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Examining Fear of Negative Evaluation in Oral Contraceptive Users and Naturally Cycling Women

An Honors Thesis submitted in partial fulfillment of the requirements of Honors Studies in Psychology

By

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Examining Fear of Negative Evaluation in Oral Contraceptive Users and Naturally Cycling Women

Anxiety-related disorders affect 18% of the American population each year, with 6.8% of these individuals having a social phobia (Kessler et al., 2005). Social phobias and anxiety have been implicated in individual's concerns with being evaluated negatively by peers (Leary, 1983). Those high in fear of negative evaluation often become nervous in evaluative situations and work to avoid evaluation or to gain approval from peers (Watson & Friend, 1969). Anxiety and mood disorders are among the most common of diagnosed mental disorders and are more prevalent in women than men (Bekker & van Mens-Verhulst, 2007). Hormonal contraceptive use is an underexplored factor that affects anxiety in women. Women taking hormonal contraceptives have reported changes in mood disorders clinically, impacting depressive and anxiety symptoms (Skovlund et al., 2018). Though Skovlund and colleagues have found clinic results linking use of hormonal contraceptives and anxiety, little research has been conducted to evaluate how the use of hormonal contraceptives impacts fear of negative evaluation and anxiety on a subclinical level. Understanding the relationship between women's menstrual cycle, contraceptive use, and psychology would allow women to have a better understanding of their body so they can find the best contraceptive for themselves and their daily lives. The current study examined how women's fear of negative evaluation differs among naturally cycling women and oral contraceptives users.

Social Anxiety and Fear of Evaluation

A common form of anxiety is social anxiety, defined as a frequent human experience characterized by an intense fear of evaluation from others in social situations (Morrison & Heimberg, 2013). Social-evaluative anxiety originally was defined as the experience of distress,

discomfort, fear, etc., in social situations, as the avoidance of socially evaluative situations, and as the fear of being negatively evaluated by others (Watson & Friend, 1969). Individuals who have a high fear of negative evaluation have been found to avoid potentially dangerous social situations, feel worse when receiving a negative evaluation, experience more anxiety when placed in an evaluative situation, and be more concerned with making a good impression on others (Collins et al., 2005). The fear of unfavorable evaluation has been associated with various behavioral changes such as conformity, compliance, and altering self-presentation (Leary, 1983). These behaviors indicate a desire to fit into an in-group and can occur daily.

The desire to be included or accepted to an in-group has long been a goal and motivation for humans. This often causes a behavior known as self-regulation or adjusting one's behaviors and attitudes to conform to a socially desirable standard (Baumeister et al., 2005). Social rejection and evaluation impact self-value, health, and behavior, and research has shown that self-regulation methods may be altered by sex hormones.

The presence of an evaluative audience increases social anxiety in individuals and thus impacts hormonal responses in the body. Testosterone has been observed to increase amygdala reactivity causing an anxiolytic effect (McHenry et al., 2014). Combined oral contraceptives lower androgen levels, including testosterone, meaning it is likely that as the anxiety reducing effect of testosterone decreases, a higher fear of negative evaluation will be observed. Additionally, the hormone progesterone has been associated with experiences of social rejection (Maner et al., 2010). Maner and colleagues found that in a sample of undergraduate students, those in the rejection condition and those high in rejection sensitivity had significant increases in progesterone following rejection. These studies provide evidence for the connection between fear of evaluation and sex hormone levels. Still however, little research has been conducted to

evaluate how women's hormones and the use of hormonal contraceptives impact women and their daily life. As social anxiety diagnoses increase and more women begin to take combined oral contraceptives, this link should be examined.

Oral Contraceptives and Mental Health

The use of contraceptives has increased in recent decades since the debut of the first birth control pill in 1960 (Bailey, 2006). Contraceptives allow for the regulation of female fertility in a variety of methods, both hormonal and non-hormonal. The most common form of contraceptives used by women is 'the pill' - an oral contraceptive taken once a day that contains synthetic progestins, often in combination with a synthetic estrogen (ethinyl estradiol). Low doses of progestins and ethinyl estradiol prevent ovulation through action on the hypothalamic-pituitary-gonadal (HPG) axis. For women who are not on hormonal contraceptives, during the ovulatory phase of the menstrual cycle, the hypothalamus releases gonadotropin-releasing hormone (GnRH), triggering the anterior pituitary gland to release follicle-stimulating hormone (FSH) and luteinizing hormone (LH). The FSH and LH then trigger the ovaries to stimulate egg follicles to release estrogen. Following ovulation, the corpus luteum forms from the ruptured egg follicle and releases progesterone and estrogen. Oral contraceptives work against this system to provide negative feedback to the hypothalamus and pituitary glands of the endocrine system, suppressing GnRH, FSH, and LH production. The low levels of these hormones limit follicular development and ovulation in the menstrual cycle, preventing the release of an egg follicle, and thus preventing pregnancy (Elliott-Sale et al., 2013).

Hormonal contraceptives have provided significant advancement in women's sexual and reproductive health, and it is estimated over 100 million women currently use hormonal contraceptives. Research shows that many positive health benefits come from using the pill. For

example, studies show use of hormonal contraceptives decreases the risk of ovarian cancer development, lessens heavy menstrual bleeding, and provides protection against corpus luteum cysts, all in addition to preventing pregnancy (Brynhildsen, 2014). Hormonal contraceptive use can be a positive experience for many women because it allows women to control their menstrual cycle and related symptomatology (Baird & Glasier, 1993).

The effects of oral contraceptives can be observed physically, with some women experiencing symptoms such as weight gain, changes in acne prevalence, nausea, and headaches (Oddens, 1999). However, the psychological and biobehavioral impact of combined oral contraceptives are not as well researched or commonly discussed. Hormonal contraceptive use significantly increased the likelihood of women being diagnosed with depression in all age groups (Gregory et al., 2018). Further, research has shown that women's hormonal dysregulation as a result of oral contraceptive use was associated with higher instances of depression diagnoses, increased mood swings, and changes in sexual function (Oinonen & Mazmanian, 2002; Skovlund et al., 2016).

In terms of mental wellbeing, Skovlund and colleagues (2016) found that all types of hormonal contraceptives were positively related to use of antidepressants and diagnosis of depression in a group of 1,061,997 women. Progesterone was present in all contraceptives used. In another study, the use of hormonal contraceptives in women of ages 15 - 33 was positively associated with a first suicide attempt (Skovlund et al., 2018). The impacts of hormonal contraceptives on depression and mood suggests that other mental health disorders such as social anxiety and social fear could also be impacted by combined oral contraceptive use. Addressing this gap in research will allow women to understand the impacts of their hormonal contraceptive and navigate selecting the best option.

Current Research

Given the psychological effects of hormonal contraceptives are not often conveyed by physicians and scientists to women, the current research will address a gap in knowledge on the subclinical side effects of the pill. Though only 4-10% of combined oral contraceptive users experience mood side effects, past studies have limitations, and it is necessary to explore potential impacts of contraceptives on women's mental well-being (Gingnell et al., 2013). Regulation of the menstrual cycling through oral contraceptives use is needed and helpful for women, but without the proper research it is difficult for individuals to find a form of hormonal contraceptives that is best for them. The subclinical implications of hormonal contraceptives may result in increased fear of evaluation and social anxiety, negatively impacting a woman's life and behaviors. Understanding the links between women's menstrual cycles and psychology allows women to have a better understanding of their body so they can find the best contraceptive for themselves. The purpose of the research is to compare naturally cycling women with women taking oral contraceptives to examine their fear of negative evaluation levels following a socially evaluative stressor. Fear of negative evaluation scores will be measured following the Trier Social Stress Test.

Fear of negative evaluation scores are higher for women than they are for men (Hartmann et al., 2010; Duke et al., 2006). These data demonstrates the need to observe anxiety trends for women as they are more at risk for social anxiety and phobias. In addition to gender, other factors are associated with greater fear of negative evaluations. This includes high BMI, the presence of acne, and disordered eating (Biwe et al., 2011; Bremser & Gallup, 2012). As use of hormonal contraceptives often has side effects including weight gain and hormonal acne, it is important to consider the link between hormonal contraceptive use and fear of negative

evaluation. Women are already vulnerable to social anxiety and the common side effects and hormonal changes due to hormonal contraceptive use could make women more susceptible to social anxiety and fear of evaluation when they are on the pill. I examined the impact of oral contraceptives on social anxiety through the measure of fear of negative evaluation and comparison of naturally cycling women to those taking oral contraceptives.

Method

Participants

The participants in the current study were women recruited from the University of Arkansas campus. Those interested completed an eligibility screening survey in order to determine if they're a good candidate. Participants were excluded if they (1) were under age 18 or over age 35, (2) have irregular menstrual cycles, (3) have been pregnant or nursing in the past 6 months, (4) have chronic health conditions that could impact endocrine functioning (e.g. diabetes, polycystic ovary syndrome, etc…), (5) use medication that could impact endocrine function (e.g. beta-blockers, corticosteroids, etc…), (6) have a BMI under 18.5 or over 30, and if they (7) smoke or drink alcohol in excess. A total of 127 women completed the study and 119 completed the fear of negative evaluations scale. There is a discrepancy between the numbers due to participants not completing all tasks, including the fear of negative evaluations scale. Of the 119 women, 45 participants were on a birth control pill and 74 were naturally cycling.

All women reported their sex as female. Most participants identified their gender as female, with one identifying as nonbinary. Most participants were 20 years old (M = 20.87, SD = 3.74, range: 18 to 33). The race demographics of the participants are 79.0% white, 7.56% Asian, 6.72% black, 2.52% reported more than one race, 1.68% did not wish to report, 1.68% other, and 0.84% American Indian of Alaskan Native. Of the participants in the study, 11.8% of

participants identified as Hispanic or Latina. Most participants identified as only heterosexual (79.8%). In terms of political orientation, on a scale of 1 (Very Liberal) to 10 (Very Conservative), the sample was found to be slightly more liberal than average (M = 4.67, SD = 2.36). The research also used a 1-10 scale to measure religiosity with 1 being not religious at all and 10 being very religious. The sample was found to be more religious than average (M = 6.45, SD = 2.86). Moreover, naturally cycling women tended to be more religious (M = 6.85, SD = 2.79) than women taking birth control (M = 5.78, SD = 2.88), $t(177) = 2.01$, $p = .046$.

Participants were recruited from an existing database of women who agreed to be contacted for future paid studies and from the campus community via flyers, social media, and daily news emails. Participants were given 1.5 SONA credits or a $25 gift card for participating. Eligible participants were scheduled for their lab session based upon their cycle phase (naturally cycling women) and when they are taking their active pills (oral contraceptive users). Naturally cycling women were asked the date of their last period and their average cycle length to determine if they are in the luteal or follicular phase of the menstrual cycle before scheduling a lab session. Participants using oral contraceptives were scheduled for a lab session when they were taking their active pills (i.e. active ingredient containing pills), rather than placebo pills.

Procedure and Materials

All participants first read and signed an informed consent document. Participants then completed the Trier Social Stress Test (TSST), a social evaluation task intended to evoke social stress (Kirschbaum et al., 1993). This consists of two components. First, participants were told that they had five minutes to mentally prepare a five-minute speech describing why they are the most qualified candidate for their dream job. After this time period, participants were taken into a new room where two female confederates were in place to evaluate their speech (i.e. judges).

The participants were told they were being recorded for analysis, though the video camera was only used to increase stress and deception, not to record. The judges were trained to give no verbal or facial feedback to the participant. If the participant stopped speaking before the five minutes ended, a judge would say, “Please continue for the full duration of time.” Following the speech portion of the TSST, the second task (an oral arithmetic task) was introduced by the judges. The participants were told to sequentially subtract the number 13 from 1,022 for five minutes. If the participant reported a number incorrectly, a judge would say, “That is incorrect, please start over from 1,022.”

Participants would then return to the original lab room and experience a 15-minute waiting period where they could color before completing a block of questionnaires about their social perceptions. This included the Brief Fear of Negative Evaluation Scale (BNFE) (Leary, 1983). The BFNE scale has been found have high internal consistency and high validity by looking at the score in comparison to other measures of anxiety (Duke et al., 2006). The BNFE is a 12-item questionnaire with a 5-point scale that asks participants to choose how characteristic it is on a scale of 1 (Not at all characteristic of me) to 5 (Extremely characteristic of me) that they fear the given item. The items relate to individuals’ experience being negatively evaluated by an audience. Example items include: “I often worry that I will say or do the wrong things” and “I am usually worried about what kind of impression I make.” The 12 questions of the BNFE results were averaged. 1 indicated a lower fear of negative evaluation and 5 indicated a high fear of negative evaluation. The mean response (M = 3.40, SD = 0.88, range: 1.58 to 5) was more fearful of negative evaluation following the Trier Social Stress Test (TSST). Cronbach’s alpha measures the internal consistency of the items and was high (α = 0.92).

Results

Because there was a difference in religiosity between the two groups, I used the Analysis of Covariance (ANCOVA) test to compare BFNE between naturally cycling women and women using oral contraceptives, while controlling for the covariate of religious beliefs. The data did not support the hypothesis that naturally cycling women would have a lower fear of negative evaluation and there is marginal support for the opposite effect, $F(1,116) = 3.84$, $p = .053$. Indeed, figure 1 shows that women who are naturally cycling averaged a higher fear of negative evaluation ($M = 3.53$, $SE = 0.10$) than birth control users ($M = 3.196$, $SE = 0.13$) following the evaluative scenario of the Trier Social Stress Test.

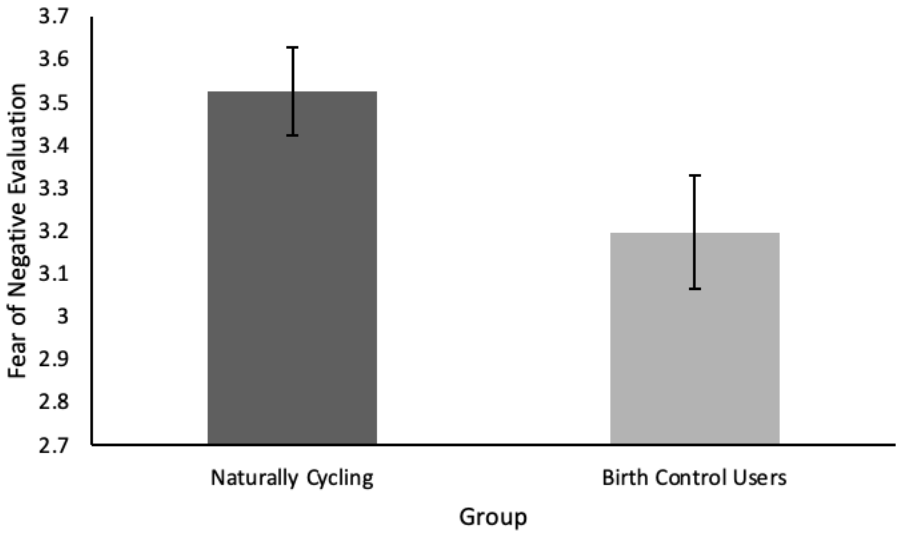

Figure 1: Fear of Negative Evaluation following TSST

Due to the results of the ANCOVA analysis, we conduced exploratory analyses that further divided the women in the naturally cycling group into two of the phases of the menstrual cycle to examine if there were differences within the naturally cycling women that could be affecting the overall means. There were 33 women in the follicular phase and 41 in the luteal phase. The follicular phase is the first phase of the menstrual cycle and takes place from days 1-8 (Thiyagarajan et al., 2021). The endometrial lining sheds during this stage, also called

menstruation. The body also prepares for the ovulatory phase during the follicular phase through maturation of the ovarian follicles. The ovulatory phase occurs from days 8-14 and is characterized by the release of luteinizing hormone (LH). The final phase of the menstrual cycle is the luteal phase, which occurs from days 15-28. During the luteal phase, progesterone from the corpus luteum peaks (Mihm et al., 2011). The increase in progesterone allows for the endometrium to thicken. The endometrium protects fertilized eggs if they are present and decays if not. Following the luteal phase, the follicular phase begins the cycle again.

The results of the ANCOVA of the follicular phase, luteal phase, and birth control women showed that the three groups were significantly different from each other, $F(2,115) = 3.90$, $p = .023$. We again controlled for religiosity. The women in the follicular phase reported marginally lower fear of negative evaluation ($M = 3.29$, $SE = 0.15$, $p = .052$) in comparison to those in the luteal phase ($M = 3.70$, $SE = 0.14$). The difference between birth control users ($M = 3.20$, $SE = 0.13$) and women in the luteal phase was significant ($p = .009$), indicating women in the luteal phase had significantly higher fear of negative evaluation following the social stress task.

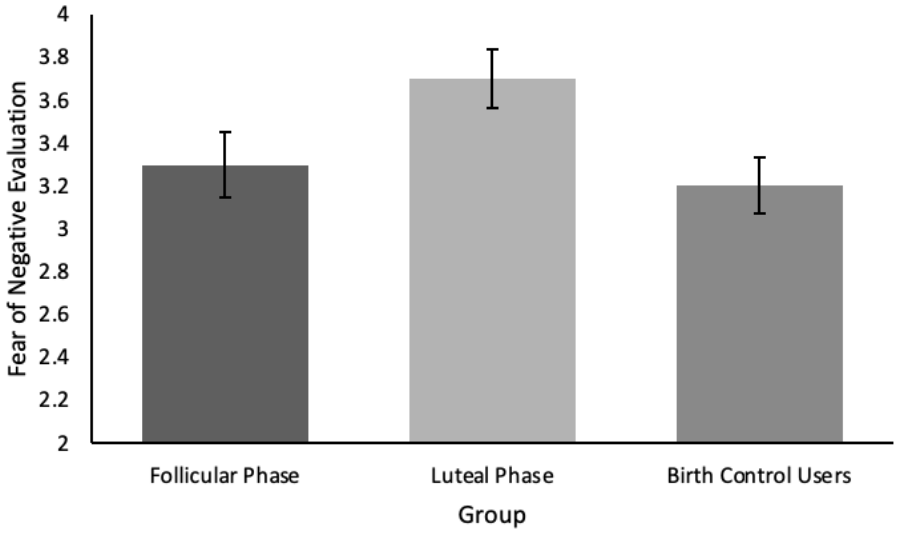

Figure 2: Fear of Negative Evaluation of Follicular, Luteal, and Birth Control Users

Discussion

The current research examined the differences between the fear of evaluation following a social stressor in

naturally cycling women and women using oral contraceptives. I hypothesized that women taking oral contraceptives would have an increased fear of evaluation in comparison to those who are naturally cycling. The data did not support this hypothesis. Women who were naturally cycling demonstrated marginally increased fear of negative evaluation in comparison to women taking oral contraceptives. Following an additional exploratory ANCOVA analysis there were significant findings discovered: naturally cycling women in the luteal phase of their menstrual cycle had higher evaluation than women in the follicular phase of their menstrual cycle and than women taking oral contraceptives. There was no significant difference between women in the follicular stage of the menstrual cycle and women taking birth control.

I hypothesized that women taking birth control would have a higher fear of negative evaluation following the social stress task compared to naturally cycling women. This was hypothesized due to the association found between mental health diagnoses and hormonal contraceptives. Skovlund and collogues (2016) found that all types of hormonal contraceptives were correlated to anti-depressive medication use and depression diagnoses in a large sample of women. Though these findings are relevant to understanding the psychological impacts of birth control, the current study did not find a link between oral contraceptive use and increased fear of evaluation. This may be due in part to the lower levels of progesterone women have while on oral contraceptives in comparison to naturally cycling women (Hamstra et al., 2014). Women taking birth control do not experience the rise in progesterone following ovulation that naturally cycling women do. The progesterone increase is caused by the empty ovarian follicle after ovulation, a stage that oral contraceptives block entirely.

The differences in the data regarding women in the follicular and luteal phases of their menstrual cycle could also be attributed to hormonal changes. Women who are naturally cycling

experience a menstrual cycle with fluctuations in concentrations of two ovarian gonadal hormones, estrogen and progesterone, over an average of twenty-eight days. The follicular phase sees a rise and peak in estradiol levels (primary form of estrogen produced in the ovaries) and low progesterone levels. The luteal phase of menstruation sees a peak in progesterone levels and a rise of estradiol before estrogen and estradiol levels fall (Garcia, Walker, & Zoellner, 2018). Previous research shows that during the luteal phase, the increase in progesterone correlates to psychological changes designed to help women overcome challenges often experienced during pregnancy (Maner & Miller, 2014). Maner and Miller found that progesterone increases during the luteal phase underlie heightened levels of social monitoring in women through evaluation of sensitivity to social cues indicating a social threat. Women in the luteal phase were associated with increased accuracy in decoding facial expressions and increased attention given to social stimuli. This suggests that in processing social cues and examining social scenarios, women with varying levels of progesterone may affiliate or regulate differently due to a social threat. These associations led us to divide the naturally cycling women into two groups – follicular and luteal – following the initial examination of the data. The increase in progesterone during the luteal phase is associated with higher social monitoring, as supported by our data of an increased fear of evaluation for these women.

There were limitations in this study that included a small sample size and varying numbers for each group. Before dividing the naturally cycling women there were 74 naturally cycling and 45 women on the pill. However, after the creation of the three groups, the sizes were more equal. The small sample size limited the power of data findings, and a larger sample size may have yielded different results. Eligibility criteria could be adapted to recruit a larger sample size, allowing for inclusion of women taking SSRIs and anti-anxiety medication. This would

allow for more generalizable conclusions to be made about the female population and contraceptives.

Another limitation of this study is the BNFE was administered after the TSST. This placed participants in a socially evaluative context before asking their opinions of evaluation. The TSST could have altered participant responses because of the recent evaluation they were placed under. However, all participants regardless of group experienced the same tasks throughout the TSST and significant results were still found. Future research could examine how women in different phases of their menstrual cycle and on different types of contraceptives would compare in fear of negative evaluation without an evaluative context present. Future research should also focus on examining the differences of how forms of birth control like hormonal IUDs and the four different generations of birth control may affect women's moods, fears, and social behaviors to lead to more education regarding birth control prescriptions.

In conclusion, we did not find a significant association between fear of negative evaluation and hormonal contraceptive use to support our hypothesis. However, we did find a significant increase in fear of negative evaluation for women in the luteal phase of their menstrual cycle compared to those taking oral contraceptives. Although the findings of the current study indicate that hormonal contraceptives may affect social behavior and mood in women, all facets should be considered when prescribing birth control. Women and prescribers are often not fully educated on the biological and behavioral impacts of hormonal contraceptives. Future research should investigate other subclinical and social behaviors that are impacted by phases of the menstrual cycle and hormonal contraceptive use to better empower women and providers of what the best options would be.

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