQ. Verbal instructions were provided. The samples were collected in 10 mL polypropylene tubes. They were stored in a laboratory freezer at no less than -34 degrees Celsius until they were shipped to a Salimetrics laboratory at Penn State University for immunoassay. Once there, a technician assayed concentrations of estradiol, progesterone, testosterone, and cortisol at sensitivities of 0.1, 5, and 1 pg/nL and < 0.007 ug/dL, respectively.

Procedure

The study received approval from relevant institutional and departmental research ethic boards. Biosafety approval was also obtained for all procedures involving saliva collection. For each participant, the study took place over approximately one month: Stage 1: Recruitment and screening; Stages 2 and 3: Prospective menstrual cycle phase design; and Stage 4: Debriefing and follow-up. Data were collected online through a secure Internet database (www.surveymonkey.com). As an added precaution, optional enhanced security (Secure Sockets Layer [SSL]) for the online surveys were used to encrypt all responses. See Figure 3.1 for a diagram of participant flow through the four stages of the study.

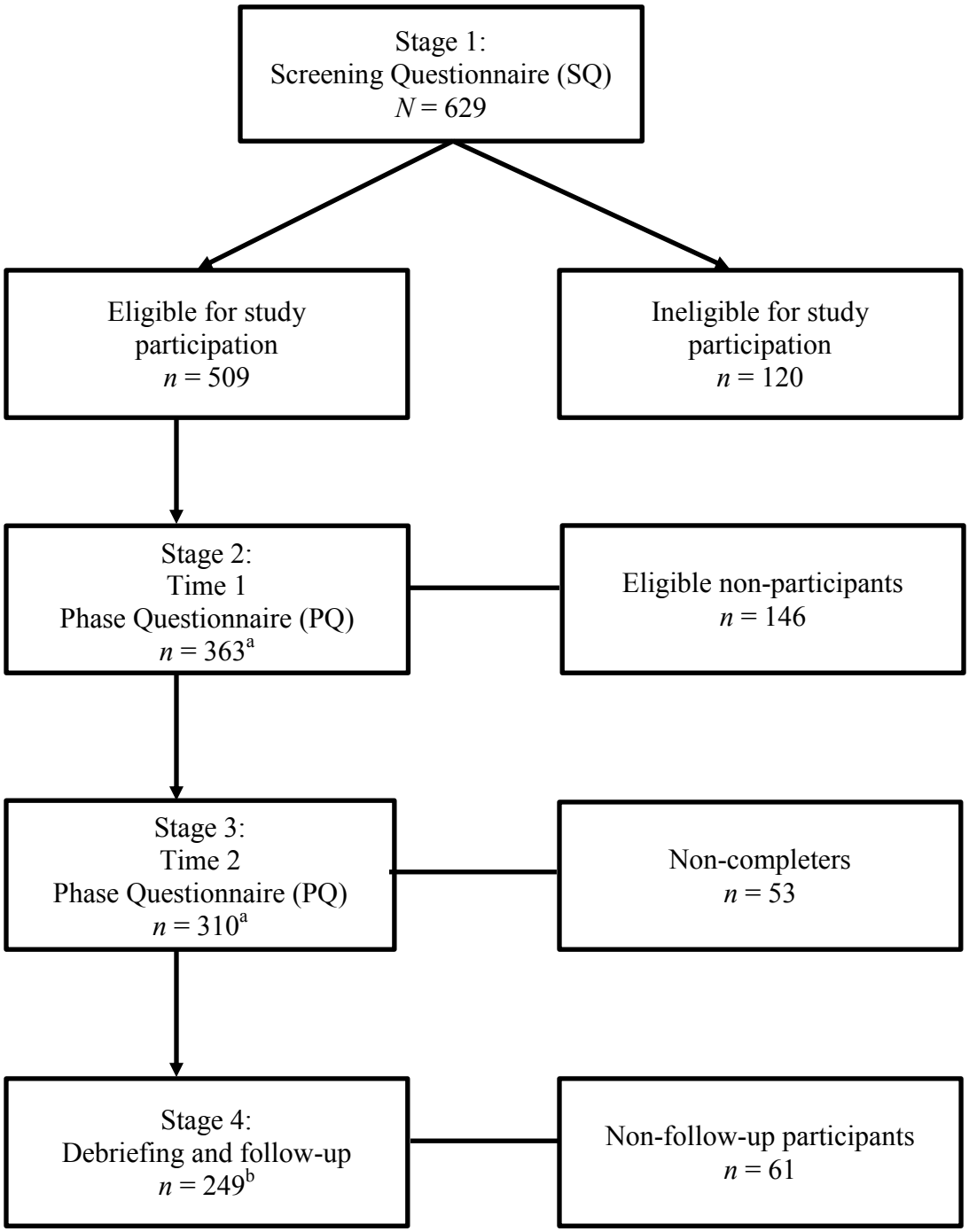

Figure 3.1. Participation flow through the four stages of the study.
[a] Thirty-three and 19 women provided some data at Time 1 and Time 2, respectively but were missing more than 5% of items from the Women's Reproductive Experiences (REP) scale. Four additional participants were excluded post hoc. The final samples were, therefore, $n = 327$ for Time 1 and $n = 278$ for Time1-Time2. [b] Follow-up and non-follow-participants were included in the final sample and subsamples.

Stage 1: Recruitment and screening. Potential participants were directed to an Internet link for Stage 1, which involved completion of the SQ outside of the laboratory (i.e., at their convenience online). At this time, they were first presented with a printable cover Letter following by Consent Form A. Each volunteer was required to complete Consent Form A to participate in the research. The participants were then given the SQ followed by Debriefing Form A with details about the next stages of the study (see Appendix B for all letters and forms).

Stages 2 and 3: Prospective menstrual cycle phase design. Based on the measures of menstrual cycle phase from the SQ, participants who meet study criteria were sent the brief online DQ each day and scheduled for two PQs across the equivalent of one cycle. All DQs were sent to participants via email and completed online (outside of the lab for many participants) with the request that participants complete them at roughly the same time each day. Local volunteers came to the university campus to complete the two PQs online during separate lab sessions with the researcher or research associate. Lab sessions were scheduled for between 8:30 and 10:30 AM if possible to help control for diurnal fluctuation of hormones. At the beginning of the first DQ as well as at each PQ administration, participants were presented with and completed Consent Form B.

For women who experience menstrual or withdrawal bleeding, testing dates were determined by the backward or reverse counting method (Jöchle's, 1973) to coincide with two menstrual cycle phases: the periovulatory phase (days 9 to 15 of a 28-day cycle or 20 to 14 days prior to menses [days -20 to -14]), and the premenstrual phase (days 19 to 28 or -10 to -1). The backward counting method is frequently used in the literature and is considered to be valid (e.g., Brown et al., 2010). These phases were chosen because they differ in the probability of conception as well as relative hormone levels (i.e., estrogen, progesterone, FSH, and LH) and

have been implicated in the patterns in women's affective, sexual, and physical functioning that are under investigation. Participants were given optimal dates on which to complete the questionnaires that corresponded with days 12 (-17) for the periovulatory phase (i.e., the estimated highest fertility day) and 22 (-7) or 26 (-3) for the premenstrual phase of their estimated menstrual cycles. Two target days were chosen for the premenstrual phase to capture the middle of both the early and late premenstrual phase. Women who did not experience menses or whose phases could not be estimated were scheduled for testing periods that were yoked with other participants. Based on the next proximate menstrual cycle phase and scheduling availability, all participants were scheduled for one of two natural testing orders: periovulatory-premenstrual (PO-PM) or premenstrual-periovulatory (PM-PO). Thus, the study was a pseudo-randomized counterbalanced controlled crossover design with respect to menstrual cyclicity. However, the data was first organized by time in the form of Time 1-Time 2.

Given that one of the two online PQ or laboratory sessions was scheduled to occur around ovulation, LH test results were used to prospectively and retrospectively determine this phase for free-cycling women who completed the study in the lab. Participants were instructed as to when to begin using the testing strips based on their menstrual cycle information (approximately 18 days prior to the expected date of one's NMP). An attempt to schedule participants within two days before the LH surge and within three days after the LH surge (i.e., -2 to +3 when 0 represents the day of the positive LH test) was made with the goal of scheduling the session on days 0 or +1. Free-cycling volunteers (who reported that they experience menstruation) were provided with a kit of at least five LH strips and an Instructions Sheet. If they obtained a positive result more than two days before their previously scheduled periovulatory laboratory session, their appointment was changed to occur within two days of the positive

results. If they obtained a positive result more than three days after the laboratory session, the participant had been inadvertently tested outside of the targeted periovulatory phase (see also Phillips, 2015).

Stage 4: Debriefing and follow-up. Following completion of, or withdrawal from, the study, participants received Debriefing Form B. In this form, it was requested that female participants who experience natural or HC-induced menstrual cycles inform the researcher of the date of their NMP by email or telephone and that the researcher would be following up with them to provide reminders. This information was used to further check the accuracy of the assigned phases and to re-categorize cycle phase if the prediction of a participant's menstrual cycle phases was initially imprecise.

General Data Screening

Several screening criteria were applied in order to obtain a sample of women in the typically fertile period of the lifespan and thus, to control for obvious non-fertile or infertile hormonal states. Based on information provided at Stage 1 (N = 609), 19% of women did not meet criteria for inclusion in the study for one or more the following reasons: (a) not within typical reproductive age range (i.e., 16 to 44 years; n = 24); (b) less than three months since having an abortion or miscarriage (n = 4); (c) less than three months since using high dose emergency contraception such as Plan B (n = 20); (d) pregnant (n = 9); (e) postpartum (i.e., less than six months since giving birth; n = 6); (f) lactating (n = 19); (g) menopausal (n = 14); and (h) no attraction to the opposite sex (i.e., exclusively homosexual in sexual orientation, which corresponds to a rating of 6 on the Kinsey scale; or asexuality, a lack of attraction to either sex (n = 11). Criterion (h) was applied primarily because male picture stimuli were used in the present study but for the purposes of generalizability, women with any orientation towards men were

included in the study. Women whose eligibility was undeterminable due to missing data were not included in the study (n = 39).

Overall, the data were screened for errors at data entry and missing values. About 0.34% of data points (i.e., items x participants) were missing from the possible 41,8456 data points of the Women's REP in the final Time 1 sample, and 0.35% of 35,456 possible data points at Time 2 for the Time 1-Time 2 sample. For the PARMSS, 0.25% of data points were missing from the possible 30,624 data points in the Time 1 sample and 0.20% of 25,248 possible data points at Time 2. Based on missing data analysis as well as examination of both raw and descriptive data, there were no clear patterns in the missing data and thus, they were considered to be missing at random. It was expected that any procedure for handling missing data would be acceptable given that no variable or case was missing more than 5% of data points and the generalizability of the subsamples were to be assessed by comparing participants and non-participants in Part 1 (see below). All analyses were conducted after replacing missing data from the Women's REP and the PARMSS with item means.

The Infrequency (INF), Negative Impression Management (NIM), and Positive Impression Management (PIM) scales of the PAI were also examined as potential screening variables in the Time 1 sample. It was found that between six and 15 participants scored above the empirical cut-off or were missing data on the INF at one of the three measurement points (33 in total). High scorers just met or exceeded the cut-off by no more than four points. For the NIM and PIM scales, which were only included in the SQ, three and four participants scored above the cut-offs, respectively, and nine and three participants were missing up to two of the items on each scale, respectively. However, based on visual examinations of all of these participants' data, there were no indications of extremely biased or careless responding. As a result, no participants

were removed from the analyses on the basis of these three measures but NIM and PIM scores were examined as potential correlates of the Women's REP and the PARMSS in Part 1. Within normal limits, NIM and PIM scores may accurately reflect respondents' cognitions and perceptions related to unfavourable or favourable views about themselves (Morey, 2007).

Prior to each main analysis, the data were screened for the assumptions of the statistical tests employed. These included univariate and multivariate outliers ($\pm z \geq 3.29$ and $p < .001$ criterion, respectively), normality, linearity, homogeneity of variance-covariance (Box's M test, $p < .05$), homogeneity of variance (Levene's test, $p < .05$), and sphericity (Mauchly's test, $p < .05$) (Tabachnick & Fidell, 2001). The assumption of linearity was met based on graphical checks. The Women's REP and PARMSS scores tended to be positively skewed, particularly the negative experiences and proceptivity scales, and include some slight outliers. In some group analyses, the Box's M and Levene's test were significant. With large samples ($n > 100$), some deviation from both normal distribution and homogeneity is common (Field, 2009; Tabachnick & Fidell, 2001). For all main analyses, results were nearly identical when outliers were removed and when robust and non-parametric analyses were examined. Thus, no changes or transformations were made to the data and the results of the parametric statistics are presented.

Part 1:

The Women's Reproductive Experiences (REP) Questionnaire: Reliability, Validity, and Associations with Mating Strategies

The purposes of Part 1 were to examine the psychometric properties of, and relationships between, the two newly developed primary measures used in Part 2: the Women's REP and the PARMSS. A related goal was to assess the replicability of, and extend, the reliability and validity results of the Women's REP from Study 1 (Parts 1 and 2). This part of the present study involved

three sets of predictions. Based on the results on Study 1, the first set of predictions was that women with current (1) hormonal problems, (2) HC side effects, (3) cycle irregularity, and (4) PMS, and would have some relatively higher negative experiences scores and some lower positive experiences scores on the Women's REP than their unaffected counterparts (i.e., women without such hormone-related experiences). Also, (5) OC users were expected to have lower negative and higher positive experiences scores than other HC users and nonusers. The construct validity of the both the Women's REP and the PARMSS was explored based on patterns of correlations with 30 other health-, sexuality-, and relationship-relevant variables. It was predicted that (6) the scales of the two measures would be (a) most strongly related to variables measuring similar constructs (in terms of area: health, sexuality, or relationship and valance: negative or positive) and (b) weakly or unrelated to dissimilar variables. Finally, research and theory suggest that women's reproductive experiences (not only hormonal changes but also the physical, psychological, and sexual changes associated with them) may facilitate adaptive mating strategy enactment (e.g., Oinonen et al., 2008; Reiber, 2009). That is, being in "a good mood" might put women "in the mood" for sex. Thus, in the third set of predictions, it was hypothesized that, regardless of current hormonal status, (7) positive reproductive experiences (affective, sexual, and physical) would be positively related to unrestricted mating tactics and aspects of sexuality, namely proceptivity. In contrast, (b) negative reproductive experiences were expected to be inversely related to sociosexuality as well as both receptivity and proceptivity (Phillips, 2015).

Data Reduction and Analysis

Of the 509 women who completed the SQ and were eligible for inclusion in the study, 363 (71%) provided at least some data at Time 1 and 310 (61%) at both Time 1 and Time 2 (Stages 2 and 3). Some of these women were missing more than 5% (i.e., 6) of the main items on

the Women's REP at Time 1 (n = 33) and were therefore, excluded from all analyses. Women missing this amount of data at Time 2 (n = 19) were only excluded from time-related or repeated-measures analyses (e.g., test-retest reliability). An additional eight women were missing more than 5% (i.e., 5) of the items from the PARMSS in the Time 1 sample, and 14 such women in the Time 1-Time 2 sample, were excluded from the relevant analyses only. Lastly, participants whose reproductive status changed to pregnant at Time 1 or Time 2 (n = 2) or who endorsed "maybe" being pregnant at Time 2 and did not respond to attempts to follow-up (n = 2) were excluded from the analyses. Thus, the final full (Time 1) sample consisted of 327 women and the Time 1-Time 2 subsample consisted of 277 women (see Figure 3.1).

To examine the internal consistency of the Women's REP and PARMSS scales, Cronbach's alpha coefficients of the standardized items were computed in the full sample. Test-retest reliability was assessed using Pearson product-moment correlation coefficients between Time 1 and Time 1 and the effect of time was explored using repeated measures ANOVAs. Relationships within and between the scales of Women's REP, PARMSS, and other measures were assessed using Pearson correlations in the full sample.

A series of one-way MANOVAs and ANOVAs were conducted to examine differences in women's reproductive experiences, as measured by the Women's REP, as a function of a variety of reproductive or hormonal status groups. Group differences in proceptivity and receptivity scores were also examined for exploratory purposes. Independent variables included women's reports of current hormonal problems (yes/no) and reproductive status (i.e., non-users, OC users, and other HC users) in the full sample; current HC side effects (yes/no and B-REP – Current HC Ratings) among HC users; and cycle regularity (regular and irregular) as well as current PMS (yes/no and B-REP – Premenstrual Phase Ratings) among non-users. Dependent

variables were the Women's REP scale, subscale, and supplementary subscale scores as well as PARMSS scores. Significant MANOVAs were followed up with univariate ANOVAs and pairwise comparison tests.

Given that only one woman was using a non-hormonal IUD, this type of contraceptive was not included in the analyses involving reproductive status and in the subsample of HC users. In determining reproductive (HC use or nonuse) status, exclusion criteria included: (a) change in status (e.g., to or from HC use, another HC, or nonuse) less than three months prior to study participation (n = 28) or (b) change in status from the SQ to the PQ at Time 1 (n = 17). One additional free-cycling woman reported that she was amenorrheic and thus, she was not included in the cycle regularity and PMS analyses. Thus, the final ns for the reproductive status, HC users, and non-users subsamples were 286, 159, and 127, respectively. Lastly, women who changed their relationship status from the SQ to Time 1 or from Time 1 to Time 2 were excluded (n = 39) from analyses involving only women in a relationship.

Results

Data screening. To help assess generalizability, women who participated at Time 1 and completed the Women's REP (i.e., the Time 1 sample) were compared to women who were eligible to participate after Screening but did not (n = 175). As seen in Table C1 of Appendix C, twenty variables from the SQ were examined, five of which were significantly different between the two groups. The Time 1 participants reported a higher level of education, higher frequency of masturbation (alone), and older age at menarche than non-participants. They were also more likely to report being a full-time post-secondary school student as well as using an HC. It seems particularly plausible that the women who completed Time 1 were more likely to be full-time university students. Comparisons were also made between the sample of women who

participated in and completed the Women's REP at Times 1 and 2 (n = 277) and women who did not complete the full study (n = 50) (see Tables C2 and C3 of Appendix C). The only significant difference was that women who completed both PQs were more likely to be from the local community then those that only completed Time 1.

Reliability analyses.

Internal consistency reliability. Cronbach's alpha coefficients for all scales and subscales of the Women's REP can be found in Table 3.4. The main scales of the Women's REP demonstrated good internal consistency estimates (i.e., > .70; Murphy & Davidshofter, 2005). Estimates ranged from .85 to .95 (Sexual Problems – General and Positive Affective and Physical Experiences, respectively). The main subscales had internal consistency estimates that ranged from .69 (Positive Sleep Experiences) to .95 (Positive Affective Experiences). The supplementary subscales had Cronbach's alphas that ranged between .61 (Positive Breast Experiences) and .94 (Positive Affect).

Cronbach's alpha coefficients for the PARMSS scores are presented in Table 3.5. The mean item scores across the four photographs were used for the Receptivity-PR and Proceptivity-PR scales. All scales showed good internal consistencies with estimates ranging from .92 to .95.

Test-retest reliability. The average number of days between Time 1 and Time 2 was 22.30 days (SD = 41.49). The test-retest reliability estimates for the Women's REP scales and subscales as well as the PARMSS subsales can be found in Tables 3.6 and 3.7 (all significant at p < .001). The scales of the Women's REP were found to have low but significant test-retest reliability estimates ranging from .59 (Sleep Quality) to .71 (Sexual Problems – Relationship and

Table 3.4

Internal Consistency Estimates of the Scales and Subscales of the Women's REP in the Full Time 1 Sample (n = 327)

Variable	Cronbach's ∝
Scales	
Negative Affective Experiences (*k* = 16)	.93
Negative Physical Experiences (*k* = 31)	.85
Sexual Problems – General (*k* = 14)	.85
Sexual Problems – Relationship[a] (*k* = 6)	.87
Positive Affective and Physical Experiences (*k* = 43)	.95
Body Image Quality (*k* =15)	.90
Sleep Quality (*k* = 9)	.86
Subscales	
Hormonal Symptoms (*k* = 22)	.80
Decreased Appetite (*k* = 2)	.86
General Aches and Pains (*k* = 7)	.71
Negative Sexual Experiences – General (*k* = 8)	.78
Negative Sexual Experiences – Relationship[a] (*k* = 3)	.76
Negative Body Image Experiences (*k* = 8)	.85
Negative Sleep Experiences (*k* = 6)	.83
Positive Sexual Experiences – Others (*k* = 6)	.81
Positive Sexual Experiences – Self (*k* = 3)	.83
Positive Sexual Experiences - Relationship[a] (*k* = 3)	.81
Positive Affective Experiences (*k* = 26)	.95
Positive Physical Experiences (*k* = 17)	.84
Positive Body Image Experiences (*k* = 7)	.86
Positive Sleep Experiences (*k* = 3)	.69
Supplementary Subscales	
Testosterone-Related Experiences (*k* = 13)	.73
Progesterone-Related Experiences (*k* = 9)	.65
Negative Sexual Experiences – Others (*k* = 5)	.63
Negative Sexual Experiences – Self (*k* = 3)	.75
Negative Weight Experiences (*k* = 2)	.86
Positive Affect (*k* = 19)	.94
Elation (*k* = 7)	.79
Positive Physical Experiences – General (*k* = 10)	.77
Positive Skin Experiences (*k* = 2)	.78
Positive Digestion Experiences (*k* = 3)	.81
Positive Breast Experiences (*k* = 3)	.61
Positive Weight Experiences (*k* = 2)	.73
Positive Appetite Experiences (*k* = 2)	.80

Note. Women's REP = Women's Reproductive Experiences Questionnaire. *k* = number of items.
[a]*n* = 194 women in a relationship.

Table 3.5

Internal Consistency Estimates for the Proceptive and Receptive Mating Strategies Scale (PARMSS) in the Full Time 1 Sample (n = 319)

Variable	Cronbach's ∝
Receptivity	
Short-Term Relationship (ST)[a]	.93
Long-Term Relationship (LT)[a]	.94
Picture Ratings (PR)[b]	.92
Proceptivity	
ST[a]	.92
LT[a]	.95
PR[b]	.92

Note. Number of items for each scale was eight.
[a]Based on responses to a vignette of an imaginary scenario involving a potential long-term or short-term relationship. [b]Based on responses to photographs of four potential male partners.

Table 3.6

Means, Test-Retest Reliability (Correlation) Coefficients, and Repeated Measures ANOVAs for the Scales and Subscales of the Women's REP in the Time 1-Time 2 Subsample (n = 277)

Variable	*M* (*SD*)		*r*	*F* (1, 276)	*p*	Partial η^2
	Time 1	Time 2				
Main Scales						
Negative Affective Experiences	2.09 (0.74)	2.08 (0.72)	.60***	0.07	.786	.000
Negative Physical Experiences	1.73 (0.41)	1.72 (0.39)	.68***	0.42	.515	.002
Sexual Problems – General	2.72 (0.70)	2.77 (0.70)	.64***	1.53	.217	.006
Sexual Problems – Relationship[a]	2.19 (0.93)	2.19 (0.99)	.71***	0.005	.942	.000
Positive Affective and Physical Experiences	2.84 (0.56)	2.80 (0.52)	.66***	2.51	.114	.009
Body Image Quality	3.20 (0.71)	3.19 (0.72)	.71***	0.05	.816	.000
Sleep Quality	3.19 (0.81)	3.18 (0.83)	.59***	0.07	.789	.000
Subscales						
Hormonal Symptoms	1.68 (0.41)	1.68 (0.39)	.66***	0.10	.751	.000
Decreased Appetite	1.71 (0.98)	1.61 (0.84)	.45***	3.09	.080	.01
General Aches and Pains	1.88 (0.61)	1.87 (0.62)	.60***	0.03	.854	.000
Negative Sexual Experiences – General	2.00 (0.75)	2.03 (0.79)	.61***	1.29	.258	.01
Negative Sexual Experiences – Relationship[a]	1.86 (0.94)	1.88 (1.03)	.64***	0.20	.657	.001
Negative Body Image Experiences	2.19 (0.79)	2.20 (0.84)	.61***	0.06	.813	.000
Negative Sleep Experiences	2.48 (0.88)	2.49 (0.90)	.58***	0.06	.804	.000
Positive Sexual Experiences – Others	2.20 (0.97)	2.18 (0.95)	.61***	0.09	.760	.000
Positive Sexual Experiences – Self	2.40 (1.05)	2.33 (1.00)	.63***	1.58	.211	.01
Positive Sexual Experiences – Relationship[a]	3.48 (1.05)	3.51 (1.11)	.68***	0.10	.590	.001
Positive Affective Experiences	2.89 (0.64)	2.84 (0.60)	.60***	2.17	.142	.01
Positive Physical Experiences	2.77 (0.52)	2.74 (0.50)	.70***	1.77	.184	.01
Positive Body Image Experiences	2.50 (0.79)	2.50 (0.76)	.77***	0.02	.880	.000
Positive Sleep Experiences	2.54 (0.89)	2.53 (0.90)	.49***	0.05	.829	.000
Supplementary Subscales						
Testosterone-Related Experiences	1.77 (0.45)	1.76 (0.43)	.69***	0.48	.489	.002
Progesterone-Related Experiences	1.56 (0.48)	1.56 (0.46)	.48***	0.04	.851	.000
Negative Sexual Experiences – Others	1.93 (0.73)	1.96 (0.78)	.55***	0.42	.519	.002
Negative Sexual Experiences – Self	2.08 (1.02)	2.16 (1.08)	.63***	1.99	.159	.01
Negative Weight Experiences	2.81 (1.18)	2.72 (1.18)	.74***	3.32	.069[†]	.01
Positive Affect	2.88 (0.66)	2.84 (0.62)	.61***	1.43	.233	.01
Elation	2.89 (0.71)	2.82 (0.66)	.45***	2.86	.092[†]	.01
Positive General Physical Experiences	2.69 (0.55)	2.67 (0.51)	.67***	0.41	.525	.001
Positive Skin Experiences	2.54 (0.97)	2.54 (0.93)	.57***	0.00	.991	.000
Positive Digestion Experiences	3.02 (0.80)	2.98 (0.79)	.61***	0.69	.408	.002
Positive Breast Experiences	3.02 (0.98)	2.88 (0.97)	.63***	7.19	.008*	.03
Positive Weight Experiences	2.06 (0.82)	2.03 (0.76)	.72***	0.53	.466	.002
Positive Appetite Experiences	2.50 (0.86)	2.43 (0.84)	.53***	2.07	.151	.01

Note. Test-retest interval: $M = 22.30$ days ($SD = 41.49$).
[a]$n = 155$ (df = 1, 154) women in a relationship.
[†]$p < .10$. *$p < .05$. ***$p < .001$.

Table 3.7

Means, Test-Retest Reliability (Correlation) Coefficients, and Repeated Measures ANOVAS of the PARMSS in the Time 1-Time 2 Subsample (n = 263)

Variable	Time 1 *M* (*SD*)	Time 2 *M* (*SD*)	*r*	*F* (1, 262)	*p*	Partial η^2
		Receptivity				
Short-Term (ST)	3.96 (2.13)	3.69 (2.12)	.81***	11.80	.001**	.04
Long-Term (LT)	4.90 (2.53)	4.42 (2.37)	.80***	25.00	.000***	.09
Picture Ratings (PR)	3.71 (1.98)	3.47 (1.88)	.83***	12.27	.001**	.05
		Proceptivity				
ST	2.75 (1.74)	2.47 (1.67)	.76***	15.03	.000***	.05
LT	3.80 (2.37)	3.21 (2.12)	.77***	36.78	.000***	.12
PR	2.65 (1.67)	2.47 (1.60)	.78***	7.21	.008**	.03

Note. PARMSS = Proceptive and Receptive Mating Strategies Scale. Test-retest interval: *M* = 22.30 days (*SD* = 41.49).
**$p < .01$. ***$p < .001$.

Body Image Quality). The main subscales had estimates that ranged from .49 (Positive Sleep Experiences) to .77 (Positive Body Image Experiences). The test-retest estimates of the supplementary subscales ranged from .48 (Progesterone-Related Experiences) to .74 (Negative Weight Experiences). As expected for state- as opposed to trait-like scales that may be sensitive to subtle day-to-day changes, the within-woman stability of the Women's REP scales tended to be modest. However, as a group, women did not demonstrate significant change in scores from Time 1 to Time 2 (as indicated by the ANOVAs) on 34 of the 35 scales and subscales. The exception was the Positive Breast Experiences supplementary scale.

The PARMSS demonstrated acceptable test-retest reliability estimates (i.e., > .70; Murphy & Davidshofter, 2005). They ranged from .80 to .83 for the receptivity scales and .76 to .78 for the proceptivity scales. Although the within-woman stability of PARMSS scores was high, as a group, women's scores significantly decreased from Time 1 to Time 2 for all scales, *p*s = .008 to < .001. These results were consistent with a carryover effect or an effect of familiarity to the items or photos of the PARMSS.

Intercorrelations. Scores on the main scales of the Women's REP were moderately correlated with one another (see Table 3.8). Scores on the negatively valenced scales were related to lower scores on the positively valenced scales, *r*s = -.23 to -.57, *p*s < .01 to .001. For example, the Negative Affective Experiences scale was inversely correlated with the Positive Affective and Physical Experiences scale. For each type of scale (negatively or positively valenced), all relationships were positive in direction, *r*s = .23 to .65, *p*s < .001. For example, the Negative Affective Experiences scale was correlated with the Negative Physical Experiences scale. These results indicate that the scales of the Women's REP are independent (i.e., the strongest correlation did not exceed the conventional cut-off of .80 for a strong effect size) as

Table 3.8

Correlations between the Main Scales of the Women's REP in the Full Time 1 Sample (n = 327)

Scale	1	2	3	4	5	6	7
1. Negative Affective Experiences	1						
2. Negative Physical Experiences	.65***	1					
3. Sexual Problems – General	.30***	.23***	1				
4. Sexual Problems – Relationship[a]	.42***	.27***	.27***	1			
5. Positive Affective and Physical Experiences	-.54***	-.25***	-.32***	-.42***	1		
6. Body Image Quality	-.54***	-.44***	-.23***	-.31***	.41***	1	
7. Sleep Quality	-.57***	-.45***	-.28***	-.23**	.41***	.32***	1

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
[a]n = 194 women in a relationship.
*$p < .01$. **$p < .001$.

well as related to one another in the expected directions. As seen in Appendix D (Tables D1 and D2), the subscales of the Women's REP showed the same patterns of intercorrelations.

Similarly, as demonstrated in Table 3.9, PARMSS scores were moderately to strongly correlated with one another, *r*s = .71 to .75 among the receptivity scales; *r*s = .70 to .73 among the proceptivity scales; and *r*s = .62 to .90 between the two types of scales, all *p*s < .001. The strongest correlation was between Receptivity – ST and Proceptivity – ST. The weakest correlations were between Receptivity –LT and Receptivity – ST as well as Receptivity – PR and Proceptivity – LT, providing some evidence that such contexts should be examined seperately.

Validity analyses.

Current hormonal problems. Eight women (2.4%) reported being diagnosed with or treated for a current hormonal problem or disorder. The problems listed by these participants primarily involved thyroid and reproductive hormones. The eight women with a current hormonal problem were compared to the other 319 women. A summary of all MANOVA and ANOVA results in this section can be found in Table 3.10. The combined six DVs from the main scales (excluding the relationship scale) of the Women's REP did not significantly differ by current hormonal problem group, F (6, 320) = 1.31, p = .250, partial η^2 = .02. However, the follow-up ANOVA for Positive Affective and Physical Experiences was significant and thus this scale was explored further. The mean score for the comparison group was higher than that of the hormonal problem group.

The two subscales of the Positive Affective and Physical Experiences scale were examined. The univariate effects of group on both Positive Affective Experiences and Positive Physical Experiences scores were significant. When the six supplementary subscales of these two main subscales were examined, there were also significant group differences for Positive

Table 3.9

Correlations between the Subscales of the PARMSS in the Full Time 1 Sample (n = 319)

Scale	1	2	3	4	5	6
Receptivity						
1. Short-Term (ST)	1					
2. Long-Term (LT)	.72***	1				
3. Picture Ratings (PR)	.75***	.71***	1			
Proceptivity						
4. ST	.86***	.62***	.65***	1		
5. LT	.64***	.90***	.62***	.71***	1	
6. PR	.64***	.63***	.87***	.73***	.70***	1

Note. PARMSS = Proceptive and Receptive Mating Strategies Scale.
***$p < .001$.

Affect, Elation, and Positive Physical Experiences – General. The means on all of these scales were higher in the comparison group than the hormonal problem group.

Five women in a relationship reported being currently diagnosed with or treated for a hormonal problem. There was a significant group difference for Sexual Problems – Relationship, F (1, 192) = 9.73, p = .002, partial η^2 = .05. Univariate ANOVAs were also significant for both Negative Sexual Experiences – Relationship and Positive Sexual Experiences – Relationship. The mean for the former subscale was higher for the hormonal problem group than the comparison group. The mean for the positively valenced subscale was lower for the hormonal problem group than the rest of the subsample.

Exploratory analyses revealed that the combined six scores of PARMSS also did not significantly differ between the groups among the full Time 1 sample, F (6, 302) = 1.79, p = .100, partial η^2 = .03. However, as seen in Table 3.10, the means for the Receptivity – LT and Proceptivity – LT scores, appeared low in the hormonal problem group.

Reproductive status groups. Overall, 127 non-users (43%), 129 OC users (43%), and 30 other HC users (10%) were included in these analyses. The three groups did not significantly differ on either the combined non-relationship Women's REP scales in a MANOVA, F (12, 558) = 1.17, p = .302, partial η^2 = .03. However, as seen in Table 3.11, pairwise comparisons suggested that OC users had higher Positive Affective and Physical Experiences scores than non-users, p = .027. When the relevant subscales were examined, the effect of group was significant for Elation. Pairwise comparisons also indicated that OC users had significantly higher scores on these subscales than non-users, ps = .033 and .021. Although the ANOVA for the Positive

Table 3.10

Summary of Means and ANOVAs for the Scales of the Women's REP and the PARMSS by Current Hormonal Problem Group (Yes/No) in the Full Time 1 Sample

Dependent variable	*M* (*SD*)		*F* (1, 325)	*p*	Partial η^2
	Yes (*n* = 8)	No (*n* = 319)			
		Women's REP			
Negative Affective Experiences	2.30 (0.97)	2.09 (0.75)	0.57	.450	.002
Negative Physical Experiences	1.82 (0.42)	1.73 (0.41)	0.41	.523	.001
Sexual Problems – General	2.97 (1.13)	2.70 (0.69)	1.18	.277	.04
Sexual Problems – Relationship[a]	3.43 (0.95)	2.15 (0.91)	9.73	.002**	.05
Negative Sexual Experiences – Relationship	2.80 (1.54)	1.83 (0.93)	5.14	.025*	.03
Positive Sexual Experiences – Relationship	1.93 (0.92)	3.53 (1.02)	12.05	.001**	.06
Positive Affective and Physical Experiences	2.41 (0.67)	2.85 (0.55)	4.84	.028*	.02
Positive Affective Experiences	2.34 (0.46)	2.85 (0.56)	6.70	.010*	.02
Positive Affect	2.41 (0.69)	2.89 (0.66)	3.99	.047*	.01
Elation	2.38 (0.89)	2.89 (0.70)	4.14	.043*	.01
Positive Physical Experiences	2.45 (0.51)	2.76 (0.47)	3.43	.065†	.01
Positive Physical Experiences – General	2.27 (0.53)	2.69 (0.47)	6.26	.013*	.02
Positive Skin Experiences	2.26 (0.71)	2.56 (0.87)	0.92	.339	.003
Positive Digestion Experiences	2.83 (0.92)	3.00 (0.73)	0.08	.772	.000
Positive Breast Experiences	2.80 (0.92)	2.89 (0.90)	0.07	.785	.000
Body Image Quality	3.30 (0.60)	3.20 (0.72)	0.15	.700	.000
Sleep Quality	2.09 (0.65)	3.22 (0.80)	0.19	.664	.001
		PARMSS[b]			
Receptivity					
Short-Term (ST)	3.75 (2.61)	3.99 (2.12)	0.06	.807	.000
Long-Term (LT)	3.47 (2.56)	4.95 (2.49)	2.78	.097†	.01
Picture Ratings (PR)	3.08 (1.74)	3.73 (1.95)	0.89	.347	.003
Proceptivity					
ST	2.28(1.68)	2.79 (1.77)	0.07	.786	.000
LT	2.20 (1.80)	3.87 (2.39)	3.50	.062†	.01
PR	1.74 (0.61)	2.70 (1.67)	2.63	.11	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. For the Women's REP, subscales are indented under their respective main scales. Only the subscales of significant or near significant (i.e., $p < .10$) main scales or subscales are presented.

[a] *n*s = 5 and 189 (df = 1, 192) women in a relationship, respectively [b] *n* = 8 for Yes and *n* = 311 for No (df = 1, 317).

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

Table 3.11

Summary Means and ANOVAs for the Scales of the Women's REP and PARMSS by Reproductive Status Group in the Full Time 1 Sample

Dependent variable	Nonusers (n = 127)	OC users (n = 129)	HC users (n = 33)	F (2, 283)	p	Partial η^2
			Women's REP			
Negative Affective Experiences	2.20 (0.79)	2.56 (0.75)	2.02 (0.73)	1.43	.241	.01
Negative Physical Experiences	1.73 (0.44)	1.70 (0.40)	1.74 (0.38)	0.19	.827	.001
Sexual Problems – General	2.67 (0.72)	2.74 (0.67)	2.74 (0.82)	0.30	.741	.002
Sexual Problems – Relationship[a]	2.32 (1.07)	2.04 (0.77)	2.45 (1.06)	2.62	.076†	.03
Negative Sexual Experiences – Relationship[b]	1.98 (1.14)	1.70 (0.74)	2.08 (1.14)	2.48	.089†	.03
Positive Sexual Experiences – Relationship[b]	3.32 (1.18)	3.61 (0.93)	3.22 (1.13)	1.78	.171	.02
Positive Affective and Physical Experiences	2.73[a] (0.57)	2.88[a] (0.51)	2.87 (0.72)	2.67	.071†	.02
Positive Affective Experiences	2.70[a] (0.54)	2.83[a] (0.48)	2.78 (0.70)	2.60	.076†	.02
Positive Affect	2.76 (0.68)	2.92 (0.61)	2.92 (0.82)	2.07	.128	.01
Elation	2.73[a] (0.74)	2.93[a] (0.63)	2.96 (0.77)	3.17	.044*	.02
Positive Physical Experiences	2.75[a] (0.66)	2.92[a] (0.59)	2.93 (0.77)	1.96	.143	.01
Body Image Quality	3.16 (0.73)	3.19 (0.72)	3.35 (0.78)	0.86	.426	.01
Sleep Quality	3.12 (0.77)	3.30 (0.80)	3.12 (0.78)	1.87	.156	.01
			PARMSS[c]			
Receptivity						
Short-Term (ST)	4.12 (2.17)	3.85[a] (2.08)	4.77[a] (2.34)	2.25	.107	.02
Long-Term (LT)	5.35[a] (2.47)	4.62[a] (2.55)	5.13 (2.14)	2.76	.065†	.02
Picture Ratings (PR)	3.85 (1.86)	3.64 (2.04)	4.17 (1.82)	1.03	.360	.01
Proceptivity						
ST	2.90 (1.84)	2.66[a] (1.65)	3.42[a] (2.26)	2.17	.116	.02
LT	4.27[a] (2.40)	3.52[a] (2.41)	4.07 (2.17)	3.18	.043*	.02
PR	2.82 (1.67)	2.64 (1.70)	3.00 (1.79)	0.67	.511	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. OC = oral contraceptive. HC = other hormonal contraceptive. For the Women's REP, subscales are indented under their respective main scales. Only the subscales of significant or near significant (i.e., $p < .10$) scales or subscales are presented. [a]Significant pairwise comparison at $p < .05$. [b]ns = 57, 89, and 23 (df = 2, 166). women in a relationship, respectively. [b]ns = 125, 126, and 329 (df = 2, 296), respectively

†$p < .10$. *$p < .05$.

Physical Experiences subscale was not significant, post hoc tests revealed that the mean score was higher for OC users compared to non-users, $p = .049$.

Among women in a relationship, 57 were non-users, 89 were OC-users, and 23 were other HC-users. While mean differences tended to be in expected directions, they were not significant.

The exploratory examination of a reproductive status group difference on the combined PARMSS scales using MANOVA was not significant, $F(12, 546) = 1.21$, $p = .274$, partial $\eta^2 = .03$. Nonetheless, ANOVAs revealed significant group differences for Proceptivity – Long-Term and a non-significant trend for Receptivity – Long-Term. Pairwise comparisons indicated that the mean scores on these scales were higher in nonusers than OC users, ps = .021 and .013, suggesting that nonusers report a greater willingness than OC users to engage in both receptive and proceptive mating behaviours with potential long-term partners. Post hoc tests also showed that other HC users had higher Receptivity – ST and Proceptivity – ST scores than OC users, ps = .038 and .043.

Current HC side effects. In the combined OC and other HC reproductive status groups, two women (1.3%) reported that they were currently diagnosed with or being treated for HC side effects and therefore, group analyses were not conducted. As seen in Table 3.12 (and Appendix E for the Women's REP subscales), however, many of the Women's REP and the PARMSS scores were correlated in expected directions with the ten Women's B-REP – Current HC Ratings (i.e., current HC users ratings of negative and positive [or increased and decreased] effects of their HCs on emotional health, physical health, sexual functioning, and relationship interests), providing some evidence of concurrent validity. The effect sizes were modest but in the appropriate directions when statistically significant. As examples, high scores on the

Table 3.12

Correlations of the Main Scales of the Women's REP and the PARMSS with the Women's Brief Reproductive Experiences (B-REP) – Current Hormonal Contraceptive Ratings (n = 159[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
					Women's REP					
Negative Affective Experiences	.13†	.21**	.18*	.05	.05	.05	-.15†	.12	.09	.19*
Negative Physical Experiences	.19*	.19*	.05	.07	.04	.13	-.07	.16†	.16†	.09
Sexual Problems – General	.01	-.04	.004	-.09	-.11	-.04	-.11	.01	-.18*	.03
Sexual Problems – Relationship[b]	-.09	.09	.01	.18†	.15	.03	-.06	.02	.19*	-.09
Positive Affective and Physical Experiences	.04	-.08	-.03	.13	.15†	.12	.28***	.07	-.003	.09
Body Image Quality	-.13†	-.30***	-.07	-.01	.05	.05	.17*	-.07	-.07	.01
Sleep Quality	-.03	-.01	-.01	.02	-.03	-.07	.08	.001	-.01	-.14†
					PARMSS					
Receptivity										
Short-Term (ST)	-.02	.04	-.04	.11	.09	.06	-.08	.14†	.28**	-.002
Long-Term (LT)	-.10	-.05	-.06	.12	.05	-.01	-.11	.11	.15†	-.02
Picture Ratings (PR)	.05	.08	.01	.19*	.15†	.10	.03	.16†	.31***	.04
Proceptivity										
ST	-.05	.04	-.04	.17*	.16*	.10	-.04	.15†	.24**	.03
LT	-.08	-.03	-.02	.12	.04	-.02	-.08	.14†	.13	.03
PR	.02	.06	.06	.25**	.21**	.13	.09	.19*	.27**	.08

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. STRs = short-term relationships. LTRs = long-term relationships. The B-REP measures current HC users ratings of the negative and positive or increased and decreased side effects of their HCs on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a]Actual *ns* = 151 to 159 due to missing data. [b]*ns* = 110 to 111 women in a relationship.

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

Negative Affective Experiences scale were related to high ratings of negative HC side effects on emotional health (non-significant trend), physical health, and sexual functioning as well as decreased interest in short-term relationships, *r*s = .13 to .21, *p*s = .076 to .008; and high Negative Physical Experiences scores were related to high ratings of negative HC side effects on emotional and physical health, both *r*s = .19, *ps* = .016 and .018. These findings provide some concurrent validity for these scales. Positively valanced scale scores on the Women's REP were generally not significantly related to ratings of negative or positive side effects of HCs, with the exception of Body Image Quality (see Table 3.12). However, women who reported high scores on this scale tended to also report increased interest in long-term relationships as a side effect of their HC, $r = .28$, $p < .001$. While the Sexual Problems – General and Sexual Problems – Relationships scores were not significantly correlated with the ratings of HC sexual functioning side effects, the former scale was negatively, while the latter was positively, correlated with increased interest in short-term relationships, *r*s = -.18 and .19, *p*s = .026 and .041.

With respect to the PARMSS, women with high receptivity and proceptivity scores also tended to have high ratings of: positive side effects ratings for emotional health and physical health, *r*s = .16 to .25, *p*s = .039 to .002; decreased interest in long-term relationships, *r*s = .14 to .19, *p*s = .094 to .020; and increased interest in short-term relationships, *r*s = .27 to .31, *p*s = .003 to .001. Overall, women who reported that their HC has (a) positive effects on their health, (b) decreased their long-term relationship interest, and (c) increased their short-term relationship interest were more receptive and proceptive.

To explore the proportion of women reporting various effects of their HCs on the B-REP, ratings of *mild* to *extreme* (as opposed to *not at all*) were combined. Overall, on the Women's B-REP – Current HC Ratings, 42 (27%) of women reported mild to extreme negative effects of

their current HC on their physical health and 66 (42%) reported positive effects. Forty-four (28%) women reported negative, and 47 (30%) reported positive, effects on their emotional health. With respect to sexual functioning, 35 (45%) reported negative effects and 46 (29%) reported positive effects. Increased interest in short-term relationships associated with their current HC was reported by 19 (12%) of women. Nineteen women (12%) also reported decreased interest in short-term relationships. Increased interest in long-term relationships was reported by 29 (19%), and decreased interest by 12 (8%), of women.

Menstrual cycle regularity groups. Among the subsample of free-cyclers, 35 women (28%) rated their cycles as irregular (i.e., *"Some months I get my period and some months I don't*"), while 92 women reported regular cycles (i.e., "*I usually get my period within two to three days of when I expect it*" or "*My period is like clockwork; the same number of days elapse between periods*"). The combined effect of the main scales of the Women's REP (excluding the relationship scale) approached significance with a MANOVA, F (6, 120) = 1.90, p = .087, partial η^2 = .09. As seen in Table 3.13, univariate ANOVAs revealed that women with irregular cycles scored higher than those with regular cycles on the Sexual Problems – General scale. Also, the irregularly cycling group reported significantly lower Body Image Quality and Sleep Quality scores than women with regular cycles.

When the subscales of the main scales that showed evidence of group differences were examined, ANOVAs indicated that the mean Negative Sexual Experiences – General and Negative Sleep Experiences scores were higher in the irregular than regular cycling group (see Table 3.13). With the supplementary subscales, the irregular group reported higher symptoms on the Negative Sexual Experiences – Others and Negative Sexual Experiences – Self scales. Among women in a relationship, 10 women reported irregular cycles and 47 reported regular

Table 3.13

Summary of Means and ANOVAs for the Scales of the Women's REP and PARMSS by Cycle Regularity Group among Free-Cycling Women

Dependent variable	Irregular (n = 35)	Regular (n = 92)	F (1, 125)	p	Partial η^2
		Women's REP			
Negative Affective Experiences	2.46 (0.867	2.10 (0.73)	5.46	.021*	.04
Negative Physical Experiences	1.86 (0.50)	1.68 (0.41)	3.85	.052†	.03
Hormonal Symptoms	1.80 (0.43)	1.65 (0.41)	3.56	.062†	.03
Testosterone-Related Experiences	1.91 (0.56)	1.74 (0.44)	3.37	.069†	.03
Progesterone-Related Experiences	1.64 (0.40)	1.51 (0.45)	2.21	.140	.02
Decreased Appetite	1.77 (1.32)	1.68 (0.99)	0.17	.681	.001
General Aches and Pains	2.05 (0.83)	1.80 (0.55)	3.78	.054†	.03
Sexual Problems – General	2.90 (0.80)	2.58 (0.68)	4.29	.040*	.03
Negative Sexual Experiences – General	2.31 (0.93)	1.77 (0.68)	13.00	.000***	.09
Negative Sexual Experiences – Others	2.31 (1.03)	1.75 (0.67)	12.89	.000***	.10
Negative Sexual Experiences – Self	2.32 (1.04)	1.81 (0.86)	7.93	.006**	.06
Positive Sexual Experiences – Others	2.37 (1.08)	2.25 (1.05)	0.32	.570	.003
Positive Sexual Experiences – Self	2.26 (0.96)	2.42 (1.08)	0.56	.456	.004
Sexual Problems – Relationship[a]	2.78 (1.30)	2.22 (1.01)	2.26	.138	.04
Positive Affective and Physical Experiences	2.67 (0.67)	2.75 (0.53)	0.54	.466	.004
Body Image Quality	3.11 (0.82)	3.18 (0.70)	0.23	.630	.002
Sleep Quality	3.86 (0.78)	3.22 (0.74)	5.96	.016*	.05
Negative Sleep Experiences	2.87 (0.89)	2.42 (0.82)	7.38	.008**	.06
Positive Sleep Experiences	2.32 (0.84)	2.51 (0.85)	1.22	.271	.01
		PARMSS[b]			
Receptivity					
Short-Term (ST)	4.26 (2.02)	4.07 (2.23)	0.19	.664	.002
Long-Term (LT)	5.68 (2.23)	5.22 (2.56)	0.84	.260	.01
Picture Ratings (PR)	4.18 (1.64)	3.73 (1.93)	1.42	.235	.01
Proceptivity					
ST	2.52 (1.48)	3.04 (1.96)	1.98	.162	.02
LT	4.01 (2.20)	4.37 (2.51)	0.54	.463	.004
PR	2.71 (1.48)	2.86 (1.75)	0.20	.657	.002

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. For the Women's REP, subscales are indented under their respective main scale. Only the subscales of significant or near significant (i.e., $p < .10$) main scales or subscales are presented.
[a]ns = 10 and 47 (df = 1, 56) women in a relationship, respectively. [b]ns = 34 and 91 (df =1, 123), respectively.
†$p < .10$. *$p < .05$., **$p < .01$. ***$p < .001$.

cycles. There was no difference between the groups in mean Sexual Problems – Relationship score.

When scores on the PARMSS scales were explored, the groups differed on the combined scales in the MANOVA, F (6, 118) = 2.48, p = .027, partial η^2 = .11, but follow-up ANOVAs were not significant. However, all of the receptivity means appeared higher among the irregularly cycling group, while all of the proceptivity means appeared higher among the regularly cycling group.

Current PMS. Among free-cyclers, 14 women (11%) reported that were currently diagnosed with or being treated for PMS and 113 women did not. Only women who were within the premenstrual phase of their cycle (i.e., one to 10 days before the self-reported date of NMP [next menstrual period]) when they participated in Time 1 were examined further. Due to small sample sizes of women in the premenstrual phase at Time 1 (2 women with, and 28 women without, self-reported PMS), group analyses were not conducted. Instead, correlations of the Women's REP and PARMSS with ratings of PMS symptoms (on the Women's B-REP – Premenstrual Phase Ratings) were examined among the 30 women in the premenstrual phase. As seen in Table 3.14 (and Appendix F for the Women's REP subscales), some of the Women's REP and PARMSS scales were correlated with Women's B-REP – Premenstrual Phase Ratings and the correlations tended to be in the expected directions when significant, with one exception noted below.

Overall, for most negatively valenced Women's REP scales, women with high scores also tended to have high PMS ratings indicating negative effects of the premenstrual phase on emotional, sexual, and physical health or functioning, rs = .37 to .74, ps = .044 to < .001, as well as decreased relationship interests, rs = .37 to .66, ps = .046 to < .001. The correlations for the

Table 3.14

Correlations of the Main Scales of the Women's REP and the PARMSS with the Women's Brief Reproductive Experiences (B-REP) – Premenstrual Phase Ratings among Free-Cycling Women in the Premenstrual Phase (n = 30[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
					Women's REP					
Negative Affective Experiences	.74***	.54**	.33†	.20	.40*	.38*	.18	.25	.32†	.37*
Negative Physical Experiences	.59**	.64***	.39*	.14	.13	.17	.24	.47**	.02	.66***
Sexual Problems – General	.29	.27	.37*	-.31†	-.09	-.03	-.01	.23	-.13	.41*
Sexual Problems – R[b]	.61*	.53*	.65*	-.36	.01	.000	-.10	.49†	.15	.45†
Positive Affective and Physical Experiences	-.25	-.16	-.30	.17	-.01	.29	.16	-.05	.23	-.23
Body Image Quality	-.28	-.12	.13	-.09	-.25	-.29	.01	.22	-.09	.20
Sleep Quality	.08	.23	.01	.44*	.42*	.42*	.23	.08	.47**	-.16
					PARMSS					
Receptivity										
Short-Term (ST)	-.30	-.19	-.08	.18	.06	-.20	-.09	-.16	-.03	-.14
Long-Term (LT)	-.20	-.06	.02	.12	-.05	-.26	-.24	-.06	-.06	-.09
Picture Ratings (PR)	-.22	-.09	.10	.31†	.01	-.07	.11	-.06	.14	-.02
Proceptivity										
ST	-.42*	-.35†	-.08	.01	-.02	-.26	.01	-.25	-.01	-.18
LT	-.30	-.18	-.08	-.03	-.11	-.31	-.15	-.18	-.04	-.19
PR	-.43*	-.33†	.11	.04	-.08	-.21	.08	-.20	.08	-.19

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. STRs = short-term relationships. LTRs = long-term. Relationships. R = Relationship. The B-REP measures women's reports of the negative and positive or increased and decreased effects of the premenstrual phase (in general) on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a]Actual *ns* = 29 to 30 due to missing data. [b]*n*s = 14 to 15 women in a relationship.

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

Negative Affective Experiences scale were relatively strong. However, contrary to expectations, Negative Affective Experiences scores also showed small positive correlations with the three positive PMS ratings, *r*s = .38 to .40, *p*s = .45 to .28, while Negative Affective Experiences, Sexual Problems – General, and Sexual Problems – Relationship scores not significantly related to these ratings. The positively valenced scale scores of the Women's REP tended to be non-significant in these analyses. The exception was Sleep Quality, which was positively related to positive effects of the premenstrual phase on emotional health, physical health, and sexual functioning as well as increased interest in short-term relationships, *r*s = .42 to .47, *p*s = .020 to .009. Proceptivity scores on the PARMSS were negatively correlated with the negative effects of the premenstrual phase on physical health and emotional health, *r*s = -.42 to -.43, *p*s = .023 to .019, but not with ratings of the effects on relationship interests.

To explore the proportions of women in the full subsample of freecycling women (not just those in premenstrual phase) reporting various effects of the premenstrual phase on the B-REP, ratings of *mild* to *extreme* (as opposed to *not at all*) were combined. On the Women's B-REP – Premenstrual Phase Ratings, 70 (55%) women reported that the premenstrual phase has negative effects, while 31 (25%) reported positive effects, on their physical health. Ninety-three (74%) reported negative effects, while 33 (26%) reported positive effects, on their emotional health. With respect to sexual functioning, 74 (59%) of women reported that the premenstrual phase has negative effects, while 74 (59%) reported that it has positive effects. Thirty-five (28%) of women reported that their interest in short-term relationships increases in the premenstrual phase, and 18 (14%) reported that it decreases. Increased interest in long-term relationships was reported by 51 (40%), and decreased interest by 17 (13%), of women.

Correlations with other relevant measures. Correlations for scores on the Women's REP and the PARMSS with 30 other health-, sexuality- or relationship-relevant variables from the SQ or the Time 1 PQ were computed. As seen in Tables 2.15, 2.16, and 2.17 (and Appendix G, H, I for the Women's REP subscales), both the negatively valenced and positively valenced scales of the Women's REP tended to be related to these variables in expected directions. Within each valance (i.e., negative or positive), the scales tended to be related to the same variables, particularly those of the same valence. For example, the negative experiences scales, such as Negative Affective Experiences, were positively correlated with Negative Impression Management, Neuroticism, hormonal sensitivity rating, and Negative Affect (PANAS), *r*s = .14 to .75, *p*s = .046 to < .001, as well as negatively correlated with Positive Affect (PANAS), physical health rating, emotional health rating, sexual functioning rating, sexual satisfaction in general (PSSI – General), and LTMO (Long-Term Mating Orientation) scores, *r*s = -.13 to -.53, *p*s = .016 to < .001. The positive experiences scales showed the opposite relationships with these variables (see Tables 2.15 and 2.16). Similarly, among women in a relationship, negative experiences scores tended to be negatively correlated with sexual satisfaction (PSSI – Partner), relationship quality scores (e.g., commitment to partner), and proceptive behaviour in the past 48 hours, *r*s = -.16 to -.47, *p*s = .029 to < .001, as well as positively correlated with jealousy (not including Sexual Problems scores), *r*s = .15 to .29, *p*s = .040 to < .001. Positive experiences scores showed the opposite relationships (see Table 3.17). These findings provide evidence of convergent validity.

Correlations between affective and sexual Women's REP scale scores were also relatively strong with other affective and sexual variables, respectively, providing some evidence of divergent validity. It was also revealed that Sexual Problems – General scores were negatively

Table 3.15

Correlations of the Main Scales of the Women's REP and the PARMSS with Other Health-Relevant Variables in the Full Time 1 Sample (n = 327[a])

Scale	NIM	PIM	N	HS	NA	PA	EH	PH	SF
Women's REP									
Negative Affective Experiences	.36***	-.32***	.46***	.19**	.75***	-.49***	-.41***	-.15**	-.23***
Negative Physical Experiences	.35***	-.31***	.37***	.23***	.50***	-.21***	-.29***	-.10†	-.09
Sexual Problems – General	.19**	-.15**	.17**	.03	.19**	-.23***	-.19**	-.05	-.35***
Sexual Problems – Relationship[b]	.25**	-.19**	.22**	.14*	.36***	-.37***	-.17*	-.19**	-.53***
Positive Affective and Physical Experiences	-.25***	.18**	-.34***	-.06	-.40***	.75***	.39***	.33***	.30***
Body Image Quality	-.17**	.27***	-.34***	-.15**	-.39***	.30***	.29***	.21***	.17**
Sleep Quality	-.25***	.24***	-.32***	-.03	-.46***	.39***	.27***	.22***	.22***
PARMSS									
Receptivity									
Short-Term (ST)	.06	-.04	-.003	-.11†	.16**	.03	-.06	.004	-.02
Long-Term (LT)	.02	-.07	.04	-.07	.16**	.05	-.004	.08	-.03
Picture Ratings (PR)	.04	-.02	.02	-.07	.12*	.09	.04	.09	.01
Proceptivity									
ST	.05	-.03	-.02	-.12*	.16**	.05	-.03	.02	-.01
LT	.01	-.06	.03	-.10†	.12*	.06	.02	.07	.002
PR	.02	-.03	-.02	-.06	.08	.13*	.07	.09	.04

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. NIM = Negative Impression Management. PIM = Positive Impression Management. N = Neuroticism. HS = Hormonal Sensitivity Rating. NA = Negative Affect (Positive and Negative Affect Schedule [PANAS]). PA = Positive Affect (PANAS). EH = Emotional Health Rating. PH = Physical Health Rating. SF = Sexual Functioning Rating.

[a] Actual *n*s = 308 to 327 due to missing data. [b] *n*s = 189 to 194 women in a relationship.

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

Table 3.16

Correlations of the Main Scales of the Women's REP and the PARMSS with Other Sexuality-Relevant Variables in the Full Time 1 Sample (n = 327[a])

Scale	SO	PSSI	MF	A – LT	A – ST	SOI	LTMO	STMO	PSB	R	P
						Women's REP					
Negative Affective Experiences	.19**	-.34***	.10†	.07	.09	.08	-.15**	.09†	.06	.002	.003
Negative Physical Experiences	.10†	-.19***	.08	.11*	.13*	.04	-.13*	.08	.01	-.03	-.001
Sexual Problems – General	-.07	-.18**	-.32***	-.08	-.18**	-.28***	.02	-.25***	-.12*	-.05	-.14*
Sexual Problems – Relationship[b]	.18*	-.66***	.13†	.08	.16*	.19**	-.12†	.23**	.14†	-.08	-.12†
Positive Affective and Physical Experiences	-.18**	.39***	.01	.03	.04	-.04	.20***	-.07	-.07	.003	-.03
Body Image Quality	-.03	.22***	.01	-.08	-.01	-.05	.05	-.03	-.10†	.01	.09
Sleep Quality	-.09	.24***	.04	-.09	-.03	.11†	.10†	.05	.05	.03	.05
						PARMSS					
Receptivity subscales											
Short-Term (ST)	.09	-.25***	.07	.36***	.54***	.39***	-.29***	.49***	.15**	.07	.11†
Long-Term (LT)	.01	-.24***	-.05	.52***	.40***	.17**	-.11*	.23***	.000	.04	.03
Picture Ratings (PR)	-.02	-.24***	.06	.72***	.69***	.24***	-.24***	.33***	.03	.05	.01
Proceptivity subscales											
ST	.09	-.18**	.01	.28***	.48***	.31***	-.28***	.41***	.14**	.08	.14*
LT	.02	-.15**	-.07	.42***	.36***	.16**	-.10†	.20***	.03	.06	.08
PR	-.04	-.16**	.002	.60***	.60***	.14*	-.24***	.23***	-.02	.06	.03

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. SO = Kinsey Sexual Orientation Scale. PSSI = Pinney Sexual Satisfaction Inventory – General (total score). MF = Masturbation Frequency Rating. A – LT = Attraction for a Long-Term Relationship – Picture Ratings. ST = Attraction for a Short-Term Relationship – Picture Ratings. SOI = Sociosexual Orientation Inventory – Revised (total score). LTMO = Long-Term Mating Orientation. STMO = Short-Term Mating Orientation. PSB = Past Sexual Behaviour. R = Number of Times *Receptive* to Sexual Activity with Others (excluding primary partner) in the past two days (48 hours). P (*Proceptive*) = Number of Times Sexual Activity with Others Initiated by Self or Both Self and Partner (excluding primary partner) in the past two days (48 hours).

[a]*n*s = 311 to 327 due to missing data. [b]*n*s = 189 to 194 women in a relationship.

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

Table 3.17

Correlations of the Main Scales of the Women's REP and the PARMSS with Other Relationship-Relevant Variables among Women in a Relationship (n = 194[a])

Variable	PSSI	S	C	I	T	CJ	EJ	BJ	R	P
					Women's REP					
Negative Affective Experiences	-.30***	-.40***	-.17*	-.35***	-.36***	.29***	.20**	.26***	.06	-.14†
Negative Physical Experiences	-.19**	-.24**	-.16*	-.20**	-.25***	.24**	.15*	.23***	.08	-.05
Sexual Problems – General	-.04	-.08	.14†	-.13†	-.16*	.02	.02	.02	-.002	-.17*
Sexual Problems – Relationship	-.42***	-.40***	-.14†	-.47***	-.25***	.12†	-.10	.04	-.12†	-.30***
Positive Affective and Physical Experiences	.27***	.40***	.15*	.39***	.34***	-.17*	-.14†	-.10	-.03	.16*
Body Image Quality	.15*	.23**	.02	.20**	.16*	-.20**	-.14†	-.19**	-.08	.08
Sleep Quality	.10	.21**	.01	.14*	.15*	-.12†	-.05	-.09	-.03	.07
					PARMSS					
Receptivity										
Short-Term (ST)	-.16*	-.29***	-.40***	-.26***	-.22**	.14†	.02	.17*	.14*	-.08
Long-Term (LT)	-.07	-.26***	-.33***	-.28***	-.28***	.21**	-.02	.14†	.04	-.02
Picture Ratings (PR)	-.17*	-.24**	-.25***	-.22**	-.24**	.10	.001	.18*	.10	-.02
Proceptivity										
ST	-.11	-.17*	-.32***	-.17*	-.18*	.09	.06	.21**	.23**	-.02
LT	-.04	-.17*	-.26***	-.18*	-.29***	.21**	.01	.18*	.04	-.14†
PR	-.15*	-.17*	-.16*	-.16*	-.26***	.07	.04	.24**	.18*	-.05

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. PSSI = Pinney Sexual Satisfaction Inventory – Partner (total score). S = Relationship Satisfaction. C = Commitment to Partner. I = Intimacy with Partner. T = Trust in Partner. CJ = Cognitive Jealousy. EJ = Emotional Jealousy. BJ = Behavioural Jealousy. R = Number of Times *Receptive* to Sexual Activity with Partner in the past two days (48 hours). P (*Proceptive*) = Number of Times Sexual Activity with Partner Initiated by Self or Both Self and Partner in the past two days (48 hours).

[a]*n*s = 188 to 194 due to missing data.

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

related to masturbation frequency and indicators of sociosexual unrestrictiveness (e.g., SOI and STMO [Short-Term Mating Orientation], *r*s = -.18 to -.32, *p*s = .003 to < .001, while Sexual Problems – Relationship scores were unrelated to masturbation frequency and negatively related to sociosexual variables, *r*s = .16 to .23, *p*s = .029 to .001.

Scales of the PARMSS were unrelated to the impression management, Neuroticism, and Positive Affect scales as well as health ratings. Receptivity and proceptivity scores tended to be negatively correlated with sexual satisfaction in general (PSSI - General) and in a relationship (PSSI – partner), relationship quality among women in a relationship, and LTMO, *r*s = -11 to -.40, *p*s = .043 to < .001. They were also positively correlated with picture ratings of attraction for long-term and short-term relationships and indicators of unrestrictiveness (e.g., SOI, LTMO, and Past Sexual Behaviour) as well as cognitive and behavioural jealousy and receptive behaviour among women in a relationship, *r*s = .14 to .72, *p*s = .014 to < .001. These findings provide evidence of convergent and divergent validity for PARMSS. The only health-relevant variable in Table 3.15 with which the PARMSS scores were significantly related was Negative Affect (PANAS), *r*s = .12 to .16, *p*s = .040 to .004. Women higher in receptivity and proceptivity reported higher negative affect.

Correlations between the Women's REP and the PARMSS. Correlations between the scales and subscales of the Women's REP and the PARMSS are presented in Table 2.18. Both Negative Affective Experiences and Negative Physical Experiences scores were positively related to the receptivity scores, *r*s = .10 to .13, *p*s = .078 to .023, particularly the imaginary vignette short-term relationship scale (Receptivity – ST). These associations suggest that women with higher emotional and physical reproductive symptoms reported more receptivity. Sexual Problems – General was negatively related to all PARMSS scales (except Proceptivity – PR), *r*s

Table 3.18

Correlations between the Scales and Subscales of the Women's REP and the PARMSS in the Full Time 1 Sample (n = 319)

Variable	Receptivity			Proceptivity		
	Short-Term (ST)	Long-Term (LT)	Picture Ratings (PR)	ST	LT	PR
Scales						
Negative Affective Experiences	.13*	.10†	.10†	.06	.03	.03
Negative Physical Experiences	.11*	.13*	.10†	.09	.11†	.08
Sexual Problems – General	-.18**	-.14*	-.14*	-.20***	-.17**	-.13
Sexual Problems – Relationship[a]	.18*	.14*	.17*	.10	.09	.08
Positive Affective and Physical Experiences	-.03	-.03	.05	-.02	-.02	.07
Body Image Quality	-.03	-.03	-.03	.03	.03	.02
Sleep Quality	-.04	-.10†	-.05	-.04	-.07	-.02
Subscales						
Hormonal Symptoms	.11*	.14*	.11†	.11†	.14*	.10†
Decreased Appetite	.15*	.13*	.15*	.13*	.14*	.12*
General Aches and Pains	.02	.02	.02	-.01	-.03	-.02
Negative Sexual Experiences – General	-.07	-.10†	-.05	-.14*	-.16*	-.07
Negative Sexual Experiences – Relationship[a]	.14†	.07	.13†	.07	.03	.04
Negative Body Image Experiences	.05	.07	.07	-.003	.02	.02
Negative Sleep Experiences	.06	.13*	.08	.04	.08	.05
Positive Sexual Experiences – Others	.38***	.27**	.32***	.31***	.25***	.25***
Positive Sexual Experiences – Self	.07	-.01	.06	.05	-.01	.03
Positive Sexual Experiences – Relationship[a]	-.19**	-.19**	-.18**	-.12	-.13†	-.10
Positive Affective Experiences	-.03	-.02	.03	-.02	-.01	.05
Positive Physical Experiences	-.01	-.03	.07	-.02	-.04	.07
Positive Body Image Experiences	-.01	.02	-.02	.04	.07	.06
Positive Sleep Experiences	.01	-.03	.03	-.01	-.03	.02
Supplementary Subscales						
Testosterone-Related Experiences	.15**	.15**	.12*	.12*	.12*	.08
Progesterone-Related Experiences	.03	.10†	.06	.06	.13*	.07
Negative Sexual Experiences – Others	-.11†	-.13*	-.09	-.17*	-.19**	-.11*
Negative Sexual Experiences – Self	-.02	-.04	.01	-.08	-.08	-.01

Variable	Receptivity			Proceptivity		
	Short-Term (ST)	Long-Term (LT)	Picture Ratings (PR)	ST	LT	PR
Supplementary Subscales						
Negative Weight Experiences	.07	.03	.06	-.01	-.04	.01
Positive Affect	-.02	.01	.05	-.01	.01	.08
Elation	-.06	-.09	-.02	-.03	-.05	.03
Positive General Physical Experiences	-.003	-.03	.07	-.002	-.02	.08
Positive Skin Experiences	.01	.04	.08	-.004	-.004	.09
Positive Digestion Experiences	.02	.04	.06	-.004	.03	.05
Positive Breast Experiences	-.09	-.13*	-.05	-.09	-.14*	-.04
Positive Weight Experiences	.01	.04	.05	.04	.07	.08
Positive Appetite Experiences	.06	.06	.07	.08	.08	.11†

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale.
[a]n = 191 women in a relationship.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

= -.14 to -.18, *p*s = .021 to < .001, suggesting that women with general sexual problems are less receptive and less proceptive. However, Sexual Problems – Relationship scores were positively related to Receptivity – ST scores, *r*s = .14 to .18, *p*s = .047 to .015, suggesting that women having more sexual problems in their relationship are more receptive to potential short-term partners. The other main scales of the Women's REP (Positive Affective and Physical Experiences, Body Image Quality, and Sleep Quality) were not significantly correlated with the PARMSS scores.

Examination of correlations between the Women's REP subscales and the PARMSS indicated that both receptivity and proceptivity were moderately positively related to Positive Sexual Experiences – Others scores, *r*s = .25 to .38, *p*s < .001, and weakly positively related to Decreased Appetite and Testosterone-Related Experiences scores, *r*s = .12 to .15, *p*s = .036 to 0.10. Women who reported greater decreased appetite and testosterone-related reproductive symptoms tend to report higher receptivity and proceptivity. Receptivity scores were also negatively related to Positive Sexual Experiences – Relationship scores, *r*s = -.18 to -.19, *p*s = .013 to .008, while proceptivity scores were negatively related to Negative Sexual Experiences – General, *r*s = -.14 and -.16, *p*s = .011 and .005.

Discussion

The main purposes of this report (Part 1 of Study 2) were to examine the psychometric properties and relationships between the scales of Women's REP and the PARMSS, two new measures relevant to the intersection of women's health and reproduction/mating. An attempt was made to replicate evidence of internal consistency and concurrent validity of the Women's REP from Study 1. The development and initial psychometric evaluation of the PARMSS was presented in Phillips (2015). Thus, another goal of the present study was to address the need for

further examination of the psychometric properties of this unique measure of both receptivity and proceptivity. The test-retest and construct validity of the Women's REP and the PARMSS were also explored.

As in Study 1, the Women's REP scales and subscales tended to show good internal consistency reliability and low to moderate intercorrelations, ranging from .61 to .95 (M = .82) and |.01| to |.68| (M = .36), respectively. These findings provide further evidence that the scales are measuring independent constructs. Building on Study 1, the test-retest reliability of the Women's REP scores was examined in the present study. Results revealed that the test-retest reliability was low, ranging from .59 to .72 (M = .62) for the main scales, but appropriate for at least two reasons. First, reproductive experiences related to fertile times in the female lifespan would be expected to be brief and somewhat fleeting, such as across phases of the menstrual cycle with changes in hormone levels. Thus, it is likely that the test-retest reliability estimates would be higher if both testing sessions occurred during the same phase of consecutive menstrual cycles. Also, the Women's REP is purported to be a measure of experiences that are more state- than trait-like and thus, its scores would not be expected to be highly stable. Nonetheless, with respect to the possibility of effects of time, the Women's REP scores did not exhibit any significant changes between Times 1 and 2. This suggests that the scale scores are reasonably stable across a 22-day (SD = 41.49) period where substantial reproductive status changes are unlikely to have occurred. These findings replicate those of Study 1 with respect to internal consistency and indicate that Women's REP demonstrates good reliability.

The PARMSS scales demonstrated good internal consistency reliability, an average of .93, and acceptable test-retest reliability (ranging from .76 to .83; M = .79) for a trait-like measure. However, an effect of time consistent with a carryover effect or an effect of familiarity

with the items or photos of the PARMSS was found such that scores tended to uniformly decrease from Time 1 to Time 2. Phillips (2015) also found such an effect. An explanation may be that the vignettes and photo stimuli are no longer novel with repeated administration and thus, less activating for women at Time 2 with respect to mating strategy enactment. Unsurprisingly, the scales of the PARMSS were also moderately to strongly intercorrelated, suggesting that women who endorse receptivity also tend to endorse proceptivity. Results also revealed that within the type of scale, receptivity or proceptivity, the three scores demonstrated somewhat lower correlations with one another (M = .72) than between context (i.e., vignette; e.g., the correlation between Receptivity – LT and Proceptivity – LT was .90) and between picture ratings (r = .87). Therefore, similar to the mate preferences literature (e.g., Gildersleeve et al., 2014; Thompson & O'Sullivan, 2013), it seems valuable to separately assess receptive and proceptive sexuality under various circumstances.

In five areas, the results of the present study partially replicated findings from Study 1 suggesting group differences on the Women's REP with respect to presence/absence of: a hormonal problem, a specific reproductive status (HC use), HC side effects, cycle regularity, and PMS. In Study 1, women who reported being diagnosed or treated with a hormonal problem differed from women without a hormonal problem on all main scales of the women's REP such that they reported greater negative and lower positive reproductive experiences. Consistent with these results, the hormonal problems group in the present study, despite a low sample size, had relatively high Negative Sexual Experiences – Relationship scores and relatively low positive sexual, affective, and physical experiences scores. In spite of low power, these findings indicate that, as expected, scores on the Women's REP seem to capture hormone-related experiences.

With respect to the examination of differences between reproductive status groups, non-

significant mean differences suggested that OC users had lower Negative Sexual Experiences – Relationship and higher *positive* affective and physical experiences (with significantly higher Elation) scores than non-users. These findings were also in line with expectations based on the results of Study 1. However, in Study 1, OC users had lower *negative* affective and sexual experiences scores than both non-users and other HC users as well as higher Body Image Quality scores than other HC users and higher Sleep Quality scores than other HC users and nonusers. These findings mean that across Studies 1 and 2, all of the main scales were significantly different in convergent ways for OC users compared to other women and are consistent with some research indicating that OCs can have positive effects on the affective and physical health of some women (Oinonen & Mazmanian, 2002; Sanders et al., 2001).

Among all HC users (i.e., OCs and other HCs), 1.3% reported currently being diagnosed or treated for HC side effects in general. Examination of the B-REP – Current HC Ratings in the full sample of HC users revealed that one-quarter to one-half of the users reported mild to extreme negative effects of their current HC on their emotional (27%), sexual (45%), and physical (28%) health. These findings are consistent with those of Sanders et al. (2001) with respect to OC discontinuation. Interestingly, 42, 30, and 29% of women reported positive effects on their emotional, physical, and sexual health, respectively (see Graham et al., 2007; Greco et al., 2007 for similar findings). Relatively fewer women indicated that their HC had effects on their relationship interests (8 to 19%). Ratings of the negative effects of one's current HC on physical health had small positive relationships with Negative Affective Experiences and Negative Physical Experiences scores as well as a moderate negative relationship with Body Image Quality scores. Contrary to what would be expected, sexual and positive affective and physical experiences scores on the Women's REP were not significantly correlated with any

ratings of the effects of one's current HC. Keeping in mind that women who are most likely to experience negative effects of HC use on their health may not be represented in the HC groups reported on here due to the possibility of discontinuation of use (and thus, the survivor effect) (e.g., Sanders et al., 2001), the finding that some scales are associated with HC side effect experiences provides further evidence of concurrent validity of the Women's REP.

In Study 1, free-cycling women with irregular versus regular menstrual cycles significantly differed on the main scales of the Women's REP. In the present study, irregularly cycling women were found to have higher Negative Affective Experiences, Negative Physical Experiences (non-significant trend), and Sexual Problems – General scores as well as lower Sleep Quality scores than regularly cycling women. These findings were consistent with the general pattern of results in Study 1 but differed slightly such that differences in Positive Affective and Physical Experience and Body Image Quality scores were not significant. Overall, however, the results of both studies are consistent with research suggesting that regularly cycling women have a higher quality of life or well-being than women with irregular cycles (e.g., Jacobs, Boynton-Jarrett, & Harville, 2015; McCook, Bailey, Williams, Anand, & Rame, 2015) and appear to the first to suggest that these groups differ in specific areas such as sleep.

Eleven percent of free-cycling women reported being currently being diagnosed or treated for PMS in general. Among all free-cycling women in the premenstrual phase, examination of the B-REP – Premenstrual Phase Ratings indicated that the majority, 55, 59, and 74%, of women reported mild to extreme negative effects of the premenstrual phase on their emotional, sexual, and physical health, respectively. Also, 25, 59, and 26% endorsed positive effects of the premenstrual phase on their emotional, sexual, and physical health. These findings are consistent with those of Warner and Bancroft (1988) and Kiesner (2011). Interestingly, 28

and 40% of women reported increased, and 14 and 13% reported decreased, interest in short- and long-term relationships in the premenstrual phase. Women who completed the study while in the premenstrual phase and reported greater negative effects of the premenstrual phase on their emotional and physical, and sexual health indeed reported more negative reproductive experiences on the Women's REP (i.e., Negative Affective Experiences, Negative Physical Experiences, and Sexual Problems). Combined with the results of Study 1 regarding group differences between women in the premenstrual phase with and without PMS, the finding that some scales are related to PMS symptomatology provides further evidence of the concurrent validity of the Women's REP. Also, it is interesting to note that women who reported positive effects of the premenstrual phase on physical, emotional, or sexual health, also had higher scores on the Women's REP Sleep Quality scale (despite also having higher scores on the Negative Affective Experiences scale).

Overall, the findings from Study 1 regarding the concurrent validity of the Women's REP based on differences between women of various reproductive/hormonal statuses were partially replicated. That is, the results of the two studies were consistent. While there were not as many significant findings in the present study, the total sample size in Study 1 was 83% larger than that of Study 2. Also, while in Study 1 women were asked whether they *thought* that they currently had hormonal problems, HC side effects, and PMS, women in Study 2 were asked whether they were currently *diagnosed or being treated* for such experiences. Thus, Study 1 had more power to detect any effects. Also, it is possible that the group differences and relationships found in Study 2 may have diagnostic utility or be particularly important given that some of the problem groups were arguably subclinical (i.e. "diagnosed or treated") as opposed to non-clinical as in Study 1. Supporting the rationale of including both negative and positive scales in the Women's

REP, both types of scales showed significant as well as non-significant findings. A third difference between the studies is that the sample in the present study was relatively young in age (predominantly university students) and thus, likely restricted in lifespan reproductive experiences. However, this was a result of intentional inclusion/exclusion criteria to examine women of reproductive age.

Some findings pertaining to exploratory analyses involving reproductive/hormonal status and the PARMSS are worth noting given the possibility that reproductive experiences and mating strategies may be related. Women with hormonal problems and OC users appeared to have lower scores on the PARMSS overall but particularly on Proceptivity – LT than women without hormonal problems and non-users/other HC users, respectively. There were no significant differences in PARMSS scores between the cycle regularity groups. The difference between hormonal problem groups is consistent with the hypothesis that negative reproductive experiences are negatively related to unrestricted mating strategies and tactics. In contrast, it is somewhat surprising that OC users were less proceptive in terms of long-term relationships than nonusers in the present study given that Bancroft, Sherwin, Alexander, Davidson, and Walker (1991) and Oinonen, Jarva, and Mazmanian (2008) found that OC users were more unrestricted than nonusers. However, sociosexuality and proceptivity seem to be independent constructs (based on correlations herein and Phillips, 2015) and so, it is possible that OC users are less proceptive in the context of long-term relationships than non-users. This finding should be replicated before conclusions are drawn.

Correlations between the PARMSS scores and B-REP Ratings indicated that receptivity and proceptivity are: (a) higher in women who report more positive emotional and physical health effects as well as decreased interest in long-term relationships, and increased interest in

short-term relationships associated with their current HCs; and (b) lower in women who report more negative effects of the premenstrual phase on their emotional health. Moreover, negative experiences scores on the Women's REP tended to be related to B-REP ratings of decreased relationship interests, while positive experiences scores showed the opposite correlations. These findings provide further evidence that positive reproductive experiences may facilitate sexual behaviour (or vice versa). While some of the data presented herein may also provide some evidence of validity for the B-REP, further research could examine the psychometric properties and potential uses of this short-form complement to the Women's REP.

Lastly, unique to this study, correlations between the Women's REP, PARMSS, and other health-, sexuality-, and relationship-relevant variables provide data on (1) the validity of the Women's REP and PARMSS as well as (2) relationships between affect and mating strategies. Evidence for the convergent validity of both measures comes from the findings that their scores were related to scores of similar or related variables in appropriate directions. As examples, negative reproductive experiences tended to be moderately and positively related to other negatively valenced variables, such as neuroticism, negative affect, hormonal sensitivity, and jealousy. Positive reproductive experiences showed the opposite relationships. These findings may help account for the significant correlations between the Women's REP and negative impression management (positive) and positive impression management (negative), given that the impression management were in the normal range and have also been shown to moderately correlated with a variety of self-report measures, including depressive symptoms, in non-clinical samples (Morey, 2007). That is, it appears that women who have relatively higher negative, and lower positive, reproductive experiences may be biologically (hyper)sensitive or reactive (Eysneck et al., 1985; Steiner et al., 2003).

Some PARMSS scores were negatively related to sexual satisfaction and long-term mating orientation and positively related to short-term mating orientation, numerical reports of receptive sexual behaviour with a primary partner, and proceptive sexual behaviour with someone other than a primary partner. Evidence for divergent validity comes from non-significant, modest, or relatively fewer correlations with dissimilar variables. For example, scales of the women's REP were most strongly related to other health-related as opposed to relationship variables, while the PARMSS scores were strongly related to other mating strategy variables (e.g., sociosexuality) and largely unrelated to health-related variables and masturbation frequency (autosexuality) (similar to the results of Phillips, 2015). Contrary to expectations, however, there were several indicators that receptivity and proceptivity are positively related to negative experiences (i.e., negative affect, jealousy, and negative affective, relationship, and physical reproductive experiences) but not positive experiences (e.g., positive affect in general as measured by the PANAS and positive reproductive experiences). However, other findings discussed herein suggested that receptivity or proceptivity scores were low among women with a hormonal problem and OC users, positively related to ratings of positive side effects of HCs, negatively related to ratings of negative effects of the premenstrual phase. Taken together, these results may suggest that negative well-being is related to increased sexuality among some women *in general* (e.g., Lykins et al., 2006; cf., Fortenberry et al., 2005), whereas increases (i.e., *changes)* in negative and positive reproductive experiences are related to decreased and increased mating behaviour respectively (e.g., Graham & Sherwin, 1993; Graham et al., 2007; Sanders et al., 1983; cf., Greco et al., 2007).

Overall, two main conclusions can be drawn from Part 1 of this study. First, the psychometric properties of both the Women's REP and the PARMSS provide evidence of

reliability and validity. Thus, further use and examination of these measures in research is warranted. Second, relationships between negative reproductive experiences, positive reproductive experience, and mating strategies necessitate further examination for clarification of possible theoretical and practical implications. These relationships are the focus of Part 2 of this study. A prospective menstrual cycle design and scales from the Women's REP and the PARMSS are used to examine patterns of phasic shifts in negative affect, positive affect, and sexual proceptivity.

Part 2:

Periovulatory Syndrome?

Patterns of Negative and Positive Affective Experiences and Sexual Proceptivity across the Menstrual Cycle

The overall purpose of Part 2 of the present study was to examine menstrual cycle phase shifts in the Women's REP and the PARMSS as two newly developed measures purported to be sensitive to hormonal changes (Study 1 and Phillips, 2015). A specific goal was to investigate the possibility of paradoxical patterns of co-variation in negative affective experiences, positive affective experiences, and mating tactics across the cycle in subgroups of women. In order to do so, the method of cluster analysis of scores based on two menstrual cycle phases was used instead of: (a) imposing a moderating or grouping variable on the data (e.g., Davydov et al., 2007; Oinonen, Klemencic, et al., 2008; Phillips, 2015) or (b) using MLM for daily questionnaire data to obtain and cluster analyze effect sizes of change across the menstrual cycle (Kiesner, 2011).

These previously used methods, while seemingly ideal, pose several problems for researchers interested in whether or not there are *patterns* rather than a single average trajectory

of menstrual cyclicity in a variable thought to be hormonally mediated (Graham & Bancroft, 2013; Moskowitz & Herschberger, 2002). First, the most appropriate moderating or grouping variables are not clear or well researched at this point. While different menstrual cycle-related patterns of both affective experiences and sociosexuality have been found in the literature, few studies have intentionally investigated this possibility or how these subgroups of women may ultimately or even proximately differ (Reiber, 2009). Second, method (b) above does not seem feasible for some researchers given the very high level of expertise required for repeated measures MLM, researcher expense, and participant time. Cluster analysis of menstrual phase difference scores may be an efficient way of identifying patterns of menstrual cycle phase shifts (Reiber, 2009; Rivera-Tovar et al., 1992). Cluster analysis has previously been used to identify patterns of: (1) change in symptoms between two phases among women diagnosed with late luteal phase dysphoric disorder (Rivera-Tovar et al., 1992) as well as in a non-clinical university sample of women (Kiesner, 2011); (2) menstrual bleeding (Gerlinger, Endrikat, Kallischnigg, & Wessel, 2007); and (3) hormonal symptoms and sensitivity across reproductive events (Pope et al., 2015).

Dependent Variables and Pattern Acronyms

One concern about the existing literature is that there is a lack of consistency in describing or labeling different patterns of psychological and physical change across the menstrual cycle. Phasic shifts in negative affect that differ from a PMS pattern (i.e., symptoms in the periovulatory phase versus symptoms in the perimenstrual phases) have been referred to as "reverse," "mid-cycle," and "pseudo" PMS patterns. These terms do not seem to adequately reflect the observed phenomena, particularly since PMS means *premenstrual* syndrome. In the evolutionary literature, the atypical or less familiar pattern across the cycle has been referred to

as an unrestricted (versus restricted) pattern based on the fact that these women were grouped based on their sociosexual orientation. For simplicity, the main variables and proposed cyclic effects in the present study have been given descriptive terms. The Negative Affective Experiences scale and Positive Affective Experiences subscale of the Women's REP will be referred to as NA and PA, respectively, as these acronyms are well-known in the health and well-being literature. Patterns of change will be differentiated by the phase in which women are expected to experience higher NA, lower PA, and lower proceptivity: (1) the premenstrual phase (a premenstrual syndrome [PMS] pattern) and (2) the periovulatory phase (a periovulatory syndrome [POS] pattern).

The Proceptivity – PR scale of the PARMSS was used as the main measure of proceptivity for two main reasons. First, two patterns of menstrual cycle change between women high and low in measures of sociosexuality, namely short-term mating orientation, using this scale were recently identified (Phillips, 2015). Second, a recent meta-analysis of women's mate preferences across the cycle determined that effects tend to be stronger when picture stimuli of real men are used as opposed to self-reports of one's general or specific preferences without an accompanying male stimulus (Gildersleeve et al., 2014; see also Phillips, 2015). Also, photos provide more ecological validity. That is, sexual desire or imagional responses to stimuli may be a better or purer measure of internal regulatory motivation than actual behavior, which can be constrained by culture and opportunity (Haselton et al., 2006).

Hypotheses

Three main data-driven and theory-based hypotheses have been developed by comparing two bodies of seemingly disparate literature on changes across the menstrual cycle: negative and positive experiences (i.e., health and well-being) and sociosexuality (i.e., mating strategies). The

overarching theory is that there are two patterns of menstrual cycle change in affective experiences and sexual motivation that *may* have coevolved through sexual selection and if so, are context-dependent. The implication may be that women's mating strategy enactment, such as through changes in proceptivity, is facilitated by changes in their NA or PA (Reiber, 2009; Vieira, 2009), all of which are purported to be calibrated by hormones.

Hypothesis 1: Menstrual cycle patterns in NA, PA, and proceptivity. (a) The majority of free-cycling women will exhibit a PMS pattern whereby NA scores are higher, PA scores are lower, and proceptivity scores are lower in the premenstrual phase than the periovulatory phase (i.e., the standard or typical changes examined in relevant literature). (b) A second identifiable subgroup of women will exhibit the opposite POS pattern of lower NA, higher PA, and higher proceptivity scores in the premenstrual phase compared to the periovulatory phase. This hypothesis is based on research suggesting that there are two patterns of change in reproductive experiences, particularly NA and PA, across the menstrual cycle (e.g., Davydov et al., 2007; Kiesner, 2010; Reiber, 2009; Rivera-Tovar et al, 1992) and two opposing periovulatory sociosexual tactic shifts (i.e., PSTS; e.g., Oinonen, Klemencic, et al., 2008; Phillips, 2015; Scarbrough & Johnson, 2005).

Hypothesis 2: Differences between the PMS and POS groups. The above two groups of women who differ in their main patterns of phasic change in affect and proceptivity will also differ in: (a) cross-sectional reports of premenstrual experiences as measures by the B-REP – Premenstrual Ratings and (b) overall sociosexual orientation. Specifically, it is expected that the PMS pattern group will report more negative effects of the premenstrual phase on their emotional health, sexual functioning, and interest in short-term relationships than the POS pattern group, who will report more positive effects. Also, the original PSTS study involved first

dividing women into two groups: those who were sociosexually unrestricted and those who were more restricted (Oinonen, Klemencic, et al., 2008). Therefore, it is predicted that the PMS pattern group will be more restricted/less unrestricted, particularly with respect to short-term mating, than the POS pattern group (Phillips, 2015).

Review of the relevant research also suggests that the groups might differ in the following areas given links with mating strategy phenotypes or patterns of affect or sexuality across the menstrual cycle (see Table 3.1): (c) demographics (age, education level, AAM/rate of pubertal development, and parity; Manning & Fink, 2011; Reiber, 2009); (d) relationships (status, length, satisfaction, and partner attractiveness; Pillsworth et al., 2004; Haselton & Gangestad, 2006); self-perceptions (attractiveness, femininity, and masculinity; Clark, 2004; Haselton & Gangestad, 2006; Scarbrough & Johnston, 2005); alcohol use (frequency of use, sensitivity to its effects, and number of drinks in the past 48 hours; Clark, 2004; Kiesner & Martin, 2013); personality/impression management (neuroticism and negative and positive impression management; van den Akker, Eves, Stein, & Murray, 1995); and anthropometric body measurements (2D:4D, mid-phalangeal hair count, BMI, and WHR; Oinonen, 2009; Scarbrough & Johnston, 2005; Wlodarski & Dunbar, 2015). However, examination of these potential differences was exploratory and thus, specific predictions were not made.

Hypothesis 3: Phasic shifts on other scales of the Women's REP and PARMSS. The PMS and POS groups will also display opposing menstrual cycle changes in (a) negative and positive sexual experiences scores on the Women's REP and (b) other scores on the PARMSS. The rationale for this hypothesis comes from research suggesting that PMS can include sexual symptoms (Dickerson et al., 2003; Van Goozen et al., 1997) and that it is important to examine both negatively and positively valenced changes (e.g., Meaden et al., 2005). The two pattern

groups may also differ in negative physical experiences, positive physical experiences, body image quality, and sleep quality scores on the Women's REP but no specific predictions were made. In general, the PMS pattern group would be expected to show high negative experiences scores, and low positive experiences scores, in the premenstrual phase compared to the periovulatory phase, while the POS pattern group would be expected to show the opposite shifts.

Data Reduction and Analysis

Women from the Time 1-Time 2 sample (n = 277) in Part 1 provided additional data for Part 2 of the study. The final menstrual cycle related sample consisted of 42 free-cycling women (i.e., not using HCs; see Table 3.2). In Part 2, participants were tested at two different menstrual cycle phases among free-cycling women. Upon completion of the study, forward and backward counts of cycle day were estimated for each completed session (Times 1 and 2) using menstrual cycle information provided by participants in the SQ, PQs, and DQs as well as follow-up by e-mail for LMP (last menstrual period) (Hampson & Young, 2008). Similar to Study 1 Part 2, these counts were used to determine estimates of standardized day in a 28-day menstrual cycle, conception probability, and levels of reproductive hormones (Puts, 2006; Wilcox et al., 2001) based on actual/current, instead of average, cycle length. Data was restructured from Time 1-Time 2 to highest fertility day-lowest fertility day (i.e., for women tested in the target phases, periovulatory phase-premenstrual phase), regardless of testing order. Data from participants who met exclusion criteria noted below were not included in the analyses in order to examine a subsample of women who provided data over the equivalent of one cycle, as per testing order, and to control for exogenous effects on hormones, as is common in similar psychoendocrinological research.

Of the 277 women from the Time 1-Time 2 subsample of Part 1, 235 were ineligible for inclusion in this part of the study for one or more of the following nine reasons: (a) a lack of menstrual bleeding reported across all stages of the study (e.g., amenorrhea; $n = 13$); (b) unclear or inconsistent menstrual cycle information such that phases could not be estimated ($n = 4$); (c) nonconsecutive phases (i.e., provided data over the equivalent of more than one cycle; $n = 13$); (d) current use of any hormone-related medication (e.g., insulin, hormone replacement, or thyroid medications; $n = 9$); (e) current use of a non-hormonal IUD contraceptive ($n = 1$); (f) change in hormonal contraceptive status (i.e., HC use or non-use) less than three months prior to study participation ($n = 20$); and (g) change in reproductive status or HC type during study participation ($n = 22$). An additional 121 were not included in the present study as they were (h) using an HC and thus, pseudo- or induced- rather than naturally-cycling[26]. While 87 free-cycling women met these criteria and provided data at two cycle-related times points, 45 of them were not included in repeated measures analyses because (i) at least one of Times 1 and 2 was completed outside of the target menstrual cycle phases.

Prior to the analyses of the three hypotheses, data on the measures of hormonal status used to schedule and confirm menstrual cycle phases were examined and the generalizability of the final subsample was assessed using between-subjects ANOVAs. General menstrual cycle shifts in scores on the Women's REP and PARMSS were then explored using repeated measures MANOVAs and follow-up ANOVAs. In order to examine whether there were at least two groups based on pattern of change between the two target phases (Hypothesis 1), the difference scores (i.e., for symptoms or experiences) was calculated for each of NA, PA, and proceptivity

[26] Women using HCs were excluded from the present report because HCs have been found to have paradoxical effects on mood and sexuality overall and across the menstrual cycle in subgroups of women (Graham & Bancroft 2013a) and have been hypothesized to disrupt psychological mating adaptations in general and across the menstrual cycle (Roberts, Miner, & Shackelford, 2010).

and used in subsequent analyses. Use of Time 2 minus Time 1 (Time 2 – Time 1) scores seems common in psychoendocrinological research (e.g., Graham et al., 2007; Greco et al., 2007; Sanders et al., 2001; Oinonen & Mazmanian, 2007; van Anders, Hamilton, Schmidt, & Watson, 2007). To find potential groups, a single Ward's method hierarchical cluster analysis on the standardized difference scores was used. This was chosen because it is one of the only methodologies that permit the possibility of different patterns, rather than an average trajectory, of menstrual cyclicity (Reiber, 2009). Rieber (2009) used similar methodology but grouped women based on having higher or lower scores in one phase versus the other. Repeated measured ANOVAs and Pearson product-moment correlations were also used to examine all hypotheses.

Results

Measures of hormonal status. Of the 87 free-cycling women who provided data at two cycle-related time points, 80 (92%) provided follow-up information regarding the actual date of their NMP after study participation. Using all available information for each participant, 52 women were determined to have completed a PQ in the periovulatory phase (i.e., not bleeding and on standardized days 9 to 15 *or* LH days -2 to +3). The remaining women completed their highest fertility PQ on days 4 to 8 or 16 to 27. Fifty-seven women completed a PQ in the premenstrual phase (i.e., on standardized days 19 to 28 and not bleeding). The remaining women completed their lowest fertility PQ on days 1 to 7 (with 17 women in the menstrual phase) or days 11 to 18.

In total, 33 of the 87 free-cycling women opted to complete at least one PQ during a lab session (n = 30 for both PQs) and thus, were eligible to provide saliva samples and complete LH testing. Thirty-two of these women provided a saliva sample in at least one phase (27 at both phases but testosterone could not be assayed for one of these women because the quantity of

saliva was not sufficient [qns]). The intra-assay coefficients of variation were 3.4% for estradiol, 4.6% for progesterone, and 2.0% for testosterone. There were no outliers or unexpected values in the hormone data by phase. Correlations between conception probability, hormone estimates, and assayed hormone levels on average (i.e., regardless of phase) and using low fertility minus high fertility phase change scores can be found in Appendix J. Within and between the estimates and assays, the hormones were generally correlated in directions that would be expected[27].

Ten of the women who completed a lab session, half of whom completed a PQ in both target phases, did not complete LH testing (e.g., either LH kits were not yet available in the study, appropriate testing dates could not be determined initially, or they did not use the kit after it was provided). Ten women, eight who completed a PQ in both target phases, reported a positive test result indicative of a surge in LH and pending ovulation. Positive LH test results were found on standardized days 8, 12, 13, 14, 17, and 19; up to six days before and five days after the estimate of LH day (day 14); with 30% occurring on day 14 and 70% during the target periovulatory phase days[28].

Thirteen women, five who completed a PQ in both target phases, failed to report a positive LH result. Negative results could be due to kit malfunction, improper testing, or a lack of an LH surge such as due to anovulation. The latter possibility is unlikely in normally cycling women (Schnatz, 1985). In these cases, the LH testing dates of 10 women were inaccurately

[27] These results were similar to those of Study 1 (Table 2.13) as well as Roney and Simmons (2013; Table 1) and provide some evidence of the reliability and validity of the menstrual cycle-related data.

[28] The backwards count days of the positive results were -25, -18, -17, -16, -15, -12, and -10; up to five days before and 10 days after the estimate of LH day (day -15); with 30% occurring on day -15 and 70% during the target periovulatory days. It is of note that categorizing phase based on standardized day in cycle was, as expected, the same for the premenstrual phase but included 17 different women as in the periovulatory phase compared to the backwards method because it accounts for both cycle length and variability in follicular phase length. The standardized method was used to categorize phase data in the present study for three main reasons: (1) to be consistent with Study 1; (2) the hormone estimates used are based on this method (see also Apgar-Garver et al., 2008); and (3) it allowed for inclusion of more women, including those with relatively long or irregular cycles, for a sample potentially more representative of women in general.

scheduled (i.e., testing did not take place in the periovulatory phase); two women did not follow kit instructions (e.g., did not test on all five days consecutively); and one woman did not provide follow-up confirmation of the actual date of her NMP after study participation. Given that these women met all other criteria, five of these women as well as five of the women that did not complete any LH testing were included in the final subsample, a procedure that is supported by the findings of Brown et al. (2011) and Gangestad et al. (2015).

Overall, 42 women provided data in both target phases. Thus, the data from about 48% of eligible participants did not fall into the appropriate cycle phases despite scheduling sessions based on self-reported LMP, NMP, cycle regularity, and average cycle length at the screening stage of the study as well as adjustments made to scheduling as more cycle information became available from participants over time. The two cycle phases in the final subsample significantly differed as expected in mean day of cycle (periovulatory: $M = 11.69$, $SD = 1.91$; premenstrual: $M = 23.69$, $SD = 2.64$); as well as estimates of conception probability (periovulatory: $M = 0.06$, $SD = 0.03$; premenstrual: $M = 0.01$, $SD = 0.01$); estimates of estradiol levels in pg/ml (periovulatory: $M = 195.20$, $SD = 47.69$; premenstrual: $M = 160.60$, $SD = 31.56$); estimates of progesterone levels in ng/ml (periovulatory: $M = 0.83$, $SD = 0.64$; premenstrual: $M = 9.85$, $SD = 3.47$); estimates of testosterone levels in pg/ml (periovulatory: $M = 356.25$, $SD = 32.61$; premenstrual: $M = 292.86$, $SD = 32.27$); estimates of LH levels in mlU/ml (periovulatory: $M = 19.10$, $SD = 11.26$; premenstrual: $M = 10.66$, $SD = 1.12$); and estimates of FSH levels in mlU/ml (periovulatory: $M = 9.60$, $SD = 3.61$; premenstrual: $M = 6.17$, $SD = 089$); Fs (1, 41) = 13.39 to 751.42, ps = .001 to < .0001, partial η^2s = .25 to .95. Estimates of the probability that a woman was in the fertile window of the periovulatory phase were also higher in the periovulatory versus

premenstrual phase (*M*s = 0.42 and 0.08, *SD*s = 0.16 and 0.05, respectively), F (1, 41) = 133.92, $p < .0001$, partial $\eta^2 = .77$.

All 18 women in the final subsample who completed a PQ during a lab session did so for both PQs. The two phases significantly differed as above (data not presented). Fifteen of these women provided saliva samples at both sessions. The two phases did not significantly differ in assayed levels (pg/ml) of estradiol (periovulatory: $M = 2.21$, $SD = 0.65$; premenstrual: $M = 2.09$, $SD = 0.73$); progesterone (periovulatory: $M = 113.87$, $SD = 53.70$; premenstrual: $M = 161.53$, $SD = 95.82$); or testosterone (periovulatory: $M = 77.55$, $SD = 22.07$; premenstrual: $M = 65.46$, $SD = 18.62$), Fs (1, 13 to 1, 14) = 0.34 to 4.66, ps = .571 to .05, partial η^2s = .02 to .26. However, the relative pattern of the means (i.e., periovulatory having higher estradiol and testosterone and lower progesterone than premenstrual) is consistent with expectations. Taken together, the data from estimates and assays provided some evidence of validity that women in the final subsample were in the target phases.

Data screening. To help assess generalizability, comparisons were made between the final subsample of women included in Part 2 and participants who were excluded on the basis of criteria (a) to (h) above ($n = 190$, ineligible participants) as well as participants whose PQs were not completed in both target phases [criterion (i); $n = 45$, imprecisely scheduled participants]. As seen in Appendix K, 19 variables from the SQ were examined. Three differences were significant across the two sets of comparisons. Ineligible participants had a higher (more unrestricted) mean sociosexual orientation score and were more likely to be single than the final subsample of women. This is consistent with research suggesting that HC users, who consisted of a large portion of ineligible participants, tend to be more unrestricted than non-users (e.g., Oinonen, Jarva, et al., 2008). Imprecisely scheduled participants reported a higher frequency of

masturbation than the final subsample. Thus, the final subsample of free-cycling women may be more restricted than the general population of women but this difference seems to be representative of the population of free-cycling women.

General menstrual cycle phase effects. Means, standard deviations, and univariate results can be found in Table 3.19 for the Women's REP and Table 3.20 for the PARMSS. There was no effect of periovulatory versus premenstrual phase on the combined main scales of the Women's REP (excluding the relationship scale) in a MANOVA, F (6, 35) = 1.66, p = .160, partial η^2 = .22. Univariate analyses also did not reveal any significant effects of phase. Among women in a relationship, the effect of phase on Sexual Problems – Relationship was not significant.

When the subscales of the Women's REP were explored, the effect of phase on the combined main subscales approached significance, F (12, 30) = 2.09, p = .050, partial η^2 = .46, but was not significant for the supplementary subscales, F (13, 29) = 0.74, p = .716, partial η^2 = .25. The univariate effect of phase on Decreased Appetite was significant such that the mean score (reflecting more decreased appetite) was higher in the periovulatory versus premenstrual phase.

The multivariate effect of cycle phase on the combined six PARMSS scales was not significant, F (6, 35) = 1.47, p = .216, partial η^2 = .22. Based on univariate analyses, however, Receptivity – ST scores were significantly higher in the periovulatory than premenstrual phase. An overall examination of the means revealed that all PARMSS scores appeared higher in the periovulatory than the premenstrual phase.

Hypothesis 1: Menstrual cycle patterns of NA, PA, and proceptivity. For reference and ease of interpretation, means and standard deviations for all scores used in this section are

Table 3.19

Summary of Means and Repeated Measures Analyses of Variance of the Scales and Subscales of the Women's REP by Periovulatory and Premenstrual Phase in Free-Cycling Women (n = 42)

Dependent Variable	*M* (*SD*)		*F* (1, 41)	*p*	Partial η^2
	Periovulatory phase	Premenstrual phase			
Scales					
Negative Affective Experiences	2.11 (0.68)	2.10 (0.69)	0.17	.686	.004
Negative Physical Experiences	1.71 (0.42)	1.66 (0.38)	1.17	.286	.03
Sexual Problems - General	2.92 (0.69)	2.86 (0.55)	1.06	.309	.03
Sexual Problems – Relationship[a]	1.99 (1.10)	2.14 (1.00)	0.82	.379	.05
Positive Affective and Physical Experiences	2.81 (0.56)	2.80 (0.62)	0.36	.552	.01
Body Image Quality	3.22 (0.65)	3.09 (0.71)	2.01	.164	.05
Sleep Quality	3.16 (0.81)	3.13 (0.74)	0.14	.710	.003
Subscales					
Hormonal Symptoms	1.64 (0.42)	1.62 (0.36)	0.21	.651	.01
Decreased Appetite	1.88 (0.97)	1.85 (0.60)	10.89	.002**	.21
General Aches and Pains	1.85 (0.60)	1.85 (0.64)	0.004	.953	.000
Negative Sexual Experiences – General	2.09 (0.84)	2.02 (0.72)	0.44	.509	.01
Negative Sexual Experiences – Relationship[a]	1.69 (1.15)	1.78 (1.00)	0.25	.626	.01
Negative Body Image Experiences	2.14 (0.72)	2.32 (0.79)	2.56	.118	.06
Negative Sleep Experiences	2.54 (0.93)	2.55 (0.79)	0.20	.892	.000
Positive Sexual Experiences – Others	1.96 (0.92)	1.89 (0.80)	0.23	.633	.01
Positive Sexual Experiences – Self	2.01 (0.90)	2.16 (0.92)	1.25	.270	.03
Positive Sexual Experiences - Relationship[a]	3.70 (1.12)	3.48 (1.10)	1.51	.236	.08
Positive Affective Experiences	2.84 (0.63)	2.84 (0.71)	0.001	.982	.000
Positive Physical Experiences	2.77 (0.55)	2.73 (0.56)	0.28	.599	.01
Positive Body Image Experiences	2.49 (0.68)	2.42 (0.82)	0.91	.345	.02
Positive Sleep Experiences	2.56 (0.84)	2.49 (0.91)	0.34	.564	.01
Supplementary Subscales					
Testosterone-Related Experiences	1.73 (0.47)	1.69 (0.46)	0.46	.501	.01
Progesterone-Related Experiences	1.51 (0.42)	1.51 (0.42)	0.001	.979	.000
Negative Sexual Experiences – Others	2.05 (0.84)	2.01 (0.82)	0.09	.344	.002

Dependent Variable	*M* (*SD*)		*F* (1, 41)	*p*	Partial η^2
	Periovulatory phase	Premenstrual phase			
Supplementary Subscales					
Negative Sexual Experiences – Self	2.16 (1.05)	2.16 (0.81)	0.92	.344	.02
Negative Weight Experiences	2.02 (0.84)	2.76 (1.11)	0.57	.456	.01
Positive Affect	2.84 (0.65)	2.85 (0.73)	0.02	.891	.000
Elation	2.85 (0.73)	2.82 (0.78)	0.06	.810	.001
Positive General Physical Experiences	2.70 (0.58)	2.70 (0.57)	0.003	.958	.000
Positive Skin Experiences	2.55 (0.84)	2.49 (1.02)	0.19	.665	.01
Positive Digestion Experiences	2.96 (0.85)	2.90 (0.79)	0.32	.574	.01
Positive Breast Experiences	3.01 (1.08)	2.87 (1.01)	1.06	.309	.03
Positive Weight Experiences	2.06 (0.75)	2.06 (0.88)	0.000	1.00	.000
Positive Appetite Experiences	2.42 (0.80)	2.26 0.92)	1.41	.242	.03

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
[a]*n* = 18 (df = 1, 17) women in a relationship.
**p* < .01.

Table 3.20

Summary of Means and Repeated Measures ANOVAs of the Subscales of the PARMSS by Periovulatory and Premenstrual Phase in Free-Cycling Women (n = 41)

Scale	*M* (*SD*)		*F* (1, 40)	*p*	Partial η^2
	Periovulatory phase	Premenstrual phase			
		Receptivity			
Short-Term (ST)	3.82 (2.09)	3.45 (1.97)	4.30	.045*	.10
Long-Term (LT)	4.82 (2.30)	3.50 (2.33)	3.10	.086†	.07
Picture Ratings (PR)	3.77 (1.69)	3.68 (1.72)	0.41	.840	.001
		Proceptivity			
ST	2.34 (1.39)	2.32 (1.60)	0.02	.902	.00
LT	3.33 (1.84)	3.21 (2.00)	0.20	.654	.01
PR	2.52 (1.33)	2.54 (1.45)	0.34	.564	.01

Note. PARMSS = Proceptive and Receptive Mating Strategies Scale.
†$p < .10$. *$p < .05$.

presented in Table 3.21. As seen in Table 3.22, premenstrual minus (-) periovulatory phase NA scores (i.e., NA change scores) were negatively correlated with PA change scores, r = -.57, p < .0001, but neither mean NA phase scores nor the NA change scores were correlated with proceptivity, rs = .01 to -.11, ps = .958 to .488. PA change scores were positively correlated with proceptivity change scores, r = .39, p = .013. However, the relationship between mean levels of PA and proceptivity was not significant within either phase, rs = .11 and .16, ps = .494 and .394.

When standardized change scores for NA, PA, and proceptivity were entered into a single hierarchical cluster analysis, the dendogram suggested two clusters of cases. This was predicted and thus, two cluster groups were extracted. It is important to note that positive change scores represent higher scores in the premenstrual versus periovulatory phase, while negative change scores represent higher scores in the periovulatory versus premenstrual phase. As seen in Figure 3.2, one cluster had scores indicative of increased NA, decreased PA, and decreased proceptivity scores in the periovulatory phase relative to the premenstrual phase (i.e., a negative mean NA change score and positive mean PA and proceptivity change scores). This group (n = 16) was consistent with a POS pattern of scores across the menstrual cycle (i.e., a menstrual cycle pattern in NA, PA, and proceptivity). The second cluster had scores indicative of the opposite, a PMS pattern (n = 25) of change scores with increased NA, decreased PA, and decreased proceptivity scores in the premenstrual versus periovulatory phase (i.e., a positive mean NA change score and negative mean PA and proceptivity change scores). Univariate ANOVAs confirmed that the two groups significantly differed on all three change scores, Fs (1, 39) = 6.14 to 47.10, ps = .018 to < .001, partial η^2s = .42 to .55 (see Table 3.21 for raw data).

Phase scores (as opposed to change scores) were entered into a repeated measures MANOVA with cluster group as an IV to examine the interaction between cluster group and

Table 3.21

Summary of Means for Negative Affective Experiences, Positive Affective Experiences, and Proceptivity – Picture Ratings Scores Relevant to Hypothesis 1

Variable	Premenstrual phase	Periovulatory phase	Premenstrual minus (-) periovulatory phase raw change score[a]	Premenstrual minus (-) periovulatory phase standardized change score[a]
Full Subsample ($N = 41$)				
Negative Affective Experiences (NA)	2.11 (0.69)	2.11 (0.69)	-0.008 (0.65)	0.00 (1.00)
Positive Affective Experiences (PA)	2.82 (0.70)	2.82 (0.53)	-0.005 (0.60)	0.00 (1.00)
Proceptivity – Picture Ratings (PR)	2.54 (1.49)	2.52 (1.33)	0.026 (0.81)	0.00 (1.00)
POS pattern group ($n = 16$)				
Negative Affective Experiences (NA)	1.80 (0.47)	2.10 (0.70)	-0.31 (0.46)	-0.46 (0.71)
Positive Affective Experiences (PA)	3.17 (0.74)	2.63 (0.58)	0.54 (0.51)	0.91 (0.86)
Proceptivity – Picture Ratings (PR)	2.92 (1.19)	2.51 (0.95)	0.41 (0.78)	0.47 (0.96)
PMS pattern group ($n = 25$)				
Negative Affective Experiences (NA)	2.30 (0.75)	2.12 (0.69)	0.18 (0.69)	0.29 (1.06)
Positive Affective Experiences (PA)	2.59 (0.59)	2.95 (0.64)	-0.35 (0.32)	-0.58 (0.54)
Proceptivity – Picture Ratings (PR)	2.30 (1.57)	2.52 (1.54)	-0.22 (0.75)	-0.30 (0.92)

Note. POS = periovulatory syndrome. PMS = premenstrual syndrome.

[a]Positive premenstrual minus periovulatory change scores reflect higher scores in the premenstrual versus periovulatory phase. Negative premenstrual minus periovulatory change scores reflect higher scores in the periovulatory versus premenstrual phase.

Table 3.22

Correlations between Negative Affective Experiences, Positive Affective Experiences, and Proceptivity – Picture Ratings Scores for the Premenstrual Phase, Periovulatory Phase, and Premenstrual Minus (-) Periovulatory Phase (n = 41)

	1	2	3	4	5	6	7	8	9
Premenstrual phase									
1. Negative Affective Experiences	1								
2. Positive Affective Experiences	-.42*	1							
3. Proceptivity – Picture Ratings	-.10	.16	1						
Periovulatory phase									
4. Negative Affective Experiences	.56***	-.32*	-.01	1					
5. Positive Affective Experiences	-.13	.60**	.07	-.52***	1				
6. Proceptivity – Picture Ratings	-.03	.001	.83***	.01	.11	1			
Premenstrual minus (-) periovulatory phase[a]									
7. Negative Affective Experiences	.47***	-.12	-.10	.-.47***	.41**	-.04	1		
8. Positive Affective Experiences	-.36*	.54**	.11	.18	-.35*	-.11	-.57***	1	
9. Proceptivity – Picture Ratings	-.13	.27†	.42**	-.02	-.06	-.15	-.11	.39*	1

[a] Premenstrual minus (-) periovulatory phase change scores: Positive scores reflect higher scores in the premenstrual versus periovulatory phase. Negative scores reflect higher scores in the periovulatory versus premenstrual phase. Thus, positive correlations indicate that a variable was related to higher scores, and negative correlations indicate that a variable was related to lower scores, in the premenstrual versus periovulatory phase.

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

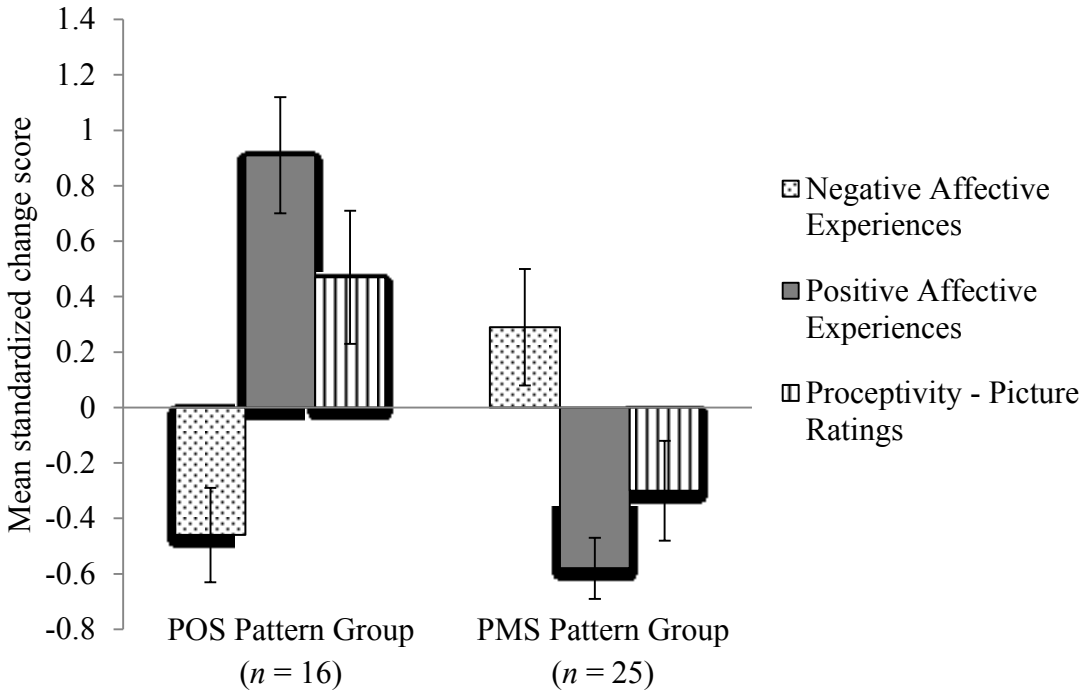

Figure 3.2. A cluster analysis of standardized premenstrual minus (-) periovulatory Negative Affective Experiences (NA), Positive Affective Experiences (PA) and Proceptivity – Picture Ratings change scores revealed two menstrual cycle pattern groups: periovulatory syndrome (POS) and premenstrual syndrome (PMS). Positive values represent mean phase scores represent NA, PA, or proceptivity scores that were higher in the premenstrual versus periovulatory phase. Negative values represent mean phase scores that were higher in the periovulatory versus premenstrual phase. Error bars represent standard error of the mean.

phase (i.e., 2 between [group: POS cluster, PMS cluster] x 2 within [phase: periovulatory, premenstrual] MANOVA; see Table 3.21 and Figure 3.3). The overall group x phase interaction was significant, F (3, 37) = 15.73, p = < .001, partial η^2 = .56, as well as the interactions for all three DVs in follow-up ANOVAs, F (1, 39) = 6.14 to 47.10, ps = .08 to < .001, partial η^2s = .14 to .55. The POS pattern group showed significant phase effects for both NA and PA, Fs (1, 15) = 7.03 and 17.78, ps = .018 to < .001, partial η^2s = .32 and .54, respectively, with proceptivity showing a trend, F (1, 15) = 4.43, p = .053, partial η^2s = .23. The PMS pattern group showed a significant phase effect for PA, Fs (1, 24) = 29.87, p < .001, partial η^2s = .55, but not for either NA, F (1, 24) = 1.73, p = .201, partial η^2s = .07, or proceptivity, F (1, 24) = 2.14, p = .156, partial η^2 = .08. However, the means were in the expected directions.

Group equivalency was examined based on 18 demographic and hormonal status variables (data presented in Appendix L). The two pattern groups did not differ in mean standard testing day in the periovulatory and premenstrual phases; menstrual cycle length; cycle regularity; sexual orientation; mean NA, PA, or proceptivity scores; or in change scores for conception probability estimates, hormone estimates, and assayed hormone levels. They also did not differ in previous HC use.

For exploratory purposes, standardized change scores for each of the three main variables were entered into *separate* cluster analyses. All dendograms suggested two clusters, which were extracted. Cluster membership based on NA change scores (Cluster 1: n = 20, M = -0.78, SD = 0.55; Cluster 2: n = 21, M = 0.74, SD = 0.72) was significantly related to cluster membership based on PA change scores (Cluster 1: n = 27, M = 0.51, SD = 0.83; Cluster 2: n = 14, M = -0.99, SD = 0.31), χ^2 (1, n = 41) = 6.37, p = .012, ϕ = .39. However, NA change score cluster membership was not related to proceptivity cluster membership (Cluster 1: n = 12, M = 1.06, SD

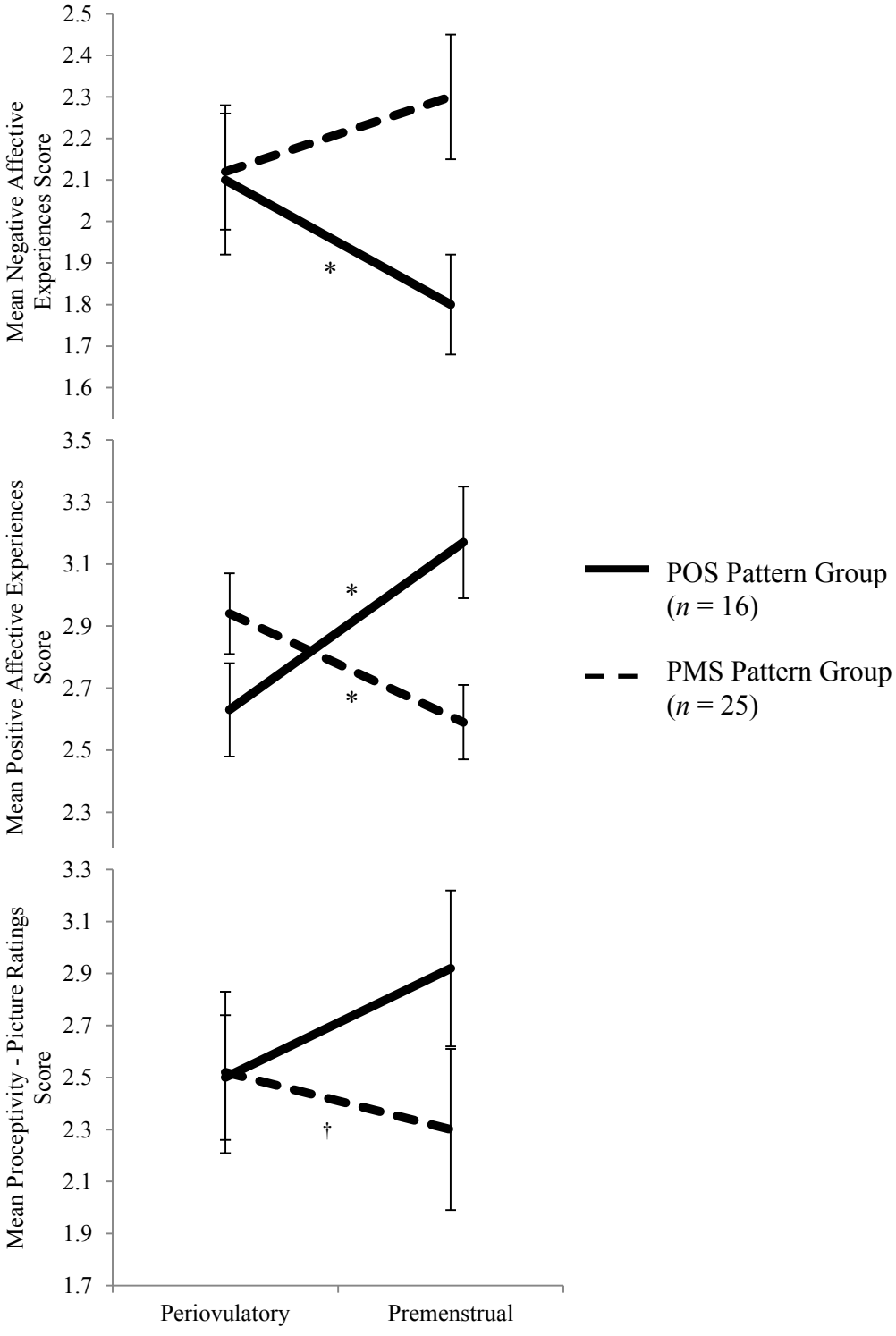

Figure 3.3. Mean Negative Affective Experiences, Positive Affective Experiences, and Proceptivity – Picture Ratings scores as a function of menstrual cycle phase as well as menstrual cycle pattern group based on cluster analysis of standardized change scores. POS = periovulatory syndrome. PMS = premenstrual syndrome. Error bars represent standard error of the mean.
$^{\dagger}p < .10$. $^{*}p < .05$.

= 0.0.55; Cluster 2: $n = 29$, $M = -0.44$, $SD = 0.79$), χ^2 (1, $n = 41$) = 0.01, $p = .920$, $\phi = .02$. The overlap between opposing NA and PA patterns (i.e., the frequency of PMS and POS patterns in affect combined) was 68%, while that between NA and proceptivity was 51%. The PA and proceptivity clusters were also not significantly related, χ^2 (1, $n = 41$) = 2.31, $p = .129$, $\phi = .24$, but there was 54% overlap between corresponding patterns (i.e., PMS and POS patterns for each variable). Moreover, the two PA cluster groups showed non-significant trends for phase effects on proceptivity scores, Fs (1, 13 and 1, 26) = 3.02 and 3.47, ps = .106 and .074, partial η^2s = .19 and .12, whereas the proceptivity clusters did not show differences in PA scores between phases, Fs (1, 11 and 1, 28) = 1.46 and 0.99, ps = .252 and .329, partial η^2s = .12 and .03. That is, there was a trend for proceptivity to increase with increases in PA in each of the PA cluster groups, but no evidence that PA increased with increases in proceptivity in the two proceptivity cluster groups. Combined with the change score correlations in the bottom section of Table 3.22 (i.e., a correlation of .39 between changes in PA and proceptivity but only -.11 between changes in NA and proceptivity), these findings suggest that changes in PA are more strongly linked with changes in proceptivity than are changes in NA.

Hypothesis 2: Differences between the PMS and POS groups. In order to examine the validity of the two PMS and POS groups, group differences on the B-REP – Premenstrual Phase Ratings were examined. These ratings of the extent to which respondents endorse experiencing negative and positive effects of the premenstrual phase on affective, physical, and sexual health or functioning, had been completed during the screening phase prior to either of the periovulatory or premenstrual sessions. As demonstrated in Table 3.23, the two groups from Hypothesis 1 significantly differed on the B-REP – Premenstrual Phase Ratings of the positive, but not negative, effects on physical health and sexual functioning. The POS pattern group

Table 3.23

Summary of Comparisons between Menstrual Cycle Pattern Groups on the Women's Brief Reproductive Experiences (B-REP) – Premenstrual Phase Ratings

	M (*SD*)		*t* (39)	*p*	Cohen's *d*
Rating	POS pattern group (*n* =16)	PMS pattern group (*n* = 25)			
Negative effects on emotional health	2.50 (1.32)	2.44 (1.36)	0.14	.890	0.05
Negative effects on physical health	1.81 (0.98)	2.20 (1.26)	-1.04	.303	-0.33
Negative effects on sexual functioning	1.19 (0.54)	1.32 (0.63)	-0.69	.492	-0.22
Positive effects on emotional health	1.19 (0.40)	1.12 (0.33)	0.58	.562	0.19
Positive effects on physical health[a]	1.44 (0.63)	1.08 (0.28)	2.50	.045*	1.15
Positive effects on sexual functioning	2.75 (1.39)	1.92 (1.18)	2.04	.048*	0.65
Increased interest in ST relationships[a]	1.56 (1.26)	1.36 (0.64)	0.60	.559	0.27
Decreased interest in ST relationships	1.19 (0.75)	1.08 (0.28)	0.65	.517	0.21
Increased interest in LT relationships[a]	2.00 (1.59)	1.80 (1.08)	0.48	.634	0.20
Decreased interest in LT relationships	1.19 (0.75)	1.08 (0.28)	0.65	.517	0.21

Note. POS = periovulatory syndrome. PMS = premenstrual syndrome. ST = Short-term. LT = Long-term.
[a]df = 18.77 to 23.85 because equal variances between groups could not be assumed.
*$p < .05$.

reported more positive effects in the premenstrual phase than the PMS pattern group. That is, the group who were prospectively found to have lower NA and higher PA scores in the premenstrual than periovulatory phase also previously reported experiencing more general positive effects of the premenstrual phase at the screening stage of the study than the group that had prospectively had higher NA and lower PA scores in the premenstrual phase. Thus, it appears that "feeling good" during the premenstrual phase may differentiate these two clusters of women more so than levels of negative symptoms at this time.

Also as hypothesized, the menstrual cycle pattern groups significantly differed in measures of sociosexuality (see Table 3.24). As seen in Figure 3.4, the POS pattern group had higher, more unrestricted, total scores on the SOI-R and on the STMO scale of the M-SOI than the PMS pattern group. These differences were found for sociosexual attitudes and behaviour, including a non-significant trend for lifetime number of sexual partners, but not desire.

With respect to other relevant variables, the groups did not differ in mean age; relationship length and satisfaction; self-perceptions; alcohol use; personality/impression management; or body measurements (see Table 3.24). However, differences in education level, partner attractiveness, and BMI approached significance. Education level and partner attractiveness appeared lower, while BMI appeared higher, in the PMS versus POS pattern group. When relationship status was examined, the two groups did not differ in likelihood of being in a relationship, single, or having switched status during the study, χ^2 (2, n = 41) = 3.37, p = .186, Cramer's V = .29 (uncorrected for expected counts less than 5) or of being in a relationship versus single only, χ^2 (1, n = 41) = 1.17, p = .279, ϕ = -.18. In the PMS group, 31% of women were in a relationship, 44% were single, and 25% switched status during the study. In

Table 3.24

Differences between Menstrual Cycle Pattern Groups on Relevant Variables

Variable	*M* (*SD*)		*t* (39)	*p*	Cohen's *d*
	POS pattern group (*n* =16)	PMS pattern group (*n* = 25)			
Demographic variables					
Age (years)	24.39 (5.82)	22.13 (5.13)	1.30	.202	0.42
Education[a]	7.06 (0.57)	6.52 (1.39)	1.48	.091[†]	0.50
Age at menarche (years)	12.98 (1.50)	12.42 (1.26)	1.30	.203	0.42
Rate of development[b]	3.06 (0.85)	2.77 (0.83)	1.13	.267	0.36
Number of times pregnant	0.19 (0.40)	0.28 (0.79)	-0.43	.668	-0.14
Relationship variables[c]					
Length (years)[a]	5.56 (6.38)	2.10 (2.07)	1.88	.289	1.81
Satisfaction[d]	17.20 (3.44)	17.11 (4.81)	0.04	.969	0.02
Relative partner attractiveness[e]	2.80 (0.83)	3.61 (0.86)	1.82	.087[†]	0.88
Self-perception variables[f]					
Attractiveness	4.93 (2.10)	5.42 (1.57)	-0.84	.405	-0.27
Femininity	5.66 (2.16)	6.30 (1.35)	-1.18	.245	-0.38
Masculinity[a]	2.88 (1.88)	2.32 (1.31)	1.11	.313	0.45
Sociosexuality variables					
Lifetime number of partners[g]	4.31 (3.53)	2.40 (2.06)	1.96	.063[†]	0.63
Likelihood of no condom use[h]	1.56 (0.89)	2.96 (3.30)	-2.01	.054[†]	-0.64
SOI-R total[ai]	10.21 (5.41)	6.51 (2.94)	2.49	.021*	0.81
Desire	8.75 (5.18)	6.92 (4.58)	1.18	.245	0.39
Attitudes[a]	14.31 (8.68)	7.92 (5.71)	2.61	.016*	0.86
Behaviour[ai]	7.56 (5.57)	4.76 (2.71)	1.87	.076[†]	0.61
M-SOI					
LTMO	8.14 (0.80)	8.44 (0.76)	-1.22	.232	-0.39
STMO	4.01 (2.06)	2.39 (1.61)	2.83	.007**	0.91
Behaviour[a]	9.19 (6.04)	5.64 (3.55)	2.13	.045*	0.68
Alcohol use variables					
Frequency[j]	2.25 (1.06)	1.80 (0.76)	1.58	.123	0.51
Sensitivity to effects[k]	2.60 (1.12)	2.08 (1.41)	1.21	.233	0.39
Number of drinks in past 48 hours	1.50 (1.25)	0.52 (0.87)	1.23	.235	0.39

Variable	*M* (*SD*)		*t* (39)	*p*	Cohen's *d*
	POS pattern group (*n* =16)	PMS pattern group (*n* = 25)			
Alcohol use variables					
Neuroticism[il]	38.60 (17.88)	47.33 (17.86)	-0.87	.391	-0.28
Negative Impression Management[m]	2.50 (2.56)	1.88 (2.86)	0.71	.485	0.23
Positive Impression Management[m]	14.44 (4.27)	14.04 (5.26)	0.25	.802	0.08
Body measurement variables[n]					
2D:4D					
Left	0.986 (0.02)	0.989 (0.04)	-0.23	.821	-0.12
Right	0.993 (0.04)	1.000 (0.03)	-0.47	.644	-0.24
Mean	0.989 (0.03)	0.995 (0.03)	-0.40	.695	-0.20
Middle-phalangeal hair count					
Left	10.63 (13.49)	6.70 (6.60)	0.81	.429	0.41
Right	7.88 (10.66)	6.20 (6.44)	0.41	.685	0.21
Mean	9.25 (12.04)	6.45 (6.36)	0.64	.534	0.32
BMI	25.34 (3.80)	31.03 (7.61)	-2.06	.058[†]	-1.03
WHR	0.81 (0.05)	0.80 (0.04)	0.43	.675	0.22

Note. SOI-R = Sociosexual Orientation Inventory – Revised. M-SOI = Multidimensional Sociosexual Orientation Inventory. STMO = Short-Term Mating Orientation. LTMO = Long-Term Mating Orientation. 2D:4D = ratio of the lengths of the second digit (finger) to the fourth digit. BMI = body mass index. WHR = waist to hip ratio.

[a] df = 4.31 to 35.58 because equal variances between groups could not be assumed. [b]From 1 (*some elementary school*) to 9 (*completed a university degree).* [c] *n*s = 5 and 14 women in a relationship. df = 17. [c]From 1 (*much younger*) to 5 (*much older*) compared to other people of the same sex and age. [d]As measured by the Perceived Relationship Quality Component (PRQC) Inventory. [e]From 1 (*partner less attractive*) to 7 (*partner much more attractive*) relative to self. [f]From 1 (*not at all*) to 9 (*extremely*). [g]Lifetime number of sexual intercourse partners. [h]Rating of percentage likelihood from 1 (*0%)* to 11 (*100%)* that one would have sex with someone for the first time without using a condom. [i]*n* = 16 and 24 due to missing data. df = 38. [j]From 1 (*never or rarely*) to 5 (*almost every day*). [k]From 1 (*very slightly or not at all)* to 5 (*extremely*). *n* = 15 due to missing data. df = 13. [l]As measured by the short-form Eysenck Personality Questionnaire-Revised (EPQ-R). [m]As measured by the Personality Assessment Inventory (PAI). [n]*n*s = 8 and 10 women who participated in laboratory sessions. df = 16.

[†]$p < .10$. *$p < .05$. **p < .01

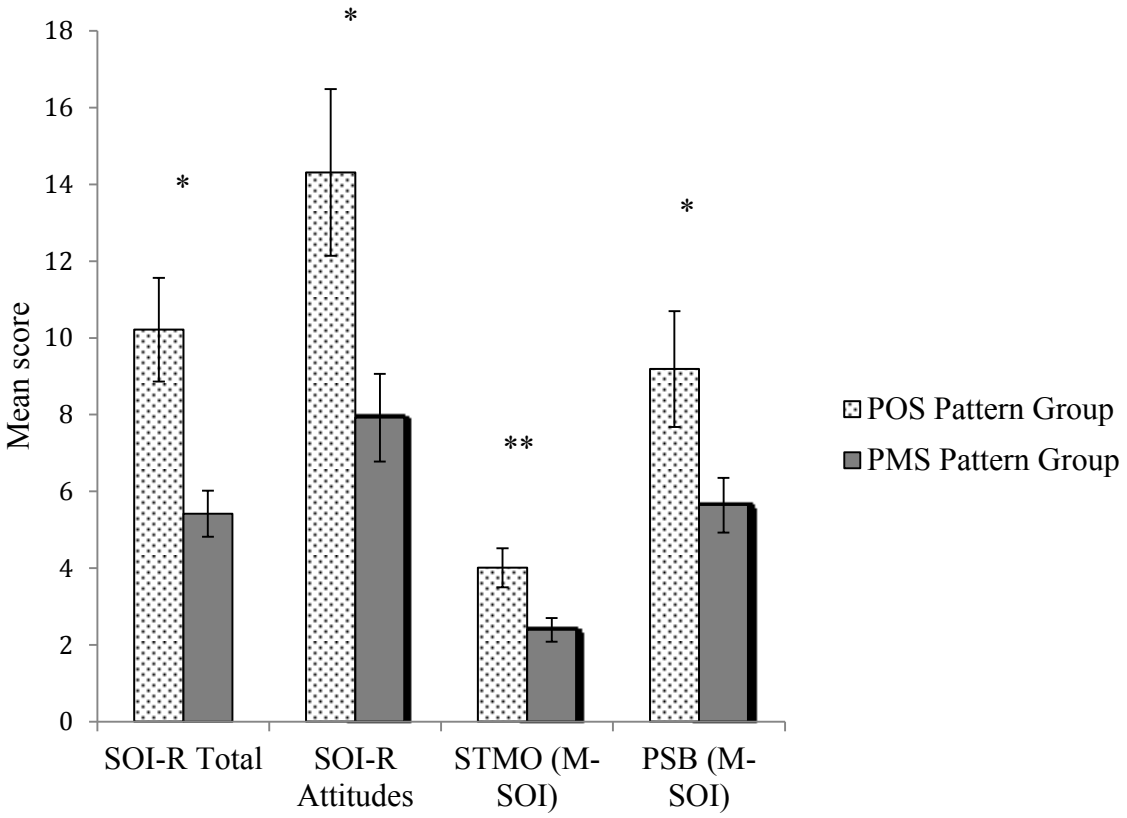

Figure 3.4. Mean sociosexuality variable scores as a function of menstrual cycle pattern group. Across all variables, the POS Pattern group had a more unrestricted sociosexual orientation than the PMS Pattern group. POS = periovulatory syndrome. PMS = premenstrual syndrome. SOI-R = Sociosexual Orientation Inventory – Revised. STMO = Short-Term Mating Orientation scale. M-SOI = Multidimensional Sociosexual Orientation Inventory. PSB = Past Sexual Behaviour scale. Error bars represent standard error of the mean.
*$p < .05$. **$p < .01$.

the POS group, 56% of women were in a relationship, 36% were single, and 8% switched status. The groups also did not differ in ever having been pregnant (yes/no), χ^2 (1, n = 41 = 0.36, p = .662, Fisher's exact test, ϕ = -.09. Nineteen percent of the PMS pattern group has ever been pregnant compared to 12% of the POS pattern group.

As exploratory analyses, correlations were computed between separate NA, PA, and proceptivity change scores and the other relevant variables to identify correlates of cyclical change in these three variables (see Tables 3.25 and 3.26). Increases in NA scores (i.e., higher scores in the premenstrual versus periovulatory phase) were positively related to the rating of negative effects of the premenstrual phase on physical health, r = .32, p = .045. There was also a near-significant negative relationship with the rating of positive effects of the premenstrual phase on physical health, r = -.27, p = .086. Increases in PA scores (i.e., higher scores in the premenstrual versus periovulatory phase) were positively correlated with ratings of positive effects on sexual functioning, increased interest in short-term relationships, and increased interest in long-term relationships in the premenstrual phase, rs = .32 to .34, ps = .041 to .031. These findings were consistent with expectations.

Increases in NA scores from the periovulatory to the premenstrual phase were also significantly positively correlated with partner attractiveness (relative to self), r = .50, p = .030, and negatively correlated at trend levels with total SOI-R score, SOI-R attitudes, and sensitivity to the affects of alcohol, rs = -.27 to -.29, ps = .085 to .063. Relationships for changes in both PA and proceptivity with education level approached significance, ps = .071 and .082, such that relatively higher scores in the premenstrual phase were correlated with having more education. As expected, increases in PA scores from the periovulatory to the premenstrual phase were significantly positively related to total SOI-R scores, SOI-R attitudes, and STMO scores (i.e.,

Table 3.25

Correlations between Premenstrual Minus Periovulatory Phase Change Scores[a] in Negative Affective Experiences, Positive Affective Experiences, and Proceptivity – Picture Ratings and the Women's B-REP – Premenstrual Phase Ratings (n = 41)

Rating	Negative Affective Experiences	Positive Affective Experiences	Proceptivity – Picture Ratings
Negative effects on emotional health	.19	.08	.10
Negative effects on physical health	.32*	-.10	.06
Negative effects on sexual functioning	-.17	.04	.04
Positive effects on emotional health	-.06	.10	.01
Positive effects on physical health	-.27†	.25	.07
Positive effects on sexual functioning	.12	.34*	.15
Increased interest in ST relationships	-.03	.34*	.02
Decreased interest in ST relationships	-.12	.05	.14
Increased interest in LT relationships	-.10	.32*	.02
Decreased interest in LT relationships	-.17	.12	.12

Note. B-REP = Brief Reproductive Experiences. ST = Short-term. LT = Long-term.

[a]Premenstrual minus periovulatory phase change scores. High scores reflect higher scores in the premenstrual versus periovulatory phase. Thus, positive correlations indicate that a rating was related to higher scores, and negative correlations indicate that a rating was related to lower scores, in the premenstrual versus periovulatory phase.

†$p < .10$. *$p < .05$.

Table 3.26

Correlations between Premenstrual Minus Periovulatory Phase Change Scores[a] in Negative Affective Experiences, Positive Affective Experiences, and Proceptivity – Picture Ratings and Relevant Variables (n = 41)

Variable	Negative Affective Experiences	Positive Affective Experiences	Proceptivity – Picture Ratings
Demographic variables			
Age (years)	.02	-.03	-.08
Education level[b]	-.17	.29†	.28†
Age at menarche (years)	-.06	.06	.29†
Rate of development[c]	.04	.11	.39*
Number of times pregnant	.10	-.25	-.09
Relationship variables[d]			
Length (years)	.12	.07	.01
Satisfaction[e]	.001	.01	-.11
Relative partner attractiveness[f]	.50*	-.34	.31
Self-perception variables[g]			
Attractiveness	.003	.05	.05
Femininity	.07	-.03	.19
Masculinity	-.17	-.003	.07
Sociosexuality variables			
Lifetime number of partners[h]	-.10	.16	.01
Likelihood of no condom use[i]	.13	-.27†	-.09
SOI-R total[j]	-.28†	.36*	-.02
Desire[j]	-.24	.20	-.08
Attitudes	-.29†	.40*	.05
Behaviour	-.05	.19	-.04
M-SOI			
LTMO	.23	-.16	-.08
STMO	-.21	.24*	.09
Behaviour	-.15	.22	.01
Alcohol use variables			
Frequency of use[k]	-.10	.14	.18
Sensitivity to effects[jl]	-.27†	.07	.14
Number of drinks in the past 48 hours	-.09	.13	.04
Personality/impression management variables			
Neuroticism[jm]	-.07	-.12	.03
Negative Impression Management[n]	-.10	.14	.07
Positive Impression Management[n]	.05	.07	-.17
Body measurement variables[o]			
2D:4D			
Left	-.12	-.07	.41†
Right	.23	-.33	.54*
Mean	.08	-.23	.53*
Middle-phalangeal hair count			
Left	-.39	. 51*	-.20
Right	-.26	.43†	-.26
Mean	-.33	.48*	-.23
BMI	-.08	-.25	.26
WHR	-.18	.01	.33

Note. SOI-R = Sociosexual Orientation Inventory-Revised. M-SOI = Multidimensional Sociosexual Orientation Inventory. 2D:4D = ratio of the lengths of the second digit (finger) to the fourth digit. BMI = body mass index. WHR = waist to hip ratio.

[a]Premenstrual minus periovulatory phase change scores. High scores reflect higher scores in the premenstrual versus periovulatory phase. Thus, positive correlations indicate that a rating was related to higher scores, and negative correlations indicate that a rating was related to lower scores, in the premenstrual versus periovulatory phase. [b]From 1 (*some elementary school*) to 9 (*completed a university degree).* [c]From 1 (*much younger*) to 5 (*much older*) compared to other people of the same sex and age. [d]*n* = 19 women in a relationship. [e]As measured by the Perceived Relationship Quality Component (PRQC) Inventory. [f]From 1 (*partner less attractive*) to 7 (*partner much more attractive*) relative to self. [g]From 1 (*not at all*) to 9 (*extremely*). [h]Lifetime number of sexual intercourse partners. [i]Rating of percentage likelihood from 1 (*0%)* to 11 (*100%)* that one would have sex with someone for the first time without using a condom. [j]*n* = 40 due to missing data. [k]From 1 (*never or rarely*) to 5 (*almost every day*). [l]From 1 (*very slightly or not at all)* to 5 (*extremely*). [m]As measured by the short-form Eysenck Personality Questionnaire-Revised (EPQ-R). [n]As measured by the Personality Assessment Inventory (PAI). [o]*n* = 18 women who participated in laboratory sessions.
[†]$p < .10$. *$p < .05$. **p < .01

sociosexual unrestrictiveness), *r*s = .24 to .40, *p*s = .022 to .010, as well as middle-phalangeal hair counts, *r*s = .43 to .51 *p*s = .076 to .029. Lastly, increases in proceptivity across the cycle (i.e., relatively higher proceptivity scores in the premenstrual phase) were positively related to education level (trend), older AAM (trend) and slower rate of development, *r*s = .28 to .39, *p*s = .011 to .068, as well as more higher or more feminine 2D:4D, *r*s = .41 to .53, *p*s = .088 to .022.

Hypothesis 3: Phasic shifts on other scales of the Women's REP and PARMSS. Means, standard deviations, and univariate results as a function of menstrual pattern group can be found in Table 3.27 for the Women's REP and Table 3.28 for the PARMSS. Phase scores on the other Women's REP scales, main subscales, and supplementary subscales as well the PARMSS scales were entered into separate repeated measures MANOVAs as DVs with menstrual cycle pattern group as an IV to examine the interaction between group and phase (i.e., 2 between [group: POS, PMS] x 2 within [phase: periovulatory, premenstrual] MANOVAs)[29]. The NA and PA scales, the subscales of the PA scale, and the Proceptivity – PR scale were excluded from these analyses as the two groups were formed using these scales. Significant effects (bolded in the tables) were followed-up with univariate ANOVAs.

On the combined four non-relationship scales of the Women's REP, there was no main effect for group, F (4, 36) = 0.43, p = .789, partial η^2 = .045, nor an interaction effect for group x phase, F (4, 36) = 1.91, p = .130, partial η^2 = .18. Univariate analyses also did not reveal group or interaction effects for Negative Physical Experiences and Body Image Quality scores, *F*s (1, 39) = 0.01 and 0.81, *p*s = .971 and .373, partial η^2s = .000 and .020. However, exploratory analyses revealed that there was a significant interaction effects for Sexual Problems – General, F (1, 39) = 6.17, p = .017, partial η^2 = .14. Follow-up univariate analyses showed a non-

[29] The overall effects of menstrual cycle phase were reported in the general menstrual cycle phase effects section above (see Tables 3.19 and 3.20).

Table 3.27

Summary of Means and Repeated Measures ANOVAs of the Scales and Subscales of the Women's REP by Menstrual Cycle Pattern Group

	POS pattern group (n =16)					PMS pattern group (n = 25)				
Variable	M (SD)		F	p	Partial η^2	M (SD)		F	p	Partial η^2
	PO	PM				PO	PM			
				Scales[a]						
Negative Physical Experiences	1.64 (0.43)	1.59 (0.30)	0.39	.542	.03	1.75 (0.43)	1.70 (0.43)	0.35	.560	.01
Sexual Problems - General	2.98 (0.72)	2.62 (0.35)	4.31	.055†	.22	2.91 (0.68)	2.99 (0.62)	0.89	.355	.04
Sexual Problems – Relationship[b]	2.58 (0.99)	2.20 (1.04)	1.29	.340	.30	1.82 (1.10)	2.11 (1.02)	1.99	.182	.13
Body Image Quality	3.16 (0.72)	3.20 (0.84)	0.25	.624	.02	3.26 (0.63)	3.00 (0.62)	4.54	.044*	.16
Sleep Quality	3.16 (0.87)	3.15 (0.70)	0.01	.942	.000	3.14 (0.80)	3.08 (0.75)	0.22	.643	.01
				Subscales[a]						
Hormonal Symptoms	1.56 (0.44)	1.57 (0.29)	0.01	.921	.01	1.69 (0.42)	1.65 (0.41)	0.35	.559	.01
Decreased Appetite	2.03 (1.07)	1.47 (0.78)	7.64	.014*	.34	1.78 (0.93)	1.48 (0.85)	3.27	.083†	.12
General Aches and Pains	1.78 (0.53)	1.72 (0.54)	0.27	.612	.02	1.90 (0.66)	1.92 (0.71)	0.31	.854	.001
Negative Sexual Experiences – General	2.17 (0.89)	1.82 (0.52)	3.93	.066†	.21	2.06 (0.84)	2.13 (0.82)	0.30	.583	.01
Negative Sexual Experiences – Relationship[b]	2.08 (1.10)	1.83 (1.04)	1.00	.391	.25	1.57 (1.17)	1.76 (1.02)	0.71	.414	.05
Negative Body Image Experiences	2.14 (0.85)	2.26 (0.89)	1.17	.297	.07	2.14 (0.66)	2.37 (0.76)	1.80	.192	.07
Negative Sleep Experiences	2.48 (0.93)	2.59 (0.72)	0.58	.460	.04	2.59 (0.95)	2.55 (0.84)	0.04	.847	.002
Positive Sexual Experiences – Others	1.88 (0.83)	2.08 (0.63)	0.77	.394	.05	1.95 (0.97)	1.77 (0.90)	1.45	.241	.06
Positive Sexual Experiences – Self	2.02 (0.90)	2.54 (0.76)	4.38	.054†	.23	1.96 (0.92)	1.93 (0.96)	0.04	.848	.002

Variable	POS pattern group (n =16)					PMS pattern group (n = 25)				
	M (SD)		F (1, 15)	p	Partial η^2	M (SD)		F (1, 24)	p	Partial η^2
	PO	PM				PO	PM			
Subscales[a]										
Positive Sexual Experiences – Relationship[b]	2.92 (1.03)	3.25 (1.26)	1.20	.353	.29	3.93 (1.07)	3.55 (1.09)	3.62	.080†	.22
Positive Physical Experiences	2.62 (0.47)	2.89 (.61)	7.88	.013*	.34	2.84 (0.58)	2.61 (0.51)	8.17	.009**	.25
Positive Body Image Experiences	2.37 (0.71)	2.59 (1.00)	4.28	.056†	.22	2.56 (0.66)	2.28 (0.67)	9.33	.005**	.28
Positive Sleep Experiences	2.45 (1.00)	2.65 (0.97)	0.82	.381	.05	2.60 (0.74)	2.33 (0.83)	4.27	.050†	.15
Supplementary Subscales										
Testosterone-Related Experiences	1.68 (0.52)	1.69 (0.45)	0.01	.909	.001	1.75 (0.46)	1.68 (0.49)	0.67	.419	.03
Progesterone-Related Experiences	1.38 (0.43)	1.38 (0.24)	0.003	.959	.000	1.61 (0.40)	1.60 (0.42)	0.02	.902	.001
Negative Sexual Experiences – Others	2.09 (0.84)	1.80 (0.53)	2.32	.148	.13	2.03 (0.87)	2.14 (0.96)	0.58	.454	.02
Negative Sexual Experiences – Self	2.29 (1.13)	1.85 (0.72)	4.33	.055†	.22	2.09 (1.02)	2.11 (0.91)	0.01	.943	.000
Negative Weight Experiences	2.66 (1.17)	2.75 (1.29)	0.26	.617	.02	2.84 (1.12)	3.00 (1.11)	0.91	.349	.04
Positive Physical Experiences – General	2.62 (0.50)	2.88 (0.62)	5.41	.034*	.27	2.73 (0.64)	2.56 (0.51)	4.69	.041*	.16
Positive Skin Experiences	2.25 (0.80)	2.56 (1.14)	2.05	.173	.12	2.74 (0.84)	2.40 (0.95)	4.52	.044*	.16
Positive Digestion Experiences	2.81 (0.84)	3.08 (0.93)	3.57	.078†	.19	3.03 (0.87)	2.79 (0.69)	2.61	.119	.10
Positive Breast Experiences	2.69 (1.08)	2.94 (1.09)	0.97	.341	.06	3.16 (1.04)	2.78 (0.97)	6.35	.019*	.21
Positive Weight Experiences	1.90 (0.83)	2.29 (1.13)	12.80	.003**	.46	2.12 (0.69)	1.88 (0.67)	4.26	.050†	.15
Positive Appetite Experiences	2.11 (0.72)	2.38 (1.00)	1.49	.241	.09	2.62 (0.81)	2.15 (0.87)	7.91	.010*	.25

Note. Women's REP = Women's Reproductive Experiences Questionnaire. POS = periovulatory syndrome. PMS = premenstrual syndrome. PO = periovulatory phase. PM = premenstrual phase. Bolded subscales represent significant group x phase interactions in an ANOVA that followed a significant interaction in a MANOVA ($p < .05$; see text for statistics).
[a]The Negative Affective Experiences scale, Positive Affective and Physical Experiences scale, and Positive Affective Experiences subscale are excluded as the two groups were formed using these scales. [b]$n = 5$ and 14 (df = 1, 4 and 1, 13) women in a relationship, respectively.
$^{\dagger}p < .10$. $*p < .05$. $**p < .01$.

Table 3.28

Summary of Means and Repeated Measures ANOVAs of the Subscales of the PARMSS by Menstrual Cycle Pattern Group

	POS pattern group (n =16)					PMS pattern group (n = 25)				
Variable	M (SD)		F (1, 15)	p	Partial η^2	M (D)		F (1, 24)	p	Partial η^2
	PO	PM				PO	PM			
				Receptivity						
Short-Term (ST)	3.82 (1.71)	3.91 (1.96)	0.11	.751	.01	3.82 (2.34)	3.16 (1.97)	8.92	.006**	.27
Long-Term (LT)	5.00 (1.66)	4.98 (2.06)	0.002	.962	.000	4.71 (2.66)	4.18 (2.48)	6.42	.018*	.21
Picture Ratings (PR)	4.07 (0.97)	4.27 (1.13)	0.60	.452	.04	3.58 (2.02)	3.31 (1.94)	2.02	.169	.08
				Proceptivity[a]						
ST	2.25 (0.95)	2.70 (1.98)	1.52	.237	.09	2.40 (1.63)	2.08 (1.30)	5.16	.032*	.18
LT	3.24 (1.36)	3.57 (2.08)	0.45	.513	.03	3.39 (2.12)	2.98 (1.96)	1.78	.195	.07

Note. PARMSS = Proceptive and Receptive Mating Strategies Scale. POS = periovulatory syndrome. PMS = premenstrual syndrome. PO = periovulatory phase. PM = premenstrual phase. Bolded scales represent significant univariate group x phase interactions following a near-significant interaction for the combined five scales in a MANOVA (p = .099; see text for statistics).
[a]The subscale Proceptivity – Picture Ratings (PR) is excluded as the two clusters were formed using this subscale.
*p < .05. **p < .01.

significant trend for an effect of phase on Sexual Problems – General among women in the POS pattern group, such that scores were relatively high in the periovulatory phase.

The main effect of group was not significant for the combined 11 main scales of the Women's REP (excluding the relationships scales) in a MANOVA, F (11, 29) = 0.46, p = .912, partial η^2 = .15. The group x phase interaction effect was significant, F (11, 29) = 2.34, p = .033, partial η^2 = .47. Univariate analyses revealed significant group x phase effects for Positive Sexual Experiences –Self, Positive Physical Experiences, and Positive Body Image Experiences, Fs (1, 39) = 2.35, p = .032, partial η^2 = .147, as well as non-significant trends for Negative Sexual Experiences – General and Positive Sleep Experiences, Fs (1, 39) = .372 and 3.82, ps = .061 to .058, partial η^2s= .09. The interaction effects were not significant for the other scales, Fs (1, 39) = 0.17 to 2.13, ps = .680 to .152, partial η^2s = .004 to .05. Follow-up ANOVAs indicated that Positive Sexual Experiences – Self scores were higher in the premenstrual versus periovulatory phase among the POS group (trend) with no significant effect for the PMS group. Positive Physical Experiences – General scores were significantly higher in the premenstrual phase for the POS group but higher in the periovulatory phase for the PMS group. The groups also showed opposite significant menstrual cycle shifts in Positive Body Image Experiences scores (see Table 3.27).

Among women in a relationship, a univariate group x phase interaction effect for Sexual Problems – Relationship scores was not significant, F (1, 17) = 2.00, p = .176, partial η^2 = .11. However, there were only four women in a relationship in the POS pattern group who completed this scale during both target phases. The effect of phase was not significant in either group, Fs (1,4 and 1, 13) = 1.28 and 1.99, ps = .340 and .182, partial η^2s = .30 and .13, respectively.

For the combined 11 supplementary subscales of the Women's REP, effect of group was not significant in a MANOVA, F (11, 29) = 0.89, p = .561, partial η^2 = .25, while the group x phase interaction was significant, F (11, 29) = 2.35, p = .032, partial η^2 = .47. Univariate analyses revealed significant group x phase effects for all positive physical experiences scales (i.e., general, skin, digestion, breast, weight, and appetite), Fs (1, 39) = 5.18 to 13.92, ps = .025 to .003, partial η^2s = .12 to .21. Follow-up ANOVAs indicated that positive scales scores tended to be significantly higher in the periovulatory phase than the premenstrual phase in the PMS group with POS group showing the opposite patterns (see Table 3.26). The interaction effects were not significant for the other four scales, Fs (1, 39) = 0.10 to 2.86, ps = .906 to .099, partial η^2s = .000 to .07.

The combined PARMSS scales exhibited a non-significant trend for a phase x group interaction in a MANOVA, F (5, 35) = 2.03, p = .099, partial η^2 = .23, which was followed-up with ANOVAs. There were no significant interaction effects for the separate Receptivity – LT, Receptivity – PR, and Proceptivity – LT scales, Fs (1, 39) = 1.81 to 2.22, ps = .186 to .144, partial η^2s = .04 to .05. The effect of phase x group was significant for Receptivity – ST and Proceptivity – ST, Fs (1, 39) = 4.57 and 5.16, p = .039 and .029, partial η^2 = .11 and .12. Within the groups, the effects of phase were not significant for the POS pattern group, while the PMS pattern group demonstrated significantly higher scores in the periovulatory versus premenstrual phase. All findings in this section were consistent with expectations.

Discussion

The main purpose of this report (Part 2 of Study 2) was to examine prospective patterns of menstrual cycle shifts in NA, PA, and sexual proceptivity. Specifically, the previously unexplored possibility of two paradoxical shifts in this *set* of experiences across the cycle was

examined and supported (as outlined below). Previous research has linked well-being with sexuality. However, only separate average trajectories of NA, PA, and sexuality have tended to be examined and researchers typically focused on determining the menstrual cycle phase in which each variable peaked or troughed. The present study appears to be the first to comprehensively differentiate between and assess: (a) negative *and* (b) positive affective, sexual, and physical experiences associated with reproductive events and hormonal sensitivity; as well as (c) proceptive *and* receptive mating psychology. Overall, combining both the PMS/POS (present study and e.g., Kiesner, 2011) and PSTS (Oinonen, Klemencic, et al., 2008) hypotheses, two groups of women were identified who show opposing patters of affect change and proceptivity across the cycle with respect to (1) the phase in which they experienced higher NA, lower PA, and proceptivity and (2) their overall sociosexual orientation.

Hypothesis 1: Two menstrual cycle pattern shifts in NA, PA, and proceptivity. It was hypothesized that the majority of free-cycling women would exhibit a PMS pattern whereby NA scores are higher, PA scores are lower, and proceptivity scores are lower in the premenstrual versus periovulatory phase (i.e., the standard trajectories separately examined in the relevant literature), while a second group of women would exhibit the opposite POS pattern (i.e., lower NA, higher PA, and higher proceptivity scores in the premenstrual phase). This hypothesis was supported. As seen in Figures 3.2 and 3.3, two groups were revealed in a cluster analysis used to group women in patterns of change scores in the three DVs. As expected, the majority of women (61%) displayed a PMS pattern, while 39% of women exhibited a POS pattern.

Additional analyses revealed that NA and PA were not significantly correlated with proceptivity scores in each phase separately (*r*s = -.10 to .01 for NA and .11 to .16 for PA). However, despite a strong inverse relationship between both mean levels and change in both NA

and PA (*r*s = -.42 to -.57), *change* in PA across the cycle was positively related to change in proceptivity (*r* = .39) but change in NA was not significantly related to change in proceptivity. When two cluster groups were derived for each DV separately, there was a 54% overlap in corresponding groups for PA and proceptivity. Thus, the results of the present study are comparable to a past finding suggesting that 61% and 13% of women demonstrate premenstrual and mid-cycle patterns of depression/anxiety (Kiesner, 2011), respectively, and 51% and 16% of women demonstrate menstrual and mid-cycle headache patterns (Kiesner & Martin, 2013). In fact, Kiesner and Martin (2013) found that these two sets of menstrual cycle changes were significantly associated as 54% of women who exhibited a menstrual or mid-cycle pattern of headaches also exhibited the corresponding premenstrual or mid-cycle pattern of depression/anxiety.

In the present study, there was a trend for proceptivity to increase with increases in PA across the menstrual cycle in each of the PA cluster groups, but no evidence that PA increased with increases in proceptivity in the proceptivity cluster groups, and the sizes of phase x group effects for affect, particularly PA, were larger than those for proceptivity. Thus, while directionality or causation cannot be determined in the current study, there seems to be more evidence that changes in PA drive changes in proceptivity (as opposed to NA affecting proceptivity or proceptivity affecting PA or NA). While not hypothesized, this finding appears to be consistent with Reiber's (2009) model of PMS (i.e., high NA and low mating effort) as a suboptimal state that is a byproduct of positive adaptive states (i.e., high PA and proceptivity) in the periovulatory phase. However, it remains a plausible that there are times when NA may be evolutionary advantageous and more strongly predict mating effort (Viera, 2009).

It is also worth noting that only 1 of 34 Women's REP scales and subscales and 1 of 6 PARMSS scales demonstrated a main effect of menstrual phase (i.e., a general cyclic shift in the overall subsample). Consistent with research on women's dietary behaviour (see Fessler, 2003 for a review), reports of decreased appetite were highest (i.e., women's appetite was lowest) in the periovulatory phase. The size of this effect was moderate. Thus, hormonal changes across the cycle may reduce a woman's set point for satiety or hunger around ovulation, which appears to be a robust finding. Between Study 1 and Study 2, it is clear that eating experiences can be reproductive and hormone related (see also Klump et al., 2014). Reduced caloric intake and metabolic rate when fertile has been hypothesized to be adaptive possibly because women "have better things to do than eat" when fertile (Fessler, 2003, p. 4). That is, during the periovulatory phase, energy and effort normally expended to seek out food may instead be focused on increasing one's attractivity in order to seek out a mate.

When examined all together, the women in the present study also reported greater receptivity, but not proceptivity, when fertile compared to when in the premenstrual phase (i.e., a general phase effect for receptivity). This finding was of a small effect size but seems consistent with the dual mating hypothesis of estrus and extended sexuality (e.g., Pillsworth & Haselton, 2006) given that women have the ability to engage in sexual behaviour when relatively infertile, at any time, which is not the case in some other species (Nelson, 2005). There is compelling evidence that estrus sexuality still exists in humans (which in human? evolutionary theory, is associated with sex with attractive men when fertile to obtain "good genes" for one's offspring; see Haselton & Gildersleeve, 2015 and Gangestad & Haselton, 2015 for reviews). While little research has explicitly examined women's receptive versus proceptive behaviours across the cycle (Phillips, 2015; but see Bullivant et al., 2004 and Gueguen, 2009), women seem to engage

in behaviours that might be proceptive but could also be indicators of increased receptivity in the periovulatory phase (e.g., socializing more with men and dressing more provocatively; Haselton & Gildersleeve, 2015). The present findings suggest that women's receptivity may be particularly responsive to increases in estrogen (see Roney & Simmons, 2013) or estrogen priming as has been demonstrated in some animal research (Nelson, 2005). Proceptivity did not demonstrate a general phase effect across the cycle in the present study but the peak in proceptivity around ovulation in the PMS pattern group might have contributed to a phase effect for receptivity. These results, a main effect for an ovulatory shift in receptivity and two opposing patterns of proceptivity herein, are nearly identical to those of Phillips (2015) and consistent with the PSTS theory (Oinonen, Klemencic, et al., 2008).

Overall, similar to the findings of Wlodarski and Dunbar (2015) regarding two overall mating strategy phenotypes as opposed to a continuum of sociosexuality, the majority of the data presented here do not seem to be best represented by one average trajectory of menstrual cycle change. With respect to NA, headaches, and symptom associations, Kiesner and colleagues (2009; 2010; 2011; 2013) have also concluded that statistically (based on MLM) there are differences between women in the magnitude and direction, namely patterns, of cyclic shifts or symptom co-variation (as opposed to merely average/overall shifts or relationships in the female population). This also appears to be the case for PA and sociosexual tactics (e.g., Davydov et al., 2007 and Phillips, 2015, respectively). The biological, evolutionary, and psychosocial bases of these different menstrual cycle patterns in women's experiences should be the focus of future research, as has also been recommended for the two overall within-sex mating strategy phenotypes (Wlodarsk et al., 2015). For instance, even if the only alternative pattern to the more common PMS pattern of change (or ovulatory shift in short-term mating preferences) is one of

attenuated or no change, an important question then becomes examining why some free-cycling women fail to experience cyclic shifts that might be advantageous for them, even if it is opposite to that of other women.

Hypothesis 2: Group differences between the PMS and POS groups. Some evidence for the validity of the PMS and POS groups comes from the finding that they differed in their B-REP – Premenstrual Phase Ratings, which were completed prior to the two prospective cycle phase testing sessions. Women in the PMS group reported significantly less positive effects of the premenstrual phase on their physical health and sexual functioning compared to the POS group. These group differences were moderate to large in effect size. In addition, examination of premenstrual minus (-) periovulatory change scores indicated that women with higher NA scores in the premenstrual relative to the periovulatory phase also endorsed higher ratings of negative effects of the premenstrual phase on their physical health. Such correlations also revealed that relatively high PA scores in the premenstrual phase were positively related to ratings of increased interest in both long- and short-term relationships in the premenstrual phase (all *r*s discussed in this section = .32 to .34). These results provide some evidence of validity for the cluster analysis results. That is, the group found to have lower NA, higher PA, and higher proceptivity scores in the premenstrual than periovulatory phase (POS pattern) based on repeated measures reported more positive effects of the premenstrual phase in general at the earlier screening stage of the study than the group that had prospectively had high NA and low PA scores in the premenstrual phase (PMS pattern).

Based on evidence for, and evolutionary theories related to, the original PSTS hypothesis (Oinonen, Klemencic, et al., 2008; summarized in the third panel of Table 3.1), it was predicted that the POS pattern group, with high proceptivity in the premenstrual phase, would have a more

unrestricted overall mating strategy (i.e., exhibit one of two between- and within-sex phenotypes of sociosexuality previously identified in the relevant literature). Indeed, strong support was found for this hypothesis. Women who showed the POS pattern reported having had more sexual partners in their lifetime, higher total sociosexuality scores, more unrestricted attitudes and behaviour, and higher short-term mating orientation scores. The groups did not differ in general sexual desire or long-term mating orientation. The finding that sociosexuality differs between two groups of women showing opposing cyclical patterns of affect and proceptivity fits with the initial findings associated with the PSTS theory (Oinonen et al., 2008) and with those of Phillips (2015). Overall, support was found for both the notion that affective experiences may facilitate mating strategy enactment (or vice versa) and the PSTS theory given that the two groups identified for cyclical shifts in NA, PA, and proceptivity differed based on sociosexuality. That is, if there are PMS and POS patterns among women, they may represent distinct mating strategy phenotypes (see Wlodarski & Dunbar, 2015): unrestricted and unrestricted, respectively. Thus, it may be unlikely that PMS (and POS) is a merely a byproduct of withdrawal from positive states between menstrual cycle phases (see Reiber, 2009) but rather the result of an interaction between a woman's overall sociosexual orientation and hormone-related changes across the cycle.

It is noteworthy that the PMS and POS groups did not significantly differ on any other variables in the areas of demographics, relationships, alcohol use, personality/impression management, and body measurements. They also did not differ in mean levels of NA, PA, and proceptivity. Thus, sociosexuality appears to a particularly important indicator of patterns in women's menstrual cycle-related mating tactics. However, non-significant trends were found for group differences in education level, partner attractiveness related to self, and BMI. The POS group (with high proceptivity around ovulation) reported slightly higher education (though both

groups tended to be in the range of having completed some university), reported lower relative partner attractiveness, and had lower BMIs. Partner attractiveness was also correlated with premenstrual minus (-) periovulatory change scores in NA. The two findings for partner attractiveness are consistent with research on partner-related moderators of women's cyclic sexual desire (Haselton & Gangestad, 2006; cf., Phillips, 2015). An association with BMI seems to make sense in the context that women with relatively high BMIs have higher circulating estrogen levels, which in the normal range has been hypothesized to protect against changes in mood (Oinonen & Mazmanian, 2001) but high BMI is also associated with various menstrual cycle problems, including PMS (Speroff & Fritz, 2005).

Some other trends in the data warrant mention for future research. Premenstrual minus (-) periovulatory change scores also indicated that both slower rate of pubertal development and later AAM were correlated with higher proceptivity in the premenstrual phase (a POS pattern), while sensitivity to the effects of alcohol was related to lower NA scores in the premenstrual phase (also a POS pattern) (most a non-significant trend level). AAM and sociosexuality have been found to be inversely related (Manning & Fink, 2011) and later AAM would thus, be expected to be associated with a PMS and not a POS pattern (see Cohen et al., 2002; Reiber, 2009). Interestingly, early and late AAM have been found to be associated with greater alcohol use in adolescence and adulthood (Richards & Oinonen, 2011), respectively, and alcohol use has found to be positively related to sociosexuality (Clark, 2004). The result pertaining to alcohol in the present study is similar to that of Kiesner (2012) in which women with a PMS pattern of NA reported less negative affective and sleep responses associated with alcohol use than women with a mid-cycle (POS) pattern. Combined, the findings described here indicate that both AAM and patterns of alcohol use or reactivity may be implicated in mating strategy enactment and patterns

of affect and proceptivity across the cycle. However, further research is needed to clarify the nature of the relationships.

Lastly, premenstrual minus (-) periovulatory change scores indicative of high PA in the premenstrual phase (a POS pattern) and high proceptivity in the premenstrual phase (also a POS pattern) were related to high (more feminine) 2D:4D and high (more masculine) mid-phalangeal hair count, respectively. Taken together, these findings seem to have some relationship to those of Oinonen (2009) regarding HC side effects. Oinonen found that low digit ratio and low mid-phalangeal hair count were both associated with a history of HC side effects (i.e., more masculine 2D:4D and more feminine MPH). The differential associations for these two measurements (i.e., more masculine 2D:4D and more feminine MPH in women showing aspects of the PMS pattern) may be related to the fact that digit ratio is a putative marker of prenatal androgen exposure (developmental masculinization), while mid-phalangeal hair count is a putative indicator of current androgen action or sensitivity. Thus, as Oinonen (2009) suggested, it is possible that extreme 2D:4Ds and hair counts may reflect sensitivity to changes in reproductive hormones. The present findings suggest that there may be value in exploring the extent to which prenatal androgen exposure and current androgen sensitivity or exposure may play a mechanistic role in the PMS and POS patterns. The findings also suggest the possibility that women showing a POS pattern may be less likely to experience negative side effects of OC use than women with the PMS pattern. The present study appears to be the first to examine whether these two variables (2D:4D and MPH) are associated with menstrual cyclicity in negative and positive experiences in women.

Hypothesis 3: Phasic shifts on other scales of the Women's REP and PARMSS. Providing some additional evidence for the validity of the two patterns of NA, PA, and

proceptivity, the POS and PMS groups displayed different patterns of phasic change in other scales of the Women's REP and PARMSS. Overall, there were significant interactions between phase and group for positive experiences and receptivity (bolded in Tables 3.27 and 3.28). Within-group follow-up analyses revealed that, as would be expected, Positive Physical Experiences – General and Positive Weight Experiences scores were significantly higher in the premenstrual versus periovulatory (a POS pattern) in the POS group. There were also similar non-significant trends for Positive Sexual Experiences – Self and Positive Body Image Experiences. In the PMS group, Positive Physical Experiences – General, Positive Body Image Experiences, Positive Skin Experiences, Positive Breast Experiences, and Positive Appetite Experiences scores were significantly higher in the periovulatory phase relative to the premenstrual phase (a PMS pattern). Receptivity – ST and Receptivity – LT were also higher in the periovulatory phase (a PMS pattern) in the PMS group. Effects sizes, which tended to be moderate, appeared somewhat higher for the PMS group. Given the fact that the PMS group demonstrated menstrual cycle change in a larger number of scores, the PMS group may have stronger psychosexual cyclicity than the POS group. This finding is similar to one found in the original PSTS paper (Oinonen, Klemencic, et al., 2008) regarding the restricted (unrestrictiveness around ovulation; a PMS pattern) group, who had evidence of greater cyclicity, versus the unrestricted (restrictiveness around ovulation; a POS pattern) group.

General discussion. All three hypotheses in this study were at least partially supported. Given the unique and thus, preliminary nature of the present study, the findings need to be replicated to assess their robustness. It would be best if replications were conducted in large samples of at least 90 (Kiesner & Martin, 2013) because there may be more than two patterns, including women who show no change, in affect or sexuality across the menstrual cycle.

However, other studies that have identified moderators of the direction of, or groups of women with paradoxical, patterns in affective experiences or sociosexuality involve relatively small samples of women (e.g., *ns* = 23 to 38; Oinonen, Klemencic, et al., 2008; Phillips, 2015; Scarbrough & Johnston, 2005) and/or used change scores to group women (Reiber, 2009; Rivera-Tovar et al., 1992). Daily data across the menstrual is probably beneficial because it would (a) result in relatively few women being excluded for being tested outside target phases and (b) would allow for the examination of lag effects (similar to Fortenbery et al., 2005). For instance, if affect facilitates mating tactics across the cycle, it is possible that phasic changes in affect slightly precede changes in mating tactics by a day or two, such as seems to be case for the effects of estrogen on women's ratings of sexual desire (Roney & Simmons, 2013). Moreover, different hormonal mechanisms or combinations thereof (i.e., estrogen, progesterone, testosterone, LH, follicle-stimulating hormone, and perhaps oxytocin, prolactin, and cortisol) may be responsible for not only affective and mating tactic switches (Puts et al., 2005; Roney & Simmons, 2013), but also other negative and positive experiences, across the cycle.

An important factor to consider in evaluating the results of the present study relates to social scripts. Although there have been substantial changes over the years, research suggests that even in modern society, men and women may be affected by sex/gender roles (O'Sullivan & Vannier, 2013). Traditional sexual scripts suggest that men are seen as the initiator or pursuer (i.e., more proceptive) and women are seen as restrictors who are either receptive or not (rather than proceptive) (O'Sullivan & Byers, 1992). However, while men tend to initiate sexual activity more so than women, there may no longer be a sex difference in receptive behaviour (e.g., Vannier & O'Sullivan, 2011) or the preference for sexual versus romantic stimuli (Thompson & O'Sullivan, 2012). The extent to which a woman enacts a conservative social script may be a

psychosocial variable that affects reproductive experiences and mating pursuits (Ussher & Perz, 2013). For example, self-perceived masculine and non-masculine women have been found to pursue different mating strategies, unrestricted ("male-typical") and restricted ("female-typical"), respectively (Clark, 2004). That being said, they also appear to have low (more masculine) and high (more feminine) 2D:4Ds, a biological variable (Clark, 2004; Teatero, 2009). In the present study, the finding that receptivity, but not proceptivity, shifted across the cycle for all of the women may be related to cultural constraint of women's proceptive sexual behaviour (as also suggested by the means in Table 3.20).

Although some researchers have suggested that changes in symptoms across the cycle (namely PMS) or in mating tactics do not exist but rather, are myths or statistical artifacts in society (e.g., Romans et al., 2012; Wood et al., 2013), societal biases seem unlikely to fully account for the phase and phase x group effects reported here. If they exist, cyclic shifts in women's experiences are "non-intuitive and difficult to explain" without evolutionary theory (Gangestad et al., 2015) or biopsychosocial theories such as hormonal sensitivity. For instance, it is unclear why the periovulatory and premenstrual phases, the timing of which are arguably harder for women themselves to predict or observe than overt menstrual bleeding, have otherwise become associated with mild (normal) to severe psychological and physical changes by researchers, clinicians, and women alike. That being said, women's experiences of PMS (and potentially POS) are somewhat intersubjective (e.g., dependent on context and life experiences; Ussher, Perz, & May, 2013) and use of the terms "symptoms" and "syndrome" may pathologize women's normal cycle-related experiences. However, until new more appropriate wording is found and negotiated with women, "PMS pattern" and "POS pattern" seem to be useful terms for

describing collections or sets of women's experiences and are consistent with the extant literature.

Consistent with previous research, the data presented in Study 2 (as well as Study 1) indicate that many women experience at least some aversive experiences at reproductive events. Positive experiences were also found herein to differ between women of various hormonal and reproductive statuses as well as within women across the menstrual cycle. Given bias in the relevant health literature towards examining negative changes and the use of medical terminology (see Meaden et al., 2005; Chrisler & Caplan, 2002), alternative approaches to conceptualizing changes in women's experiences and functioning at reproductive events are clearly needed to avoid pathologization. First, a continuum perspective seems useful in this regard (e.g., from reproductive experiences that seem to be a part of life as a woman to hormonal sensitivity to pathology; Steiner et al., 2003). Attemps should be made to limit the use of clinical terms to samples that have met diagnostic criteria for a reproductive disorder (see O'Brien et al., 2011 for recommendations regarding the diagnosis of a premenstrual disorder). Second, examination of evolutionary accounts of health-related reproductive experiences may reveal adaptive or byproduct features of both normal and clinical psychological and physical changes or conditions across reproductive events. For example, in this study, the PSTS theory of evolved sexual behavior across the menstral cycle was extended to, and support was found for, the possibility that mood may modulate sexual proceptivity based on a woman's overall mating strategy.

It is also important to note that the menstrual cycle is dissimilar from other reproductive events in that it appears to be the only one that is cyclic with respect to phases over a woman's lifespan. While research has largely focused on the premenstrual phase (Romans et al., 2012), the

menstrual phase may involve relatively more common negative experiences, as suggested by Study 1, and the periovulatory phase appears to be equally important in assessing negative and positive changes across the cycle. That is, all of the phases of the menstrual cycle may be reproductive events in and of themselves. For instance, the present study is one of the first to show that not all women exhibit the classic PMS pattern of menstrual cycle experiences and some women even experience positive changes in the premenstrual phase combined with negative changes in the periovulatory phase. Positive changes across the cycle seem to include not only decreased negative experiences but also increased positive experiences and increased sexual proceptivity.

Previous studies that have compared two menstrual cycle phases have not mentioned regression to the mean as a possible explanation for findings related to different patterns of phasic changes in affect (e.g., Reiber, 2009) or moderators of ovulatory shifts in mating interests (e.g., Haselton & Gangestad, 2006). However, it is worth noting that regression to the mean is unlikely to account for or negate such results, including those presented here, for at least four reasons. First, the three dependent variables (change in NA, PA, proceptivity) were clustered simultaneously/together to reveal associations consistent with expectations despite the fact that the overall correlations in the full sample between mean NA, PA, and proceptivity, regardless of menstrual cycle phase, indicated different relationships. Second, the cluster analysis results were different than grouping women based on the median split of each dependent variable (given the unequal cluster group sizes). Third, cluster analysis is somewhat more sophisticated perhaps than imposing a moderating or grouping variable on the data or by simply grouping women by the direction of their menstrual cycle change scores.

Fourth, when asked qualitatively, women do report different effects of the premenstrual phase on their mood and sexuality (e.g., King & Ussher, 2013). Combined with finding of the present study that the PMS and POS groups differed on the previously administered B-REP – Premenstrual Phase Ratings, these data suggest that the two types of phasic change, regardless of direction/valence, are noticeable enough for some women to identify and thus, are in effect "real." Fifth, there are now at least four studies that directly implicate a woman's overall sociosexual mating strategy, based on a version of the SOI or 2D:4D (Wlodarski & Dunbar, 2015), to her pattern of menstrual cycle change (present study; Oinonen, Klemencic, et al., 2008; Phillips, 2015; Scarbourgh & Johnston, 2009). What have been referred to as alternative patterns have been found since the 1930s (see Teatero et al., 2014) yet findings seem to have been limited by difficulties in or barriers to statistically testing for individual variability (i.e., random effects) compared to average (i.e., fixed) effects in repeated measures data (Moskowitz & Hershberger, 2002). Paradoxical menstrual cycle patterns have also been found in at least one sample for which daily data was analyzed (Kiesner, 2011; Kiesner & Martin, 2013). Overall, when two target phases are compared, as is typically the case in menstrual cycle research, regression to the mean could account for finding paradoxical patterns in groups of women. While finding paradoxical patterns in groups of women may be a result of true hormonal, affective, sexual, or physical differences between the two phases, it of course remains a possibility that different menstrual cycle findings between and within studies could reflect an overall null or negative effect (i.e., type II errors).

Unfortunately, the validity of researcher assessments of conception probability, hormone level estimates, and menstrual cycle phase classifications is unclear and differences in methodology are vast (see Gildersleeve et al., 2014). A recent study, however, suggests that the

validity of forward count from LMP and backward count from estimated NMP is modest (.40 to .55; Gangestad et al., 2015). Backward count from NMP confirmed in follow-up has generally been recommended (Brown et al., 2011; Hampson & Young, 2008) with a validity estimate of .66 (Gangestad et al., 2015). Thus, a strength of the present study is that 92% of women provided their actual NMP at follow-up. Also, given differences within-women between the target phases in conception probability estimates, hormone estimates, and assays, one can be reasonably confident that the menstrual cycle phase classifications were valid, or at least optimal for research in the field.

Overall, the possibility of different patterns of psychosexual menstrual cycle change should not be ignored as they may better represent the lived experiences of women (Bancroft & Warner, 1988; King & Ussher, 2013). Analogies can also be drawn to other areas of health and well-being. As a clinical example, there is widespread acceptance that there are different mood episodes (which may be affected by the menstrual cycle in groups of women; Teatero et al., 2014) as well as types of depressive and bipolar disorders (APA, 2013). Another example is that overall and menstrual cycle-related negative and positive side effects of HCs vary among women (Kiesner, 2011; Graham & Bancroft 2013a; see Rapkin, 2003 and Halbreich et al., 2006 for reviews regarding, in part, the effects of HCs on PMS). For instance, HCs have been found to reduce testosterone levels in women. This hormonal change is associated with three different effects in subgroups of women: decreased, increased, and no difference in sexual desire (Burrows, Basha, & Goldstein, 2012; Graham et al., 2007; Graham & Bancroft, 2013b; Pastor, Holla, & Chmel, 2013). Similar to the conclusions of Graham and Bancroft (2013) regarding the effects of HCs on sexual desire, it seems likely that differences between women in their

experiences across the menstrual cycle in a given study contribute to differences in findings between studies.

However, given the widespread use of HCs and findings that users may be more sociosexually unrestricted than non-users (Bancroft et al., 1991; Oinonen, Jarva, & Mazmanian, 2008), it should be noted that the women most likely to experience the POS pattern of change may be those who opt to use HCs and are thus excluded from most menstrual cycle research. The finding that ineligible participants, consisting primarily of HC users, were indeed more sociosexually unrestricted than the final free-cycling subsample makes sense in this context. Interestingly, there is some evidence that the relationship between affective and sexual experiences are dissociated to some extent in HC users and that HCs may not only nullify menstrual cycle effects but also disrupt mating adaptations (Greco et al., 2007; Roberts et al., 2012). Future research should examine the interaction between HC use and menstrual cycle phase on affect and sexuality (e.g., see Greco et al., 2007 for opposing patterns of NA and PA across the cycle between monophasic and triphasic HC users) as well as the possibility of paradoxical patterns of negative and positive affective, sexual, and physical experiences at other reproductive events.

Conclusions

Part 1 of this study ($N = 327$) provided some evidence of the internal consistency, test-retest reliability, and construct validity of the Women's REP (developed in Study 1) and the PARMSS (Phillips, 2015), two measures that were recently developed to address methodological issues in the women's health and evolutionary psychology literature, respectively. In addition, findings pertaining to reproductive/hormonal status differences on Women's REP scores were at least partially replicated for five reproductive experience groups (presence/absence): women's

reports of hormonal disorder, HC use, HC side effects, cycle regularity, and PMS. Thus, there is considerable support for the concurrent validity of this measure.

Thus, scales from the Women's REP and the PARMSS were used in Part 2 to examine patterns of NA, PA, and proceptivity across the menstrual cycle in free-cycling women (n = 41). Overall, two conclusions can be drawn from this part of the study. First, support was found for the existence of two groups of women who have paradoxical patterns of change: a PMS pattern in 61% of women (higher NA, lower PA, and lower proceptivity in the premenstrual versus periovulatory phase) and a POS pattern in 39% of women (higher NA, lower PA, and lower proceptivity in the *periovulatory* relative to premenstrual phase) (see also Kiesner, 2011 and Oinonen, Klemencic, et al., 2008). Second, in line with the PSTS theory, the POS group was more sociosexually unrestricted overall, while the PMS group was more restricted. These results are also consistent with evolutionary research suggesting that there are two phenotypes of sociosexuality within each sex. That is, the menstrual cycle shifts in the PMS and POS groups suggest that these two groups of women may experience hormone-calibrated changes that are part of the enactment of two different evolved mating strategies.

While it seems plausible that being in a good mood (e.g., low NA or high PA) facilitates sexual behaviour, it is also possible that engaging in certain types of mating strategies, or simply even having sex, leads to greater happiness and well-being (e.g., Muise, Schimmack, & Impett, 2015). However, in the present study (Part 2), change in PA across the menstrual cycle were relatively strong (compared to NA and proceptivity), negatively related to change in NA and positively related to change in proceptivity. Also, the PMS and POS groups showed opposing patterns of change in PA between the periovulatory and premenstrual phases. These two groups, while they differed in overall sociosexual orientation (e.g., short-term mating orientation), did

not differ in mean levels of affective experiences. These findings seem to provide some evidence that being "in the mood" for sexual proceptivity involves being in a relatively good mood, at least across the menstrual cycle, given that in the absence of opportunity for behaviour, proceptivity is attitudinal. It is arguably non-intuitive that *change* in proceptivity would predict change in mood. The opposite direction, shifts in mood preceding shifts proceptivity across the cycle, seems to make sense for understanding how the associations might be adaptive. However, further research in this area is needed.

The present study had some limitations and strengths that should be considered when evaluating its results. A strength of the study was that the two main measures used in Part 2, the Women's REP and the PARMSS, were first assessed in Study 1 and Part 1 for evidence of reliability in terms of internal consistency as well as temporal stability and valid using both a concurrent and multi-trait method. Also, women were recruited from both the Internet community and a local community, a strategy that resulted in a large and diverse sample in Study 1. However, participants in the present study tended to be of young reproductive age in their early 20s and thus, the results are likely generalizable to that population but may not be generalizable to women in their 30s and early 40s. While many non-clinical studies in the areas of women's health and evolutionary psychology tend to involve university samples, young women may have limited reproductive and mating/relationship experiences. Also, the magnitude of hormonal shifts across the menstrual cycle peaks in the late 20s to early 30s (see Hampson & Young, 2008) and thus, the reproductive/hormonal status group findings in Part 1 and identified PMS and POS patterns of phase shifts in Part 2 may be more pronounced in an older sample of women.

Another limitation was the modest size of the menstrual cycle-related subsample size (due to attrition, inclusion criteria, and difficulty accurately predicting women's menstrual cycle phases based on initial self-report information), potentially affecting power to detect overall phase effects and cluster analysis pattern groups. Nonetheless, at least partial support was found for each of the predictions of both Parts 1 and 2 and guidelines form Gangestad et al. (2014) indicate that a sample size of 48 would be needed for 80% power to detect a cyclic shift using design of the present study. Also, the study included not only a longitudinal design but also a menstrual cycle design that involved careful ongoing follow-up with all participants as well as "wet" hormonal measures (i.e., LH testing and saliva collection among a subset of women). In menstrual cycle research, these methods are ideal (Brown et al., 2011; Hampson & Young, 2008; Gangestad et al., 2015) and are a strength of this study. Thus, the resulting data provided confidence that the free-cycling women in the present study were tested in both of the target phases. Given that women act as their own controls, repeated measures and within-women analyses are more sensitive to menstrual cycle phase shifts than between-women analyses and allow for the examination of subgroups of women who may or may not exhibit different trajectories of change. Finally, in using cluster analysis, the PMS and POS patterns groups were identified in a somewhat more natural way than by imposing a grouping/moderating variable on the data; in a more sophisticated manner than by creating groups based on the median split of scores; and in a more easily accessed or simple way than HLM. That being said, it is clear that further research on patterns of, and relationships between, affect and sexuality across the cycle is needed.

Through further research on the possibility of different patterns of menstrual cycle changes in affect and sexuality, society may benefit from the discovery of differences as well as

related descriptions and terms that are best representative, respectful, and potentially validating and empowering for individual women (Ussher et al., 2014).

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Chapter 4:

General Discussion

General Discussion

The primary aim of this two-study dissertation was to contribute to the extant literature on women's affective, sexual, and physical experiences associated with reproductive and hormonal events, particularly the menstrual/ovulatory cycle. The overarching theme of this dissertation, that seems to also be emerging in women's health research, was that there are differences between women not only in magnitude (e.g., hormonal sensitivity) and valance (i.e., direction: negative or positive) but also patterns of responses to the same reproductive events due to biological, psychological, and social factors (e.g., Kiesner & Poulin, 2012; King & Ussher, 2012). For example, there is some evidence of different menstrual cycle patterns in women's well-being between and within studies (e.g., premenstrual syndrome [PMS] and negative experiences in the periovulatory phase; Kiesner, 2011), which in part has lead some researchers to question the validity of PMS (see Romans, Clarkson, Einstein, Petrovic, & Stewart, 2012).

This dissertation was also an attempt to integrate research and theories in the areas of women's health and evolutionary psychology. While health research has tended to focus on non-clinical negative changes and the perimenstrual phase, evolutionary research has tended to examine changes in mating tactics and the periovulatory phase. In the latter area, evidence of two opposing patterns in women's sexual behaviour has been reported (e.g., the periovulatory sociosexual tactic shift [PSTS]; Oinonen, Klemencic, & Mazmanian, 2008; Phillips, 2015). Despite evolutionary models of PMS (e.g., Reiber, 2009) and health research indicative of a link between mood and sexual behaviour (see Warner & Bancroft, 1988 for an early study), a surprising lack of research has been conducted on changes in negative or positive well-being as related to changes in types of sexuality and mating tactics across the cycle. Thus, this dissertation seems to have addressed gaps in the existing research by examining: (a) both negative and

positive reproductive experiences using a health measure; (b) sexuality using a mating strategies measure of both proceptivity and receptivity; and (c) different patterns of affective experiences and sexual proceptivity across the menstrual cycle between women.

Overall, this dissertation consisted of three main parts: a comprehensive general literature review (Chapter 1) and two original studies (Chapters 2 and 3). Thus far, the literature review has resulted in a manuscript on positive affect across the menstrual cycle (Teatero, Oinonen, Mazmanian, & Streutker, 2015) and was the impetus for the publication of a systematic review of the research on the effects of the menstrual cycle on bipolar disorder (Teatero, Mazmanian, & Sharma, 2014). When designing Study 2, issues in the measurement of women's reproductive- and hormone-related health experiences led to the development of the Women's Reproductive Experiences (REP) Questionnaire in Study 1. As a result, each study has two parts. Study 1 presented on the initial psychometric properties of this new comprehensive measure that is unique in its assessment of both negative and positive experiences associated with reproductive events across the lifespan in three domains: affective, sexual, and physical. The initial psychometric properties examined were its factor structure and internal consistency (Part 1) as well as concurrent validity (i.e., differences in scores between women of various reproductive and hormonal statuses; Parts 1 and 2). In Part 1 of Study 2, an attempt was made to replicate some of the analyses of Study 1; test-retest reliability as well as convergent and divergent validity for the Women's REP and another newer measure, the Proceptive and Receptive Mating Strategies Scale (PARMSS), was assessed; and relationships between these two measures were examined (Part 1). Scales of the Women's REP and PARMSS were then used to examine three hypothesizes regarding patterns of change in affect and proceptivity between the periovulatory and premenstrual phases (Part 2).

Summary of Results

In Part 1 of Study 1 (overall *N* = 1934), factor analysis of the 134 items of the Women's REP resulted in seven main scales: Negative Affective Experiences, Negative Physical Experiences, Sexual Problems – General, Sexual Problems – Relationship, Positive Affective and Physical Experiences, Body Image Quality, and Sleep Quality. Fourteen subscales and 13 supplementary subscales were also identified (as seen in Figure 2.1 [p. 146] and Table 3.1 [p. 237]). As demonstrated by comparing Tables 2.2 and 2.3 (pp. 127 and 134), the scales corresponded well to the rationally derived content domain scales that were formed in the development of the measure. Also, across Studies 1 and 2, the scales and subscales demonstrated good internal consistency with an average Cronbach's alpha for the main scales of .89.

Concurrent validity of the measure was assessed by examining scale and subscale scores as a function of current: hormonal problems; hormonal contraceptive (HC) side effects; and PMS (all yes/no; Part 1) as well as reproductive status (i.e., free-cycling, intrauterine device [IUD] users, oral contraceptive [OC] users, other HC users, pregnant women, postpartum women, and menopausal women); menstrual cycle regularity (amenorrhea, irregularly cycling, and regularly cycling among free cycling women); and menstrual cycle phase (free-cycling women in the menstrual, periovulatory, versus premenstrual phase) (Part 2). Correlations between Women's REP scores and conception probability/hormone estimates were also examined. Similar analyses were also conducted in Part 1 of Study 2 (*N* = 327) in an attempt to help determine the replicability of the findings in Study 1. A detailed summary of the main findings for similar analyses between Study 1 and Study 2 can be found in Table 4.1. Overall, women who differed in the various hormone- and reproductive-related statuses also tended to differ in expected ways on relevant scales. For example, women who reported a current hormonal problem had

Table 4.1

Summary of Main Findings of Similar Analyses between Study 1 and Study 2 by Area of Analysis

Area	Study 1 (overall $N = 1934$)	Study 2[b] (overall $N = 327$)	Replication of Findings
	Reliability of the Women's REP		
Internal consistency	Scales: .84 to .95 ($M = .89$) Subscales: .67 to .95 ($M = .88$) Supplementary subscales: .62 to .94 ($M = .70$)	Scales: .85 to .95 ($M = .89$) Subscales: .69 to .94 ($M = .88$) Supplementary subscales: .61 to .94 ($M = .70$)	Yes
	Concurrent validity of the Women's REP		
Hormonal problems	All negative scales and subscale scores > among women who reported thinking that they had current hormonal problems [.003 to .05]	**Negative Sexual Experiences – Relationship** scores > among women who reported being diagnosed with current hormonal problems [.06]	Partial
	Most positive scales and subscales < among women with a current hormonal problems [.004 to .02], except Positive Sexual Experiences – Others and Positive Sexual Experiences – Self	**Positive Affective Experiences**, **Positive Physical Experiences – General**, and **Positive Sexual Experiences – Relationship** scores < among women with a current hormonal problem [.01 to .02]	
HC status	Negative Affective Experiences, Negative Body Image Experiences, and Negative Sleep Experiences scores tended to be in the order of other HC users > free-cycling women > OC users [all .01]	No significant differences in negative scales and subscales between free-cycling women, OC users, and HC users but means were in directions consistent with Study 1 [.01 to .03]; trend for Negative Sexual Experiences - Relationships [.03]	Partial
	Positive Sexual Experiences – Relationship, Positive Affective Experiences and Elation, and Positive Sleep Experiences scores tended to be highest among OC users compared to free-cycling women and other HC users [.01 to .03]	**Elation** scores > in OC users than non-users [.02]; means tended to be in directions consistent with Study 1 [.01 to .02]	

Area	Study 1 (overall $N = 1934$)	Study 2[b] (overall $N = 327$)	Replication of Findings
	Concurrent validity of the Women's REP		
HC side effects	Most negative scale and subscale scores > among women who reported thinking that they had current HC side effects [.01 to .03], except Sexual Problems – General and related subscales as well as Decreased Appetite and General Aches and Pains	**Negative Affective Experiences** scores positively related to ratings of the negative effects of current HCs on sexual functioning and physical health [.18 and .21]; **Negative Physical Experiences** scores positively related to ratings of the negative effects of current HCS on emotional health and physical health [both .19];	Partial
	Many positive scale and subscale scores < among women who reported current HC side effects [.01 to .03], except Sleep Quality, Positive Sexual Experiences – Relationship, and Positive Physical Experiences	**Body Image Quality** scores negatively related to ratings of the negative effects of current HCs on physical health [-.30]	
Cycle regularity[c]	Most negative scale and subscale scores tended to in the order of women with amenorrhea > irregularly cycling women > regularly cycling women [.01 to .05], except Negative Sexual Experiences – Self and Negative Sexual Experiences - Relationship	**Negative Affective Experiences** and **Negative Sleep Experiences scores** as well as **Sexual Problems – General** and related subscale scores > among irregularly cycling women than regularly cycling women [.04 to .10]; trends for **Negative Physical Experiences** scale and subscale scores [all. 03] and means for **Sexual Problems – Relationship** scores [.04] consistent with Study 1	Partial
	Most positive scale and subscales scores tended to be in order of regularly cycling women > irregularly cycling women > women with amenorrhea [.01 to .04], except Positive Sexual Experiences (others and self)	No significant differences between irregularly and regularly cycling women on positive scale and subscale scores but most means were in directions consistent with Study 1 [.004 to .01]	
PMS	Many negative scale and subscale scores > among free-cycling women in the premenstrual phase who reported thinking that they have PMS [.01 to .08], except Sexual Problems (both others and relationship),	**Most negative scale scores** were positively related to ratings of negative effects of the premenstrual phase on emotional, sexual, and physical health or functioning [.37 to 74][d]	Partial

Area	Study 1 (overall $N = 1934$)	Study 2[b] (overall $N = 327$)	Replication of Findings
	Concurrent validity of the Women's REP		
PMS	Positive Affective Experiences and related subscale scores < among free-cycling women with PMS [.01 to .04]	Sleep Quality scores were positively related to ratings of positive effects on the premenstrual phase on emotional, sexual, and physical health or functioning [.42 to .44]	
Menstrual cycle phase[e]	Negative Affective Experiences, Negative Physical Experiences and some related subscales as well as Negative Body Image Experiences and Negative Sleep Experiences scale and subscale scores > women in the menstrual compared to periovulatory phase [.01 to .09]; Latter two scores also > premenstrual than periovulatory women [.01 to .03] Positive scale and subscale scores did not differ between phase groups, with the exception of a trend for Positive Affective Experiences (periovulatory > menstrual) [.01]; No significant differences between periovulatory and premenstrual phase groups	Decreased Appetite scores > in the periovulatory compared to premenstrual phase across women's cycles [.21]; Study 1 also found few differences between these two phases	Partial

Note. Women's REP = Women's Reproductive Experiences Questionnaire. HC = hormonal contraceptive. OC = oral contraceptive. PMS = premenstrual syndrome. Values in square brackets represent partial η^2 effect sizes for significant group differences or correlation coefficients. Within, rows, bolded items represent scale or subscale scores that were significant across both studies.

[a] Part 1 of study: internal consistency, hormonal problems, HC side effects, and PMS. Part 2: HC status, cycle regularity, and menstrual cycle phase. [b]Part 1 of study: all areas except menstrual cycle phase. [c]Women with amenorrhea were not included in these analyses in Study 2 due to low subsample size. [d]However, Negative Affective Experiences scores were also positively related to positive effects on sexual functioning and physical health [.40 and .38]. [e]The menstrual phase was not included in Study 2.

significantly higher negative experiences scales (e.g., Negative Sexual Experiences – Relationship) and lower positive experiences scores (e.g., Positive Affective Experiences) than those who did not.

The findings in each of the five areas of concurrent validity analyses were at least partially replicated. In some cases, methodological differences between Study 1 and Study 2 may have contributed to partial replication in findings (i.e., analyses that were only partially replicated). For instance, women were asked whether they currently *thought* that they had hormonal problems, HC side effects, and PMS, whereas women in Study 2 were asked whether they were currently *diagnosed or being treated* for such experiences. Only women of reproductive age who were not pregnant, postpartum, or menopausal were included in Study 2 (and thus, findings from Study 1 comparing these specific group could not be replicated). Study 2 involved a within-subjects menstrual cycle design and included only two instead of three menstrual cycle phases. Also, while there were not as many significant findings in the second study, the total sample size in Study 1 was 83% larger than that of Study 2. Thus, Study 1 had more power to detect any effects.

Unique to Part 1 of Study 2, the test-retest reliability and construct validity of the Women's REP and the PARMSS were examined. Both measures demonstrated adequate to good test-retest reliability as well as evidence of convergent and divergent validity based on patterns of relationships with 30 other health and mating strategy variables. As predicted, the scales of the two measures tended to be (a) most strongly related to variables measuring similar constructs (in terms of area [e.g., health, sexuality, or relationship] and valance [e.g., negative or positive]) and (b) weakly or unrelated to dissimilar variables. For instance, negative experiences scores of the Women's REP were positively related to other negatively valenced health- and relationship-

relevant variables (e.g., neuroticism, hormonal sensitivity, negative affect, and relationship jealousy) and negatively related to positively valenced affective, sexual, and physical well-being variables as well as sexual satisfaction and relationship quality. Positive experiences scores tended to show the opposite relationships. A detailed summary of the main findings specific to Study 2 can be found in Table 4.2.

Relationships between the Women's REP and PARMSS were also investigated in Part 1 of Study 2. Contrary to expectations, small positive correlations between proceptivity in the context of an imagined short-term relationship (i.e., the Proceptivity – Short-Term [ST] scale) and Negative Affective Experiences (NA), Negative Physical Experiences, and Sexual Problems – Relationship scores were found. In contrast, the main positive experiences scales were not significantly related to receptivity or proceptivity. Some exploratory analyses, however, indicated that receptivity and proceptivity was lower in women with a hormonal problem compared to other women; higher in women who reported more positive emotional and physical health effects associated with their current HCs; and lower in women who reported more negative effects of the premenstrual phase on their emotional health. Thus, there was some mixed evidence for the hypothesis that being in a good mood is related to being "in the mood" for sex in general.

Patterns of co-variation in NA, Positive Affective Experiences (PA), and proceptivity scores based on ratings of photographs of men (Proceptivity – Picture Ratings [PR]) across the periovulatory and premenstrual phases of free-cycling women (n = 41) were examined. Three hypotheses were made and at least partially supported. Using cluster analyses, support was found for the existence of two within-women menstrual cycle patterns differentiated by the phase in which NA was higher, PA was lower, and proceptivity was lower: (1) the premenstrual phase

Table 4.2

Summary of Main Findings Specific to Study 2 by Area of Analysis

Area	Reliability of the Women's REP[a]
Test-rest reliability	Scales: .59 to .71 (*M* = .66) Subscales: .45 to .77 (*M* = .60) Supplementary subscales: .45 to .74 (*M* = .61)
	Construct validity of the Women's REP[a]
Convergent	Negative scales and subscales positively related to other negatively valenced health- and relationship-relevant variables (e.g., neuroticism, hormonal sensitivity, and negative affect, and relationship jealousy) [.14 to .75]; also, negatively related to positively valenced emotional, sexual, and physical health ratings as well as sexual satisfaction, and relationship quality [-.17 to -.66] Positive scales and subscales positively related to other positively valenced health- and relationship-related measures (e.g., positive affect, sexual satisfaction, and relationship quality) [.15 to .75]; also negatively related to negatively valenced health-relevant variables and relationship jealousy [-.15 to -.46]
Divergent	Correlations between affective and sexual scale and subscale scores more strongly correlated with other affective and sexual variables, respectively (e.g., Sexual Problems more strongly correlated with sexual health variables [-.32 to -.54] than other scales and ratings); however, Negative Physical Experiences scores not strongly correlated with physical health ratings (perhaps suggesting the scale measures reproductive symptoms and not general health) Fewer correlations than the PARMSS with mating strategies variables (e.g., long- and short-term mating orientation)
	Reliability of the PARMSS[a]
Internal consistency	Scales: .92 to .95 (*M* = .93)
Test-retest reliability	Scales: .76 to .83 (*M* = .79)
	Construct validity of the PARMSS[a]
Convergent	Scales positively related to attraction to men in photographs, unrestrictiveness, short-term mating orientation, relationship jealousy, receptive sexual behaviour (with primary partner), and proceptive sexual behaviour (excluding primary partner; i.e., initiation) [.11 to .69]

	Construct validity of the PARMSS[a]
Convergent	Scales negatively related to sexual satisfaction, long-term mating orientation, and relationship quality [-.11 to -.29];
Divergent	Scales not significantly related to most health-relevant variables as well as masturbation frequency
	Reproductive and hormonal event related findings of the PARMSS
Reproductive status[a]	Proceptivity – Long Term scores > free-cycling women compared to OC users but not other HC others [.02]; Trend for Receptivity – Long-Term scores as well [.02]
Hormonal problems[a]	No significant differences between with and without current hormonal problems; Trends for Receptivity – Long Term and Proceptivity – Short Term scores > among women without a hormonal problem [both .01]
HC side effects[a]	Scales related to ratings of the positive effects of current HCs on emotional and physical health [.16 to .25] but not sexual health
Cycle regularity[a]	No significant differences between irregularly and regularly cycling women
PMS[a]	Proceptivity- Short Term and Proceptivity – Picture Ratings scores negatively related to ratings of negative effects of the premenstrual phase on emotional health [-.42 and-.43] and trends for physical health [-.35 and -33]
Menstrual cycle phase[b]	Receptivity – Short-Term and Receptivity – Long-Term scores > in the periovulatory compared to premenstrual phase across women's cycles [.10 and .07]
	Relationships between the Women's REP and the PARMSS
General/overall[a]	Negative Affective Experiences scores positively related to Receptivity – Short Term [.13]; Testosterone-Related Experiences and Decreased Appetite, scores positively related to various receptivity and proceptivity scale scores [.12 to .15]; Negative Sexual Experiences – Others scores negatively related to various receptivity and proceptivity scale scores [-.11 to -.19] Most positive Women's REP scale scores not significantly related to the PARMSS scales; Positive Sexual Experiences – Others positively related to all PARMSS scales [.25 to .38], while Positive Sexual Experiences – Relationship scores negatively related to receptivity scale scores [-.18 to -.19]

	Relationships between the Women's REP and the PARMSS
Across menstrual cycle phase[b]	Premenstrual minus periovulatory change scores negatively correlated between Negative Affective Experiences and Positive Affective Experience [-.57] and positively correlated between Positive Affective Experiences and Proceptivity – Picture Ratings [.39] Two opposing menstrual cycle pattern groups found that were differentiated by the phase in which they had higher Negative Affective Experiences scores as well as lower Positive Affective Experiences and Proceptivity – Picture Ratings scores: (1) the premenstrual phase (i.e., a PMS pattern; 61%) and (2) the periovulatory phase (i.e., a periovulatory syndrome [POS]; 39%)
	PMS and POS[b]
Group differences	Ratings of positive effects of the premenstrual phase on both sexual functioning and physical health > for POS than PMS group [Cohen's d = 0.65 to 1.15] (evidence of validity of the groups) POS group more sociosexually unrestricted (e.g., higher short-term mating orientation scores) overall than PMS group [Cohen's d = 0.68 to 0.91] Groups not significantly different on demographic, relationship, self-perception, alcohol use, personality/impression management (e.g., neuroticism), and body measurement variables
Correlations	Higher Negative Affective Experiences scores in the premenstrual versus periovulatory phase positively related to relative partner attractiveness [.50] Higher Positive Affective Experiences scores in the premenstrual versus periovulatory phase positively related to sociosexual unrestrictiveness (e.g., short-term mating orientation) [.24 to .40] and middle-phalangeal hair count (high androgen activity) [.48 to .51] Higher Proceptivity – Picture Ratings scores in the premenstrual versus periovulatory phase positively related to 2D:4D (low prenatal androgen exposure) [.41 to .54]

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scale. HC = hormonal contraceptive. PMS = premenstrual syndrome. Values in squared brackets represent partial η^2 effect sizes for significant group differences or correlation coefficients, unless otherwise stated.
[a]Part 1 of study. [b]Part 2 of study.

(a PMS pattern in 61% of women) and (2) the periovulatory phase (what is proposed to be periovulatory syndrome [POS] pattern in 31% of women). Supporting the validity of these two groups, women in the PMS group reported less positive effects of the premenstrual phase on their physical health and sexual functioning than did the POS group – on ratings completed at the screening phase of the study before the two prospective cycle-related testing sessions. They also displayed opposite patterns of positive physical experiences scores on the Women's REP and other PARMSS scores. In line with the PSTS, support was also found for the hypothesis that women who show the POS pattern have a more unrestricted overall mating strategy (e.g., short-term mating orientation) than those who demonstrate the PMS.

Limitations and Strengths

Specific limitations and strengths of the two individual studies can be found in their respective Conclusions sections on pages 198 and 358. However, several general limitations and strengths of Studies 1 and 2 warrant mention. The overall sample and subscales sizes across the two studies ranged from large, nearly 2,000 women in Study 1, to modest (e.g., $n = 41$ in Study 2 Part 2). Based on guidelines from Gangestad et al. (2015), however, both studies had 80% power to detect medium-sized menstrual cycle phase effects. Some analyses such as those involving pregnant and postpartum women (*n*s = 24 and 25) and those involving the PMS and POS groups (*n*s = 35 and 16) may have been underpowered. Another limitation may be the reliance on self-report data. However, use of self-report is appropriate in examining women's experiences (from their perspective), the raw data was thoroughly examined by the author for response sets, and there was no indication of significant negative or positive response styles, including on the impression management scales of the Personality Assessment Inventory (PAI; Morey, 2007). Given the number of analyses across the two studies, some positive findings may be a result of

Type I error, yet the results did not substantially change in either study when Bonferroni correction was applied to dependent sets of analyses and most positive findings were as predicted. That being said, a strength is that both cross-sectional and prospective methods were used. Lastly, as demonstrated in Table 4.1, an important strength of this dissertation was that some similar or replicated analyses were conducted across Parts 1 and 2 of the first study and Part 1 of the second study, which suggests reasonable confidence and robustness in the findings pertaining to reliability and concurrent validity of the Women's REP. Other findings, such as those pertaining to the PMS and POS groups were unique and preliminary, and warrant further study.

Practical Implications

The Women's REP seems to be the only measure of both negative and positive experiences that can be used at any reproductive event or time point across the lifespan. Thus, this newly developed measure could potentially be used to assess women's reproductive experiences in three domains (affective, sexual, and physical) across seven distinct areas (i.e., scales) using a common metric for any event or time point. A strength of the Women's REP is that it allows for the measurement of general areas but also specificity in experiences based on its 13 subscale areas and 14 supplementary subscale areas. It is difficult to compare experiences between women of different reproductive/hormonal statuses and across prospective events based on separate event-specific measures because they consistent of various sets of experiences evaluated using different scales. While some have circumvented this issue by using general health measures, these measures were not designed for assessment specific to reproductive events and thus, may fail to assess key reproductive or hormonal experiences, and should not be used diagnostically. Also, the assessment of positive experiences is consistent with a strength-

based perspective. It is clear that the presence of negative experiences cannot be assumed to be synonymous with the absence of positive experiences.

The Women's REP could be used clinically as a screening measure to obtain a snapshot of a woman's functioning at any given time given that it takes about 20 minutes to complete and individual (sub)scales could be used on their own. It appears to be a non-event and non-disorder specific measure of hormonal sensitivity. With further research, it may also prove to have utility as a diagnostic tool in combination with specific measures. It could be used at individual events to assess severity of symptoms (e.g., increased or decreased affective and sexual well-being with HC use) and across them over time to assess what has referred to as hormonal sensitivity syndrome (HSS; Pope, Oinonen, Mazmanian, & Stone, 2015) or even the effects of treatment (pre- and post). That is, the Women's REP may help to clarify to what extent a woman is experiencing symptoms, and which symptoms, at an individual reproductive event but also patterns in her experiences across time. While some degree of at least physical experiences appear common at certain points in a woman's life (i.e., seem to come with being a woman), this measure involves a comprehensive collection of experiences known to be associated with at least one reproductive event, including those that are mood- and sex-related.

Another potential implication of the Women's REP and the present dissertation is increasing evidence that all women do not experience a common PMS pattern of mood, sex, and physical well-being. In fact, some women seem to show the opposite POS pattern. It remains to be well researched whether the POS pattern at its extreme may be a clinical condition, similar to premenstrual dysphoric disorder. If so, this would have implications for assessment, diagnosis, and treatment. For instance, clinical PMS and POS patterns might have different etiologies and differential responses to treatment, such as medications. Women showing these two different

menstrual cycle patterns may also have differing experiences at other reproductive events and respond differently to possible treatments during those events. This same issue may also apply to various patterns at other reproductive events (e.g., women who experience postpartum depression versus elation).

Conclusions

Conclusions can be drawn from this dissertation in several areas. First, a contribution to the existing literature may prove to be the development of the Women's REP. Studies 1 and 2 are the first to use a comprehensive measure of not only negative but also positive affective, sexual, and physical experiences associated with all of the major female reproductive events across the adult lifespan. The Women's REP, which is one of the only non-disorder and non-event measures of its kind, appears applicable for use with women of all ages. The scales of this measure demonstrate evidence of good psychometric properties. These properties include a multidimensional scale structure, internal consistency, test-retest reliability, concurrent validity, convergent validity, and divergent validity. It is expected that the Women's REP will have utility in research as well as clinical practice related to women's reproductive health (e.g., HSS; Pope et al., 2015). That is, results reported across the two studies herein are important in that they provide evidence of the usefulness of such a comprehensive measure as well as of the scales that may represent women's reproductively related or hormonally mediated experiences across the adult lifespan. Further study and refinement of the measure is warranted (e.g., confirmatory factor analysis).

Second, Study 2 is one of two studies that have used the newly developed PARMSS (Phillips, 2015), distinct in its measurement of both proceptive and receptive mating strategies using a common metric. The PARMSS demonstrates good internal consistency, high test-retest

reliability, and evidence of construct validity. These psychometric properties of the items of the PARMSS appear to be consistent across use with various imaginary vignettes and picture rating tasks. These results are similar to those of Phillips (2015). Further study and refinement of this measure is also warranted.

Third, there was mixed evidence for the hypothesis that being in a good mood is related to being in the mood for sex. It seems plausible that negative well-being may be related to increased sexuality among some women *in general* (e.g., Lykins, Janssen, & Graham, 2006), whereas increases (i.e., *changes)* in negative and positive reproductive experiences, such as across the menstrual cycle, are related to decreased and increased mating behaviour, respectively. This possibility should be investigated in the future.

Fourth, in addition to a PMS pattern in the majority of women, there is evidence for the existence of a menstrual cycle pattern in a group of women that involves increased negative experiences, such as NA, as well as lower PA and lower proceptivity around ovulation. For consistency with past research, this pattern is consistent with a new term: periovulatory syndrome (POS). These findings suggest that across the menstrual cycle, being in a good mood may facilitate proceptivity or vice versa (i.e., PA and proceptivity seem to be positively related). In line with the PSTS theory, women who show a POS pattern may be enacting tactics across the cycle of an overall unrestricted mating strategy, while the PMS pattern seems to be consistent with a restricted phenotype (Wlodarski & Dunbar, 2015). There are now at least four studies that have found a woman's pattern of menstrual cycle change in mating tactics to be associated with her overall sociosexuality (present dissertation; Oinonen, Klemencic, et al., 2008; Phillips, 2015; Scarbourgh & Johnston, 2009). This dissertation appears to be the first to extend this finding to changes in NA and PA. These results suggest that the possibility of paradoxical or various

patterns in women's experiences across the menstrual cycle should be considered in future research.

Lastly, cluster analysis may have utility in preliminary testing for patterns of women's experiences over time, such as across the menstrual cycle (Study 2, Part 2) and HSS (Pope et al., 2015). However, the logical next step in this area of research would be to examine the temporal order of peaks or troughs in affect and proceptivity across the menstrual cycle, such as by examining the effects of previous day affect on current day proceptivity. Mood induction procedures might also prove useful in this regard. Future research should also, at least, consider the possibility of at least two phenotypes of psychosexual changes across the menstrual cycle, which could have implications for validating women's lived experiences.

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Appendix A

Forms and Questionnaires for Study 1

Information and Consent Form

Dear Potential Participant,

Thank you for your interest in the Women's Health Experiences Study conducted by Ms. Missy Teatero and Dr. Kirsten Oinonen with the Health Hormones & Behaviour Laboratory (HHAB Lab) in the Department of Psychology at Lakehead University (LU). The main purpose of this research is to help develop a questionnaire to assess the physical, emotional, and sexual health experiences of women. The data will be used in Ms. Teatero's doctoral dissertation but other related research questions in the HHAB Lab will be examined as well. **Lakehead University students and members of the general public (16 years or older) are eligible to participate.**

The study will take about 30 minutes to complete and involves answering questions of a personal nature regarding your thoughts, feelings, behaviours, and physical symptoms over the past 48 hours. Your participation is voluntary and you may withdraw from, or refuse to participate in, any part of the study at any time without explanation or penalty. You may decline to answer any question. The information obtained for the study will be securely stored by Dr. Oinonen for at least five years after the study is completed. All records of your participation will be kept in strict confidence, and there will be absolutely no way to identify you as a participant in any subsequent reports. All participants will have the opportunity to enter their name into a draw for one of four $50 VISA gift cards. Psychology students at LU may receive 0.5 of a bonus point for participation in the study. If you wish to be entered into the draws or to receive 0.5 bonus points, you will be asked for your name and email address but this information will be stored in a separate file from your questionnaire responses and will not be connected to them. Thus, all information collected in this questionnaire will remain both anonymous and confidential.

There are no known physical or psychological risks associated with participation in this study. Some people may experience discomfort when answering personal questions and thus, a list of mental health resources is provided at the end of both this letter and the study. The possible benefits of participation include: a better understanding of oneself, learning about the research process, and contribution to research that will provide a better understanding of women's experiences.

If you would like a summary of the study results, please send a request to Ms. Teatero. If you have any questions or concerns regarding this study, please do not hesitate to contact Ms. Teatero or Dr. Oinonen. This study has been approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca. Please keep this Cover Letter for your records.

Thank you for your time. We very much appreciate your contribution to our research.

Sincerely,

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Mental Health Resources

Your physician, a counselor, a walk-in clinic, or a sexual health clinic

International: http://www.mymentalhealth.ca/ http://www.iasp.info/resources/Crisis_Centres/

Canada: www.crisisline.ca/links.htm

The 24-hour Thunder Bay Crisis Response Service at 807-346-8282
The Thunder Bay Regional Health Sciences Centre Walk-in Clinic at 807-768-1333
The Thunder Bay Counseling Centre at 807-684-1880
The Thunder Bay District Health Unit (sexual health clinic) at 807-625-5900
The Student Health and Counseling Centre, Lakehead University at 807-343-8361

***I have read and understood the above information and I agree to participate in this study under these conditions. I also understand that I am not obliged to answer questions which I am uncomfortable with and that I am free to withdraw from the study at any time without penalty or other consequence.**

[ ] I understand that my consent to the above is implied if I check this box and choose to continue with this study.

Women's Health Experiences Questionnaire

Note that this questionnaire was administered electronically through a secure Internet database. Therefore, the numbering of the items here merely indicates situations in which some items were not applicable to certain participants and were automatically not displayed for those individuals. This means that some participants were not given all of the items (i.e., different items were applicable to different women).

Demographics

1. Your biological sex: [ ] Male [ ] Female [ ] Other (please specify): _____

2. Your age: _____ years and _____ months

3. What is your ethnic background? (Chose the option that *best* describes your ethnicity)
[ ] Caucasian/White
[ ] African?Black
[ ] Native/Aboriginal
[ ] Hispanic/Latino
[ ] Other (please specify): _____
[ ] Middle Eastern
[ ] East Indian
[ ] European
[ ] Asian

4. Where do you currently live? Province/State: _____ Country: _____

5. What is your sexual orientation? (Chose the one that *best* describes you)
[ ] 0 – Exclusively heterosexual
[ ] 1 – Predominantly heterosexual, only incidentally homosexual
[ ] 2 – Predominantly heterosexual, but more than incidentally homosexual
[ ] 3 – Equally heterosexual and homosexual
[ ] 4 – Predominantly homosexual, but more than incidentally heterosexual
[ ] 5 – Predominantly homosexual, only incidentally heterosexual
[ ] 6 – Exclusively homosexual
[ ] X Asexual (i.e., lack of attraction to, or desire for, either sex)
[ ] Other (please describe): _____

6. What is your current relationship status? (Choose the one that *best* describes you)
[ ] Married
[ ] One steady dating partner
[ ] One regular sexual partner
[ ] Single
[ ] Common-law or living together
[ ] More than one dating partner
[ ] More than one sexual partner
[ ] Other (please specify): _____

7. Sex of your primary partner: [ ] Male [ ] Female

8. Is your relationship long distance? [ ] Yes [ ] No

9. Below is a list of sexual experiences that can be positive or negative. Please indicate the extent to which you have had each experience in the *past 48 hours* (i.e., over the *past 2 days*). If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity.

	Not at all 0	Mildly 1	Moderately 2	Strongly 3	Extremely 4
Sexual desire/drive for primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in sexual activity with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty having an orgasm with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to have an orgasm with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]

Health Background

10. Please indicate whether you think that you have ever had any of the following conditions:

Premenstrual syndrome (PMS; in general and not necessarily at the present moment)	[ ] Never [ ] Past [ ] Present
Hormonal contraceptive side effects	[ ] Never [ ] Past [ ] Present
Mood problems during pregnancy	[ ] Never [ ] Past [ ] Present
Mood problems during postpartum period	[ ] Never [ ] Past [ ] Present
Hormonal problem or disorder	[ ] Never [ ] Past [ ] Present

11. Check the statement that *best* describes your menstrual cycle:
[ ] I have gone through menopause and do not get a period
[ ] I am not currently menstruating because I am currently lactating or breast feeding
[ ] I never have my period
[ ] I have not had my period in the last three months
[ ] Some months I get my period and some months I don't
[ ] I usually get my period every month, but it is irregular and I cannot predict when it will start
[ ] I usually get my period within two to three days of when I expect it
[ ] My period is like clockwork; the same number of days elapse between periods

12. What is the average length of your menstrual cycle (i.e., *how many days are there from the first day of one period to the day before your next period***.** Most women range between 25 and 35 days)? _____ days

13. What is your average length of menstruation (i.e., how many days does your menstrual period or bleeding last. Most women range between 2 to 7 days)? _____ days

14. Using the calendars above, please indicate the first day of your *last/most recent* menstrual period:

_____ _____ _____
Day Month Year

15. How confident are you that your last menstrual period started on the day indicated above?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

16. Using the calendars above, please indicate the day that you think your *next* menstrual period will start:

_____ _____ _____
Day Month Year

17. How confident are you that your next menstrual period will start on the day indicated above?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

18. Are you menstruating (i.e., on your period) today? [ ] Yes [ ] No

ITEM 19 WAS FOR WOMEN CURRENTLY MENSTRUATING

19. If *yes*, for how many days (including today) have you been menstruating? _____ days

20. Are you *currently* taking any form of female contraception? If *yes*, please specific the type:
[ ] No
[ ] Oral contraception (the pill) [ ] Injected contraception (e.g., Depo)
[ ] Contraceptive patch (e.g., Evra) [ ] Hormonal Intrauterine Device (e.g., Mirena)
[ ] Cooper Intrauterine Device (e.g., Flex-T) [ ] Vaginal Ring (e.g., NuvaRing)

ITEMS 21 TO 22 WERE FOR WOMEN CURRENTLY USING AN ORAL CONTRACEPTIVE

21. Please indicate the type and specific brand of oral contraceptive you are *currently* taking or using:

[ ] Alesse	[ ] Linessa	[ ] Norlevo	[ ] Seasonique
[ ] Apri	[ ] Lo-Femenal	[ ] Ortho 0.5/35	[ ] Select 1/35
[ ] Aviane	[ ] Loestrin 1.5/30	[ ] Ortho 1/35	[ ] Synphasic
[ ] Brevicon 0.5/35	[ ] Marvelon	[ ] Ortho 10/11	[ ] Tri-Cyclen
[ ] Brevicon 1/35	[ ] Micronor	[ ] Ortho 7/7/7	[ ] Tri-Cyclen Lo
[ ] Cyclen	[ ] Min-Ovral	[ ] Ortho-Cept	[ ] Triquilar
[ ] Demulen 30	[ ] Minestrin 1/20	[ ] Portia	[ ] Yasmin

[ ] Demulen 50 [ ] Next Choice [ ] Seasonale [ ] Yaz
[ ] Other (please specify): _____

22. How often do you miss a contraceptive pill (e.g., forget to take at the usual time)?

Never	Once or twice a year	Every few months	Every month	Every week
[ ]	[ ]	[ ]	[ ]	[ ]

23. What week of your current oral contraceptives pill pack are you in?

Week 1 of active pills	Week 2 of active pills	Week 3 of active pills	Pill-free/inactive or sugar pill week
[ ]	[ ]	[ ]	[ ]

ITEMS 24 TO 27 WERE FOR WOMEN USING CURRENTLY USING ANY HORMONAL CONTRACEPTION

24. For how long have you been taking this particular contraceptive?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

25. Do you take the contraceptive continuously without a pill- or hormone-free week? For instance, do you skip menstrual/withdrawal bleeding by not taking any time off of the contraceptive? [ ] Yes [ ] No

26. Have you *ever* used a hormonal contraceptive or non-hormonal intrauterine device in the past? [ ] Yes [ ] No

27. How long has it been since you stopped taking your *last (most recent)* hormonal contraceptive or non-hormonal intrauterine device?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

28. Please indicate whether you are currently . . .

Pregnant?	[ ] Yes	[ ] No	[ ] Maybe
In the postpartum period (within 6 months of the birth of a child)?	[ ] Yes	[ ] No	[ ] Maybe
Going through of went through natural or surgically-induced menopause?	[ ] Yes	[ ] No	[ ] Maybe

29. To your knowledge, have you ever been pregnant? [ ] Yes [ ] No

30. How many times have you been pregnant in your lifetime? _____ times

Women's REP

31. Below is a list of physical, emotional, and sexual experiences that can be positive or negative. Please indicate the extent to which you have experienced each item in the *past 48 hours* (i.e., over the *past 2 days*). If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity.

	Not at all 0	Mild 1	Moderate 2	Strong 3	Extreme 4
Anxiety or worry	[ ]	[ ]	[ ]	[ ]	[ ]
Loneliness	[ ]	[ ]	[ ]	[ ]	[ ]
Physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Energized/active	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling down, sad, or depressed	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Sleeping less than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with food preferences	[ ]	[ ]	[ ]	[ ]	[ ]
Leg cramps	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling great or special	[ ]	[ ]	[ ]	[ ]	[ ]
Regular bowel movements	[ ]	[ ]	[ ]	[ ]	[ ]
Less breakthrough bleeding/spotting	[ ]	[ ]	[ ]	[ ]	[ ]
Breast size decrease	[ ]	[ ]	[ ]	[ ]	[ ]
Physical pleasure/comfort during sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]
Achievement/productivity in work or school	[ ]	[ ]	[ ]	[ ]	[ ]
Not feeling like self	[ ]	[ ]	[ ]	[ ]	[ ]
Connectedness/support	[ ]	[ ]	[ ]	[ ]	[ ]
Abdominal cramps or discomfort	[ ]	[ ]	[ ]	[ ]	[ ]
Lack of interest or enjoyment in usual activities	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with weight	[ ]	[ ]	[ ]	[ ]	[ ]
Affectionate/intimate with others	[ ]	[ ]	[ ]	[ ]	[ ]
Joint or muscle agility (i.e., ease of movement)	[ ]	[ ]	[ ]	[ ]	[ ]
Focused	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to have an orgasm with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling happy, elated, or euphoric	[ ]	[ ]	[ ]	[ ]	[ ]
Emotional calmness/stability	[ ]	[ ]	[ ]	[ ]	[ ]
Vaginal dryness	[ ]	[ ]	[ ]	[ ]	[ ]
High self-esteem	[ ]	[ ]	[ ]	[ ]	[ ]

Difficulty having an orgasm through masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Content with weight	[ ]	[ ]	[ ]	[ ]	[ ]
Mental relaxation/calm	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual desire/drive for others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
General physical comfort	[ ]	[ ]	[ ]	[ ]	[ ]
Not enough sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Clumsiness/minor accidents	[ ]	[ ]	[ ]	[ ]	[ ]
Increased appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Sweating	[ ]	[ ]	[ ]	[ ]	[ ]
Uninterrupted (peaceful) sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with food intake	[ ]	[ ]	[ ]	[ ]	[ ]
Emotional irritability/sensitivity	[ ]	[ ]	[ ]	[ ]	[ ]
Sleeping more than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Impairment in work or school	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to have an orgasm through masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling capable/competent	[ ]	[ ]	[ ]	[ ]	[ ]
Acne/pimples	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling in control	[ ]	[ ]	[ ]	[ ]	[ ]
Healthy bowel movements	[ ]	[ ]	[ ]	[ ]	[ ]
Thoughtfulness	[ ]	[ ]	[ ]	[ ]	[ ]
Self-blame/critical	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling unoriginal or plain	[ ]	[ ]	[ ]	[ ]	[ ]
Flatulence/gassy	[ ]	[ ]	[ ]	[ ]	[ ]
Please with body shape/size	[ ]	[ ]	[ ]	[ ]	[ ]
Mood stability (consistent mood)	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in sexual activity with others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Hydrated	[ ]	[ ]	[ ]	[ ]	[ ]
Breast size increase	[ ]	[ ]	[ ]	[ ]	[ ]
Eating more than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Food aversions	[ ]	[ ]	[ ]	[ ]	[ ]
Looking forward to a bright future	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
A strong back	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Even facial skin tone	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]

Crying	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling thinner than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Facial hair growth	[ ]	[ ]	[ ]	[ ]	[ ]
Negative thoughts about the future (pessimism)	[ ]	[ ]	[ ]	[ ]	[ ]
Headaches/migraines	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with breast size	[ ]	[ ]	[ ]	[ ]	[ ]
Clear complexion/skin	[ ]	[ ]	[ ]	[ ]	[ ]
Facial skin discolouration (i.e., colour blotches on face)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling bigger than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Pleased with breast size	[ ]	[ ]	[ ]	[ ]	[ ]
Pain/discomfort during sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]
Low self-esteem	[ ]	[ ]	[ ]	[ ]	[ ]
Stomach comfort	[ ]	[ ]	[ ]	[ ]	[ ]
Content with appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Fatigue/lack of energy	[ ]	[ ]	[ ]	[ ]	[ ]
Painful or tender breasts	[ ]	[ ]	[ ]	[ ]	[ ]
Impulsivity	[ ]	[ ]	[ ]	[ ]	[ ]
Interest or enjoyment in usual activities	[ ]	[ ]	[ ]	[ ]	[ ]
Bloating/swelling	[ ]	[ ]	[ ]	[ ]	[ ]
Sense of physical well-being	[ ]	[ ]	[ ]	[ ]	[ ]
Avoidant of intimacy/affection	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Disrupted sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Content with food intake	[ ]	[ ]	[ ]	[ ]	[ ]
Vaginal lubrication	[ ]	[ ]	[ ]	[ ]	[ ]
Sociable (desire to be around others)	[ ]	[ ]	[ ]	[ ]	[ ]
Eating less than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Concern about body shape/size	[ ]	[ ]	[ ]	[ ]	[ ]
Food cravings	[ ]	[ ]	[ ]	[ ]	[ ]
Healthy digestion	[ ]	[ ]	[ ]	[ ]	[ ]
Joint or muscle stiffness	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty concentrating	[ ]	[ ]	[ ]	[ ]	[ ]
Strong and nimble legs	[ ]	[ ]	[ ]	[ ]	[ ]
Mood lability (mood swings)	[ ]	[ ]	[ ]	[ ]	[ ]
Calm intestinal track	[ ]	[ ]	[ ]	[ ]	[ ]
Breakthrough bleeding/spotting	[ ]	[ ]	[ ]	[ ]	[ ]
Good judgment or rational	[ ]	[ ]	[ ]	[ ]	[ ]
Content with amount of sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Jealous of other women	[ ]	[ ]	[ ]	[ ]	[ ]
Content with food preferences	[ ]	[ ]	[ ]	[ ]	[ ]

Nausea or vomiting	[ ]	[ ]	[ ]	[ ]	[ ]
Excitement and enthusiasm	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty falling asleep	[ ]	[ ]	[ ]	[ ]	[ ]
Constipation	[ ]	[ ]	[ ]	[ ]	[ ]
Please with self compared to other women	[ ]	[ ]	[ ]	[ ]	[ ]
Decrease in facial hair	[ ]	[ ]	[ ]	[ ]	[ ]
Heartburn or indigestion	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling out of control	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty having an orgasm with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Unsociable (desire to be alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Smiling	[ ]	[ ]	[ ]	[ ]	[ ]
Clear-headedness	[ ]	[ ]	[ ]	[ ]	[ ]
Desire/drive for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Physical grace/motor coordination	[ ]	[ ]	[ ]	[ ]	[ ]
Backache	[ ]	[ ]	[ ]	[ ]	[ ]
Easy falling asleep	[ ]	[ ]	[ ]	[ ]	[ ]
Poor judgment or irrational	[ ]	[ ]	[ ]	[ ]	[ ]
Diarrhea	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling like self	[ ]	[ ]	[ ]	[ ]	[ ]
Comfort in breast area	[ ]	[ ]	[ ]	[ ]	[ ]
General aches and pains	[ ]	[ ]	[ ]	[ ]	[ ]
Restlessness	[ ]	[ ]	[ ]	[ ]	[ ]

Debriefing Form

Dear Participant,

Thank you for completing the Women's Health Experiences Study. It will provide us with a better understanding of the associations among women's physical, emotional, and sexual health experiences. More specifically, the data you provided will be used to help develop a questionnaire to assess the experiences of women over a 48-hour period for a doctoral dissertation by Ms. Missy Teatero under the supervision of Dr. Kirsten Oinonen. This research project was approved by the Lakehead University Research Ethics Board (807-343-8283 or research@lakeheadu.ca).

Please be assured that your name and contact information is not associated with data collected and there will be no way to identify your responses. All of your responses will remain completely anonymous and confidential. Please send a request to Ms. Teatero if you would like to receive a summary of the study results once we are finished collecting data.

All participants can be entered in four draws for $50 VISA giftcards. In addition, psychology students at Lakehead University (LU) may receive 0.5 bonus points for the completion of this study. If you would like to be entered in the draws or are an LU student in a Psychology course and would like to receive 0.5 bonus points, please click here

For your interest, here are two references for articles in this research area:

Haywood, A., Slade, P., & King, H. (2002). Assessing the assessment measures for menstrual cycle symptoms: A guide for researchers and clinicians. *Journal of Psychosomatic Research, 52*, 223-237.

O'Brien, P. M. S., Bäckström, T., Brown, C., Dennerstein, L., Endicott, J., Epperson, C. N., . . . Yonkers, K. (2011). Towards consensus on diagnostic criteria, measurement and trial design of the premenstrual disorders: The ISPMD Montreal consensus. *Archives of Women's Mental Health, 14*, 13-21. doi: 10.1007/s00737-010-0201-3

Sincerely,

Missy Teatero, M.A. and Kirsten Oinonen, Ph.D., C. Psych.
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807-343-8943; 807-343-8096

Health, Hormones, & Behaviour Lab
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Mental Health Resources

Your physician, a counselor, a walk-in clinic, or a sexual health clinic
International: http://www.mymentalhealth.ca/ http://www.iasp.info/resources/Crisis_Centres/
Canada: www.crisisline.ca/links.htm

The 24-hour Thunder Bay Crisis Response Service at 807-346-8282
The Thunder Bay Regional Health Sciences Centre Walk-in Clinic at 807-768-1333
The Thunder Bay Counseling Centre at 807-684-1880
The Thunder Bay District Health Unit (sexual health clinic) at 807-625-5900
The Student Health and Counseling Centre, Lakehead University at 807-343-8361

Appendix B

Forms and Questionnaires for Study 2

Cover Letter

Dear Potential Participant,

Thank you for your interest in the Hormones & Sociosexuality Study conducted by Ms. Missy Teatero and Dr. Kirsten Oinonen with the Health, Hormones, & Behaviour Lab in the Department of Psychology at Lakehead University. Dr. Dwight Mazmanian is also a collaborator of this study. The main purpose of this research is to examine the effects of hormones (e.g., cortisol and progesterone) on patterns of physical, emotional, and sexual well-being. The majority of this project will constitute Ms. Teatero's doctoral dissertation but other related research questions will be examined as well. Lakehead University students (16 years or older) and members of the general public (18 years or older) are eligible to participate.

This study takes place in 3 main stages. Stage 1 involves an online Screening Questionnaire that takes about 40 to 60 minutes to complete. This questionnaire will be used to select participants who will be contacted by the researchers in the next few weeks. If selected to participate in Stages 2 and 3, you will be asked to complete two Phase Questionnaires and a 2- to 5-minute Daily Questionnaire across approximately 1 month, all sent via e-mail unless you would prefer hard copies. The two Phase Questionnaires will be separated by about 10 to 14 days and take approximately 40 to 60 minutes to complete. Overall, you will be asked to respond to questions of a personal and sexual nature that include, but are not limited to, the following: health, reproductive experiences like puberty, mood, personality, sexual attitudes and behaviours, and romantic relationships.

Thunder Bay residents may be asked to complete the Phase Questionnaires during two separate lab sessions (each about 1 hour in total) at Lakehead. During these sessions, a few body measurements (e.g., finger length and weight) will be taken by a female researcher and some participants will be asked to provide saliva samples for hormone analysis. Some volunteers will also be provided with a kit of urine hormone testing strips to use at home, as instructed by the researchers. The hormone testing strips will take less than 5 minutes a day for about 5 days.

Your participation is voluntary and you may withdraw from, or refuse to participate in any part of, the study at any time without explanation or penalty. You may decline to answer any question. The information obtained for the study will be securely stored by Dr. Oinonen for 5 years. All records of your participation will be kept in strict confidence, and there will be absolutely no way to identify you as a participant in any subsequent reports. Once you have completed the study, your contact information will be removed from your questionnaires and your information will remain both anonymous and confidential.

There are no known physical or psychological risks associated with participation in this study. Some people may experience discomfort when answering personal questions and thus, a list of mental health resources is provided at the end of this letter. The possible benefits of participation

include: a better understanding of oneself, learning about the research process, and contribution to research that will provide a better understanding of health and sexual relationships.

Psychology students at Lakehead University may be eligible to receive up to 4 bonus points: 1 point for Stage 1 (i.e., the Online Screening Questionnaire) and 1 for each of two Online Phase Questionnaires OR 1.5 for each of two Lab Sessions. Other Thunder Bay residents (i.e., those not eligible for bonus points) who complete lab sessions will be offered nominal remuneration of up to $15 (i.e., $5 for Stage 2 and $10 for Stage 3). All participants will be entered into a separate draw for a $50 VISA gift card for each of Stages 1, 2, and 3 (the Screening Questionnaire and two Phase Questionnaires), whether completed online or in the lab. All participants who complete 80% or more of the Daily Questionnaires will be entered into a draw for a $50 VISA gift card. Draws will be held periodically until the end of data collection (approximately January 2014). Funding is provided by the Canadian Institute of Health Research (CIHR).

If you would a summary of the research results, please send a request to Ms. Teatero at the end of the study. If you have any questions or concerns regarding this study, please do not hesitate to contact Ms. Teatero or Dr. Oinonen. This study has been approved by Lakehead University's Research Ethics Board (807-776-7289). Please keep the Cover Letter for your records.

Thank you for your time. We very much appreciate your contribution to our research.

Sincerely,

Missy Teatero, M.A. and Kirsten Oinonen, Ph.D., C. Psych.
hormones@lakeheadu.ca; koinonen@lakeheadu.ca
807-343-8943; 807-343-8096

Health, Hormones, and Behaviour Lab
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Mental Health Resources

Your physician, a counselor, a walk-in clinic, or a sexual health clinic
International: http://www.mymentalhealth.ca/ http://www.iasp.info/resources/Crisis_Centres/
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The 24-hour Thunder Bay Crisis Response Service at 807-346-8282
The Thunder Bay Regional Health Sciences Centre Walk-in Clinic at 807-768-1333
The Thunder Bay Counseling Centre at 807-684-1880
The Thunder Bay District Health Unit (sexual health clinic) at 807-625-5900
The Student Health and Counseling Centre, Lakehead University at 807-343-8361

Consent Form A

I have read and understood the Cover Letter for the Hormones & Sociosexuality Study conducted by Ms. Teatero and Dr. Oinonen with the Health, Hormones, & Behaviour Lab in the Department of Psychology at Lakehead University. I agree to participate in this research and understand the following:

1. I am a volunteer, can withdraw at any time from this study, and may choose not to answer any question.
2. There are no known serious risks associated with participation in this study.
3. Benefits of participation may include: (a) an appreciation of research on hormones, health, and sexual attitudes and behaviours, (b) an opportunity to contribute to science, (c) up to 3 bonus points for psychology students at Lakehead University or nominal remuneration of up to $15 for lab sessions, and (d) entry in up to 4 draws for $50 VISA gift cards.
4. I will remain anonymous in any publications or presentations of the research findings. All data will remain confidential and will only be accessed by researchers who have been trained in research ethics. At the end of the study, the data I have provided will be associated with a participant number, and not my contact information or any other identifying information.
5. The data will be securely stored for at least 5 years by Dr. Oinonen at Lakehead.
6. I may contact the researchers if I would like to receive a summary of the findings.
7. For the duration of the study, the researchers and I will have ongoing communication via the e-mail address(es) and telephone number(s) that I have provided below. This information will not be used for any other reason.

***By providing any information below, I agree to the above.**

E-mail address(es): _____

Phone number(s): _____

Lakehead University Psychology students only (for bonus points, if applicable):

Name: _____

Psychology professor: _____

Psychology course: _____

Lakehead Student Number: _____

Screening Questionnaire

Note that this Screening Questionnaire and the Daily Questionnaire below were administered electronically through a secure Internet database. Therefore, the numbering of the items here merely indicates situations in which some items were not applicable to certain participants and were automatically not displayed for those individuals. This means that many participants were not given all of the items (i.e., different items were applicable to different women).

Demographics

1. Your biological sex: [ ] Male [ ] Female [ ] Other (please specify): _____

2. You're age: _____ years and _____ months

3. What is your ethnic background? (Chose the option that *best* describes your ethnicity)
[ ] Caucasian/White
[ ] African/Black
[ ] Native/Aboriginal
[ ] Hispanic/Latino
[ ] Other (please specify): _____
[ ] Middle Eastern
[ ] East Indian
[ ] European
[ ] Asian

4. Do you currently live in Thunder Bay, Ontario, Canada? [ ] Yes [ ] No

ITEM 5 WAS FOR PARTICIPANTS WHO DID LIVE IN THUNDER BAY

5. Where do you currently live? Province/State: _____ Country: _____

6. What is your highest level of education?
[ ] Some elementary school [ ] Completed high school [ ] Some university
[ ] Completed grade 8 [ ] Some college [ ] Completed a university degree
[ ] Some high school [ ] Completed college [ ] Completed a graduate degree

7. Are you currently a full-time college or university student? [ ] Yes [ ] No

8. Please choose the option that *best* describes your handedness:
[ ] Left-handed [ ] Ambidextrous (use both hands equally) [ ] Right-handed

9. Please choose the option that *best* describes you:
[ ] I feel happiest and most productive in the morning hours of the day
[ ] I feel happiest and most productive in the evening hours of the day
[ ] I am equally happy and productive in the morning and evening

Health Background

10. Please choose the option that *best* describes your smoking status:
[ ] Current occasional/social smoker [ ] Current smoker
[ ] Previous occasional/social smoker [ ] Previous smoker
[ ] Non-smoker

11. Are you current taking any over-the-counter or prescribed medications (other than birth control)? [ ] Yes [ ] No

ITEMS 12 AND 13 WERE FOR PARTICIPANTS CURRENTLY TAKING MEDICATIONS

12. How many over-the-counter or prescribed medications (other than birth control) are you currently taking? _____

13. What types of over-the-counter or prescribed medications are you currently taking? (Select all that apply)

[ ] Anti-anxiety medication (e.g., Celexa, Ativan) [ ] Asthma medication
[ ] Anti-depressants (e.g., Paxil, Zyban) [ ] Hormone replacement therapy
[ ] Anti-psychotics (e.g., Abiligy, Clozaril) [ ] Pain medication (e.g., Aspirin)
[ ] Allergy medication [ ] Thyroid medication
[ ] Other (please list): _____

14. Stress can be experienced as a result of both positive and negative life events and can be defined as physical or emotional strain/tension. Compared to other people your age and sex, to what extent did you experience . . .

	Much less			Average			Much more
	1	2	3	4	5	6	7
Stressful *negative* life events between birth and 10 years of age?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Stressful *positive* life events between birth and 10 years of age?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Stressful *negative* life events in the past year?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Stressful *positive* life events in the past year?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

15. How aware are you of the health problems of your *biological relatives* (i.e., your grandparents, aunts/uncles, parents, siblings, and children)?

Unaware Very Aware

1	2	3	4	5	6
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

16. Please indicate whether you think that any of your *biological relatives* (i.e., your grandparents, aunts/uncles, parents, siblings, and children) may have ever been diagnosed with or treated for any of the following physical/medical or emotional/psychological conditions. If applicable, please list the exact condition(s):

Cancer:_____	[ ] Yes	[ ] No	[ ] Maybe
Heart disease	[ ] Yes	[ ] No	[ ] Maybe
Fertility problem: _____	[ ] Yes	[ ] No	[ ] Maybe
Hormonal disorder:_____	[ ] Yes	[ ] No	[ ] Maybe
Menstrual cycle problem: _____	[ ] Yes	[ ] No	[ ] Maybe
Hormonal contraceptive side effects: _____	[ ] Yes	[ ] No	[ ] Maybe
Depression	[ ] Yes	[ ] No	[ ] Maybe
Seasonal affective disorder	[ ] Yes	[ ] No	[ ] Maybe
Bipolar disorder (e.g., manic-depression)	[ ] Yes	[ ] No	[ ] Maybe
Mood disorder during pregnancy: _____	[ ] Yes	[ ] No	[ ] Maybe
Post-partum mood disorder: _____	[ ] Yes	[ ] No	[ ] Maybe
Substance abuse:_____	[ ] Yes	[ ] No	[ ] Maybe

17. Use the following scale to indicate how often, on average, you tend to . . .

	Never or rarely 1	Once or twice a month 2	Once or twice a week 3	Three to four time a week 4	Almost every day 5
Eat "healthy" (unprocessed) foods	[ ]	[ ]	[ ]	[ ]	[ ]
Eat "unhealthy" (processed) foods	[ ]	[ ]	[ ]	[ ]	[ ]
Try to lose weight/diet	[ ]	[ ]	[ ]	[ ]	[ ]
Physically exercise (to the point of sweating or elevated heart rate)	[ ]	[ ]	[ ]	[ ]	[ ]
Drink caffeinated beverages (i.e., pop, coffee, and energy drinks)	[ ]	[ ]	[ ]	[ ]	[ ]
Drink alcohol	[ ]	[ ]	[ ]	[ ]	[ ]
Use recreational drugs	[ ]	[ ]	[ ]	[ ]	[ ]

18. Compared to other people my age and sex, I believe that I am sensitive to (i.e., susceptible to or more likely to experience) the effects of . . .

	Very slightly or not at all 1	A little 2	Moderately 3	Quite a bit 4	Extremely 5
Natural hormone changes	[ ]	[ ]	[ ]	[ ]	[ ]
Seasonal changes	[ ]	[ ]	[ ]	[ ]	[ ]

Smell	[ ]	[ ]	[ ]	[ ]	[ ]
Caffeine	[ ]	[ ]	[ ]	[ ]	[ ]
Alcohol	[ ]	[ ]	[ ]	[ ]	[ ]
Positive mood changes following exercise	[ ]	[ ]	[ ]	[ ]	[ ]

20. Rate your *current* physical health, emotional health, and sexual functioning (in general):

	Very *un*healthy 1	2	3	4	Average 5	6	7	8	Very healthy 9
Physical	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Emotional	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

21. Please answer each question by indicating "yes" or "no" following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the question. Please remember to answer each question.

	Yes	No
Does your mood often go up and down?	[ ]	[ ]
Do you ever feel "just miserable" for no reason?	[ ]	[ ]
Are you an irritable person?	[ ]	[ ]
Are your feelings hurt easily?	[ ]	[ ]
Do you often feel "fed-up"?	[ ]	[ ]
Would you call yourself a nervous person?	[ ]	[ ]
Are you a worrier?	[ ]	[ ]
Would you call yourself a tense or 'highly-strung'?	[ ]	[ ]
Do you worry too long after an embarrassing experience?	[ ]	[ ]
Do you suffer from 'nerves'	[ ]	[ ]
Do you often feel lonely?	[ ]	[ ]
Are you often troubled about feelings of guilt?	[ ]	[ ]

22. How many tattoos do *you* have in total? (Please estimate) _____ tattoos

ITEM 23 WAS FOR PARTICIPANTS WITH TATTOOS

23. If you have at least one tattoo, please indicate the location(s) on your body: (All that apply)

[ ] Upper back [ ] Lower back [ ] Arm [ ] Legs
[ ] Ankle [ ] Feet [ ] Chest [ ] Stomach
[ ] Neck [ ] Other (please list): _____

24. How many piercings (*including* ear piercings) do you have it total? _____ piercings

ITEM 25 WAS FOR PARTICIPANTS WITH PIERCINGS

25. If you have at least one piercing, please indicate the location(s) on your body: (All that apply)

[ ] Ear lobe (regular) [ ] Ear lobe (plug) [ ] Ear cartilage [ ] Navel/belly button
[ ] Eyebrow [ ] Nose [ ] Septum [ ] Lip
[ ] Nipple [ ] Genital [ ] Surface (please specify): _____
[ ] Other (please specify): _____

26. Your height (best estimate): _____ (feet and inches) or _____ (cm)

27. Your weight (best estimate): _____ (pounds) or _____ (kg)

Relationships and Sexuality

28. What is your sexual orientation? (Chose the option that *best* describes you)

[ ] 0 – Exclusively heterosexual
[ ] 1 – Predominantly heterosexual, only incidentally homosexual
[ ] 2 – Predominantly heterosexual, but more than incidentally homosexual
[ ] 3 – Equally heterosexual and homosexual
[ ] 4 – Predominantly homosexual, but more than incidentally heterosexual
[ ] 5 – Predominantly homosexual, only incidentally heterosexual
[ ] 6 – Exclusively homosexual
[ ] X Asexual (i.e., lack of attraction to, or desire for, either sex)
[ ] Other (please describe): _____

29. With how many different partners have you . . .

	0	1	2	3	4	5-6	7-9	10-19	20 or more
Deep/French kissed or "made out" with in your *lifetime*?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Had sexual contact (i.e., hands to genital or oral sex) that did NOT include intercourse in your *lifetime*?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Had sexual intercourse (sex) in your *lifetime*?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Had sex in the *past 12 months*?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Had sex on one and only one occasion?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Had sex without having an interest in a long-term committed relationship with the person?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

30. At what age did you first have . . . (Please type "0" [zero] if you have never engaged in the activity)

Sexual contact (i.e., hands to genital or oral sex) that did NOT include intercourse?	_____ years
Sexual intercourse	_____ years

31. Please respond honestly to the following questions:

Strongly disagree								Strongly agree
1	2	3	4	5	6	7	8	9

	1	2	3	4	5	6	7	8	9
For me, sex without love is OK	[ ]	[ ]	[ ]	[ ]	[]	[ ]	[ ]	[ ]	[ ]
I can imagine myself being comfortable and enjoying "casual" sex with different partners	[ ]	[ ]	[ ]	[ ]	[]	[ ]	[ ]	[ ]	[ ]
I do *not* want to have sex with a person until I am sure that we will have a long-term serious relationship	[ ]	[ ]	[ ]	[ ]	[]	[ ]	[ ]	[ ]	[ ]

32. How often do you . . .

Never	Very seldom	About once every two or three months	About once a month	About once every two weeks	About once a week	Several times per week	Nearly every day	At least once a day
1	2	3	4	5	6	7	8	9

	1	2	3	4	5	6	7	8	9
Have fantasies about having sex with someone you are *not* in a committed romantic relationship with	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Experience sexual arousal when you are in contact with someone you are *not* in a committed romantic relationship with	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Have spontaneous fantasies about having sex with someone you just met	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Masturbate (alone)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

33. Considering your past and future behaviour, what is the likelihood (percentage chance) that you would have sex with someone for the first time without using a condom?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

34. In total, how many months of dating do you consider to be a "long-term relationship"?
_____ months

35. How many romantic long-term relationships (more than just casual sex) that were *longer than* 8 months have you been in? _____

36. What is the longest romantic relationship that you have been in?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

37. How many romantic relationships (more than just casual sex) that lasted *less than* 8 months have you been in? _____

38. What is your current relationship status? (Choose the one that *best* describes you)

[ ] Married	[ ] Common-law or living together
[ ] One steady dating partner	[ ] More than one dating partner
[ ] One regular sexual partner	[ ] More than one sexual partner
[ ] Single	[ ] Other (please specify): _____

39. Do you currently have a primary romantic partner? [ ] Yes [ ] No

ITEMS 40 TO 45 WERE FOR WOMEN IN A ROMANTIC RELATIONSHIP

40. Sex of your primary partner: [ ] Male [ ] Female

41. Age of your primary partner: _____ years

42. How long have you and your primary current partner been together?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

43. Is your relationship long distance? [ ] Yes [ ] No

44. With how many different people have you "cheated" on your current primary partner with someone else in the following ways?

	0	1	2	3	4	5-6	7-9	10-19	20 or more
Sexual contact (i.e., hands to genitals or oral sex) that did NOT include intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Developing an emotional connection	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

45. With how many different people has your current primary partner "cheated" on you with someone else in the following ways?

	0	1	2	3	4	5-6	7-9	10-19	20 or more
Sexual contact (i.e., hands to genitals or oral sex) that did NOT include intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Developing an emotional connection	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Health Background

46. Read each statement and decide if it is an accurate statement about you. Give your own opinion of yourself.

	False, not at all true	Slightly true	Mainly true	Very true
My favourite poet is Robert Kertezc	[ ]	[ ]	[ ]	[ ]
Sometimes I get ads in the mail I don't really want	[ ]	[ ]	[ ]	[ ]
My favourite sports event on television is the high jump	[ ]	[ ]	[ ]	[ ]
Most people would rather win than lose	[ ]	[ ]	[ ]	[ ]
My favourite hobbies are archery and stamp collecting	[ ]	[ ]	[ ]	[ ]
I don't like to buy things that are overpriced	[ ]	[ ]	[ ]	[ ]
Most people look forward to a trip to the dentist	[ ]	[ ]	[ ]	[ ]
In my free time I might read, watch TV, or just relax	[ ]	[ ]	[ ]	[ ]
Sometimes I cannot remember who I am	[ ]	[ ]	[ ]	[ ]
I have visions in which I see myself forced to commit crimes	[ ]	[ ]	[ ]	[ ]
Since the day I was born, I was destined to be unhappy	[ ]	[ ]	[ ]	[ ]
I think I have three or four completely different personalities inside of me	[ ]	[ ]	[ ]	[ ]
People don't understand how much I suffer	[ ]	[ ]	[ ]	[ ]
Every once and a while I totally lose my memory	[ ]	[ ]	[ ]	[ ]
Sometimes my vision is only in black and white	[ ]	[ ]	[ ]	[ ]
I don't have any good memories from childhood	[ ]	[ ]	[ ]	[ ]
I have severe psychological problems that	[ ]	[ ]	[ ]	[ ]

began very suddenly				
Sometimes I let little things bother me too much	[ ]	[ ]	[ ]	[ ]
Sometimes I'll avoid someone I really don't like	[ ]	[ ]	[ ]	[ ]
I sometimes complain too much	[ ]	[ ]	[ ]	[ ]
Sometimes I'm too impatient	[ ]	[ ]	[ ]	[ ]
I don't take criticism very well	[ ]	[ ]	[ ]	[ ]
Sometimes I put things off until the last minute	[ ]	[ ]	[ ]	[ ]
I sometimes make promises I can't keep	[ ]	[ ]	[ ]	[ ]
There have been times when could have been more thoughtful than I was	[ ]	[ ]	[ ]	[ ]
I rarely get in a bad mood	[ ]	[ ]	[ ]	[ ]

47. The questions that follow are different for men and women. For this reason, please specific your sex (again): [ ] Male [ ] Female

48. Please indicate whether *you* have been, or are presently, diagnosed with or treated for any of the following conditions. If applicable, please list the exact condition(s):

Overweight or obesity	[ ] Never [ ] Past [ ] Present
Underweight	[ ] Never [ ] Past [ ] Present
Heart disease:_____	[ ] Never [ ] Past [ ] Present
Fertility problem:_____	[ ] Never [ ] Past [ ] Present
Hormonal disorder:_____	[ ] Never [ ] Past [ ] Present
Balding/thinning of hair	[ ] Never [ ] Past [ ] Present
Sexual dysfunction:_____	[ ] Never [ ] Past [ ] Present
Sexually transmitted disease/infection (STD/I): _____	[ ] Never [ ] Past [ ] Present
Depression	[ ] Never [ ] Past [ ] Present
Seasonal affective disorder	[ ] Never [ ] Past [ ] Present
Bipolar disorder (e.g., manic-depression)	[ ] Never [ ] Past [ ] Present
Autism spectrum disorder	[ ] Never [ ] Past [ ] Present
Eating or body image disorder (e.g., Anorexia):_____	[ ] Never [ ] Past [ ] Present
Substance abuse: _____	[ ] Never [ ] Past [ ] Present
Breast cancer	[ ] Never [ ] Past [ ] Present
Cervical cancer	[ ] Never [ ] Past [ ] Present
Ovarian cancer	[ ] Never [ ] Past [ ] Present
Uterine cancer	[ ] Never [ ] Past [ ] Present
Other cancer: _____	[ ] Never [ ] Past [ ] Present
Endometriosis	[ ] Never [ ] Past [ ] Present
Anovulation (lack of ovulation)	[ ] Never [ ] Past [ ] Present
Amenorrhea (lack of menstruation)	[ ] Never [ ] Past [ ] Present
Dysmenorrhea (pain during menstruation)	[ ] Never [ ] Past [ ] Present

Polycystic ovary syndrome (PCOS)	[ ] Never [ ] Past [ ] Present
Premenstrual syndrome (PMS)	[ ] Never [ ] Past [ ] Present
Premenstrual dysphoric disorder (PMDD)	[ ] Never [ ] Past [ ] Present
Other menstrual cycle problem:_____	[ ] Never [ ] Past [ ] Present

49. Please list any other *physical or medical* conditions with which you have been diagnosed or treated: _____

50. Please list any *other emotional* or *psychological* conditions (including developmental and learning disorders) with which you have been diagnosed or treated: _____

51. On average, is one of your breasts larger than the other? [ ] Yes [ ] No

ITEM 52 WAS FOR WOMEN WITH ONE BREAST THAT WAS LARGER THAN THE OTHER

52. Please indicate which breast is larger: [ ] Left [ ] Right

53. What is your typical bra size (e.g., 32 back, D cup)? Back/band: _____ Cup:_____
Other (please specify): _____

54. Between the ages of 16 and 40, have (did) you ever noticed a milky discharge from your nipples (NOT including during pregnancy or recent childbirth)? [ ] Yes [ ] No

55. During your menstruation years (*NOT* including during pregnancy), did you have a tendency to grow dark, course hair on your . . .

Upper lip	[ ] Yes	[ ] No	Back	[ ] Yes [ ] No
Chin	[ ] Yes	[ ] No	Belly	[ ] Yes [ ] No
Breasts	[ ] Yes	[ ] No	Upper arms	[ ] Yes [ ] No
Chest between the breasts	[ ] Yes	[ ] No	Upper thighs	[ ] Yes [ ] No

56. What is the average length of your menstrual cycle (i.e., *how many days are there from the first day of one period to the day before your next period*)? _____ days

57. What is your average length of menstruation (i.e., *how many days does your menstrual period or bleeding last)?* _____ days

59. How painful is your menstrual period?

Not at all	Mild	Strong	Severe
0	1	2	3
[ ]	[ ]	[ ]	[ ]

60. Check the statement that *best* describes your menstrual cycle:
[ ] I have not had my period in the last three months
[ ] Some months I get my period and some months I don't

[ ] I usually get my period every month, but it is irregular and I cannot predict when it will start
[ ] I usually get my period within two to three days of when I expect it
[ ] My period is like clockwork; the same number of days elapse between periods

61. In general, I think that *the week before* I get my menstrual bleeding is associated with . . .

	Not at all 1	Mildly 2	Moderately 3	Strongly 4	Extremely 5
Negative effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]

62. Using the calendars above, please indicate the first day of your *last/most recent* menstrual period:

_____ _____ _____
Day Month Year

63. How confident are you that your last menstrual period started on the day indicated above?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

64. Using the calendars above, please indicate the day that you believe your *next* menstrual period will start:

_____ _____ _____
Day Month Year

65. How confident are you that your next menstrual period will start on the day indicated above?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

66. Are you menstruating (i.e., on your period) today? [ ] Yes [ ] No

ITEM 67 WAS FOR WOMEN CURRENTLY MENSTRUATING

67. For how many days (including today) have you been menstruating? _____ days

68. Are you *currently* taking any form of hormonal contraception (i.e., birth control pill, patch, injection, or hormonal intrauterine device) or non-hormonal (i.e., copper) intrauterine device?
[ ] Yes [ ] No

ITEMS 69 TO 74 WERE FOR WOMEN CURRENTLY USING CONTRACEPTION

69. Please indicate the type and specific brand of contraceptive you are *currently* taking or using:

[ ] Oral Contraceptive:

[ ] Alesse	[ ] Linessa	[ ] Norlevo	[ ] Seasonique
[ ] Apri	[ ] Lo-Femenal	[ ] Ortho 0.5/35	[ ] Select 1/35
[ ] Aviane	[ ] Loestrin 1.5/30	[ ] Ortho 1/35	[ ] Synphasic
[ ] Brevicon 0.5/35	[ ] Marvelon	[ ] Ortho 10/11	[ ] Tri-Cyclen
[ ] Brevicon 1/35	[ ] Micronor	[ ] Ortho 7/7/7	[ ] Tri-Cyclen Lo
[ ] Cyclen	[ ] Min-Ovral	[ ] Ortho-Cept	[ ] Triquilar
[ ] Demulen 30	[ ] Minestrin 1/20	[ ] Portia	[ ] Yasmin
[ ] Demulen 50	[ ] Next Choice	[ ] Seasonale	[ ] Yaz

[ ] Other (please specify): _____

[ ] Injected Contraceptive:
- [ ] Depo-Provera
- [ ] Lunelle
- [ ] Other (Please specify): _____

[ ] Contraceptive Patch:
- [ ] Evra
-] Other (Please specify): _____

[ ] Intrauterine Device (IUD):
- [ ] Mirena (hormonal)
- [ ] Nova-T (non-hormonal; copper)
- [ ] Flexi-T (non-hormonal; copper)
- [ ] Other (Please specify): _____

[ ] Vaginal Ring:
- [ ] NuvaRing
- [ ] Other (Please specify): _____

70. For how long have you been taking this particular contraceptive?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

71. Do you still experience a menstrual period (i.e., withdrawal bleeding during a hormone-free week)? [ ] Yes [ ] No

72. Do you take the contraceptive continuously without a pill- or hormone-free week? For instance, do you skip menstrual/withdrawal bleeding by not taking any time off of the contraceptive? [ ] Yes [ ] No

73. On average, how frequently do you experience menstrual/withdrawal bleeding?
Every _____ days

74. In general, I believe that my current contraceptive has been associated with . . .

	Not at all 1	Mildly 2	Moderately 3	Strongly 4	Extremely 5
Negative effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]

ITEMS 75 AND 76 WERE FOR WOMEN USING ORAL CONTRACEPTIVES

75. How often do you miss a contraceptive pill (e.g., forget to take at the usual time)?

Never	Once or twice a year	Every few months	Every month	Every week
[ ]	[ ]	[ ]	[ ]	[ ]

76. What week of your current oral contraceptives pill pack are you in?

Week 1 of active pills	Week 2 of active pills	Week 3 of active pills	Pill-free/inactive or sugar pill week
[ ]	[ ]	[ ]	[ ]

77. Have you *ever* used a (different) hormonal contraceptive or non-hormonal intrauterine device in the past? [ ] Yes [ ] No

ITEMS 78 to 84 WERE FOR WOMEN WHO HAD EVER USED (DIFFERENT) CONTRACEPTION

78. Please check *all* types of contraceptives and specific brands that you have ever used:

[ ] Oral Contraceptive:

[ ] Alesse	[ ] Linessa	[ ] Norlevo	[ ] Seasonique
[ ] Apri	[ ] Lo-Femenal	[ ] Ortho 0.5/35	[ ] Select 1/35
[ ] Aviane	[ ] Loestrin 1.5/30	[ ] Ortho 1/35	[ ] Synphasic
[ ] Brevicon 0.5/35	[ ] Marvelon	[ ] Ortho 10/11	[ ] Tri-Cyclen
[ ] Brevicon 1/35	[ ] Micronor	[ ] Ortho 7/7/7	[ ] Tri-Cyclen Lo
[ ] Cyclen	[ ] Min-Ovral	[ ] Ortho-Cept	[ ] Triquilar
[ ] Demulen 30	[ ] Minestrin 1/20	[ ] Portia	[ ] Yasmin
[ ] Demulen 50	[ ] Next Choice	[ ] Seasonale	[ ] Yaz

[ ] Other (please specify): _____

[ ] Injected Contraceptive:
- [ ] Depo-Provera
- [ ] Lunelle
-] Other (Please specify): _____

[ ] Contraceptive Patch:
- [ ] Evra
- [ ] Other (Please specify): _____

[ ] Intrauterine Device (IUD):
- [ ] Mirena (hormonal)
- [ ] Nova-T (non-hormonal; copper)
- [ ] Flexi-T (non-hormonal; copper)

[ ] Vaginal Ring:
- [ ] NuvaRing
- [ ] Other (Please specify): _____

79. How old were you when you first started using hormonal contraception? _____ years

80. In total, how many times have you switched hormonal contraceptives (i.e., was on a contraceptive than went off and/or started a new contraceptive?) _____ times

81. In general, I believe that my past hormonal contraceptive use has been associated with . . .

	Not at all 1	Mildly 2	Moderately 3	Strongly 4	Extremely 5
Negative effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical	[ ]	[ ]	[ ]	[ ]	[ ]

health					
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]

82. In general, why did you discontinue taking past hormonal contraceptives? (All that apply)

[ ] Increase in negative mood
[ ] Increase in positive mood
[ ] Increase in sexual functioning
[ ] PMS symptoms
[ ] Too hard to use
[ ] Desire to become pregnant
[ ] Short-term/sexual relationship ended
[ ] Concerned about hormones
[ ] Decrease in negative mood
[ ] Decrease in positive mood
[ ] Decrease in sexual functioning
[ ] Medical condition
[ ] Too expensive
[ ] Conflict with another medication
[ ] Long-term/dating relationship ended
[ ] Other (please specify): _____

83. Please think about all of the different types of hormonal contraception that you have used. What is the total (combined) amount of time that you have taken any "continuous" hormonal contraception (e.g., Seasonale or other hormonal contraceptives where you skipped menstrual periods)?

_____ years and/or _____ months and/or _____weeks and/or _____days

84. How long has it been since you stopped taking your last (most recent) hormonal contraceptive? _____ years and/or _____ months and/or _____ weeks and/or _____ days

85. Have you ever taken emergency hormonal contraception (e.g., Plan B)? [ ] Yes [ ] No

ITEMS 86 and 87 WERE FOR WOMEN WHO HAD EVER USED EMERGENCY CONTRACEPTION

86. How many different times have you taken emergency hormonal contraception (e.g., Plan B)?
_____ times

87. How long has it been since you last took emergency hormonal contraception (e.g., Plan B)?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

88. How old were you when you first starting menstruating (i.e., got your first menstrual period)?
_____ years and _____ months

89. Compared to other people of your sex and age, how old were you when you showed most of the changes associated with puberty?

Much Younger	A Little Younger	About the Same Age	A Little Older	Much Older
1	2	3	4	5
[ ]	[ ]	[ ]	[ ]	[ ]

90. As a teenager and young adult, how did your acne/pimples compare to others your age? Please consider times when you were *not* using any hormonal contraceptives (e.g., the pill).

Significantly less	Slightly less	About the same	Slightly more	Significantly more
1	2	3	4	5
[ ]	[ ]	[ ]	]	[ ]

91. I believe that puberty was associated with . . .

	Not at all	Mildly	Moderately	Strongly	Extremely
	1	2	3	4	5
Negative effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]

92. From birth to the age when you got your first menstrual period, were there ever any males living in your home(s) that were *NOT* biologically related to you (by blood)? [ ] Yes [ ] No

93. Are you currently pregnant? [ ] Yes [ ] No [ ] Maybe

94. Are you currently lactating or breast feeding? [ ] Yes [ ] No [ ] Maybe

95. To your knowledge, have you ever been pregnant? [ ] Yes [ ] No [ ] Maybe

ITEMS 96 to 99 WERE FOR WOMEN WHO HAD EVER BEEN PREGNANT

96. How many times have you been pregnant in your lifetime? _____ times

97. How mahy ectopic (tubal) pregnancie have you had in your lifetime? _____

98. In total, how many months of your life have spent pregnant? _____ months

99. In general, I believe that pregnancy (i.e., the months during which I was pregnant) was associated with. . .

	Not at all 1	Mildly 2	Moderately 3	Strongly 4	Extremely 5
Negative effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]

100. Have you ever donated eggs/ova? [ ] Yes [ ] No

101. Have you personally ever received treatment for infertility?
[ ] Yes (please explain): _____ [ ] No

102. Have you ever given birth? [ ] Yes [ ] No

ITEMS 103 TO 109 WERE FOR WOMEN WHO HAD EVER GIVEN BIRTH

104. How many times have you given birth in your lifetime? _____

105. How many stillbirths have you had in your lifetime? _____

106. How many Cesarean or C- sections have you had in your lifetime? _____

107. In total, how many months of your life have spent breastfeeding (or lactating)? _____ months

108. How long has it been since you last gave birth? _____ years and/or _____ months and/or _____ weeks and/or _____ days

109. In general, I believe that postpartum period (i.e., the 6 months after the birth of each of my children) was associated with . . .

	Not at all 1	Mildly 2	Moderately 3	Strongly 4	Extremely 5
Negatives effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my emotional health	[ ]	[ ]	[ ]	[ ]	[ ]
Positive effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Negative effects on my sexual functioning (i.e., desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in short-term (sexual) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Increased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased interest in long-term (romantic) relationships	[ ]	[ ]	[ ]	[ ]	[ ]

100. Have you ever had an induced abortion? [ ] Yes [ ] No

ITEMS 111 and 12 WERE FOR WOMEN WHO HAD EVER HAD AN ABORTION

111. How many induced abortions have you had? _____

112. How long has it been since you last had an induced abortion?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

113. Have you ever had a spontaneous miscarriage? [ ] Yes [ ] No

ITEMS 114 and 115 WERE FOR WOMEN WHO HAD EVER HAD A MISCARRIAGE

114. How many spontaneous abortions have you had? _____

115. How long has it been since you last had a spontaneous abortion?
_____ years and/or _____ months and/or _____ weeks and/or _____ days

116. Have you started to go through natural or surgically-induced menopause?
[ ] Yes (at what age): _____ [ ] No [ ] Maybe (please explain): _____

Debriefing Form A

Thank you for participating in Stage 1 of the Hormones & Sociosexuality Study: the Screening Questionnaire. You will be entered into a draw for one $50 VISA gift certificate. If applicable, Lakehead University students will receive 1 bonus point towards a psychology course for completing this stage of the study.

If you are selected to participate in Stages 2 and 3 of the study, you will be contacted via e-mail or telephone by a research assistant in the next few weeks. If applicable, Lakehead University students can receive up to 2 more bonus points for completing these stages during lab sessions. Other Thunder Bay residents who complete Stages 2 and 3 during lab sessions at Lakehead University will be offered nominal compensation of up to $10 ($5 for Stage 2 and $10 for Stage 3). All participants, including those who complete the entire study through the Internet, have the opportunity to be entered into a separate draw for a $50 VISA gift card for each of Stages 2 and 3. Also, everyone who completes at least 80% of the 2- to 5-minute Daily Questionnaires across approximately 1 month will be entered into a draw for a $50 VISA gift card.

Please be assured that your name and contact information will be removed from the Screening Questionnaire at the end of the study and there will be no way to identify your responses. All of your responses will remain completely anonymous and confidential. If you have any questions or concerns regarding this study, please contact Ms. Teatero or Dr. Oinonen. You may also contact Lakehead University's Research Ethics Board, which has approved this study, at 807-776-7289. Please keep a copy of this letter for your records.

Sincerely,

Missy Teatero, M.A. and Kirsten Oinonen, Ph.D., C. Psych.
hormones@lakeheadu.ca; koinonen@lakeheadu.ca
807-343-894; 807-343-8096

Health, Hormones, and Behaviour Lab
Department of Psychology
Lakehead University
955 Oliver Road
Thunder Bay, ON
P7B 5E1

Consent Form B

I have previously read and understood the Cover Letter for the Hormones & Sociosexuality Study conducted by Ms. Teatero and Dr. Oinonen with the Health, Hormones, & Behaviour Lab in the Department of Psychology at Lakehead University. I agree to participate in this research and understand the following:

1. I have been selected to participate in Stages 2 and 3 of this study. This involves online Daily Questionnaires (sent via e-mail; 2- to 5-minutes each) as well as two Phase Questionnaires (sent via e-mail or, if possible, completed during separate lab sessions; about 1 hour each) across approximately 1 month.
2. If I am selected and able to attend lab sessions, body measurements will be taken by a female researcher and I may be asked to provide saliva samples for hormone analysis. Also, I may be invited to use urine hormone detection strips (5 minutes each) for about 5 consecutive days, as specified by the researchers.
3. I will be asked to respond to questions of a personal nature that include, but are not limited to, the following: health, reproductive experiences like puberty, mood, personality, sexual attitudes and behaviours, and romantic relationships.
4. I am a volunteer, can withdraw at any time from this study, and may choose not to complete question in the study.
5. There are no known serious risks in involved in participating in this study.
6. Benefits of participation may include: (a) an appreciation of research on hormones, health, and sexual attitudes and behaviours, (b) an opportunity to contribute to science, (c) up to 3 more bonus points for psychology students at Lakehead University or nominal remuneration of up to $15 for lab sessions, and (d) entry in up to 3 more draws for $50 VISA gift cards.
7. I will remain anonymous in any publications or presentations of research findings. All data will remain confidential and will only be accessed by researchers who have been trained in research ethics. At the end of the study, the data I have provided will be associated with a participant number, and not my contact information or any other identifying information.
8. The data will be securely stored for at least 5 years by Dr. Oinonen at Lakehead.
9. I may contact the researchers if I would like to receive a summary of the findings at the end of the study.

By providing any information in the following questionnaire, I agree to the above.

Phase Questionnaire

Throughout this entire questionnaire, please respond based on your current experiences, feelings, and behaviours in the *PAST 48 HOURS* (i.e., over the *PAST 2 DAYS*).

Current Health

1. What time did you wake up *today*? _____

2. Below is a list of physical, emotional, and sexual experiences that can be positive or negative. Please indicate the extent to which you have experienced each item in the past 48 hours (i.e., over the past 2 days). If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity.

	Not at all 0	Mild 1	Moderate 2	Strong 3	Extreme 4
Anxiety or worry	[ ]	[ ]	[ ]	[ ]	[ ]
Loneliness	[ ]	[ ]	[ ]	[ ]	[ ]
Physical health	[ ]	[ ]	[ ]	[ ]	[ ]
Energized/active	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling down, sad, or depressed	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Sleeping less than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with food preferences	[ ]	[ ]	[ ]	[ ]	[ ]
Leg cramps	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling great or special	[ ]	[ ]	[ ]	[ ]	[ ]
Regular bowel movements	[ ]	[ ]	[ ]	[ ]	[ ]
Less breakthrough bleeding/spotting	[ ]	[ ]	[ ]	[ ]	[ ]
Breast size decrease	[ ]	[ ]	[ ]	[ ]	[ ]
Physical pleasure/comfort during sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]
Achievement/productivity in work or school	[ ]	[ ]	[ ]	[ ]	[ ]
Not feeling like self	[ ]	[ ]	[ ]	[ ]	[ ]
Connectedness/support	[ ]	[ ]	[ ]	[ ]	[ ]
Abdominal cramps or discomfort	[ ]	[ ]	[ ]	[ ]	[ ]
Lack of interest or enjoyment in usual activities	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with weight	[ ]	[ ]	[ ]	[ ]	[ ]
Affectionate/intimate with others	[ ]	[ ]	[ ]	[ ]	[ ]
Joint or muscle agility (i.e., ease of movement)	[ ]	[ ]	[ ]	[ ]	[ ]
Focused	[ ]	[ ]	[ ]	[ ]	[ ]

Easy to have an orgasm with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling happy, elated, or euphoric	[ ]	[ ]	[ ]	[ ]	[ ]
Emotional calmness/stability	[ ]	[ ]	[ ]	[ ]	[ ]
Vaginal dryness	[ ]	[ ]	[ ]	[ ]	[ ]
High self-esteem	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty having an orgasm through masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Content with weight	[ ]	[ ]	[ ]	[ ]	[ ]
Mental relaxation/calm	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual desire/drive for others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
General physical comfort	[ ]	[ ]	[ ]	[ ]	[ ]
Not enough sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Clumsiness/minor accidents	[ ]	[ ]	[ ]	[ ]	[ ]
Increased appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Sweating	[ ]	[ ]	[ ]	[ ]	[ ]
Uninterrupted (peaceful) sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with food intake	[ ]	[ ]	[ ]	[ ]	[ ]
Emotional irritability/sensitivity	[ ]	[ ]	[ ]	[ ]	[ ]
Sleeping more than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Impairment in work or school	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to have an orgasm through masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling capable/competent	[ ]	[ ]	[ ]	[ ]	[ ]
Acne/pimples	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling in control	[ ]	[ ]	[ ]	[ ]	[ ]
Healthy bowel movements	[ ]	[ ]	[ ]	[ ]	[ ]
Thoughtfulness	[ ]	[ ]	[ ]	[ ]	[ ]
Self-blame/critical	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling unoriginal or plain	[ ]	[ ]	[ ]	[ ]	[ ]
Flatulence/gassy	[ ]	[ ]	[ ]	[ ]	[ ]
Please with body shape/size	[ ]	[ ]	[ ]	[ ]	[ ]
Mood stability (consistent mood)	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in sexual activity with others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Hydrated	[ ]	[ ]	[ ]	[ ]	[ ]
Breast size increase	[ ]	[ ]	[ ]	[ ]	[ ]
Eating more than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Food aversions	[ ]	[ ]	[ ]	[ ]	[ ]
Looking forward to a bright future	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]

A strong back	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Even facial skin tone	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Crying	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling thinner than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Facial hair growth	[ ]	[ ]	[ ]	[ ]	[ ]
Negative thoughts about the future (pessimism)	[ ]	[ ]	[ ]	[ ]	[ ]
Headaches/migraines	[ ]	[ ]	[ ]	[ ]	[ ]
Decreased appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Unhappy with breast size	[ ]	[ ]	[ ]	[ ]	[ ]
Clear complexion/skin	[ ]	[ ]	[ ]	[ ]	[ ]
Facial skin discolouration (i.e., colour blotches on face)	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling bigger than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Pleased with breast size	[ ]	[ ]	[ ]	[ ]	[ ]
Pain/discomfort during sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]
Low self-esteem	[ ]	[ ]	[ ]	[ ]	[ ]
Stomach comfort	[ ]	[ ]	[ ]	[ ]	[ ]
Content with appetite	[ ]	[ ]	[ ]	[ ]	[ ]
Fatigue/lack of energy	[ ]	[ ]	[ ]	[ ]	[ ]
Painful or tender breasts	[ ]	[ ]	[ ]	[ ]	[ ]
Impulsivity	[ ]	[ ]	[ ]	[ ]	[ ]
Interest or enjoyment in usual activities	[ ]	[ ]	[ ]	[ ]	[ ]
Bloating/swelling	[ ]	[ ]	[ ]	[ ]	[ ]
Sense of physical well-being	[ ]	[ ]	[ ]	[ ]	[ ]
Avoidant of intimacy/affection	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Disrupted sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Content with food intake	[ ]	[ ]	[ ]	[ ]	[ ]
Vaginal lubrication	[ ]	[ ]	[ ]	[ ]	[ ]
Sociable (desire to be around others)	[ ]	[ ]	[ ]	[ ]	[ ]
Eating less than usual	[ ]	[ ]	[ ]	[ ]	[ ]
Concern about body shape/size	[ ]	[ ]	[ ]	[ ]	[ ]
Food cravings	[ ]	[ ]	[ ]	[ ]	[ ]
Healthy digestion	[ ]	[ ]	[ ]	[ ]	[ ]
Joint or muscle stiffness	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty concentrating	[ ]	[ ]	[ ]	[ ]	[ ]
Strong and nimble legs	[ ]	[ ]	[ ]	[ ]	[ ]
Mood lability (mood swings)	[ ]	[ ]	[ ]	[ ]	[ ]
Calm intestinal track	[ ]	[ ]	[ ]	[ ]	[ ]

Breakthrough bleeding/spotting	[ ]	[ ]	[ ]	[ ]	[ ]
Good judgment or rational	[ ]	[ ]	[ ]	[ ]	[ ]
Content with amount of sleep	[ ]	[ ]	[ ]	[ ]	[ ]
Jealous of other women	[ ]	[ ]	[ ]	[ ]	[ ]
Content with food preferences	[ ]	[ ]	[ ]	[ ]	[ ]
Nausea or vomiting	[ ]	[ ]	[ ]	[ ]	[ ]
Excitement and enthusiasm	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty falling asleep	[ ]	[ ]	[ ]	[ ]	[ ]
Constipation	[ ]	[ ]	[ ]	[ ]	[ ]
Please with self compared to other women	[ ]	[ ]	[ ]	[ ]	[ ]
Decrease in facial hair	[ ]	[ ]	[ ]	[ ]	[ ]
Heartburn or indigestion	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling out of control	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty having an orgasm with others or the thought of others (excluding primary partner)	[ ]	[ ]	[ ]	[ ]	[ ]
Unsociable (desire to be alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Smiling	[ ]	[ ]	[ ]	[ ]	[ ]
Clear-headedness	[ ]	[ ]	[ ]	[ ]	[ ]
Desire/drive for masturbation (alone)	[ ]	[ ]	[ ]	[ ]	[ ]
Physical grace/motor coordination	[ ]	[ ]	[ ]	[ ]	[ ]
Backache	[ ]	[ ]	[ ]	[ ]	[ ]
Easy falling asleep	[ ]	[ ]	[ ]	[ ]	[ ]
Poor judgment or irrational	[ ]	[ ]	[ ]	[ ]	[ ]
Diarrhea	[ ]	[ ]	[ ]	[ ]	[ ]
Feeling like self	[ ]	[ ]	[ ]	[ ]	[ ]
Comfort in breast area	[ ]	[ ]	[ ]	[ ]	[ ]
General aches and pains	[ ]	[ ]	[ ]	[ ]	[ ]
Restlessness	[ ]	[ ]	[ ]	[ ]	[ ]

3. This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer. Indicate to what extent you have felt this way in the past 48 hours (i.e., over the past 2 days), including how you feel now.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
	1	2	3	4	5
Interested	[ ]	[ ]	[ ]	[ ]	[ ]
Distressed	[ ]	[ ]	[ ]	[ ]	[ ]
Excited	[ ]	[ ]	[ ]	[ ]	[ ]
Upset	[ ]	[ ]	[ ]	[ ]	[ ]
Strong	[ ]	[ ]	[ ]	[ ]	[ ]
Guilty	[ ]	[ ]	[ ]	[ ]	[ ]
Scared	[ ]	[ ]	[ ]	[ ]	[ ]
Enthusiastic	[ ]	[ ]	[ ]	[ ]	[ ]

Proud	[ ]	[ ]	[ ]	[ ]	[ ]
Irritable	[ ]	[ ]	[ ]	[ ]	[ ]
Alert	[ ]	[ ]	[ ]	[ ]	[ ]
Ashamed	[ ]	[ ]	[ ]	[ ]	[ ]
Inspired	[ ]	[ ]	[ ]	[ ]	[ ]
Nervous	[ ]	[ ]	[ ]	[ ]	[ ]
Attentive	[ ]	[ ]	[ ]	[ ]	[ ]
Jittery	[ ]	[ ]	[ ]	[ ]	[ ]
Active	[ ]	[ ]	[ ]	[ ]	[ ]
Afraid	[ ]	[ ]	[ ]	[ ]	[ ]
Hostile	[ ]	[ ]	[ ]	[ ]	[ ]
Determined	[ ]	[ ]	[ ]	[ ]	[ ]

4. How stressful has the past 48 days (i.e., the past 2 days) been for you . . .

	Much less			Average			Much more
	1	2	3	4	5	6	7
Compared to how you normally feel?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Compared to others your age and sex?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

5. Read each statement and indicate the extent to which it describes how you feel now as well as your feelings and experiences in the past 48 days (i.e., over the past 2 days).

	False, not at all						Extremely true
	0	1	2	3	4	5	6
Does your mood often go up and down?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Do you ever feel "just miserable "for no reason?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Are you an irritable person?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Are your feelings hurt easily?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Do you often feel "fed-up"?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Would you call yourself a nervous person?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Are you a worrier?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Would you call yourself a tense or 'highly-strung'?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Do you worry too long after an embarrassing experience?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Do you suffer from 'nerves'	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Do you often feel lonely?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Are you often troubled about	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

feelings of guilt?

6. To what extent to which do you wish to *avoid* pregnancy or having a baby *at the present time*?

Not at all				Extremely
1	2	3	4	5
[ ]	[ ]	[ ]	[ ]	[ ]

7. Are you *currently* taking an oral contraceptive (i.e., the birth control pill)? [ ] Yes [ ] No

ITEM 8 AND 9 WERE FOR WOMEN USING ORAL CONTRACEPTION

8. What week of your current pill pack are you in?

Week 1 of active pills	Week 2 of active pills	Week 3 of active pills	Pill-free/inactive or sugar pill week
[ ]	[ ]	[ ]	[ ]

9. How many pills have you missed (e.g., forgot to take at the usual time) in the current week of your pill pack? _____ pills

ITEM 10 WAS FOR WOMEN NOT USING ORAL CONTRACEPTION

10. Are you currently using any other form of hormonal contraception (e.g., patch, injection, vaginal ring) or non-hormonal (copper) intrauterine device? [ ] Yes [ ] No

11. Has there been a change in your use/type of hormonal contraception or non-hormonal (copper) intrauterine device since the last questionnaire? That is, did you stop using, begin using, or switch to a different contraceptive? [ ] Yes [ ] No

ITEMS 12 FOR PARTICIPANTS WHO STARTED USING A NEW CONTRACEPTIVE SINCE THE LAST QUESTIONNAIRE THEY COMPLETED FOR THE STUDY

12. Please select the specific type and brand of your *new* contraceptive:

[ ] Oral Contraceptive:

[ ] Alesse	[ ] Linessa	[ ] Norlevo	[ ] Seasonique
[ ] Apri	[ ] Lo-Femenal	[ ] Ortho 0.5/35	[ ] Select 1/35
[ ] Aviane	[ ] Loestrin 1.5/30	[ ] Ortho 1/35	[ ] Synphasic
[ ] Brevicon 0.5/35	[ ] Marvelon	[ ] Ortho 10/11	[ ] Tri-Cyclen
[ ] Brevicon 1/35	[ ] Micronor	[ ] Ortho 7/7/7	[ ] Tri-Cyclen Lo
[ ] Cyclen	[ ] Min-Ovral	[ ] Ortho-Cept	[ ] Triquilar
[ ] Demulen 30	[ ] Minestrin 1/20	[ ] Portia	[ ] Yasmin
[ ] Demulen 50	[ ] Next Choice	[ ] Seasonale	[ ] Yaz

[ ] Other (please specify): _____

[ ] Injected Contraceptive:
- [ ] Depo-Provera
- [ ] Lunelle
- [ ] Other (Please specify): _____

[ ] Contraceptive Patch:
- [ ] Evra
- [ ] Other (Please specify): _____

[ ] Intrauterine Device (IUD):
- [ ] Mirena (hormonal)
- [ ] Nova-T (non-hormonal; copper)
- [ ] Flexi-T (non-hormonal; copper)

[ ] Vaginal Ring:
- [ ] NuvaRing
- [ ] Other (Please specify): _____

ITEM 13 WAS FOR WOMEN CURRENTLY USING HORMONAL CONTRACEPTION

13. Are you currently taking your hormonal contraceptive continuously? For instance, do you skip menstrual periods by not taking any time off of the contraceptive? [ ] Yes [ ] No

ITEM 14 WAS FOR WOMEN WHO STOPPED TAKING A CONTRACEPTIVE OR SWITCHED FROM ONE CONTRACEPTIVE TO ANOTHER

14. Why did you stop taking your contraceptive? (All that apply)

[ ] Increase in negative mood	[ ] Decrease in negative mood
[ ] Increase in positive mood	[ ] Decrease in positive mood
[ ] Increase in sexual functioning	[ ] Decrease in sexual functioning
[ ] PMS symptoms	[ ] Medical condition
[ ] Too hard to use	[ ] Too expensive
[ ] Desire to become pregnant	[ ] Conflict with another medication
[ ] Short-term/sexual relationship ended	[ ] Long-term/dating relationship ended
[ ] Concerned about hormones	[ ] Other (please specify): _____

ITEM 15 WAS FOR WOMEN WHOSE CONTRACEPTIVE STATUS CHANGED SINCE THE LAST QUESTIONNAIRE THEY COMPLETED FOR THE STUDY

15. Using the calendars above, when did this change occur?

_____ _____ _____
Day Month Year

16. Are you menstruating (i.e., on your period) today? [ ] Yes [ ] No

ITEM 17 WAS FOR WOMEN CURRENTLY MENSTRUATING

17. For how many days (including today) have you been menstruating? _____ days

18. In the past 48 hours (i.e., over the past 2 days), how many drinks of alcohol have you had? _____drinks

19. In the past 48 hours (i.e., over the past 2 days), how many times have you used recreational drugs? _____ times

20. Has there been any change to your relationship status since the last questionnaire?
[ ] Yes [ ] No

ITEM 21 WAS FOR WOMEN WHOSE RELATIONSHIP STATUS CHANGED SINCE THE LAST QUESTIONNAIRE THEY COMPLETED FOR THE STUDY

21. Please check all that apply:
[ ] Long-term relationship ended [ ] Short-term or sexual relationship ended
[ ] Potential long-term relationship began [ ] Short-term or sexual relationship began
[ ] Other (please specify): _____

22. Are you currently pregnant? [ ] Yes [ ] No [ ] Maybe

Relationships and Sociosexuality

23. Do you currently have a primary partner? [ ] Yes [ ] No

ITEMS 24 TO 31 WERE FOR WOMEN IN A RELATIONSHIP

24. Based on the past 48 hours (i.e., the past 2 days), I think that my partner has shown the following traits . . .

	Not at all 1	2	3	4	5	6	7	8	Extremely 9
Attractiveness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Masculinity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Femininity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Naturally smells good	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Healthiness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Social status	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Parenting qualities	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Intelligence	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

25. Please respond based on how feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days). Compared to my partner, I think that I am . . .

Less attractive 1	2	3	Equally attractive 4	5	6	More attractive 7
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

26. Please respond to the following questions about your current primary partner based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days*)*.

	Not at all 1	2	3	4	5	6	Extremely 7
How satisfied are you with your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How content are you with your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How happy are you with your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How committed are you to your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How dedicated are you to your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How devoted are you to your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How intimate is your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How close is your relationship?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How connected are you to your partner	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How much do you trust your partner?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How much can you count on your partner?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]
How dependable is your partner?	[ ]	[ ]	[ ]	[ ]	]	[ ]	[ ]

27. Please respond to the following questions about your current primary partner based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days*). If you have not had sexual intercourse with your partner, please respond based on sexual activity (hands to genital or oral sex) more generally.*

	Strongly disagree 1	2	3	Neutral 4	5	6	Strongly Agree 7
I wish my partner was more sensitive to my physical needs when we make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner initiated sex more often	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner was more affectionate during foreplay	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner was a better lover	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner could communicate more openly about what he wants in our sexual encounters	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner would make me feel more attractive	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish I were less inhibited when I make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner was more loving and caring when we make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I wish my partner was more patient	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

when we make love							
I wish my partner was more romantic when we make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

28. Below is a list of sexual experiences that can be positive or negative. Please indicate the extent to which you have had each experience in the past 48 hours (i.e., over the past 2 days). *If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity.*

	Not at all 0	Mildly 1	Moderately 2	Strongly 3	Extremely 4
Sexual desire/drive for primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Disinterest in sexual activity with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty becoming aroused with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to become aroused with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Difficulty having an orgasm with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]
Easy to have an orgasm with primary partner	[ ]	[ ]	[ ]	[ ]	[ ]

29. In the past 48 hours (i.e., over the past 2 days), I have . . .

	Not at all 0	Once 1	A few times 2	More than a few times 3
Felt strong sexual attraction toward my partner	[ ]	[ ]	]	[ ]
Fantasized about sex with my partner	[ ]	[ ]	]	[ ]
Engaged in sexual activity with my partner	[ ]	[ ]	]	[ ]

30. If you have engaged in sexual activity in the past 48 hours (i.e., over the past 2 days) with your partner at least once, please indicate how many times the activity was initiated by:
You only: _____
Your partner only: _____
Both equally: _____

31. In the past 48 hours (i.e., over the past 2 days), how much has *your partner* . . .

	Far less than usual 1	2	3	4	Average 5	6	7	8	Far less than usual 9
Given you attention	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Expressed commitment to you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Expressed feelings of love to you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Expressed sexual attraction to you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Acted jealous about your casual interactions with people	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Monopolized your time	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Acted possessive of you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

32. Based on how you are feeling now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days), how jealous would you be if your primary partner cheated on you with a . . . *(If you do not have a primary partner, please imagine how jealous you would be)*

	Not at all jealous 1	2	3	4	5	6	7	8	Extremely jealous 9
Short-term/sexual relationship?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Long-term/emotional relationship	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

33. Read each statement and decide if it is an accurate statement about you. Give your own opinion of yourself.

	False, Not at All True	Slightly True	Mainly True	Very True
My favourite poet is Robert Kertezc	[ ]	[ ]	[ ]	[ ]
Sometimes I get ads in the mail I don't really want	[ ]	[ ]	[ ]	[ ]
My favourite sports event on television is the high jump	[ ]	[ ]	[ ]	[ ]
Most people would rather win than lose	[ ]	[ ]	[ ]	[ ]

34. Based on the past 48 hours (i.e., the past 2 days), I think that I have shown the following traits in the past 48 hours (i.e., the past 2 days) . . .

	Not at all 1	2	3	4	5	6	7	8	Extremely 9
Attractiveness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Masculinity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Femininity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Naturally smell good	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Healthiness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Social status	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Parenting qualities	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Intelligence	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

35. Based on how you are feeling now as well as your feelings and experiences in the past 48 hours (i.e., over the past 2 days), how would you describe your sexual orientation?

	Men only 1	2	3	Men and women equally 4	5	6	Women only 7
I am sexually attracted to	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am interested in sexual behaviour with	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

36. Based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e.., over the past 2 days) . . .

	Definitely Disagree 1	Slightly Disagree 2	Slightly Agree 3	Definitely Agree 4
I really enjoy caring for other people	[ ]	[ ]	[ ]	[ ]
It is hard for me to see why some things upset people so much	[ ]	[ ]	[ ]	[ ]
I find it easy to put myself in somebody else's shoes	[ ]	[ ]	[ ]	[ ]
If anyone asked me if I liked their haircut, I would reply truthfully, even if I did not like it	[ ]	[ ]	[ ]	[ ]
Other people tell me I am good at understanding how they are feeling and what they are thinking	[ ]	[ ]	[ ]	[ ]
I am able to make decisions without being influenced by people's feelings	[ ]	[ ]	[ ]	[ ]
Other people tell me I am good at understanding how they are feeling and what they are thinking	[ ]	[ ]	[ ]	[ ]
I usually stay emotionally detached when watching	[ ]	[ ]	[ ]	[ ]

a film				
I can tell if someone is masking their true emotion	[ ]	[ ]	[ ]	[ ]
I tend to get emotionally involved with a friend's problems	[ ]	[ ]	[ ]	[ ]
I find it difficult to read and understand things	[ ]	[ ]	[ ]	[ ]
I find it difficult to learn how to programme video recorders	[ ]	[ ]	[ ]	[ ]
I find it easy to grasp exactly how offs work in betting	[ ]	[ ]	[ ]	[ ]
I do not enjoy gamed that involve a high degree of strategy (e.g., chess, Risk, Games Workshop)	[ ]	[ ]	[ ]	[ ]
I can remember large amounts of information about a topic that interests me (e.g., flags of the world, airline logos)	[ ]	[ ]	[ ]	[ ]
I am fascinated by how machines work	[ ]	[ ]	[ ]	[ ]
I know very little about the different stages of the legislation process in my country	[ ]	[ ]	[ ]	[ ]
I can easily visualize how the motorways in my region link up	[ ]	[ ]	[ ]	[ ]
I do not enjoy in-depth political discussions	[ ]	[ ]	[ ]	[ ]
If I were buying a stereo, I would want to know about its precise technical features	[ ]	[ ]	[ ]	[ ]

37. In the past 48 hours (i.e., over the past 2 days), I have. . .

	Not at all 0	Once 1	A few times 2	More than a few times 3
Felt strong feelings of sexual desire in general	[ ]	[ ]	[ ]	[ ]
Fantasized about sex with a stranger or acquaintance	[ ]	[ ]	[ ]	[ ]
Fantasized about sex with a past partner	[ ]	[ ]	[ ]	[ ]
Felt strong sexual attraction toward someone (other than my primary partner)	[ ]	[ ]	[ ]	[ ]
Felt sexually aroused by the sight of someone very physically attractive (other than my primary partner)	[ ]	[ ]	[ ]	[ ]
Felt sexually aroused by the scent of someone (other than my primary partner)	[ ]	[ ]	[ ]	[ ]
Flirted with someone (other than my primary partner)	[ ]	[ ]	[ ]	[ ]
Engaged in sexual activity with	[ ]	[ ]	[ ]	[ ]

someone (other than my primary partner)				
Had fantasies about having sex with someone you are *not* in a committed romantic relationship with	[ ]	[ ]	[ ]	[ ]
Experienced sexual arousal when you were in contact with someone you are *not* in a committed romantic relationship with	[ ]	[ ]	[ ]	[ ]
Had spontaneous fantasies about having sex with someone you just met	[ ]	[ ]	[ ]	[ ]
Masturbated (alone)	[ ]	[ ]	[ ]	[ ]

38. If you have engaged in sexual activity with someone (other than a current primary partner) in the past 48 hours (i.e., over the past 2 days), please indicate how many times the activity was initiated by:

You only: _____
A partner only: _____
Both equally: _____

39. Please respond to the following questions:

	0	1	2	3	4	5-6	7-9	10-19	20 or more
During your entire life, with how many partners have you had sexual intercourse (sex)?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
With how many different partners have you had sex within the past 12 months	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
With how many differ partners have you had sex on *one* and *only one* occasion?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
With how many different partners have you had sex without having an interest in a long-term committed relationship with this person?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

40. Please respond honestly to the following general questions based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days).

Strongly disagree 1 2 3 4 5 6 7 8 Strongly agree 9

	1	2	3	4	5	6	7	8	9
I would like to have a romantic relationship that lasts forever	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I would never consider having a brief sexual relationship with someone	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I would have to be closely attached to someone (both emotionally and psychologically) before I could feel comfortable and fully enjoy having sex with him or her	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
For me, sex without love is OK	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I can see myself settling down romantically with one special person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I would consider having sex with a stranger if I could be assured that it was safe and he was attractive to me	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I can imagine myself being comfortable and enjoying "casual" sex with different partners	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sometimes I would rather have sex with someone I did not care about	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I can imagine myself enjoying a brief sexual encounter with someone I find very attractive	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I believe in taking sexual opportunities when I find them	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am interested in maintaining a long-term relationship with someone special.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I could easily imagine myself enjoying one night of sex with someone I would never see again.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I can easily see myself engaging in a long-term relationship with someone special.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Long-term romantic relationships are *not* for me.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Finding a long-term romantic partner is *not* important for me.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I could enjoy sex with someone I find highly desirable even if that person does not have long-term potential.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

I hope to have a romantic relationship that lasts the rest of my life.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I do *not* want to have sex with a person until I am sure that we will have a long-term serious relationship	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

41. Please respond to the following statements based on you feel now as well as your feelings and experiences in the past 48 hours (i.e., over the past 2 days). *If you have not engaged in sexual activity in the past 48 hours, please imagine how you would respond to the sexual items if you had engaged in sexual activity.*

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
I am satisfied with the frequency with which I have sexual intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied that my personal needs are completely met during lovemaking	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the amount of time that my partner and I spend together when we make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the spontaneity of my lovemaking.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with my ability to make my physical needs known to my partner(s)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the frequency with which I have orgasms	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the amount of time my partner and I spend together immediately after intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the quality of the time my partner(s) and I spend together immediately after intercourse	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the amount of foreplay involved in my lovemaking	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the importance my partner (s) places on lovemaking in the relationship	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with the times of day and night when my partner(s) and I usually make love	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I feel that nothing is lacking in my sex life	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am satisfied with my capacity for enjoying sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Generally, I am satisfied with my sex life	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

42. To what extent do you find members of the opposite sex with *tattoos* to be attractive based on how you feel now and how you have been feeling in the past 48 hours (i.e., the past 2 days)?

Not at all attractive								Extremely attractive
1	2	3	4	5	6	7	8	9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

43. To what extent do you find members of the opposite sex with *piercings* based on how you feel now and how you have been feeling in the past 48 hours (i.e., the past 2 days)?

Not at all attractive								Extremely attractive
1	2	3	4	5	6	7	8	9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

44. Consider the following hypothetical situation:
Your life is exactly as it is right now. *Imagine that you just met someone new that you think would be ideal or attractive for a short-term relationship.* A short-term relationship is primarily sexual in nature and tends not to last very long. Examples of this type of relationship include someone you may have a sexual affair with and someone you may have a one-night stand with. Based on how you feel now as well as your feelings and behaviour in the past 48 hours (i.e., over the past 2 days), how likely are you to . . .

Not at all likely								Extremely likely
1	2	3	4	5	6	7	8	9

	1	2	3	4	5	6	7	9
Give this person your phone number if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask this person for their number	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Return a smile or eye contact from this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Smile, or initiate eye contact with, this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Dance with this person if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask this person to dance with you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Buy this person a drink or ask this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to kiss you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate kissing with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Accept a ride home from this person if offered	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Offer this person a ride home or ask this person for a ride home	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate any sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate any sexual activity with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate sex with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

45. Based on how you feel now as well as your feeling and behaviours in the past 48 hours (i.e., over the past 2 days), how interested in a short-term (sexual) relationship are you?

Not at all interested								Extremely interested
1	2	3	4	5	6	7	8	9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

46. Consider the following hypothetical situation:
Your life is as it is now. *Imagine that you just met someone new that you would think would be ideal or attractive for a long-term relationship*. A long-term relationship involves commitment as well as an emotional connection. Examples of this type of relationship would include someone you may want to move in with, someone you may consider leaving a current partner to be with, and someone you may wish to marry at some point. Based on how you feel now as well as your feelings and behaviour in the past 48 hours (i.e., over the past 2 days), how likely are you to . . .

Not at all likely								Extremely likely
1	2	3	4	5	6	7	8	9

	1	2	3	4	5	6	7	9
Give this person your phone number if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask this person for their number?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Return a smile or eye contact from this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Smile at, or initiate eye contact with, this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Dance with this person if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask this person to dance with you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Buy this person a drink or ask this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow such a person to kiss you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate kissing with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Accept a ride home from this person if offered	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Offer this person a ride home or ask this person for a ride home	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate any sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate any sexual activity with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate sex with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

47. Based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days), how interested are you in a long-term (romantic) relationship?

Not at all interested 1	2	3	4	5	6	7	8	Extremely interested 9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

48. Read each statement and decide if it is an accurate statement about you. Give your own opinion of yourself.

	False, not at all true	Slightly true	Mainly true	Very true
My favourite hobbies are archery and stamp collecting	[ ]	[ ]	[ ]	[ ]
I don't like to buy things that are overpriced	[ ]	[ ]	[ ]	[ ]
Most people look forward to a trip to the dentist	[ ]	[ ]	[ ]	[ ]
In my free time I might read, watch TV, or just relax	[ ]	[ ]	[ ]	[ ]

For each of the following four images, please imagine that the person pictured is now around your age and complete the ratings that follow based on how you feel now as well as your feelings and behaviours in the past 48 hours (i.e., over the past 2 days).

Note that in the electronic questionnaire items 49 to 51 were presented four times, once for each of these four picture stimuli:

49. How likely would you be to . . .

Not at all interested 1	2	3	4	5	6	7	8	Extremely interested 9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

	1	2	3	4	5	6	7	9
Give this person your phone number if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask such this person for their number?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Return a smile or eye contact from this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Smile at, or make eye contact with, this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Dance with such this person if asked	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ask this person to dance with you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Buy this person a drink or ask this person to buy you a drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow such a person to kiss you	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate kissing with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Accept a ride home from such a person if offered	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Offer this person a ride home or ask this person for a ride home	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate any sexual activity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate any sexual activity with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Allow this person to initiate sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Initiate sex with this person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

50. If you met this person right now or in the past 48 hours (i.e., the past 2 days), indicate the extent to which you would be *attracted* to this person as . . .

	1	2	3	4	5	6	7	9
A long-term (romantic) partner	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
A short-term (sexual) partner	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

51. Indicate the extent to which you think the person has the following characteristics:

	1	2	3	4	5	6	7	9
Attractiveness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Healthiness	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Parenting qualities	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Social status	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Promiscuity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Intelligence	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Think of a person with whom you are having a strong romantic relationship. If you do not have a current primary partner, please imagine what your responses would be if you did. This person will be referred to as X in the following questions.

52. Based on how you feel now as well as well as your feelings and experiences in the past 48 hours (i.e., over the past 2 days), how often have you had the following thoughts about X?

	Never						All the time
	1	2	3	4	5	6	7
I suspect that X is secretly seeing someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am worried that some member of the opposite sex may be chasing after X.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I suspect that X may be attracted to someone else	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I suspect X may be physically intimate with another member of the opposite sex behind my back	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I think that some members of the opposite sex may be romantically interested in X	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I am worried that someone of the opposite sex is trying to seduce X	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I think that X is secretly developing an intimate relationship with someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I suspect that X is crazy about members of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

53. Based on how you feel now as well as your feelings and experiences in the past 48 hours (i.e., over the past 2 days), how would you emotionally react to the following situations?

	Not at all upset 1	2	3	4	5	6	Extremely upset 7
X comments to you on how great looking a particular member of the opposite sex is	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
X shows a great deal of interest or excitement in talking to someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
X smiles in a very friendly manner to someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
A member of the opposite sex is trying to get close to X all the time	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
X is flirting with someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Someone of the opposite sex is dating X	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
X hugs and kisses someone of the opposite sex	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
X works very closely with a member of the opposite sex (in school or office	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

54. Based on how you feel now as well as your feelings and experiences in the past 48 hours (i.e., over the past 2 days), how often have you been engaging in the following behaviours?

	Never 1	2	3	4	5	6	All the time 7
I look through X's drawers, handbag, or pockets	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I call X unexpectedly, just to see if he or she is there	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I question X about previous or present romantic relationships.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I say something nasty about someone of the opposite sex if X shows an interest in that person	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I question X about his or her telephone calls	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I question X about his or her whereabouts	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I join in whenever I see X talking to	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

a member of the opposite sex							
I pay X a surprise visit just to see who is with him or her	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

55.	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
I can tell when a man is being genuine and sincere in his affection toward me	[ ]	[ ]	[ ]	[ ]	[ ]
I doubt I could ever pull off cheating	[ ]	[ ]	[ ]	[ ]	[ ]
I look younger than most women my age	[ ]	[ ]	[ ]	[ ]	[ ]
When a man doesn't seem interested in me, I take it personally and assume something is wrong with me	[ ]	[ ]	[ ]	[ ]	[ ]
I have a sense of style and wear clothes that make me look sexy	[ ]	[ ]	[ ]	[ ]	[ ]
Honestly, I don't think I understand men at all!	[ ]	[ ]	[ ]	[ ]	[ ]
With me, a man gets what he sees – no pretenses here	[ ]	[ ]	[ ]	[ ]	[ ]
If I wanted to make my current partner jealous, I could easily get the attention of other people	[ ]	[ ]	[ ]	[ ]	[ ]
Men don't tend to be interested in my mind	[ ]	[ ]	[ ]	[ ]	[ ]
I'm definitely more creative than most people	[ ]	[ ]	[ ]	[ ]	[ ]
I hardly know when a man likes me romantically	[ ]	[ ]	[ ]	[ ]	[ ]
I laugh a lot at men's jokes	[ ]	[ ]	[ ]	[ ]	[ ]
If a man doesn't want to date me, I figure he doesn't know what he's missing!	[ ]	[ ]	[ ]	[ ]	[ ]
I'm not very artistic	[ ]	[ ]	[ ]	[ ]	[ ]
I'm usually right on the money about a man's intentions toward me	[ ]	[ ]	[ ]	[ ]	[ ]
I really don't have a great body compared to other women I know	[ ]	[ ]	[ ]	[ ]	[ ]
I believe that most men are actually more interested in long-term relationships than they're given credit for	[ ]	[ ]	[ ]	[ ]	[ ]
Most men who are nice to me are just trying to get in my pants	[ ]	[ ]	[ ]	[ ]	[ ]
When it comes down to it, I think most men want to get married and have children	[ ]	[ ]	[ ]	[ ]	[ ]
If I have sex with a man too soon, I know he will leave me	[ ]	[ ]	[ ]	[ ]	[ ]

Daily Questionnaire

1. *Today's* Date: _____ _____ _____
Day Month Year

2. This questionnaire is based on: (*Please do not complete a daily questionnaire more than 1 day late*) [ ] Today [ ] Yesterday

3. Are you menstruating (i.e., on your menstrual period) *today*? [ ] Yes [ ] No

4. This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer. Indicate to what extent *you* have felt this way *TODAY*.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
	1	2	3	4	5
Interested	[ ]	[ ]	[ ]	[ ]	[ ]
Distressed	[ ]	[ ]	[ ]	[ ]	[ ]
Excited	[ ]	[ ]	[ ]	[ ]	[ ]
Upset	[ ]	[ ]	[ ]	[ ]	[ ]
Strong	[ ]	[ ]	[ ]	[ ]	[ ]
Guilty	[ ]	[ ]	[ ]	[ ]	[ ]
Scared	[ ]	[ ]	[ ]	[ ]	[ ]
Enthusiastic	[ ]	[ ]	[ ]	[ ]	[ ]
Proud	[ ]	[ ]	[ ]	[ ]	[ ]
Irritable	[ ]	[ ]	[ ]	[ ]	[ ]
Alert	[ ]	[ ]	[ ]	[ ]	[ ]
Ashamed	[ ]	[ ]	[ ]	[ ]	[ ]
Inspired	[ ]	[ ]	[ ]	[ ]	[ ]
Nervous	[ ]	[ ]	[ ]	[ ]	[ ]
Attentive	[ ]	[ ]	[ ]	[ ]	[ ]
Jittery	[ ]	[ ]	[ ]	[ ]	[ ]
Active	[ ]	[ ]	[ ]	[ ]	[ ]
Afraid	[ ]	[ ]	[ ]	[ ]	[ ]
Hostile	[ ]	[ ]	[ ]	[ ]	[ ]
Determined	[ ]	[ ]	[ ]	[ ]	[ ]

5. Did you experience any medical illnesses *today* (e.g., the cold or flu)? [ ] Yes [ ] No

6. Please provide the following ratings based on how you feel *today*:

	Worse/Less than Usual		Average		Better/More than Usual
	1	2	3	4	5
Physical health (i.e., experience of physical symptoms)	[ ]	[ ]	[ ]	[ ]	[ ]

Emotional health (e.g., mood)	[ ]	[ ]	[ ]	[ ]	[ ]
Sexual functioning (desire, arousal, and ability to orgasm)	[ ]	[ ]	[ ]	[ ]	[ ]
Interest in a short-term (sexual) relationship	[ ]	[ ]	[ ]	[ ]	[ ]
Interest in a long-term (romantic) relationship	[ ]	[ ]	[ ]	[ ]	[ ]

7. Please indicate how many times sexual activity was initiated by . . . in the *past 48 hours*
You only: _____
A partner only: _____
Both equally: _____

8. Who have you engaged in sexual activity with in the *past 24 hours*? (All that apply)
[ ] Long-term/committed partner [ ] Regular sexual/uncommitted partner
[ ] Dating partner [ ] One-night stand/new sexual partner
[ ] I have not engaged in sexual activity with anyone in the past 24 hours
[ ] Others (please specify): _____

9. Were you scheduled to use a urine hormone testing strip *today*? [ ] Yes [ ] No

ITEM 10 WAS FOR WOMEN WHO WERE SCHEDULED TO USE A URINE HORMONE TESTING STRIP

10. If yes, what was the result of your hormone detection test today?
[ ] Positive (two [2] coloured bands present)
[ ] Negative (one [1] coloured band present
[ ] Unclear (was unable to interpret the results
[ ] Unavailable (was unable to use a testing strip today)

If the result was negative or unavailable, please continue the daily testing. If the result was unclear, please contact the researchers at hormones@lakeheadu.ca to let them know that you have an unclear result and continue the daily testing.

ITEM 11 WAS FOR WOMEN WHO WERE SCHEDULED TO USE A URINE HORMOME TESTING STRIP AND INDICATED A POSITIVE RESULT

11. If POSITIVE, how confident are you that the result of the hormone detection strip was positive?

0%		25%		50%		75%		100%
1	2	3	4	5	6	7	8	9
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Please contact the researchers at hormones@lakeheadu.ca to let them know that you have had a positive test result. Discontinue use of the hormone detection strips.

Debriefing Form B

Thank you for completing the Hormones & Sociosexuality Study. It will provide us with a better understanding of the associations among physical, emotional, and sexual health and wellbeing. For example, we will examine how changes in emotions influence changes in sexual attitudes and behaviours, and how these changes may be affected by reproductive events and hormones.

The dates of the Phase Questionnaires were scheduled to coincide with phases of the menstrual cycle. Female participants were scheduled for a high fertility (ovulatory) or mid-cycle phase and a low fertility (premenstrual) phase. Otherwise, questionnaire dates were scheduled to be about 10 to 14 days apart (e.g., for women who do not experience menstrual bleeding or who have irregular cycles and men). The results for women will be compared to those for men, and the results for women not using hormonal contraception, such as the birth control pill, will be compared to those of women using hormonal contraception. To help determine the accuracy of the phases, we kindly ask that all female participants please email Ms. Teatero with the start of their next menstrual period. This information is important for the data analyses.

The saliva samples that were collected from some female participants during lab sessions will be used to determine levels of sex and stress hormones like estrogen, progesterone, and cortisol. This information will be used to assess the accuracy of the menstrual cycle phases as well as the effects of hormones on the study results.

The body measurements that were taken at the laboratory sessions will be used as health-indicators, including body mass index (BMI), waist-to-hip ratio (WHR), second-to-fourth finger ratio (2D:4D), and mid-phalangeal hair count. Your hands were scanned to obtain the reliability of 2D:4D measurements.

Please be assured that your name and contact information will be removed from the data collected and there will be no way to identify your responses. All of your responses will remain completely anonymous and confidential. Please send a request to Ms. Teatero if you would like to receive a summary of the study results once we are finished collecting data.

If applicable, psychology students at Lakehead University have received up to 4 bonus points for the completion of the study. Other Thunder Bay residents (i.e., those not eligible for bonus points) who completed lab sessions were offered nominal remuneration of up to $15 (i.e., $5 for Stage 1 and $10 for Stage 2). All participants will be entered into up to 4 draws $50 VISA gift cards (one draw entry for each of Stages 1, 2, and 3; i.e., the Screening Questionnaire and two Phase Questionnaires). All participants who completed 80% or more of the Daily Questionnaires will be entered into a draw for one $50 Visa gift cards. Draws will be held periodically until the end of data collection (approximately January 2014). Only participants who have won the draws will be contacted.

For your interest, here are two references for articles in this research area:

Kiesner, J. (2011). One woman's low is another women's high: Paradoxical effects of the menstrual cycle. Psychoneuroendocrinology, 36, 69-76.

Oinonen, K. A. (2009). Putting a finger on potential predictors of oral contraceptive side effects: 2D:4D and middle-phalangeal hair. Psychoneuroendocrinology, 34, 713-726.

Sincerely,

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Appendix C

Data Screening for Part 1 of Study 2

Table C1

Summary of Means, Frequencies, and Comparisons on Screening Questionnaire (SQ) Variables between the Time 1 Sample (n = 327) and Eligible Non-Participants (n = 175)

Variable	*M* (SD)		*t*	df	*p*
	Time 1 sample[a]	Eligible non-participants[b]			
Age (years)	22.73 (5.26)	21.98 (4.93)	1.54	500	.125
Education level	6.56 (1.28)	6.25 (1.37)	2.55	336.98	.013*
Sexual orientation	1.43 (0.89)	1.47 (1.09)	-0.49	498	.624
Hormonal sensitivity	2.57 (1.17)	2.47 (1.21)	0.85	500	.394
Emotional health	5.75 (1.87)	5.54 (1.98)	1.18	500	.237
Physical health	5.82 (1.72)	5.92 (1.60)	-0.70	500	.488
Sexual functioning	6.31 (1.98)	6.19 (2.02)	0.61	497	.544
Negative impression management	2.17 (2.80)	2.53 (3.35)	-1.27	487	.203
Positive impression management	13.93 (4.65)	14.51 (4.97)	-1.29	493	.199
Neuroticism	7.62 (3.40)	7.45 (3.42)	0.54	482	.343
Sociosexuality	9.72 (4.66)	9.30 (4.61)	0.95	500	.201
Frequency of masturbation	3.93 (2.39)	3.36 (2.34)	2.57	495	.011*
Body mass index[c] (kg/m^2)	24.61 (5.90)	24.01 (6.56)	1.04	499	.297
Age at menarche (years)	12.70 (1.49)	12.03 (4.07)	-.2.39	497	.017*
Average menstrual cycle length (days)	30.22 (17.49)	28.24 (8.39)	1.38	485	.170
Menstrual cycle regularity	3.85 (1.03)	3.74 (1.10)	1.15	497	.250
	n (%)		X^2	df	*p*
Local community					.216
Yes	187 (57.2)	90 (51.4)	1.53	1	
No	140 (42.8)	85 (48.6)			
Full-time student					
Yes	290 (89.0)	144 (82.3)	4.38	1	.036*
No	36 (11.0)	31(17.7)			
Reproductive status					
HC use	185 (56.6)	80 (45.7)	5.40	1	.020*
Free-cycling	142 (43.4)	95 (54.3)			
Relationship status					
Single	112 (34.3)	60 (34.4)	.000	1	.994
In a relationship	215 (65.7)	115 (65.7)			

[a]*n*s ranged from 319 to 327 due to missing data. [b]*n*s ranged from 165 to 175 due to missing data. [c]Based on self-reported height and weight.
*$p < .05$.

Table C2

Summary of Means, Frequencies, and Comparisons on Screening Questionnaire (SQ) Variables between the Time 1-Time 2 Subsample (n = 277) and Non-Completers (n = 50)

Variable	*M* (SD)		*t*	df	*p*
	Time 1-Time 2 sample[a]	Non-completers[b]			
Age (years)	22.80 (5.29)	22.30 (5.09)	0.63	325	.530
Education level	5.60 (1.29)	6.38 (1.23)	1.11	324	.270
Sexual orientation	1.42 (0.89)	1.50 (0.91)	-0.58	324	.563
Hormonal sensitivity	2.58 (1.17)	2.48 (1.15)	0.58	325	.560
Physical health	5.77 (1.730	6.1 (1.63)	-1.27	325	.206
Emotional health	5.73 (1.82)	5.86 (1.95)	-0.48	325	.635
Sexual functioning	6.24 (1.98)	6.66 (1.92)	-1.38	325	.169
Negative impression management	2.14 (2.85)	2.33 (2.49)	-0.44	316	.661
Positive impression management	13.77 (4.60)	14.88 (4.86)	-1.54	322	.124
Neuroticism	7.71 (3.35)	7.12 (3.65)	1.13	321	.259
Sociosexuality	9.63 (4.65)	10.21 (4.74)	-0.79	317	.432
Frequency of masturbation (alone)	3.93 (2.72)	3.98 (2.52)	-0.14	323	.886
Body mass index[c] (kg/m^2)	24.69 (5.90)	24.20 (5.96)	0.53	324	.597
Age at menarche (years)	12.66 (1.41)	12.95 (1.84)	-1.25	324	.211
Average menstrual cycle length (days)	30.55 (18.83)	28.29 (4.99)	0.83	320	409
Menstrual cycle regularity	3.83 (1.07)	4.00 (0.81)	-1.09	319	.829
	n (%)		X^2	df	*p*
Local community					
Yes	165 (59.6)	22 (44.0)	4.19	1	.041*
No	112 (40.4)	28 (56.0)			
Full-time student					
Yes	244 (88.4)	46 (92.0)	0.56	1	.456
No	32 (11.6)	4 (8.0)			
Reproductive status					
HC use	163 (58.8)	22 (44.0)	3.80	1	.051[†]
Free-cycling	114 (41.2)	28 (56.0)			
Relationship status					
Single	184 (66.4)	31 (62.0)	0.37	1	.544
In a relationship	93 (33.6)	19 (38.0)			

[a]*n*s ranged from 270 to 277 due to missing data. [b]*n*s ranged from 48 to 50 due to missing data. [c]Based on self-reported height and weight.

[†]$p < .10$.*$p < .05$.

Table C3

Summary of Means and Comparisons between the Time 1-Time 2 Subsample (n = 277) and Non-Completers (n = 50) of the Main Time 1 Phase Questionnaire (PQ) Variables

Variable	*M* (*SD*)		*t*	df	*p*
	Time 1-Time 2 sample[a]	Non-completers[b]			
Main Scales of the Women's REP					
Negative Affective Experiences	2.09 (0.74)	2.14 (0.82)	-0.47	325	.643
Negative Physical Experiences	1.73 (0.41)	1.74 (0.42)	-0.25	325	.804
Sexual Problems – General	2.72 (0.70)	2.63 (0.71)	0.91	325	.366
Sexual Problems – Relationship[c]	2.19 (0.91)	2.13 (1.04)	0.34	192	.736
Positive Affective and Physical Experiences	2.84 (0.56)	2.84 (0.59)	0.04	325	.970
Body Image Quality	3.20 (0.71)	3.22 (0.74)	-0.19	325	.852
Sleep Quality	3.19 (0.81)	3.31 (0.71)	-1.00	325	.324
Receptivity Scales of the PARMSS					
Short-Term	3.97 (2.13)	4.04 (2.10)	-0.23	317	.819
Long-Term	4.93 (2.54)	4.86 (2.30)	0.16	317	.873
Picture Ratings	3.72 (1.98)	3.72 (1.74)	0.01	317	.991
Proceptivity Scales of the PARMSS					
Short-Term	2.78 (1.75)	2.83 (1.85)	-0.21	317	.835
Long-Term	3.83 (2.39)	3.81 (2.35)	0.04	317	.965
Picture Ratings	2.67 (1.68)	2.73 (1.58)	-0.19	317	.852

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptivity and Receptivity Mating Strategies Scale.
[a]*n* = 271 for the PARMSS. [b]*n* = 48 for the PARMSS [c]*n* = 165 for the Time 1-Time 2 subsample and *n* = 29 for the non-completers.

Appendix D

Tables of Correlations between the Subscales of the Women's Reproductive Experiences (REP) Questionnaire

Table D1

Correlations between the Main Subscales of the Women's REP in the Full Time 1 Sample (n = 327)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Hormonal Symptoms	1													
2. Decreased Appetite	.35***	1												
3. General Aches and Pains	.53***	.31***	1											
4. Negative Sexual Experiences – General	.38***	.21***	.29***	1										
5. Negative Sexual Experiences – Rship[a]	.29***	.01	.19*	.40***	1									
6. Negative Body Image Experiences	.59***	.09	.43***	.33***	.31***	1								
7. Negative Sleep Experiences	.45***	.34***	.45***	.34***	.27***	.39***	1							
8. Positive Sexual Experiences – Others	.13*	.09	.05	-.36***	.06	.06	-.02	1						
9. Positive Sexual Experiences – Self	-.03	-.07	-.09	-.47***	-.11	-.06	-.17**	.54***	1					
10. Positive Sexual Experiences – Rship[a]	-.24**	.02	-.17*	-.29***	-.73***	-.22**	-.20**	.001	.19**	1				
11. Positive Affective Experiences	-.19**	-.11*	-.26***	-.24***	-.38***	-.24***	-.33***	.16**	.32***	.45***	1			
12. Positive Physical Experiences	-.17**	-.09	-.24***	-.18**	-.25***	-.19***	-.20***	.22***	.40***	.31***	.73***	1		
13. Positive Body Image Experiences	-.21***	-.11†	-.22***	-.20***	-.26***	-.63***	-.23***	.09	.17**	.26***	.46***	.47***	1	
14. Positive Sleep Experiences	-.21*	-.15**	-.21***	-.17**	-.13†	-.09†	-.60***	.14*	.24***	.11	.48**	.45***	.25***	1

Note. Women's REP = Women's Reproductive Experiences Questionnaire. Rship = Relationship.
[a]*n* = 194 women in a relationship.
$^{\dagger}p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table D2

Correlations between the Supplementary Subscales of the Women's REP in the Full Time 1 Sample (n = 327)

	1	2	3	6	7	8	9	10	11	12	13	14	15
1. Testosterone-Related Experiences	1												
2. Progesterone-Related Experiences	.56***	1											
3. Negative Sexual Experiences – Others	.38***	.27***	1										
6. Negative Sexual Experiences – Self	.29***	.20***	.58***	1									
7. Negative Weight Experiences	.32***	.30***	.25***	.18**	1								
8. Positive Affect	-.28***	-.08	-.22***	-.23***	-.30***	1							
9. Elation	-.10†	.01	-.17**	-.11*	-.16**	.75***	1						
10. Positive General Physical Experiences	-.14*	-.05	-.11†	-.14*	-.27***	.71***	.59***	1					
11. Positive Skin Experiences	-.21***	-.05	-.02	-.01	-.13*	.36***	.26***	.35***	1				
12. Positive Digestion Experiences	-.05	-.08	-.25***	-.18**	-.18**	.47***	.35***	.52***	.20***	1			
13. Positive Breast Experiences	-.23***	-.15**	-.05	-.17**	-.06	.40***	.30***	.40***	.30***	.19**	1		
14. Positive Weight Experiences	-.03	.02	-.07	-.05	-.68***	.46***	.34***	.44***	.21***	.28***	.19**	1	
15. Positive Appetite Experiences	-.19***	-.14*	-.21***	-.18**	-.48***	.50***	.31***	.50***	.21***	.36***	.31***	.50***	1

Note. Women's REP = Women's Reproductive Experiences Questionnaire.
$^{\dagger}p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$

Appendix E

Tables of Correlations between the Main and Supplementary Subscales of the Women's Reproductive Experiences (REP) Questionnaire with the Women's Brief REP – Current Hormonal Contraceptive (HC) Ratings

Table E1

Correlations between the Main Subscales Women's REP with the Women's Brief REP – Current HC Ratings among HC Users (n = 159[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
Hormonal Symptoms	.19*	.18*	.04	.08	.08	.08	-.05	.18*	.17*	.13
Decreased Appetite	.20*	.16*	.10	.12	.06	.20*	.05	.24**	.17*	.14†
General Aches and Pains	.07	.10	.03	-.01	-.09	.11	-.13	-.03	.03	-.06
Negative Sexual Experiences – General	.08	.01	.05	-.01	-.04	.03	-.10	.001	-.08	.11
Negative Sexual Experiences – Relationship[b]	-.11	.07	.01	.21*	.11	.08	.13	-.13	-.05	-.02
Negative Body Image Experiences	.25**	.33***	.12	.05	.01	.01	-.09	.16*	.12	.09
Negative Sleep Experiences	.05	.05	.07	.01	.04	.10	-.06	.06	.05	.17*
Positive Sexual Experiences – Others	.02	.14†	.03	.14†	.13	.01	-.05	.10	.27**	.07

Variable	Negative	Negative	Negative	Positive	Positive	Positive	Increased	Decreased	Increased	Decreased

	effects on emotional health	effects on physical health	effects on sexual functioning	effects on emotional health	effects on physical health	effects on sexual functioning	interest in LTRs	interest in LTRs	interest in STRs	interest in STRs
Positive Sexual Experiences – Self	.10	.003	.05	.13	.16*	.17*	.18*	-.12	.14†	.04
Positive Sexual Experiences – Relationship[b]	.06	-.10	.004	-.14	-.17†	.01	-.22*	.05	.07	-.05
Positive Affective Experiences	.03	-.09	-.04	.11	.13†	.12	.28***	.07	.02	.07
Positive Physical Experiences	.05	-.04	.01	.13	.16*	.10	.24**	.06	-.05	.12
Positive Body Image Experiences	.03	-.21**	.01	.04	.10	.11	.23**	.05	-.001	.11
Positive Sleep Experiences	.03	.08	.10	.05	.001	-.01	.09	.12	.07	-.05

Note. Women's REP = Women's Reproductive Experiences Questionnaire. HC = Hormonal contraceptive. LTRs = long-term relationships. STRs = short-term relationships. The B-REP measures current HC users ratings of the negative and positive or increased and decreased side effects of their HCs on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a]Actual *n*s = 155 to 157 due to missing data. [b]*n*s = 110 to 111 women in a relationship.

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

Table E2

Correlations between the Supplementary Subscales Women's REP with the Women's Brief REP – Current HC Ratings among HC Users (n = 159[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
Testosterone-Related Experiences	.20*	.22**	.12	.10	.12	.08	-.09	.24**	.26**	.14†
Progesterone-Related Experiences	.13	.08	-.08	.04	.01	.06	.01	.05	.01	.07
Negative Sexual Experiences – Others	.12	.01	.09	.01	-.001	.08	-.02	-.01	-.06	.15†
Negative Sexual Experiences – Self	.02	.004	-.001	-.04	-.07	-.04	-.17*	.02	-.08	.04
Negative Weight Experiences	.06	.25**	.04	.001	-.06	-.05	-.18*	.02	-.08	.04
Positive Affect	.02	-.08	-.04	.11	.14†	.10	.27**	.07	.03	.07
Elation	-.03	-.10	-.05	.09	.10	.15†	.26*	.07	.02	.05
Positive General Physical Experiences	.06	-.06	.01	.08	.14†	.06	.21**	.05	-.07	.11
Positive Skin Experiences	.10	.13†	-.02	.14†	.09	.08	.18*	.16*	-.03	.09
Positive Digestion Experiences	-.01	-.02	.01	.09	.13	.03	.03	-.02	-.02	.07

| Variable | Negative | Negative | Negative | Positive | Positive | Positive | Increased | Decreased | Increased | Decreased |

	effects on emotional health	effects on physical health	effects on sexual functioning	effects on emotional health	effects on physical health	effects on sexual functioning	interest in LTRs	interest in LTRs	interest in STRs	interest in STRs
Positive Breast Experiences	-.02	-.10	.03	.12	.09	.17*	.27**	-.02	.01	.07
Positive Weight Experiences	.12	-.13	.06	.08	.14†	.13†	.23**	.11	.07	.21**
Positive Appetite Experiences	-.01	-.16*	.01	.03	.04	.11	.17*	.01	-.08	.01

Note. Women's REP = Women's Reproductive Experiences Questionnaire. HC = Hormonal contraceptive. LTRs = long-term relationships. STRs = short-term relationships. The B-REP measures current HC users ratings of the negative and positive or increased and decreased side effects of their HCs on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a] Actual *n*s = 155 to 157 due to missing data.

†$p < .10$. *$p < .05$. **$p < .01$.

Tables of Correlations between the Main and Supplementary Subscales of the Women's Reproductive Experiences (REP) Questionnaire with the Women's Brief REP – Premenstrual Phase Ratings

Table F1

Correlations between the Main Subscales Women's REP with the Women's Brief REP – Premenstrual Phase Ratings among Free-Cycling Women (n = 30[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
Hormonal Symptoms	.60**	.65***	.31†	.10	.09	.17	.21	.41*	-.01	.59**
Decreased Appetite	-.32†	-.17	-.09	-.15	-.12	-.30	.25	-.15	-.18	.36*
General Aches and Pains	.62***	.59**	.58**	.27	.24	.28	.16	.62***	.16	.60***
Negative Sexual Experiences – General	.55**	.41*	.47**	-.16	.004	.16	.04	.35†	-.03	.50**
Negative Sexual Experiences – Relationship[b]	.70**	.49†	.61*	-.21	.18	.20	-.16	.45†	.25	.28
Negative Body Image Experiences	.49**	.23	.03	.17	.36†	.43*	-.002	-.02	.19	-.04
Negative Sleep Experiences	.01	-.13	-.01	-.36†	-.36†	-.24	-.15	-.03	-.35†	.17
Positive Sexual Experiences – Others	.12	-.04	-.12	.32†	.10	.23	.02	-.01	.24	-.19

Variable	Negative	Negative	Negative	Positive	Positive	Positive	Increased	Decrease	Increased	Decreased

	effects on emotional health	effects on physical health	effects on sexual functioning	effects on emotional health	effects on physical health	effects on sexual functioning	interest in LTRs	d interest in LTRs	interest in STRs	interest in STRs
Positive Sexual Experiences – Self	.05	-.04	-.16	.39*	.20	.19	.09	-.03	.15	-.15
Positive Sexual Experiences – Relationship[b]	-.43	-.50†	-.61*	.47†	.17	.21	.03	-.47†	-.02	-.57*
Positive Affective Experiences	-.37*	-.26	-.32†	.02	-.13	.12	.08	-.11	.02	-.25
Positive Physical Experiences	.06	.08	-.19	.41*	.22	.53**	.29	.07	.55**	-.12
Positive Body Image Experiences	.06	.05	.30	.03	-.04	-.05	.02	.41*	.07	.35†
Positive Sleep Experiences	.21	.34†	.01	.47**	.43*	.64***	.31†	.15	.56**	-.11

Note. Women's REP = Women's Reproductive Experiences Questionnaire. LTRs = long-term relationships. STRs = short-term relationships. The B-REP measures women's reports of the negative and positive or increased and decreased effects of the premenstrual phase (in general) on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a]Actual *n*s = 29 to 30 due to missing data. [b]*n* = 15 women in a relationship.

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

Table F2

Correlations between the Supplementary Subscales Women's REP with the Women's Brief REP – Premenstrual Phase Ratings among Free-Cycling Women (n = 30[a])

Variable	Negative effects on emotional health	Negative effects on physical health	Negative effects on sexual functioning	Positive effects on emotional health	Positive effects on physical health	Positive effects on sexual functioning	Increased interest in LTRs	Decreased interest in LTRs	Increased interest in STRs	Decreased interest in STRs
Testosterone-Related Experiences	.58**	.63***	.30	.21	.25	.16	.15	.45*	.03	.57**
Progesterone-Related Experiences	.44*	.47**	.23	-.16	-.27	.12	.26	.19	-.10	.43*
Negative Sexual Experiences – Others	.57**	.48**	.55**	-.12	.04	.12	-.03	.42*	-.09	.54**
Negative Sexual Experiences – Self	.40*	.18	.22	-.20	-.05	.22	.12	.17	.09	.33†
Negative Weight Experiences	.01	.02	-.21	-.01	.05	.13	-.04	-.31	-.13	-.21
Positive Affect	-.39*	-.27	-.26	.02	-.15	.11	.07	-.12	.003	-.24
Elation	-.27	-.20	-.40*	.01	-.07	.13	.07	-.07	.06	-.23
Positive General Physical Experiences	.18	.16	-.12	.37*	.26	.54**	.31	.10	.50**	-.05
Positive Skin Experiences	-.33†	-.29	-.30	.20	.11	.18	.04	-.16	.39*	-.29

| Variable | Negative | Negative | Negative | Positive | Positive | Positive | Increased | Decreased | Increased | Decreased |

	effects on emotional health	effects on physical health	effects on sexual functioning	effects on emotional health	effects on physical health	effects on sexual functioning	interest in LTRs	interest in LTRs	interest in STRs	interest in STRs
Positive Digestion Experiences	.04	.21	-.18	.26	-.15	.26	.23	.14	.26	.03
Positive Breast Experiences	.07	-.05	-.03	.29	.37*	.44*	.13	.02	.42*	-.18
Positive Weight Experiences	.15	.05	.34	.03	.01	.13	.09	.37*	.17	.34†
Positive Appetite Experiences	-.02	.10	.22	.05	-.09	-.22	-.14	.40*	-.25	.36†

Note. Women's REP = Women's Reproductive Experiences Questionnaire. LTRs = long-term relationships. STRs = short-term relationships. The B-REP measures women's reports of the negative and positive or increased and decreased effects of the premenstrual phase (in general) on their emotional health, physical health, and sexual functioning (one item for each valance for a total of 10 ratings) from 1 (*not at all*) to 5 (*extremely*). High ratings reflect greater side effects, negative or positive.

[a] Actual *n*s = 29 to 30 due to missing data.

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

Appendix G

Table of Correlations of the Main and Supplementary Subscales of the Women's REP with Other Health-Relevant Variables in the Full Sample (n = 327[a])

Varaible	NIM	PIM	N	HS	NA	PA	EH	PH	SF
Main Subscales									
Hormonal Symptoms	.32***	-.29***	.33***	.21***	.47***	-.18**	-.25***	-.10†	-.10†
Decreased Appetite	.22***	-.07	.13*	.07	.25***	-.11†	-.08	.01	.05
General Aches and Pains	.30***	-.28***	.25***	.22***	.38***	-.20***	-.30***	-.11*	-.08
Negative Sexual Experiences – General	.26***	-.20***	.23***	.05	.29***	-.21***	-.26***	-.06	-.34***
Negative Sexual Experiences – Relationship[b]	.23**	-.20**	.26***	.15*	.36***	-.28***	-.20**	-.16*	-.51***
Negative Body Image Experiences	.19***	-.28***	.35***	.19***	.44***	-.20***	-.24***	-.09†	-.16**
Negative Sleep Experiences	.27***	-.27***	.30***	.05	.51***	-.34***	-.27***	-.17**	-.21***
Positive Sexual Experiences – Others	-.04	-.01	.02	.01	.07	.11†	-.001	.02	.15**
Positive Sexual Experiences – Self	-.05	.12*	-.10	-.02	-.10†	.20***	.09	.01	.29***
Positive Sexual Experiences – Relationship[b]	-.24**	.16*	-.16*	-.12†	-.32***	.39***	.15*	.16*	.48***
Positive Affective Experiences	-.26***	.16**	-.34***	-.06	-.45***	.79***	.40**	.29***	.31***
Positive Physical Experiences	-.18**	.17**	-.27***	-.04	-.23***	.54***	.31**	.33***	.24***
Positive Body Image Experiences	-.12*	.20***	-.26***	-.07	-.25***	.36***	.28**	.29***	.15**
Positive Sleep Experiences	-.16**	.13*	-.25***	.02	-.21***	.28***	.20**	.26***	.18**
Supplementary Subscales									
Testosterone-Related Experiences	.34***	-.31***	.35***	.21***	.49***	-.22***	-.28***	-.13*	-.15**
Progesterone-Related Experiences	.18**	-.19**	.21***	.16**	.31***	-.08	-.l4*	-.03	.000
Negative Sexual Experiences – Others	.24***	-.16**	.21***	.05	.28***	-.21***	-.25***	-.10†	-.33***
Negative Sexual Experiences – Self	.22***	-.18**	.20***	.03	.22***	-.17**	-.21***	.002	-.27***
Negative Weight Experiences	.14*	-.22***	.26***	.09	.28***	-.24***	-.26***	-.20***	-.15**
Positive Affect	-.27***	.19**	-.27***	-.07	-.46***	.79***	.42***	.30***	.28***
Elation	-.20***	.06	-.20***	-.03	-.30***	.65***	.27***	.22***	.33***
Positive General Physical Experiences	-.16**	.14**	-.27***	-.04	-.19**	.57***	.30***	.33***	.25***
Positive Skin Experiences	-.10†	.09†	-.13*	-.02	-.13*	.19**	.13*	.20***	.07
Positive Digestion Experiences	-.06	.13*	-.13*	.02	-.18**	.34***	.23***	.20***	.16**
Positive Breast Experiences	-.20***	.15**	-.17**	-.02	-.16**	.23***	.14*	.15**	.11*
Positive Weight Experiences	-.05	.14*	-.18**	-.02	-.15**	.33***	.30***	.23***	.11*
Positive Appetite Experiences	-.10†	.16**	-.24***	.09	-.21***	.37***	.23**	.24***	.11*

Note. Women's REP = Women's Reproductive Experiences Questionnaire. NIM = Negative Impression Management. PIM = Positive Impression Management. N = Neuroticism. HS = Hormonal Sensitivity Rating. NA = Negative Affect. PA = Positive Affect. EH = Emotional Health Rating. PH = Physical Health Rating. SF = Sexual Functioning Rating.

[a]Actual ns = 318 to 327 due to missing data. [b]ns = 180 to 194 women in a relationship.

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

Appendix H

Table of Correlations of the Main Subscales and Supplementary Subscales of the Women's Reproductive Experiences (REP) with Other Sexuality-Relevant Variables in the Full Sample (n = 327[a])

Variable	SO	PSSI	MF	A – LT	A – ST	SOI	LTMO	STMO	PSB	R	P
Main Subscales											
Hormonal Symptoms	.09	-.20***	.08	.13*	.13*	.04	-.10†	.06	-.01	-.02	-.02
Decreased Appetite	.04	-.11**	.04	.10†	.14*	.07	-.19***	.09	.01	-.01	.01
General Aches and Pains	.11*	-.10†	.04	.03	.04	.02	-.10	.05	.02	-.03	.03
Negative Sexual Experiences – General	.01	-.18**	-.12*	-.04	-.07	-.17**	-.06	.03	-.08	-.04	-.13*
Negative Sexual Experiences – Relationship[b]	.20**	-.56***	.15*	.03	.14*	.20**	-.08	.25**	.16**	-.06	-.13†
Negative Body Image Experiences	-.02	-.18**	-.01	.12*	.06	.03	-.04	.11*	.06	-.02	-.10†
Negative Sleep Experiences	.07	-.21***	-.02	.12*	.07	-.09	-.09	.03	-.06	-.05	-.05
Positive Sexual Experiences – Others	.13*	.01	.26***	.20***	.28***	.34***	-.13*	-.04	.07	-.04	.05
Positive Sexual Experiences – Self	.10†	.20***	.51***	-.03	.15**	.24***	-.04	.34**	.15**	.10†	.15*
Positive Sexual Experiences – Relationship[b]	-.14†	.66***	-.09	-.11	-.15*	-.16*	.14*	-.19**	-.10	.10	.10
Positive Affective Experiences	-.18**	.30***	.08	.02	.05	-.003	.22***	.22**	-.04	-.03	-.04
Positive Physical Experiences	-.14*	.40***	-.03	.03	.03	-.06	.15**	-.01	-.08	.02	-.02
Positive Body Image Experiences	-.07	.21***	.01	-.01	.04	-.07	.05	-.09	-.12*	.002	.06
Positive Sleep Experiences	-.08	.23***	.06	-.01	.06	.12*	.09	.07	.01	-.01	.02
Supplementary Subscales											
Testosterone-Related Experiences	.13*	-.24***	.09	.12*	.15**	.10†	-.12*	.14*	.04	-.02	-.04
Progesterone-Related Experiences	.000	-.09	.04	.10†	.08	-.06	-.05	-.01	-.07	-.01	.01
Negative Sexual Experiences – Others	-.004	-.14*	-.03	-.09	-.11	-.17**	-.03	-.13*	-.03	-.02	-.10†
Negative Sexual Experiences – Self	.02	-.18**	.19***	.02	.02	-.13*	-.08	-.07	-.12*	-.06	-.12*
Negative Weight Experiences	.01	-.17**	-.01	.07	.03	.04	-.02	.03	.05	-.01	-.06
Positive Affect	-.17**	.38***	-.03	.04	.02	-.07	.19***	-.09	-.09	-.02	-.05
Elation	-.16**	.40***	-.03	.001	.05	-.03	.23***	-.06	-.02	.11†	.07
Positive General Physical Experiences	-.17**	.28***	.08	.02	.07	-.004	.17**	-.01	-.02	.01	-.01

| Variable | SO | PSSI | MF | A – LT | A – ST | SOI | LTMO | STMO | PSB | R | P |

Supplementary Subscales											
Positive Skin Experiences	-.10†	.10†	-.01	.01	.02	-.05	.001	-.07	-.02	-.03	-.004
Positive Digestion Experiences	-.03	.22***	.04	.04	.06	.04	.10†	.06	-.04	-.09	-.08
Positive Breast Experiences	-.05	.22***	.13*	-.05	-.06	-.01	.05	-.04	-.03	-.03	-.05
Positive Weight Experiences	-.08	.15**	.01	.04	.07	-.10†	.06	-.04	-.14*	.02	.04
Positive Appetite Experiences	-.09†	.21***	-.01	-.001	.06	-.02	.04	.02	-.12*	-.04	.03

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scales. SO = Sexual Orientation rating. PSSI = Pinney Sexual Satisfaction Inventory – General (total score). MF = Masturbation Frequency Rating. A – LT = Attraction for a Long-Term Relationship – Picture Ratings. ST = Attraction for a Short-Term Relationship – Picture Ratings. SOI = Sociosexual Orientation Inventory – Revised (total score). LTMO = Long-Term Mating Orientation. STMO = Short-Term Mating Orientation. PSB = Past Sexual Behaviour. R = Number of Times *Receptive* to Sexual Activity with Others (excluding primary partner) in the past two days (48 hours). P (*Proceptive*) = Number of Times Sexual Activity with Others Initiated by Self or Both Self and Partner (excluding primary partner) in the past two days (48 hours).

[a]*n*s = 319 to 327 due to missing data. [b]*n*s = 189 to 194 women in a relationship.

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

Appendix I

Table of Correlations of the Main and Supplementary Subscales of the Women's Reproductive Experiences (REP) with Other Relationship-Relevant Variables among Women in a Relationship (n = 194[a])

Variable	PSSI	S	C	I	T	CJ	EJ	BJ	R	P
Main Subscales										
Hormonal Symptoms	-.25**	-.18*	-.11	-.14†	-.21**	.20**	.14†	.20**	.04	-.06
Decreased Appetite	-.03	-.20**	-.15*	-.17*	-.25***	.18*	.004	.18*	.08	.03
General Aches and Pains	-.02	-.22**	-.16*	-.22**	-.18*	.17*	.14†	.17*	.11	-.04
Negative Sexual Experiences – General	-.07	-.13†	.10	-.17*	-.17*	.09	.06	.05	.01	-.16*
Negative Sexual Experiences – Relationship	-.39***	-.35***	-.08	-.40***	-.24**	.12	-.04	.05	-.08	-.20**
Negative Body Image Experiences	-.20**	-.20**	-.01	-.19**	-.20**	.24**	.23**	.24**	.08	-.07
Negative Sleep Experiences	-.13†	-.24**	-.05	-.17*	-.18*	.16*	.07	.13	.02	-.12
Positive Sexual Experiences – Others	-.07	-.15*	-.27***	-.04	-.03	.11	-.06	.05	-.07	-.002
Positive Sexual Experiences – Self	.06	.12†	.01	.09	.20**	.01	.11	-.02	.09	.22**
Positive Sexual Experiences – Relationship	.38***	.40***	.17*	.48***	.23**	-.11	.14	-.02	.14†	.35***
Positive Affective Experiences	.18*	.30***	.11	.28***	.28***	-.13	.02	-.08	-.07	.10
Positive Physical Experiences	.30***	.41***	.17*	.42***	.34***	-.17	-.05	-.10	.001	.18*
Positive Body Image Experiences	.07	.22**	.03	.17*	.10	-.11	-.01	-.11	.08	.09
Positive Sleep Experiences	.04	.10	-.07	.06	.07	-.01	.002	.001	-.03	-.06
Supplementary Subscales										
Testosterone-Related Experiences	-.27***	-.23**	-.14†	-.22**	-.26***	.25**	.14*	.21**	.03	-.10
Progesterone-Related Experiences	-.14†	-.05	-.05	.02	-.08	.09	.09	.12†	.04	.01
Negative Sexual Experiences – Others	-.08	-.12	.07	-.18*	-.12†	.10	.11	.10	.03	-.12
Negative Sexual Experiences – Self	-.03	-.11	.11	-.12	-.19*	.05	-.01	-.02	-.02	-.17*
Negative Weight Experiences	-.06	-.22**	-.06	-.15*	-.10	.17*	.05	.13	.08	-.08
Positive Affect	.28***	.40***	.15*	.39**	.35***	-.19*	-.08	-.02	-.03	.15*

| Variable | PSSI | S | C | I | T | CJ | EJ | BJ | R | P |

Supplementary Subscales										
Elation	.31***	.38***	.17*	.44**	.26***	-.11	.04	.02	.08	.22**
Positive General Physical Experiences	.14*	.32***	.09	.30**	.26***	-.12†	.05	-.07	-.05	.13†
Positive Skin Experiences	.11	.03	.05	.05	.11	-.07	-.07	-.05	-.08	.03
Positive Digestion Experiences	.10	.26***	.09	.21**	.24**	-.07	.03	-.02	-.07	.03
Positive Breast Experiences	-.16*	.11	.06	.11	.15*	-.09	.01	-.07	-.01	.03
Positive Weight Experiences	-.08	.17*	.05	.15*	.05	-.08	.02	-.03	-.03	.07
Positive Appetite Experiences	-.04	.16*	-.06	.13†	.10	-.03	.004	-.12	-.09	.08

Note. Women's REP = Women's Reproductive Experiences Questionnaire. PARMSS = Proceptive and Receptive Mating Strategies Scales. PSSI = Pinney Sexual Satisfaction Inventory – Partner (total score). S = Relationship Satisfaction. C = Commitment to Partner. I = Intimacy with Partner. T = Trust in Partner. CJ = Cognitive Jealousy. EJ = Emotional Jealousy. BJ = Behavioural Jealousy. R = Number of Times *Receptive* to Sexual Activity with Partner in the past two days (48 hours). P (*Proceptive*) = Number of Times Sexual Activity with Partner Initiated by Self or Both Self and Partner in the past two days (48 hours).
[a]*n*s = 188 to 194 due to missing data.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Appendix J

Tables of Correlations between Average as well as Premenstrual Minus (-) Periovulatory Phase Change Scores for Conception Probability Estimates, Hormone Estimates, and Hormone Assays

Table J1

Correlations between Average as well as Premenstrual Minus (-) Periovulatory Phase Change Scores for Conception Probability Estimates, Hormone Estimates, and Hormone Assays in the Full Sample of Free-cycling Women (n = 87)

	CP Estimate	E Estimate	P Estimate	T Estimate	LH Estimate	FSH Estimate	E Assay[a]	P Assay[a]	T Assay[a]
CP	1	.07	-.26*	.40***	.27*	.31**	.13	-.34[†]	.14
E Estimate	.29**	1	.37***	.56***	.45**	.10	.31	.32	.17
P Estimate	-.15	.37***	1	.07	-.21*-	-.51***	.37[†]	.48*	-.08
T Estimate	.43***	.31**	-.02	1	.63***	.48***	.41*	.05	.15
LH Estimate	.21*	.36**	-.29**	.53**	1	.89***	-.10	-.25	-.08
FSH Estimate	.03	-.10	-.49***	.40**	.85***	1	-.17	-.41*	.01
E Assay[a]	-.07	.12	.40*	.08	-.01	-.01	1	.36[†]	.39[†]
P Assay[a]	-.24	.28	.48**	-.01	.16	.05	.69***	1	.44*
T Assay[a]	-.08	.31[†]	.24	-.04	.12	-.07	.64***	.34[†]	1

Note. Correlations for average estimates and assays are above the diagonal. Correlations for change scores are below the diagonal. Change scores were calculated as lowest fertility phase score minus highest fertility phase score and thus, higher scores change scores represent higher scores in the lowest fertility phase. CP = conception probability. E = estradiol. P = progesterone. T = testosterone. LH = luteinizing hormone. FSH = follicle stimulating hormone.

[a]n = 31 (27 for change scores) for E and P Assays. n = 30 (26 for change scores) for T Assay.

[†]$p < .10$. *$p < .05$. **$p < .01$. $p < .001$.

Table J2

Correlations between Average as well as Premenstrual Minus (-) Periovulatory Phase Change Scores for Conception Probability Estimates, Hormone Estimates, and Hormone Assays in the Final Sample of Free-Cycling Women (n = 42)

	CP Estimate	E Estimate	P Estimate	T Estimate	LH Estimate	FSH Estimate	E Assay[a]	P Assay[a]	T Assay[a]
CP	1	-.08	-.14	.11	.06	.12	-.07	-.20	.22
E Estimate	-.07	1	.42**	.15	.37*	.22	.41	.63**	.34
P Estimate	.15	.54***	1	.53***	-.10	-.17	.16	.45†	-.003
T Estimate	.15	.44**	.68***	1	.56**	.47**	.25	.39	-.05
LH Estimate	.06	.40**	.19	.63***	1	.98**	.63**	.56*	.22
FSH Estimate	.09	.28	.15	.58***	.97***	1	.58*	.47†	.10
E Assay[a]	.14	.09	.39	.18	-.18	.08	1	.46†	.51*
P Assay[a]	-.23	.29	.40	.19	.01	-.01	.44†	1	.15
T Assay[a]	-.002	-.02	.02	-.18	-.40	-.36	.52†	.69**	1

Note. Correlations for average estimates and assays are above the diagonal. Correlations for change scores are below the diagonal. Change scores were calculated as premenstrual phase score minus (-) periovulatory phase score and thus, higher scores change scores represent higher scores in the premenstrual phase. E = estradiol. P = progesterone. T = testosterone. CP = conception probability. LH = luteinizing hormone. FSH = follicle stimulating hormone.

[a]$n = 15$ for E and P Assays. $n = 14$ for T Assay.

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

Appendix K

Data Screening for Part 2 of Study 2

Table K1

Summary of Means and Frequencies for Comparisons on Screening Questionnaire (SQ) Variables between the Part 2 Subsample and Ineligible Participants

Variable	*M* (SD)		*t*	df	*p*
	Part 2 subsample (*n* = 42)	Ineligible participants[a] (*n* = 190)			
Age (years)	22.92 (5.43)	22.43 (4.82)	0.58	230	.561
Education level	6.67 (1.22)	6.59 (1.23)	0.36	229	.722
Sexual orientation	1.24 (0.82)	1.43 (0.88)	-1.32	229	.189
Hormonal sensitivity	2.48 (1.21)	2.58 (1.18)	-0.54	230	.593
Physical health	5.60 (1.56)	5.82 (1.74)	-.078	230	.439
Emotional health	5.50 (1.99)	5.73 (1.81)	-.074	230	.462
Sexual functioning	6.00 (1.70)	6.23 (2.02)	-0.86	230	.389
Negative impression management	2.14 (2.70)	2.05 (2.55)	0.21	223	.832
Positive impression management	14.19 (4.79)	13.79 (4.49)	0.51	229	.609
Neuroticism	7.61 (3.60)	7.69 (3.35)	-0.14	227	.889
Sociosexuality	8.02 (4.39)	10.04 (4.77)	-2.49	226	.013*
Frequency of masturbation	3.51 (2.40)	3.85 (2.37)	-0.83	228	.407
Body mass index[b] (kg/m^2)	25.99 (6.43)	24.43 (5.62)	1.56	230	.120
Age at menarche (years)	12.64 (1.35)	12.65 (1.44)	-0.04	230	.971
Average menstrual cycle length (days)	29.40 (5.26)	30.95 (22.24)	-0.44	227	.658
Menstrual cycle regularity	3.83 (0.70)	3.85(1.16)	-0.10	230	.918
	n (%)		X^2	df	*p*
Local community					
Yes	24 (57.1)	114 (60.0)	0.12	1	.733
No	18 (42.9)	76 (40.0)			
Full-time student					
Yes	36 (85.7)	171 (90.0)	0.18	1	.676
No	5 (11.9)	19 (10.0)			
Relationship status					
Single	23 (54.8)	138 (72.6)	8.29	1	.004**
In a relationship	19 (45.2)	52 (27.4)			

[a]*n*s ranged from 187 to 175 due to missing data. [b]Based on self-reported height and weight.
*$p < .05$. **$p < .01$.

Table K2

Summary of Means and Frequencies for Comparisons on Screening Questionnaire (SQ) Variables between the Part 2 Subsample and Imprecisely Scheduled Participants

Variable	*M* (SD)		*t*	df	*p*
	Part 2 subsample (*n* = 42)	Imprecisely scheduled participants[a] (*n* = 45)			
Age (years)	22.92 (5.43)	24.29 (6.77)	-1.04	85	.301
Education level	6.67 (1.22)	6.56 (1.63)	0.36	81.31	.719
Sexual orientation	1.24 (0.82)	1.53 (0.99)	-1.51	85	.135
Hormonal sensitivity	2.48 (1.21)	2.68 (1.12)	-0.85	85	.399
Physical health	5.60 (1.56)	5.69 (1.88)	-0.25	85	.802
Emotional health	5.50 (1.99)	5.91 (1.12)	-1.03	85	.304
Sexual functioning	6.00 (1.70)	6.27 (2.09)	-0.65	85	.517
Negative impression management	2.14 (2.70)	2.51 (3.96)	-0.50	85	.616
Positive impression management	14.19 (4.79)	13.25 (4.91)	0.90	84	.371
Neuroticism	7.61 (3.60)	7.89 (3.16)	-0.38	83	.707
Sociosexuality	8.02 (4.39)	9.40 (4.06)	-1.50	82	.136
Frequency of masturbation	3.51 (2.40)	4.62 (2.28)	-2.20	84	.031*
Body mass index[b] (kg/m^2)	25.99 (6.43)	24.55 (5.52)	1.02	84	.309
Age at menarche (years)	12.64 (1.35)	12.70 (1.40)	-0.21	85	.837
Average menstrual cycle length (days)	29.40 (5.26)	30.02 (8.98)	-0.39	85	.699
Menstrual cycle regularity	3.83 (0.70)	3.71 (0.94)	0.68	85	.496
	n (%)		X^2	df	*p*
Local community					
Yes	24 (57.1)	27 (60.0)	0.07	1	.787
No	18 (42.9)	18 (40.0)			
Full-time student					
Yes	36 (85.7)	37 (82.2)	0.52	1	.470
No	5 (11.9)	8 (17.8)			
Relationship status					
Single	23 (54.8)	23 (51.1)	0.16	1	.687
In a relationship	19 (45.2)	22 (48.9)			

[a]*n*s ranged from 42 to 45 due to missing data. [b]Based on self-reported height and weight.
*$p < .05$.

Appendix L

Table of Means, Frequencies, and Comparisons on Demographic and Hormonal Status Variables between Menstrual Cycle Pattern Groups

Variable	*M* (SD)		*t*	df	*p*
	POS (*n* = 16)	PMS (*n* = 25)			
Periovulatory phase day	12.18 (2.07)	11.44 (1.78)	1.23	39	.226
Premenstrual phase day	23.06 (2.58)	24.20 (2.63)	-1.36	39	.181
Menstrual cycle length (days)	29.50 (6.09)	29.44 (4.88)	0.04	39	.972
Menstrual cycle regularity	3.75 (0.94)	3.88 (0.53)	-0.57	21.20	.616
Sexual orientation	1.31 (0.87)	1.20 (0.82)	0.42	39	.678
Mean NA	1.95 (0.56)	2.21 (0.63)	-1.35	39	.184
Mean PA	2.90 (0.61)	2.77 (0.59)	0.65	39	.519
Mean proceptivity	2.71 (1.00)	2.41 (1.51)	0.70	39	.490
Conception probability	-0.05 (0.03)	-0.05 (0.03)	0.86	39	.396
Estradiol level estimate[a]	-32.22 (60.04)	-32.72 (64.53)	-0.03	39	.980
Progesterone level estimate[b]	9.60 (2.97)	8.52 (3.93)	0.93	39	.357
Testosterone level estimate[a]	-60.43 (36.32)	-64.38 (52.25)	0.26	39	.794
LH level estimate[c]	-10.53 (12.53)	-6.85 (10.87)	00.99	39	.326
FSH level estimate[c]	-4.19 (4.05)	-2.93 (3.47)	-1.06	39	.295
Estradiol level assay[ad]	-0.19 (0.60)	-0.09 (0.93)	-0.21	13	.836
Progesterone level assay[ad]	49.54 (159.51)	46.72 (93.70)	0.04	13	.966
Testosterone level assay[ad]	-4.76 (18.38)	-15.02 (22.10)	0.82	12	.430
	n (%)		X^2	df	*p*
Previous HC use					
Yes	3 (18.8)	5 (20.0)	0.01	1	.922
No	13 (81.3)	20 (80.0)			

Note. POS = periovulatory syndrome. PMS = premenstrual syndrome. NA = Negative Affective Experiences. PA = Positive Affective Experiences. Proceptivity = Proceptivity – Picture Ratings. HC = hormonal contraceptive. Values for conception probability, hormone estimates, and hormone assays are premenstrual minus (-) periovulatory change scores.
[a]pg/ml. [b]ng/ml. [c]mlU/ml. [d]*n*s = 5 and 10, respectively.