

THESIS

LEAKING THE SECRET: WOMEN'S ATTITUDES TOWARD MENSTRUATION AND  
MENSTRUAL-TRACKER MOBILE APPS

Submitted By

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## ABSTRACT

### LEAKING THE SECRET: WOMEN'S ATTITUDES TOWARD MENSTRUATION AND MENSTRUAL-TRACKER MOBILE APPS

This study explored how menstrual-tracker mobile apps have characteristics that reflect menstruation as a taboo in the U.S. culture. Objectification theory and gender schema theory provided a conceptual and overarching framework to explore how the U.S. sociocultural context may play a role in the development of norms and assumptions surrounding menstruation, and in turn, menstrual-tracker mobile apps reflecting society's norms and assumptions about menstruation as a taboo. Feminist theory is discussed as well, as it shed light on the development of the androcentric view toward menstruation in the United States, and it kindled the researcher's interest in conducting this study. A dearth of literature exists about menstrual-tracker mobile apps as cultural products, and an online survey was conducted among a convenience sample of female undergraduate millennials ( $n = 258$ ) to investigate if a correlation exists between their attitudes toward menstruation as a taboo and menstrual-tracker mobile apps' security features, body control features, and discussion features. The analysis of the data revealed that female undergraduate millennials' attitudes toward menstruation as a taboo in this study correlated to their attitudes toward security features and discussion features but not body control features on menstrual-tracker mobile apps.

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# CHAPTER 1

## INTRODUCTION

Women have been tracking their menstrual cycles for thousands of years (Eveleth, 2014). Women marked the phases of the moon to track their menstrual cycles and marked their periods with tally marks (Marshack, 1972). In the 1920s, surgeons developed the Calendar Method, or Rhythm Method, to help women who have predictable menstrual cycles avoid conception (Singer, 2004). In the 1960s, Austrian physicians, Drs. John and Evelyn Billings, developed the Ovulation Method and Sympto-Thermal Method of Fertility Awareness to help women identify fertile and infertile times based on women's cervical mucus patterns (Singer, 2004). Women have used pen and paper, spreadsheets, and calendars to track their periods long before technology was prevalent (Eveleth, 2014).

Even with the widespread usage of the Internet in the United States in 2007, Heather Rivers, a software developer, could not find a website to track menstrual cycles after using Google to search for one (Eveleth, 2014). Rivers developed and established a website called MonthlyInfo in 2008 to track her own period and opened it to other users (CrunchBase, 2008); the site quickly grew to over 100,000 users, and a market for tracking periods emerged (Eveleth, 2014). Rivers created MonthlyInfo for women to track their periods using the Internet nearly a decade before menstrual-tracker mobile apps became prevalent (Eveleth, 2014).

The demand for menstrual-tracker mobile apps is huge and hundreds of menstrual-tracker mobile apps, or period-tracker mobile apps, are on the market today (Eveleth, 2014). Tracking periods using menstrual-tracker mobile apps allows women to store data about their periods, which is a form of quantified self-tracking (Eveleth, 2014). Tracking periods can help women

identify if their menstrual cycles are regular, which is a sign of good reproductive health (Office of Women's Health, 2012). Many women from the Quantified Self community have expressed a common concern about new technologies developed for the masses, such as mobile apps and devices: they are generally biased toward men's interests (Eveleth, 2014). For example, several sex-tracker mobile apps are geared toward men to measure their sexual performance and superiority among other users (Lupton, 2014). One of the possible reasons for the skew toward men's interests could be that the majority of tech developers are men (Eveleth, 2014).

Indeed, only 20% of tech developers are women at Apple and 18% of tech developers are women at Google (Brustein, 2015). Apple and Google are two of the top five largest tech companies in the world (Chen, 2015), and the two companies have overlooked women's reproductive health in its mobile apps (Khurshid, 2015). Apple overlooked creating features for women's reproductive health in its HealthKit mobile app, and Google does not have features for women's reproductive health in its health mobile app (Khurshid, 2015). Apple released its HealthKit mobile app in 2014 (Diamond, 2014), which has the ability to track the user's daily chromium intake and electrodermal activity, but the HealthKit mobile app did not include tracking one of the earliest forms of quantified self-tracking: menstrual cycles (Eveleth, 2014). After widespread criticism, Apple developed features in its HealthKit mobile app for women to track their reproductive activities, such as their menstrual cycles (Khurshid, 2015).

Moreover, several menstrual-tracker mobile apps reflect what app developers believe are society's norms and assumptions about women's fertility (Eveleth, 2014). According to Lupton (2014), "Apps are new digital technology tools, but they are also sociocultural products located within pre-established circuits of discourse and meaning" (p. 440). App developers have created several menstrual-tracker mobile apps that have stereotypical features, such as having pink, floral



layouts, focusing on moods, and using euphemisms, which reflect and perpetuate menstruation as a taboo (Eveleth, 2014). According to Lupton (2012), “Technologies bestow meaning and subjectivity upon their users, just as users shape the technologies and give them meaning as they incorporate them into everyday practices” (p. 232). The stereotypical features in menstrual-tracker mobile apps are inviting women to think of menstruation as a taboo while they use these apps for health purposes (Eveleth, 2014; Lavigne, 2014; Lupton, 2014).

In the U.S. culture, menstruation is a taboo even though menstruation is a biological function of a woman’s body, and the media reinforce menstruation as a taboo (Delaney, Lupton, & Toth, 1988). The media portray menstruation in a negative light and can influence how some women view themselves and their bodies (Kissling, 1996). The literature regarding menstruation as a taboo in the U.S. is extensive. Some research includes the history of menstruation as a taboo in the United States (Delaney et al., 1988), advertisements in the U.S. society focusing on using hygiene products to hide menstruation (Merskin, 1999), embarrassment surrounding menstruation (Roberts, 2004), and the social stigma of discussing menstruation (Kissling, 1996).

Discussing and hiding menstruation is a burden for many women: they use euphemisms to avoid blatantly discussing menstruation and hide feminine hygiene products in male-dominated jobs (Massey, 2015). Today, women have the option to suppress menstruation with contraceptive devices, such as intrauterine devices (IUD’s) and birth control pills to avoid the physical and emotional symptoms associated with menstruation (Massey, 2015). Gynecologists have said that skipping menstrual cycles using prescribed contraceptives have no short- or long-term consequences, but the debate continues if suppressing menstruation is unnatural or not (Massey, 2015).

Much of the literature discusses how menstruation is a taboo in the United States, but only a sparse amount of literature, however, examines how menstruation as a taboo plays a role in the usage and design of menstrual-tracker mobile apps. Three recent articles have discussed menstrual-tracker mobile apps and noted that more research needs to investigate menstrual-tracker mobile apps (Bretschneider, 2015; Lupton, 2014; Richman, Webb, Brinkley, & Martin, 2014).

In a study, Richman et al. (2014) surveyed 738 college students in the United States, and of the 74% of females who reported they owned a smartphone, 46% of females listed tracking periods as the top feature they would find the most useful in a mobile app that is for managing sexual health.

In another study, Lupton (2014) critically examined sexual and reproductive mobile apps, including menstrual-tracker mobile apps, and found that menstrual-tracker mobile apps and fertility-tracker mobile apps are often lumped together. The reproductive mobile apps invite women to think of their reproductive health in medical terms, and the apps encourage women to believe that they are responsible in surveilling their bodies and documenting and managing their sexual activities with pregnancy as the main goal (Lupton, 2014). The apps often perpetuate stereotypes as well, such as encouraging women to send messages to their partner that they are fertile and encourage their partner to send them flowers or take them out on a date (Lupton, 2014).

Bretschneider (2015) and his team looked at comments from seven period-tracker mobile apps in the Android Play Store and six period-tracker mobile apps in the Apple iTunes Store and found the most frequent comments included: the graphic user interface (GUI) lacks clarity, no

birth-control pill reminder, a confusing list of possible symptoms and moods, and too few gradations to enter menstruation.

Additionally, Bretschneider (2015) and his team surveyed 196 women and found that 62% were using at least one period-tracker mobile app within the last year, 29% said they have switched to different menstrual-tracker mobile apps because the apps were too confusing and too complex, and 63% said they would use a period-tracker mobile app purely to observe their menstrual cycle.

Bretschneider (2015) and his team also interviewed five women, and three of the women said they preferred a period-tracker mobile app “with an unobtrusive appearance and name” (p. 282); one woman said, “I don’t want anybody using my phone to see that I have such an app” (p. 282).

Although menstrual-tracker mobile apps are now being produced and actively used, their design and usage are influenced by the fact that the U.S. culture considers menstruation as a taboo. Menstrual-tracker mobile apps reflect menstruation stereotypes (Eveleth, 2014; Lupton, 2014), and app designers should stop depending on cultural norms surrounding menstruation and listen to women when creating apps for them (Lavigne, 2014). The purpose of this study is to listen to women regarding menstrual-tracker mobile apps and to examine menstrual-tracker mobile apps as cultural products.

The objective of this study is to understand how attitudes toward menstruation are determining the way menstrual-tracker mobile apps are designed and used. Fishbein and Ajzen (2010) defined “attitude as a latent disposition or tendency to respond with some degree of favorableness or unfavorableness to a psychological object” (p. 76 & p. 125). Women may have different attitudes toward menstruation as a taboo and menstrual-tracker mobile apps based on

social norms surrounding menstruation, as well as their own motivations, expectancies, and experiences with menstrual-tracker mobile apps and menstruation.

This study will use objectification theory (Fredrickson & Roberts, 1997) and gender schema theory (Bem, 1981) as the conceptual and overarching framework, as these theories provide insight into how the U.S. sociocultural context may play a role in the development of norms and assumptions surrounding menstruation, and in turn, menstrual-tracker mobile apps reflecting society's norms and assumptions about menstruation as a taboo. Feminist theory will also be discussed, as the researcher's interest in this study was kindled from feminist theory; however, feminist theory did not inform the study design or data analysis. By conducting this study, it will critically examine how the media perpetuate menstruation as a taboo and continue the conversation to challenge the menstruation taboo in the U.S. culture.

CHAPTER 2  
LITERATURE REVIEW

**The Menstruation Taboo**

**Etymology of Taboo**

The meaning of the word “taboo” in English has not changed much over the years. The word “taboo” in English has been around for over two centuries, and it derived from the Tongan word *tabu* (Allan & Burridge, 2006). In the late 1770s, Captain James Cook wrote in his logbooks about Tahitians in Tahiti and their use of the word *tabu*, which he explained meant prohibited behaviors, and he later spelled it “taboo” (Cook, 1967).

According to Allan and Burridge (2006), “Taboo refers to a proscription of behaviour [*sic*] for a specifiable community of one or more persons, at a specifiable time, in specifiable contexts” (p. 11). People will forbid behaviors that they perceive will cause harm to a person or community; however, “the degree of harm can fall anywhere on a scale from a breach of etiquette to downright fatality” (Allan & Burridge, 2006, p. 11). Freud (1920) noted that the origins of taboos are largely unknown. Taboos include a wide range of topics and behaviors, such as menstruation, illnesses, sexual behaviors, and food preparation (Allan & Burridge, 2006). Although many taboos exist for many different reasons, this study will focus on the menstruation taboo.

**Origins of Menstruation as a Taboo**

The *Oxford English Dictionary* (2015) defines menstruation as “the periodic shedding of the uterine lining in women and certain other female primates, manifesting itself as a flow of blood from the vagina at approximately 28-day intervals from menarche until the menopause,

except during pregnancy and lactation.” Menstruation could be a taboo for a variety of reasons. The menstruation taboo probably began due to superstitious beliefs, not logic (Goldschmidt, 1934). According to Allan and Burrige (2006), “In the Middle Ages, menstrual blood was believed to contain defiled spirits, and many of the most feared diseases, like leprosy and syphilis, were thought to be transmitted through menstruating women” (p. 164). In the early 1900s, Sigmund Freud (1920) ascribed menstruation as a taboo because of the menstrual blood. Some cultures used menstrual blood for folk magic spells, and it continues today (Allan & Burrige, 2006). The disgust of being unclean, the females need to protect themselves, and the fascination with blood are probably the origins of menstruation as a taboo (Goldschmidt, 1934).

Indeed, cultures around the world have created prohibited behaviors when women are menstruating. Menstruation is a biological process, but the way people perceive menstruation developed from their cultural context (Chrisler, 2013; Delaney et al., 1988). For example, due to several passages in the Bible regarding menstruation as unclean, Hasidic Jews ride separate buses from menstruating women in Manhattan to remain clean (Allan & Burrige, 2006). In the Navajo culture, Navajo women also have several restrictions when menstruating, such as not having sexual relations with their husbands and not participating in ceremonies (Allan & Burrige, 2006). In the Western society, people equate menstrual blood with waste excrement, and menstrual blood is seen as disgusting and not to be touched; the idea of touching blood from our loved ones from a wound is regarded differently than the idea of touching menstrual blood (Bramwell, 2001). The restricted behaviors regarding menstruation have solidified it as a taboo.

Moreover, men have most likely played a part in the origins and reinforcement of menstruation as a taboo (Delaney et al., 1988). Menstruation has caused a cultural dichotomy between men and women. The reason why menstruation started out as a taboo might be that a

woman's cycle and the moon's cycle are the same length of time, and men do not have a bodily link that coincides with a cosmic entity (Allan & Burrige, 2006).

Due to women's menstrual cycles linking them with nature and sexuality, Thomas (2007) argued that men prevented women from engaging with men in political and governmental discussions because the men considered women to be emotional and passionate. Women go through great lengths to control their menstrual cycles, keep it secret, and fit in with a society that welcomes masculine ideals (MacDonald, 2007; Merskin, 1999; Thomas, 2007). According to MacDonald (2007), "We have removed bodily fluids from the intellectual/rational/masculine realm, exiling them to the material/emotional/feminine world where, paradoxically, we can ignore them by exerting control over them" (p. 341). Many women may feel they need to hide a feminine, biological process to participate in society.

### **Brief History of the Menstruation Taboo in the U.S. Media**

In the United States, the obsession with cleanliness and concealment developed with advertising (Vostral, 2005). In the end of the 19<sup>th</sup> century, industrialization of products became common, and advertising campaigns for hygiene products became popular (Vostral, 2005). In the early 1900s, and with the passing of the 19<sup>th</sup> Amendment, women wanted to be more modern; at that time, women who were menstruating were seen as mentally and physically incompetent (Vostral, 2005). Women began to view hygiene products for menstruation in a new light. According to Vostral (2005), "Menstrual hygiene products provided a technological fix to a bodily and social problem" (p. 257). Advertisers appealed to educated, white women to sell pads; women wanted to be civilized, and they wanted to maintain being discreet with their menstrual cycles (Vostral, 2005). The emergence of menstrual hygiene products were a tool women could use to manage their cycles and go to work and school, but the advertisers also played on

women's fears of revealing that they were menstruating to sell the menstrual hygiene products (Thomas, 2007).

Furthermore, advertisements during World War II promoted menstrual hygiene products as a way to meet women's needs while encouraging them to work (Delaney et al., 1988). When the men came home after World War II, the language and the focus of the advertisements changed; only women's faces were in the advertisements, and the advertisements used the word "girls" instead of "women" (Delaney et al., 1988). Advertisements between the end of the 1950s and the beginning of the 1980s encouraged women to stay at home and maintain being discreet with menstrual hygiene products because advertisers perpetuated menstruation as embarrassing (Delaney et al., 1988). Television and radio banned menstrual hygiene products on air until the end of 1972; after that, the advertisements had several restrictions about the language they could use regarding menstruation, and the advertisements could only air during the day when women were home and in the evening when children were asleep (Delaney et al., 1988).

The media have continued to play on women's fears of embarrassment regarding menstruation. For example, Thomas (2007) discussed a tampon advertisement that had a scuba diver close to a shark, which said, "A leak can attract unwanted attention." Some films and television shows perpetuate menstruation as a taboo as well. Kissling (2002) critically analyzed scenes where adolescent girls received their menarche in three movies and four television shows. The main theme among all of them was that adolescents who received their menarche felt shameful and alone. Kissling (2002) tied together the elements of menstruation as a taboo:

The taboos that enforce this isolation and secrecy are material, physical, and linguistic; menstruation must be concealed verbally as well as physically, and communication rules and restrictions define and enforce the concealment and activity taboos. (p. 5)



## **The Language of the Menstruation Taboo**

Unquestionably, the media commonly use euphemisms when discussing menstruation. When Chrisler et al. (2011) entered three drugstore chains, the researchers discovered that the menstrual hygiene products were in the back of the store, and the signs emphasized cleanliness and used euphemisms to describe the products. Advertisements will use euphemisms like “that time of the month” and “not feeling fresh”; advertisements will also use floral symbols on menstrual hygiene products to signify freshness and delicacy (Merskin, 1999). On television, advertisers will use blue liquid for demonstration purposes on pads instead of red liquid, which euphemizes blood (Merskin, 1999).

Popular menstrual hygiene brands use euphemisms. Tampax commercials have showed a woman holding a box and used the euphemism “Mother Nature’s Gift” (Chrisler, 2011). Kotex brand’s slogan was “Kotex fits, period,” which “gives a sense that the word is used to hide the offensive feeling associated with menstruation as a cultural taboo and conceals it with a less offensive meaning” (Lee, 2007, p. 12). On a television talk show, Joan Rivers said “period,” and the show censored it (Chrisler, 2011). Euphemisms appear to be a way the media perpetuate the necessity of concealing menstruation through language.

Not only do the media use euphemisms, but people in social situations do as well. Allan and Burrige (2006) said, “The phrase *taboo language* commonly refers to language that is a breach of etiquette because it contains so-called ‘dirty words’” (p. 40). In social settings, people want to be polite and use expressions that will assist with keeping a good reputation (Allan & Burrige, 2006). In the United States, the phrases for menstruation are more negative than positive: “They seem intended either to hide the subject entirely (to some minds, the word is as

shameful as the thing it signifies) or to defend against embarrassment by being overtly gross” (Delaney et al., 1988, p. 117).

In “The Tampax Report” (Tampax, 1981), a survey of 1,034 men and women from the ages 14 and up, two-thirds of them believed women should not discuss menstruation at work or in social settings. In another study, Kissling (1996) interviewed 11 adolescent girls, and the researcher asked the girls questions about their thoughts and attitudes toward menstruation. Kissling (1996) discovered that the girls used different linguistic ways to discuss menstruation to avoid discomfort and embarrassment. The girls discussed their menstrual cycles with friends by using phrases like “*the curse, the woman’s complaint, and riding the rag*” (Kissling, 1996, p. 299). In the U.S. culture, people may want to avoid breaching etiquette by using euphemisms.

Additionally, girls seem to seek and discuss information about menstruation primarily from other females. In “The Tampax Report” (Tampax, 1981), nearly two-thirds of women said they first learned about menstruation from their mother. Kissling (1996) noted that many of the girls said they prefer to discuss menstruation with their female friends at girls-only social events like sleepovers. Jackson and Falmagne (2013) interviewed 13 young women between 18-21 about their menarche, and the researchers found that some of the young women discussed that they prefer to talk about their menstrual cycles in a private space among friends.

Beausang and Razor (2000) studied 85 stories that young college women wrote about their menarche, and the researchers found that the primary sources of information about menstruation were from mothers as well as schoolteachers, but some of the college women said their sources were from their sisters, friends, grandmothers, and the media.

Indeed, menstruation is a private realm for females, and the language used to describe it reinforces the Western philosophy of the dichotomy between the mind-body and the private-

public (Kissling, 1996). For example, Jackson and Falmagne (2013) found in their interviews that the majority of the women used the word “it” in place of menarche, and this illustrates how girls separate a bodily function from their minds.

Erchull, Chrisler, Gorman, and Johnston-Robledo (2002) evaluated 28 educational booklets about menstruation between 1932-1997. In half of the booklets, female reproductive system diagrams were not included in a full diagram of the body.

Advertisements also reflect the dichotomy between the mind and the body. Lee (2007) conducted a qualitative study evaluating a Kotex advertisement in the United States and White, another Kotex brand name in South Korea. In the Kotex advertisement, the girl is a faceless illustration dancing with a red dot, but she never actually touches the dot.

### **Concealing Menstruation Through Actions**

Undoubtedly, concealing menstruation through actions is an element of it being a taboo. Oxley (1998) conducted a survey among 30 undergraduate women and 25 professional women. Oxley (1998) found that the women said they wear loose clothing and avoid activities while menstruating, such as sexual intercourse and swimming. In “The Tampax Report” (Tampax, 1981), one-half of the respondents believed that women should not have sexual intercourse while menstruating. According to Oxley (1998), “An apparent taboo surrounds menstrual blood and women’s responses suggest that menstruation itself is considered to be dirty and undesirable and they conceal it from others” (pp. 189-190).

In the study by Jackson and Falmagne (2013), they found from their interviews of young women that hiding and concealment was a common theme among all of them: some were afraid of revealing tampons to boys in class, wearing white, and throwing away menstrual hygiene

products in the main trash can in the bathroom. Erchull et al. (2002) found that the booklets they studied emphasized concealing menstruation to be fresh and neat:

One booklet stated outright that “your main concern will probably be *avoiding accidents* with an appropriately absorbent pad, *avoiding a wet feeling*, and using a pad that *doesn't show*.” An emphasis on secrecy was found in the text of each booklet. (p. 471)

In the Western market economy, advertisers can increase profits by feeding off women's needs to conceal their menstrual cycles with protection and deodorizers (Bramwell, 2001). The advertisers promote hygiene products as a way to conceal leaks and to continue with daily life without interruption (Merskin, 1999). Merskin (1999) looked at 94 advertisements from *Seventeen* and *Teen* and coded for text, content, and tone. Merskin (1999) found that four-fifths of the advertisements used a fear and uncertainty element, and nearly two-fifths used a secrecy element.

Erchull (2013) analyzed 240 menstruation advertisements in *Seventeen* and *Cosmopolitan*, and coded for images of photographs, cartoons, clothing and body language. Erchull (2013) found that in one-third of the advertisements, the women were wearing white clothing because the advertisers wanted to promote the hygiene products as a reliable way to prevent leaking through clothes.

### **Attitudes Toward Menstruation**

Researchers have found that in the U.S. society, the attitudes toward menstruation appear to be more negative than positive. Beausang and Razor (2000) found from the booklets they studied that out of half of the stories that discussed menarche positively or negatively, only about one-fourth regarded menarche as positive. Erchull et al. (2002) found that the tone of the menstruation educational booklets was more often negative than positive, and the majority of the

booklets discussed moodiness and cramps; only one-seventh of the booklets had a positive aspect.

Thornton (2013) analyzed 2,211 tweets in 2010 and discovered that the common themes were negative emotions associated with menstruation. Additionally, White (2013) conducted a survey of 165 adolescents using items from the Adolescent Menstrual Attitude Questionnaire (Morse, Kieren, & Buttorff, 1993) related to menstrual taboos like concealment and communication. White (2013) found that more than three-fifths of the responses from the girls used negative tones about their menstrual cycles.

Indeed, birth control medication has made suppressing menstruation possible. Johnston-Robledo, Barnack, and Wares (2006) examined 22 articles from magazines and newspapers regarding a new oral contraceptive. The researchers found that in half of the articles, professionals said suppressing menstruation allows women to have more control. In nearly three-fourths of the articles, the authors of the articles skewed menstrual suppression toward supporters of the oral contraceptive rather than the opponents of the oral contraceptive; the researchers noted that the articles lacked discussing long-term effects of using oral contraceptives (Johnston-Robledo et al., 2006). OB/GYN professionals have also explained that menstrual suppression with the use of IUDs or birth-control pills are not harmful, and menstrual cycles are unnecessary (Massey, 2015).

### **Definition of Menstruation Taboo for this Study**

Overall, menstruation continues to exist as a taboo in the U.S. society. The denotation of menstruation, a biological aspect of women, has become connoted with secrecy and uncleanness in the United States. For this study, the menstruation taboo's definition will be "the beliefs and attitudes toward concealing menstruation via language and actions." By asking

women the words and phrases they use to discuss menstruation with family, friends, or colleagues, such as “that time of the month,” or the word “period,” in different locations, such as their workplace, classes, or at home, language can be operationalized. By asking women if they avoid certain activities like hiding menstrual products, exercising, swimming, wearing white clothing, touching their genital region, or using medicinal devices to suppress menstruation, actions can be operationalized.

Furthermore, the U.S. media, primarily advertising and television, have reinforced concealing menstruation via language and actions over the years by playing on the fear of menstrual blood and products being openly shown or discussed. Much research examines how advertising and television have perpetuated menstruation as a taboo culturally and socially in the United States, but mobile applications are a more recent medium in the U.S. culture that reinforces menstruation as a taboo with its design and usage (Eveleth, 2014; Lavigne, 2014). More research needs to investigate and analyze mobile applications culturally and socially (Groggin, 2011; Krieger, 2013).

### **Mobile Applications**

Smartphones and its health uses have become prevalent in the United States. According to a Pew Research Center survey, 64% of U.S. adults own a smartphone of some kind (Smith, 2015). Eighty-five percent of smartphone owners are between the ages of 18-29 (Smith, 2015), and 51% of smartphone owners within this age range check their smartphone a few times an hour (Newport, 2015). About 20% of smartphone owners have a health mobile app on their phone (Fox & Duggan, 2012). Seventy-five percent of smartphone owners within the age range of 18-29 have also used their phone to look up a health condition in the past year (Smith, 2015).

The foreshadowing for mobile applications, or apps, began more than 30 years ago. According to West et al. (2012), “Apps are software programs designed specifically to run on mobile devices” (para. 2). Steve Jobs, former Corporate Executive Officer of Apple, gave a speech at a conference in 1983 and discussed a software distribution center where systems can be bought over phone lines (Brown, 2012). In October 1999, the Wireless Application Protocol created a standard for mobile phone users to access the Internet (Open Mobile Alliance, 2001).

In June 2007, Apple announced that the iPhone would have applications with Web 2.0 Internet standards, and developers can create Web 2.0 applications that can access iPhone’s services (Apple Press Info, 2007). Apple launched the App Store in July 2008, and the App Store had 10 million downloads and 800 native applications available to download (Apple Press Info, 2008). Google launched its Android Market in October 2008 and became the second major distributor of apps (Android Developers Blog, 2008). Google renamed the Android market to Google Play Store in March 2012 (Barnett, 2012). The American Dialect Society voted the word “app” as the 2010 word of the year (American Dialect Society, 2011). By the end of 2013, smartphone users between the ages of 18-24 spent an average of 37 hours and 7 minutes on apps per month (Nielsen, 2014). In June 2014, the App Store received 75 billion downloads with users in 155 countries (Dilger, 2014).

### **Mobile Health**

Mobile health, or mHealth, “is an emerging field that uses wireless technologies such as mobile phones and other devices in health practice” (Mani, Kavanagh, Hides, & Stoyanov, 2015, para. 4). On both iOS and Android in the first quarter of 2014, more than 100,000 mHealth apps have been developed (Research2Guidance, 2014). Health mobile apps have a wide range of uses,

such as tracking exercise, eating habits, and alcohol consumption to help lose weight and improve health (Lupton, 2013).

The benefits of health mobile apps include tracking data about the users' bodies in any location (Lupton, 2012), and self-diagnosing the users (Lupton, 2014). Health mobile apps can empower users to monitor and manage their own health (Lupton, 2013). The information in health mobile apps is a feedback cycle: the users upload information about themselves to the app, and the app interprets and processes the information to feed back to the user (Lupton, 2012).

Health mobile apps also have caveats for users, such as feeding data to a platform that the app stores in a cloud without removing the name identifier (Lupton, 2014). The user also has to engage with the app regularly to upload personal information, and the app might send beeping reminders that could annoy the user (Lupton, 2013). Healthcare providers might also expect more from people to use apps to monitor their health regularly, which turns the responsibility from the healthcare professionals to the user (Lupton, 2013). People could also start seeing the immune system as a mechanical system, and the disease or illness as a malfunction (Lupton, 2012). The data and algorithms the mobile apps use are unemotional and clean whereas life is emotional and messy (Lupton, 2013).

### **Menstrual-Tracker Mobile Apps**

Menstrual-tracker mobile apps, or period-tracker mobile apps, are in the category of health mobile apps (Appcrawlr, 2015a). Currently a total of 190 period-tracker mobile apps are available on Android smartphones, and 173 period-tracker mobile apps are available on iPhones (Appcrawlr, 2015a). West et al. (2012) conducted a study of 3,336 health mobile apps and found that sexual and reproductive health mobile apps were the least common category of health mobile apps.



Menstrual-tracker mobile apps have various uses and benefits for women. Women can track their menstrual cycle and fertility window with period-tracker mobile apps to help get pregnant or be more prepared to avoid pregnancy (Moya-Fajardo, 2015). Period-tracker mobile apps allow users to log moods for Premenstrual Syndrome (PMS), and users can adjust cycle lengths (Moya-Fajardo, 2015). Most period-tracker mobile apps also have passcodes and backup features to ensure privacy and security (Moya-Fajardo, 2015).

Apple's HealthKit mobile app now has the option for women to enter reproductive information, such as sexual activities and menstruation (Khurshid, 2015). Samsung and Google Fit do not have these features on its mobile phones (Khurshid, 2015). Apple's HealthKit mobile app now includes options to log information for body temperature, spotting, protection for sex, and cervical mucus quality (Khurshid, 2015).

Max Levchin, the founder of PayPal and Yelp, developed Glow, a period-tracker mobile app with pregnancy as the goal (Eveleth, 2014). Levchin "sees infertility as an 'information problem' to be solved using 'machine learning and predictive analytics'" (Hines, 2013, para. 5). Glow also has the ability to send notes to users' partners with seduction advice like bringing a bouquet (Eveleth, 2014). Glow also uses euphemisms to cover up blatantly discussing "icky" factors associated with pregnancy and menstruation (Hines, 2013).

Clue, a period-tracker mobile app, has more than 2 million active users on Android and iOS in over 180 countries, and the app is available in 10 languages (Lomas, 2015). Ida Tin, an entrepreneur from Denmark (Flynn, 2015), developed Clue and wanted the app's design to go against feminine stereotypes and make the app a natural part of life (Eveleth, 2014). Because Levchin launched Glow before Clue, Tin said he validated the period-tracker app mobile market, so she was able to have investors take her more seriously (Eveleth, 2014).

Clue allows users to enter body temperature for fertility charting, track sexual activities, moods, and receive birth control pill reminders (Pappas, 2015). Clue even includes academic citations to back up its reliability and predicts periods and ovulation days (Pappas, 2015). As users enter more menstrual cycle information into Clue, the app will adapt to the information to provide more accurate predictions for future menstrual cycles (Moya-Fajardo, 2015). The app allows users to track their sex drive, energy levels, and insomnia, and the app is expanding its features to improve prediction and accuracy (Lomas, 2015). The app also has a neutral design and a passcode option available (Moya-Fajardo, 2015).

Another popular period-tracker mobile app, Period Tracker, allows women to log menstruation flow and journal moods, and it has ovulation and sexual activity options as well (Moya-Fajardo, 2015). Period Tracker Live is a top seller in the menstrual cycle tracking category (Pappas, 2015). The app displays flowers on the menstruation calendar to signify ovulation, and it can track sexual activity, cramps, cravings, and uses emotion symbols to signify moods (Pappas, 2015).

Pink Pad, a period-tracker mobile app that millions of women trust (Appcrawlr, 2015b), can track periods, moods, PMS symptoms, temperature, ovulation, sexual activities, and predicts the dates for future menstrual cycles (Wodarcyk, 2015). Pink Pad has a health discussion forum to discuss menstruation topics, and Pink Pad can synchronize predicted cycles with the calendar on the user's smartphone and notify the user when a menstrual cycle is about to begin (Wodarcyk, 2015). Pink Pad can also transfer data from past period-tracker mobile apps to itself (Wodarcyk, 2015).

Menstrual-tracker mobile apps can assist women with recording information about their menstrual cycles to help them better understand their bodies (Hines, 2013). The apps record

information about menstrual cycles for the users, so users can share information that is more accurate with their doctors to help them detect any health problems (Flynn, 2015). Many of the period-tracker mobile apps, however, also “reinforce oddly old-school gender stereotypes” (Hines, 2013, para. 4). In general, the apps are pink and flowery, the apps focus on tracking moods, and the apps invite the user to share the information with their partner (Eveleth, 2014). The apps also often have features that perpetuate to users that they need to log information about their bodies to maintain control of themselves, such as options to track spotting, moods, and food cravings (Eveleth, 2014; Hines, 2013; Khurshid 2015; Pappas 2015), which will be referred to as body control features for this study.

Several characteristics of menstrual-tracker mobile apps also invite the users to think menstruation needs to be a secret (Lavigne, 2014). With some apps having discussion forums (Wodarczyk, 2015), passcodes for security (Moya-Fajardo, 2015), euphemisms (Hines, 2013), and body control features (Khurshid, 2015; Pappas, 2015), these characteristics align with menstruation studies about concealing menstruation via language and actions (Chrisler, 2011; Kissling, 1996; Merskin, 1999). With many characteristics reflecting feminine stereotypes and perpetuating menstruation as an embarrassment, app developers need to work harder to design apps that break away from the traditional norms and assumptions surrounding menstruation (Lavigne, 2014).

### **Theoretical Framework**

Objectification theory and gender schema theory can provide a framework in understanding how the U.S. sociocultural context developed norms and assumptions toward women’s bodies and their menstrual cycles. Perhaps the U.S. sociocultural milieu surrounding menstruation has had an effect on app developers to integrate these norms and assumptions into

menstrual-tracker mobile apps. Objectification theory suggests that the U.S. culture can cause women to internalize themselves as objects for others to view (Fredrickson & Roberts, 1997). Gender schema theory suggests that men and women can develop a motivation to fit sexual objection of women into their schemas (Bem, 1983). Feminist theory will also be discussed, as it recognized the androcentric view toward menstruation in the United States and how this view can permeate women's attitudes toward menstruation. Perhaps the U.S. sociocultural context can affect how women become conscientious of their bodies and feel compelled to hide their menstrual cycles. The characteristics of several menstrual-tracker mobile apps aid women in concealing their menstrual cycles, which perpetuates menstruation as a taboo.

### **Objectification Theory**

Objectification theory can provide insight into how women are socialized to objectify their bodies. According to Fredrickson and Roberts (1997), "Objectification theory posits that the cultural milieu of objectification functions to socialize girls and women to, at some level, treat *themselves* as objects to be looked at and evaluated" (p. 177). The U.S. culture plays a role in how women objectify themselves. In the U.S. culture that sexually objectifies, the media emphasize women's beauty, an idealized standard that is difficult, maybe even impossible, for girls and women to maintain (Roberts & Waters, 2004). According to Fredrickson and Roberts (1997), "The common thread running through all forms of sexual objectification is the experience of being treated *as a body* (or collection of body parts) valued predominantly for its use to (or consumption by) others" (p. 174).

An extension of objectification theory is self-objectification (Fredrickson & Roberts, 1997). When girls and women are aware that others are looking at them sexually, then they might observe themselves as objects for others to view, which is self-objectification (Fredrickson

& Roberts, 1997). Thus, women and girls might feel compelled to constantly monitor their own bodies “to help determine how other people will *treat them, which has clear implications for their quality of life*” (Fredrickson & Roberts, 1997, p. 180). Girls and women feel they need to have control over their bodies, and because they only have so much control, they could feel helpless and become depressed (Fredrickson & Roberts, 1997). When girls and women feel that others are always looking at them, they might internalize those views from a third person point of view (Fredrickson & Roberts, 1997).

Researchers have developed measures to empirically study objectification theory and provide evidence for its existence. McKinley and Hyde (1996) developed the objectified body consciousness scale based on body surveillance, internalization of cultural body standards and body shame, and beliefs about body control. In a study of 121 undergraduate women using the objectified body consciousness scale, McKinley and Hyde (1996) found in their study:

that both surveillance and body shame are negatively related to body esteem and demonstrates that these scales are valid measures that are consistent with the argument that surveillance and internalization of cultural body standards contribute to negative body esteem for women. (p. 193)

Furthermore, Noll and Fredrickson (1998) developed and implemented a self-objectification questionnaire, which included six attributes to rank for the body and six attributes to rank for competence. Noll and Fredrickson (1998) conducted two studies – the first was on 93 undergraduate women, and the second study was on 111 undergraduate women – to investigate the relationship between body shame, self-objectification, and disordered eating. In both studies, Noll and Fredrickson (1998) found that “body shame mediates the relationship between self-objectification and disordered eating” (p. 632).

## **The Male Gaze**

Indeed, researchers have not only studied how women objectify themselves, but have also done studies to investigate how men objectify women. According to Calogero, Tantleff-Dunn, and Thompson (2011):

Sexual objectification plays out most obviously in two areas: actual interpersonal or social encounters (e.g., catcalls, “checking out” or gazing at women’s bodies, sexual comments, harassment) and exposure to visual media that spotlight women’s bodies and body parts, depicting them as the target of nonreciprocated male gaze. (p. 6)

Gervais, Holland, and Dodd (2013) used eye-tracking technology to conduct a study on 29 college-aged women and 36 college-aged men to investigate how both genders viewed women of different body types that fit cultural ideas. Gervais et al. (2013) found that compared to the women, males tended to have more of an objectifying gaze, and the men rated women with high ideal body shapes more positively.

Calogero (2004) conducted an experiment on 105 female undergraduates where each one anticipated interacting with nobody, a male, or a female. Calogero (2004) used the self-objectification questionnaire and other scales and found that the students reported more shame and anxiety about their bodies when they were expecting a male gaze. From these studies, it appears that the male gaze plays a role in objectification.

Researchers have also sought to investigate how self-objectification differs between men and women. Fredrickson, Roberts, Noll, Quinn, and Twenge (1998) conducted an experiment on 72 college-aged women by asking them to wear a sweater or swimsuit to investigate the relationship between body shame and self-objectification. The researchers found that the women who wore a swimsuit had higher levels of body shame but only if they scored high on self-objectification. Fredrickson et al. (1998) conducted another experiment on 40 college-aged men and 42 college-aged women to investigate the relationship between self-objectification and body

shame when wearing a sweater or swimsuit and doing a math test. Fredrickson et al. (1998) found that women who wore swimsuits performed worse on a math test than women who wore sweaters. There was little difference between the scores of the math tests between men wearing a swimsuit or men wearing a sweater. Because of their findings, Fredrickson et al. (1998) argued that the U.S. culture socializes women more than men to objectify themselves.

### **Menstruation and Objectification Studies**

The media emphasize that women need to be beautiful and their bodies need to look and smell perfectly, so menstruation needs to be kept a secret (Roberts & Waters, 2004). According to Roberts (2004), “One of the obligations that women have in a culture that sexually objectifies their bodies is to conceal the biological *functioning* of their bodies” (p. 22). Many advertisements create anxiety among women to conceal their menstrual cycles from men or else men might find out thus having a negative effect on women’s reputation in society (Roberts & Waters, 2004). Roberts (2004) argued that the obsession with using feminine products for cleanliness might lead to an increase in self-objectification.

Several researchers have conducted studies to investigate the relationship between menstruation and the objectification theory. Roberts, Goldenberg, Power, and Pyszczynski (2002) conducted an experiment on 65 college students, 32 females and 33 males, where the students filled out a packet about gender types. A female confederate then dropped either a hairpin or a tampon on the table, and then the students filled a modified self-objectification questionnaire about the confederate. Roberts et al. (2002) found that the students rated the confederate as less competent and less likeable after she dropped the tampon. The students who were more gender-typed also objectified women in the tampon condition more than the hairpin condition.

Johnston-Robledo, Sheffield, Voigt, and Wilcox-Constantine (2007) conducted a survey among 166 college women using an adapted version of the objectified body consciousness scale as well as other scales to see if self-objectification was associated with negative attitudes toward menstruation and breastfeeding. The researchers found that women who scored higher on the body shame subscale and self-surveillance subscales of the objectified body consciousness scale had negative attitudes toward menstruation and breastfeeding. According to Johnston-Robledo et al. (2007), “Women’s attitudes reflect the shame, secrecy, and taboos commonly associated with breastfeeding and menstruation, reproductive functions that complicate or interfere with the social construction of women’s bodies as objects of desire” (p. 33).

Moreover, Grose and Grabe (2014) used the self-objectification questionnaire as an independent variable to evaluate 151 female college students’ attitudes toward the menstruation cup. Grose and Grabe (2014) found that women who rated higher on the self-objectification questionnaire had more negative attitudes toward menstruation, and this resulted in women’s negative reactions toward being open to buying a menstruation cup. Thus, higher rates of self-objectification appear to increase negative attitudes toward menstruation.

### **Menstrual Suppression**

Since the U.S. culture encourages women to conceal their menstrual cycles, researchers have also investigated the relationship between menstrual suppression and objectification. Johnston-Robledo, Ball, Lauta, and Zekoll (2003) surveyed 103 female undergraduate students between the ages of 17-22. The researchers used the objectified body consciousness scale, the self-objectification questionnaire, and developed the reproductive health measure and menstrual suppression scale to learn more about the students’ attitudes toward menstrual suppression. Johnston-Robledo et al. (2003) found that only a little more than one-third of the women were



familiar with menstrual suppression. The women who scored higher on the self-objectification measure held strongly negative attitudes toward menstruation and thought less of menstruation as a natural event.

Roberts (2004) surveyed 200 women between the ages of 12-61 to see if those who scored higher on self-objectification would regard menstruation with negative attitudes and emotions. Roberts (2004) used the self-objectification questionnaire, the objectified body consciousness scale, and developed a menstrual self-evaluation scale. Roberts (2004) found that women who engaged in self-objectification had more negative attitudes toward menstruating. From these studies, it appears that college women who self-objectify themselves tend to feel uncomfortable with menstruation and are open to the idea of suppressing menstruation.

### **Gender Schema Theory**

Gender schema theory can provide further insight into how the U.S. culture socializes men and women to normalize the sexual objectification of women's bodies and that menstruation does not fit in this schema. A schema is defined as "a cognitive structure that represents knowledge about a concept or type of stimulus, including its attributes and the relations among those attributes" (Fiske & Taylor, 1991, p. 98). Because the cognitive structure's information is organized, a person can quickly and efficiently access the information (Levine & Harrison, 1994). According to Bem (1981), "A schema is a cognitive structure, a network of associations that organizes and guides an individual's perception" (p. 355).

Gender schema theory interprets "perception as a constructive process in which the interaction between incoming information and an individual's preexisting schema determines what is perceived" (Bem, 1983, p. 604). According to Bem (1981):

What gender schema theory proposes, then, is that the phenomenon of sex typing derives, in part, from gender-based schematic processing, from a generalized readiness to process

information on the basis of the sex-linked associations that constitute the gender schema. (p. 355)

Gender schema theory emphasizes the process that sex-typed individuals categorize feminine and masculine characteristics from their culture, not the content of those categories (Bem, 1983). The U.S. society seeks to dichotomize males and females by sex-typing them into masculine or feminine characteristics (Bem, 1981). Children develop a motivation within themselves to control their behavior to fit in the masculine or feminine characteristics that the culture has created (Bem, 1981). In the U.S. culture, boys and girls learn from socialization that it is normal for women's bodies to be sexually objectified (Calogero et al., 2011). Thus, from the dichotomized U.S. culture, girls could learn to fit in sexual objectification in their feminine schemas, and boys could learn to objectify women in their masculine schemas.

Unquestionably, the U.S. society tends to emphasize the biological differences between men and women. The functions of women's bodies are inherently different from men's bodies in ways such as childbirth and menstruation (Roberts & Waters, 2004). Men have normalized their own bodies. Because the features on women's bodies are different from theirs, they are thus abnormal and subordinate to men's bodies (Roberts & Waters, 2004). If women want men to take them seriously, being attractive is the price women need pay to be socially and economically successful (Fredrickson & Roberts, 1997).

### **Feminist Theory**

Feminist theory, feminist empiricism and feminist standpoint theory in particular, provides a framework in understanding how women recognized the androcentric view toward menstruation. According to Bromley (2012): "Feminist theory provides frameworks for understanding the way things could be different, and strategies for taking action and making change" (p. 43). In the 1960s and 1970s, women started questioning traditional approaches to

knowledge construction and why research was excluding women's perspectives (Hesse-Biber, Leavy, & Yaiser, 2004).

Historically, researchers with a positivist approach ignored women in the private sphere because the private sphere was seen as inferior to the public sphere, and research on women in the public sphere was being excluded because it was not the norm for women to work (Hesse-Biber, Leavy, & Yaiser, 2004). Feminist empiricists were interested in eliminating heteropatriarchal biases in research and including women in research projects, such as women's job satisfaction in the workplace (Hesse-Biber, Leavy, & Yaiser, 2004). Feminist empiricism is an approach to research feminist concerns while strictly adhering to current standards of scientific inquiry (Harding, 1991).

Indeed, feminist researchers recognized the androcentric bias in scientific work regarding menstruation. Martin (1987) noted that many medical textbooks described menstruation as a "loss" or a "failure" of producing a child whereas the language described the male reproductive physiology as a celebratory event. The textbooks described the shedding of the uterus lining, which only women experience, negatively whereas the textbooks described the shedding of the lining of the stomach, which both men and women experience, as a renewal (Martin, 1987).

Furthermore, feminist standpoint theory can provide further insight into the development of the androcentric view toward menstruation. Feminist standpoint theory developed from the Marxist idea that a person's material and lived experiences influence their perspectives of the world and focuses on understanding how situated experiences influence knowledge — and how those situated experiences may be influenced by a person's gender or sex among other identities; it is more than how domination is gendered but how we experience domination and make sense of it through our various standpoints (Hesse-Biber, 2014), and this theory sparked the

researcher's approach to this study. According to Harding (1991), "[Feminist standpoint theorists] argue that not just opinions but also a culture's best beliefs — what it calls knowledge — are socially situated" (p. 119).

The cultural belief in the United States that menstruation is a failure or a sickness developed in the nineteenth century (Tavris, 1992). In the nineteenth century and early twentieth century, factories emphasized production and did not provide time or sanitary, private places for women to address their bodily functions (Martin, 1987). Perhaps the perspective toward menstruation as a sickness developed because menstruation symbolized a failure to produce workers for a capitalist society. Feminists argued that capitalist forces encouraged women to bear children because it is a form of a reproduction of the labor force, and women who have children and take care of them are creating future, happy workers for capitalists (Bromley, 2012).

In the 1950s, after World War II when men re-entered the work force, British physician Katharine Dalton wrote about the possible harmful effects of menstruation and coined the term "premenstrual syndrome" (Tavris, 1992). In the 1970s, women were emerging in the paid work force due to many factors, such as a lower birth rate, increasing urbanization, more educational opportunities for women, the second wave of feminism, laws that barred sex discrimination, and strong support about women's right to work (Kessler-Harris, 1982; Weiner, 1985). New research in the 1970s also showed that women were just as able as men to work and play regardless of the phase of their menstrual cycle (Tavris, 1992). Premenstrual syndrome research greatly increased during this time as well: "When women's participation in the labor force is seen as a threat instead of a necessity, menstruation becomes a liability" (Tavris, 1992, p. 141).

Martin (1987) noted that "our general cultural conceptions place menstruation in the private realm of home and family" (p. 92), but after discussing menstruation with several

women, she found that “when women talk about menstruation they usually do not see it as a private function relegated to the sphere of home and family, but as inextricable from the rest of life at work and school (p. 92). Because of the cultural view that menstruation is a dirty taboo, women must do everything in the power to conceal their cycles:

But the woman trying to sneak a tampon from the classroom into the bathroom and the woman who cannot tell her boss what is the matter are both being asked to do the impossible: conceal and control their bodily functions in institutions whose organization of time and space take little cognizance of them. (p. 94)

Feminist empiricism and feminist standpoint theory shed light on the androcentric view toward menstruation. In the U.S. capitalist society, women in the work force and in school have had to learn to accommodate their bodily functions. Feminists recognized these struggles and made progress with legislation in the 1970s for women in the work force. If modern culture would make a paradigm shift that would normalize female reproductive processes, then as a natural progression, the workforce and educational institutions would serve as positive environments for women.

### **Research Purpose and Hypotheses**

Based on the literature review, objectification theory and gender schema theory have provided insights into the development of an idealized standard of women’s bodies, and menstruation calls for concealment because it does not meet this idealized standard. Some women would even consider suppressing or even erasing menstruation from their lives completely. Based on the studies regarding menstruation, women generally have negative attitudes toward menstruation, and the menstruation taboo is prevalent in the U.S. society. The menstrual-tracker mobile apps have characteristics that closely align with the menstruation taboo, such as security features, discussion forums, and body control features, such as tracking moods, food cravings, and spotting. Because of the dearth of literature regarding menstrual-

tracker mobile apps as cultural products and women's perspectives toward them, the objective of this study is to establish the link between the sociocultural milieu and women's attitudes toward menstrual cycles and their evaluation of menstrual-tracker mobile apps.

- **Hypothesis 1:** Women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will think it is important that menstrual-tracker mobile apps have security features.
- **Hypothesis 2:** Women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will think it is important that menstrual-tracker mobile apps have body control features.
- **Hypothesis 3:** Women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will be uncomfortable using menstrual-tracker mobile apps to discuss menstruation.

## CHAPTER 3

### METHODOLOGY

To investigate these hypotheses, the researcher conducted a survey using Qualtrics, a secure online questionnaire platform, at Colorado State University in March 2016 after Colorado State University's Institutional Review Board (IRB) approved the survey materials (see Appendix F for survey questionnaire).

#### **Population and Sampling**

The researcher used a convenience sample at Colorado State University to collect data from female college students between the ages of 18-24 to investigate this study's hypotheses. The convenience sample included two sections of JTC 100 and three sections of JTC 300. One JTC 100 section had 171 total students, and the other JTC 100 section had 132 total students. One of the JTC 300 sections had 96 total students, one JTC 300 section had 122 total students, and one JTC 300 section had 117 total students. The five class sections had a maximum total of 638 college students, and the male to female ratio at Colorado State University is 51% to 49%, respectively (Forbes, 2014), so the researcher collected data from an estimated pool of 313 female college students, and 258 female college students participated in the study.

Female college students were an ideal population for this study because the majority had already experienced biological changes during puberty, and, thus, they have most likely developed attitudes toward their bodies and menstruation (Striegel-Moore, 1993). Female college students are also developing their sexual identities and autonomy (Chickering, 1969), and they are involved in relationships that could contribute to self-objectification (Striegel-Moore, 1993).

Female college students were also a compatible population for this study, as many of the current students in the courses are considered millennials. Millennials are digital natives, or “networked youth between the age of 15 and 24, with five or more years of experience using the Internet” (ICT Data and Statistics Division, 2013, p. 156). The researcher assumed the majority of the female college students have had experience using smartphones and mobile apps. Millennials are a unique generation for this study regarding the menstruation taboo because they are more open to change, they are becoming the most educated generation, they embrace self-expressions, they are more ethnically and racially diverse, and they are less religious than other generations (Pew Research Center, 2010).

Because the majority of female college students have already experienced the onset of menstruation during puberty, they are millennials with digital experience, and they are in a time of their lives where they are having sexual relationships, they have valuable opinions about menstrual-tracker mobile apps, as menstrual-tracker mobile apps can help them keep track of their menstrual cycles for fertility purposes as well as for personal purposes. Their attitudes on menstruation and menstrual-tracker mobile apps provided valuable insight into the relationship between their attitudes toward menstruation as a taboo and menstrual-tracker mobile apps.

**Criteria.** The researcher’s criteria for participant eligibility included being a female college student between the ages of 18-24. Per IRB, respondents age 17 or under would need to have a parent or guardian sign off on their survey, so they were screened out. Assuming that the majority of female college students at Colorado State University have experienced menstruation and they were aware of smartphones and mobile apps, measuring female college students’ attitudes toward menstruation and mobile apps was not an issue, and the researcher gave a detailed description of menstrual-tracker mobile apps. The study’s purpose was not to see if they



have used or would intend to use menstrual-tracker mobile apps, so it was not a requirement that female college students have experience using a menstrual-tracker mobile app.

## **Recruitment**

Dillman, Smythe, and Christian (2014) recommend pre-notifying respondents, sending respondents a survey invitation, and sending respondents reminder emails to optimize the response rate. As a pre-notification, the researcher announced the survey to each of the five college classes using a PowerPoint slide (see Appendix B). The PowerPoint slide accompanied the announcement to recruit female college students to take the survey (see Appendix C). The researcher incentivized the female college students to take the survey by informing them that the survey is an opportunity to receive five extra credit points in their college class. Students who were not eligible to take the survey could complete an alternative assignment to receive extra credit points, which was writing a 1-2 page essay about female health mobile apps.

The following day, the researcher emailed the students a survey invitation (see Appendix D). After four business days from the survey invitation email, the researcher sent a follow-up email to students who had not taken the survey reminding them to please participate and thanked students who had taken the survey (see Appendix E).

College students are most likely to check their emails Monday through Thursday (Foreman, 2014), so the researcher sent the survey invitation on a Tuesday. The timeline provides details for the days and times that the college students received the survey invitation and reminder email (see Appendix A).

**Recruitment limitations.** The researcher recruited female college students via in-person presentations in each of the college classes, so a chance of bias being introduced was a possibility. The survey was not applicable to males, which also limited the sample group for the

survey. Another possible limitation was that some female college students were not in the class at the time the researcher announced the survey, so they might not have been as willing to participate in the study when they saw the survey invitation email or follow-up reminder. The survey was about a taboo subject, so some female students might not have been as willing to participate in the survey, and if they were willing to participate in the survey, they might have dropped out of the survey.

### **Pretesting and Procedure**

The researcher pretested the online survey in a JTC 210 class to ensure the survey did not have any technical problems, wording issues, or branching issues. Out of 17 female students in the class, 12 female students participated in the survey. The researcher incentivized them with extra credit for their responses. The researcher pre-notified the students in the classroom using a PowerPoint slide (see Appendix B) and an announcement (see Appendix C) letting them know it was for their feedback. The researcher set up an online panel on Qualtrics with the students' names and email addresses. The researcher set up Qualtrics to email all of the students with the survey invitation and survey link. The open-ended questions at the end of the survey asked for their feedback and were: *Which questions and/or questions choices in the survey were confusing? Would you prefer to see the word "period" or "menstrual cycle" in the survey? What suggestions do you have to improve this survey (formatting, adding/deleting questions, instructions, question choices, etc.)? Were there any technical difficulties with completing the survey? If so, what were the difficulties? Overall, what are your thoughts on the survey?*

After the researcher pretested the survey and IRB approved the survey materials, the researcher followed the timeline to survey students in the two JTC 100 classes and the three JTC 300 classes (see Appendix A). The researcher created panels in Qualtrics for each of the five

classes using students' names and email addresses received from the instructors to email the survey invitations.

The researcher set up Qualtrics to email the college students a survey invitation. The respondent could click the survey link in the survey invitation, which took them directly to the Qualtrics survey. The respondents received an IRB-approved informed consent statement at the beginning of the survey discussing the purpose of the survey and requested their permission to consent before participating in the survey. If they chose not to consent, the survey took them to the end of the survey. For those who consented, the survey asked them for their age, and if they chose 17 or under, Qualtrics screened them out of the survey. They also needed to select their biological gender as a screening question. If they chose female, they continued with the survey. If they choose male, Qualtrics screened them out of the survey.

The respondents could then go through every question in the survey, each question was on a different page, and they could always go back to previous questions. Per IRB, they were not required to answer every question in the survey, and they could choose to drop out of the survey at any time. After they finished the survey, they could click a link that took them to a separate survey where they could fill out a form to receive extra credit for taking the survey. Qualtrics tracked and organized all of the students' responses, and the researcher exported the results into SPSS to analyze the information. The SPSS file had students' email addresses from the panels in Qualtrics, but the researcher deleted the email addresses before analyzing the results.

### **Measures**

**Screening questions.** The survey asked the respondents for their age, and if they chose 17 or under, Qualtrics screened them out. The survey also asked the respondents with which

gender they identify, male or female, and the next question asked which gender they were assigned at birth, male or female, and if they chose male, then Qualtrics would screen them out.

**Participant characteristics.** The survey asked them a nominal, yes/no question if they have a period (menstrual cycle) on a regular basis, a nominal, yes/no question if they are using any types of birth control that helps regulate periods (birth control pills, birth control shots, implants, IUD's, etc.), a nominal, yes/no/I don't know question if they are pregnant, a nominal, yes/no question if they are trying to get pregnant, and a nominal, yes/no question if they are trying to avoid pregnancy.

**Mobile technology usage.** The survey asked the respondents a nominal, closed-ended yes/no question if they own a mobile phone. The survey asked two items adapted from Richman et al. (2014) about mobile technology usage: a nominal, closed-ended yes/no question if they owned a mobile phone with Internet access and a nominal, yes/no question if they used their mobile phone to look up health information. The survey also asked the respondents a 6-point question how often they look up health information on their mobile phone with these choices: several times a day, about once a day, 3-5 days a week, 1-2 days a week, every few weeks, and less often.

**Menstrual-tracker mobile app usage and ownership.** The survey provided a detailed explanation about menstrual-tracker mobile apps. The survey asked the respondents a nominal, closed-ended yes/no questions if they currently have a menstrual-tracker mobile app on their smartphone. The survey asked the respondents a nominal, open-ended question why they use the menstrual-tracker mobile app. The survey also asked the respondents how often they use their menstrual-tracker mobile app if they have one with these choices: *I only use the app when I'm on my period, I use the app both when I'm on my period and when I'm not on my period, and I*

*never use the app*. If they chose *I use the app both when I'm on my period and when I'm not on my period*, the survey asked how often they use the app on a 6-point scale with these choices: several times a day, about once a day, 3-5 days a week, 1-2 days a week, every few weeks, and less often. For respondents that said they did not have a menstrual-tracker mobile app, the survey asked the respondents if they would be interested in using a menstrual-tracker mobile app if they knew it was free using a 5-point Likert scale ranging from “1 = not very interested” to “5 = very interested.”

**Menstrual-tracker mobile apps.** The researcher created questions about the characteristics of menstrual-tracker mobile apps to measure female college students' attitudes toward menstrual-tracker mobile apps, such as security features, body control features, and discussion features, which were some of the most common characteristics from articles about menstrual-tracker mobile apps (Eveleth, 2014; Khurshid, 2015; Moya-Fajardo, 2015; Pappas, 2015; Wodarczyk, 2015).

The survey had a matrix question using a 5-point Likert scale from “1 = not very important” to “5 = very important” that asked the respondents: *If you wanted to use an app that is designed to track your period, how important or not important is it to you....* The choices for body control features were: *that you can enter your spotting on the app, that you can enter your moods on the app, and that you can enter your food cravings on the app*. For the body control features scale of three items for this study,  $\alpha = .72$ . The choices for security features were: *that the app has a passcode or other security measure to access the app, that the app's layout doesn't make it obvious that it's for tracking periods (pink/purple colors, flowery symbols), and the app's title doesn't have the word "period" in it*. For the security features scale of three items for this study,  $\alpha = .82$ .

The survey had a matrix question using a 5-point Likert scale ranging from “1 = very uncomfortable” to “5 = very comfortable,” that asked the respondents: *if you wanted to use an app that is designed to track your period, how comfortable or uncomfortable would you be with...* The choices for the discussion features were: *discussing periods with other women using the discussion forum on the app, setting the app to send messages to your partner (some apps can send messages to other people, not just the person who has it on her phone), and discussing how the app can be improved with the app developers on the app’s discussion forum.* For the discussion features scale of three items for this study,  $\alpha = .69$ .

**Menstruation as a taboo.** The researcher defined the menstruation taboo as “the beliefs and attitudes toward concealing menstruation via language and actions.” To operationalize this concept, the researcher used scales from previous studies (Brooks-Gunn & Ruble, 1980; Johnston-Robledo et al., 2003; Marván, Ramírez-Esparza, Cortés-Iniestra, & Chrisler, 2006; Morse et al., 1993; Roberts, 2004) as well as created scales inspired by previous studies that fit into this definition (Jurgens & Powers, 1991; Oxley, 1998; Tampax, 1981).

**Concealing language.** The researcher used and adapted one item that has a 5-point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree” from the postmenarcheal Adolescent Menstrual Attitude Questionnaire (Morse et al., 1993). The questionnaire was developed to measure adolescents’ attitudes toward menarche after receiving it, and the questionnaire had a reported Cronbach’s alpha of .90. The item was: *I feel it’s okay to discuss periods with men.*

The researcher used one item from the attitudes section of The Menstruation Self-Evaluation Scale, which had a 5-point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree” (Roberts, 2004), which was: *I would prefer not to talk openly about periods.*

Roberts (2004) developed the questionnaire to measure women's attitudes and emotions toward menstruation, which was an adaptation from the Menstruation Attitude Questionnaire (Brooks-Gunn & Ruble, 1980). Each item was a 7-point Likert scale from "1 = strongly disagree" to "7 = strongly agree," and the researcher reduced the item from a 7-point Likert scale to a 5-point Likert scale for uniformity of the questions in the survey. Roberts (2004) reported a Cronbach's alpha of .81 for the attitude section of The Menstruation Self-Evaluation Scale.

The researcher used and adapted six items with 5-point Likert scales ranging from "1 = strongly disagree" to "5 = strongly agree" from the secrecy section of the Beliefs and Attitudes Toward Menstruation Questionnaire (Marván et al., 2006). These items were created to measure undergraduates' stereotypical beliefs and attitudes toward menstruation, and the researchers reported a Cronbach's alpha of .79 for the secrecy section. The items were: *it is important to talk about periods with men, it is important to discuss the topic of periods in college classes with both men and women, it is uncomfortable for us women to talk about periods, it is important to keep periods a secret, we women should avoid talking about our periods when men are present, and it is important to talk about periods at home openly.*

Inspired by "The Tampax Report" (Tampax, 1981), the researcher used one 5-point Likert scale from "1 = strongly disagree" to "5 = strongly agree, which was: *I feel comfortable talking about periods at the workplace.*

Inspired by the study done by Jurgens and Powers (1991), the researcher asked the respondents two matrix questions. Jurgens and Powers (1991) found from their interviews that most of the women used euphemistic phrases when discussing menstruation, and only one interviewee said she sometimes used the word "menstruation" with her family. The first matrix question asked the respondents if they prefer to use phrases like "that time of the month" and "a

visitor arrived” when discussing menstruation with family members, colleagues, and friends using a 5-point scale with the following choices: never, rarely, sometimes, often, and always. The second matrix question used a 5-point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree,” which asked the respondents if they are comfortable using the word “period” when discussing menstruation with family members, colleagues, and friends.

***Concealing actions.*** The researcher used and adapted three items that each had a 5-point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree” from the secrecy section of the Beliefs and Attitudes Toward Menstruation Questionnaire (Marván et al., 2006). The items were: *it is important to buy feminine hygiene products (tampons, pads, etc.) without being seen, it is embarrassing when a man find out that a woman is having her period, and I blush when we see an advertisement about sanitary pads when we are with a man.*

The researcher used and adapted two items with a 5-point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree” from the postmenarcheal Adolescent Menstrual Attitude Questionnaire (Morse et al., 1993). The items were: *I avoid exercising when I’m on my period, and I avoid swimming when I’m on my period.*

The researcher used three items from the attitudes section of The Menstruation Self-Evaluation Scale with a 5-point Likert scale from “1= strongly disagree” to “5 = strongly agree” (Roberts, 2004). The items were: *I would feel ashamed if I ‘leaked’ menstrual blood on my clothes, I avoid touching my genital region when I’m on my period, and when I’m on my period, I do things to hide the fact that I’m menstruating.*

Inspired by the study done by Oxley (1998), the researcher created and used an item with a 5-point Likert scale from “1 = strongly disagree” to “5 = strongly agree,” which was: *I avoid wearing white clothing while menstruating.*



The researcher used all seven items from The Menstrual Suppression Scale, which were 7-point Likert scales, but the researcher reduced the scale from a 7-point Likert scale down to a 5-point Likert scale from “1 = strongly disagree” to “5 = strongly agree” for uniformity in all the questions (Johnston-Robledo et al., 2003). The Menstrual Suppression Scale was used to measure women’s attitudes toward menstrual suppression via hormonal birth control methods. Johnston-Robledo et al. (2007) reported a Cronbach’s alpha of .70 when they used The Menstrual Suppression Scale for their study. The items were: *I think that suppressing menstruation is a good idea, even if it was free and completely safe, I would not be interested in eliminating my menstrual periods, I am interested in learning more about menstrual suppression, extensive research should be done on menstrual suppression, I would be willing to suppress my menstruation, if my period disappeared, I wouldn’t miss it, and it seems strange to argue that frequent menstruation could be harmful to women’s health.*

For the attitudes toward menstruation scale for this study, which combined 31 total items for concealing language and concealing actions,  $\alpha = .79$

**Demographics.** The survey asked the respondents five questions regarding their demographics: a nominal, closed-ended question with checkmark boxes to choose one or more answers about their ethnicity (Caucasian, Hispanic/Latino or Spanish origin, Black or African American, American Indian, Alaska Native, Native Hawaiian, Asian or Pacific Islander, and other for them to specify), a nominal, closed-ended question for their total household income from less than \$10,000 to \$150,000 or more, and a nominal, closed-ended question for their religion (Christian, Muslim, Jewish, Buddhist, Hindu, Atheist, unaffiliated, and other for them to specify). Another nominal, 6-point closed-ended question asked them how often they take part in religious services with the following choices: daily, weekly, 1-3 times a month, a few times a

year, less often, and never. Lastly, a nominal question asked the respondents for their sexual orientation: heterosexual, gay/lesbian, bisexual, questioning or other (please specify).

### **Statistical Analysis**

The researcher used Qualtrics to collect the data, which was later analyzed with SPSS. The researcher removed biological males ( $n = 180$ ), respondents who did not consent ( $n = 1$ ), those who were not between 18-24 ( $n = 3$ ), and those who did not answer more than 80% of the questions ( $n = 11$ ). The researcher reverse-coded ten items from the attitudes toward menstruation scale so that a high score (5) indicated supportive attitudes toward menstruation as a taboo. The researcher also reverse-coded the three items from the discussion features scale so that “1 = very comfortable” and “5 = very uncomfortable.”

The researcher performed univariate analyses on the independent variable (attitudes toward menstruation as a taboo) and dependent variables (body control features, security features, and discussion features) and checked on normality. The researcher ran logarithmic transformations for security features and body control features to normalize them, and the researcher reported the non-transformed mean and standard deviation values for each of these dependent variables.

The researcher ran three linear regression analyses with the normalized data to establish the relationship between the three dependent variables and one independent variable. The researcher tested for the effect of potentially relevant factors, such as age, birth control usage, regular periods, pregnancy avoidance, income, ethnicity, sexual orientation, religion on the three dependent variables (see Appendix I). Attending religious services regularly was a significant factor with security features, but the model fit was better only when attitudes toward menstruation was included in the model. The rest of the factors were not statistically significant

and therefore were removed from subsequent analyses. After the researcher completed data analysis and verification of accuracy, the Department of Journalism and Media Communication will safely secure the surveys for three years in compliance with IRB and federal regulations.

## CHAPTER 4

### FINDINGS

#### **Demographics**

The researcher's data yielded  $N = 258$  responses, and of the 258 biological females, one respondent identified as male. The average age of the respondents was 20. The majority of the respondents were Caucasian (78%) and heterosexual (88%). More than half of the respondents were Christian (52%), and one-third of the respondents were unaffiliated. The average religious attendance of the respondents was a few a times of year. The average annual household income was nearly \$50,000 to \$59,999. See Appendix G for a table of the demographic information.

#### **Participant Characteristics**

Nearly two-thirds of the respondents reported that they were using some type of birth control (64%), and 36% reported that they were not using birth control. An overwhelming majority reported that they have regular periods (85%), and 15% reported that they do not have regular periods. All of the respondents reported that they were neither pregnant nor trying to get pregnant, and 92% reported that they were avoiding pregnancy.

#### **Mobile Technology Usage**

Nearly all of the respondents reported that they own a mobile phone (99%) and could access the Internet on their mobile phone (99%). The majority of the respondents reported that they use their mobile phone to look up health information (86%), and 14% reported that they do not use their mobile phone to look up health information. The average amount they reported that they use their mobile phone to look up health information was between 1-2 days a week and every few weeks.

## **Menstrual-Tracker Mobile App Usage and Ownership**

More than three-fourths of the respondents reported that they do not have a menstrual-tracker mobile app (78%), and only a small percentage of respondents reported that they own a menstrual-tracker mobile app (21%). Nearly two-fifths of the respondents who do not have a menstrual-tracker mobile app are interested in having one (38%), nearly two-fifths of them are not interested (37%), more than one-fifth of them are neither interested nor not interested (22%), and 3% reported they did not know if they were interested.

More than half of the respondents who own a menstrual-tracker mobile app use the app both when they are having their period and not having their period (52%), and of those 52%, the average amount of time they reported they use the app was every few weeks. A little less than half of the respondents reported they use their menstrual-tracker mobile app only when they are having their period (43%), and a small percentage of respondents reported they never use their menstrual-tracker mobile app (6%). See Appendix H for a table of regular periods and birth control usage associations with menstrual-tracker mobile app ownership.

Fifty-four respondents reported that they have a menstrual-tracker mobile app on their mobile phone, and all of them responded to the open-ended question of why they own a menstrual-tracker mobile app. The most common response was to better predict their next period ( $n = 22$ ). The next most common response was to log their periods and have a better idea of when their periods start and finish ( $n = 14$ ). Ten respondents listed the name of the menstrual-tracker mobile app that they have on their mobile phone. Other responses included: irregular cycles ( $n = 6$ ), tracking symptoms ( $n = 5$ ), tracking intimacy/sexual intercourse ( $n = 4$ ), ovulating ( $n = 4$ ), and birth control-related reasons ( $n = 4$ ). The researcher placed responses into one or more categories based on the main theme(s).

## Results

Table 1 provides the means and standard deviations of the independent variable, which is attitudes toward menstruation as a taboo, and the dependent variables, which are security features, body control features, and discussion features.

Table 2 provides the means and standard deviations of the independent variable and dependent variables for respondents who own and do not own a menstrual-tracker mobile app. The means and standard deviations for respondents who own and do not own a menstrual-tracker mobile app are the same for attitudes toward menstruation as a taboo and slightly different for security features, discussion features, and body control features.

Table 1

*Means and Standard Deviations for the Independent Variable and Dependent Variables*

	<i>M</i>	<i>SD</i>
<u>Independent variable</u>		
Attitudes toward menstruation as a taboo	2.86	0.39
<u>Dependent variables</u>		
Security features	3.53	1.05
Body control features	3.06	0.92
Discussion features	2.90	0.85

Table 2

*Means and Standard Deviations of the Independent Variable and Dependent Variables for Respondents Who Own and Do Not Own a Menstrual-tracker Mobile App*

	Owns		Does Not Own	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Independent variable</u>				
Attitudes toward menstruation as a taboo	2.85	0.39	2.85	0.39
<u>Dependent variables</u>				
Security features	3.38	1.00	3.56	1.06
Body control features	3.09	0.92	3.05	0.92
Discussion features	2.88	0.95	2.90	0.83

### Hypothesis 1

A linear regression test for the dependent variable, security features ( $M = 3.53$ ,  $SD = 1.05$ ), and the independent variable, attitudes toward menstruation as a taboo ( $M = 2.86$ ,  $SD = 0.39$ ), was statistically significant,  $F(1, 256) = 61.89$ ,  $p < .001$ , which supports the hypothesis that women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will think it is important that menstrual-tracker mobile apps have security features.

## Hypothesis 2

A linear regression test for the dependent variable, body control features ( $M = 3.06$ ,  $SD = 0.92$ ), and the independent variable, attitudes toward menstruation as a taboo ( $M = 2.86$ ,  $SD = 0.39$ ), was not statistically significant,  $F(1, 256) = 0.49$ ,  $p = .48$ , which does not support the hypothesis that women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will think it is important that menstrual-tracker mobile apps have body control features.

## Hypothesis 3

A linear regression test for the dependent variable, discussion features ( $M = 2.90$ ,  $SD = 0.85$ ), and the independent variable, attitudes toward menstruation as a taboo ( $M = 2.86$ ,  $SD = 0.39$ ), was statistically significant,  $F(1, 256) = 20.91$ ,  $p < .001$ , which supports the hypothesis that women who hold negative attitudes toward menstruation compared to women who hold positive attitudes toward menstruation will be uncomfortable using menstrual-tracker mobile apps to discuss menstruation.



## CHAPTER 5

### DISCUSSION

#### **Summary of Significant Findings**

The results of this study provided interesting findings on female undergraduate millennials' attitudes toward menstruation as a taboo and their attitudes toward menstrual-tracker mobile apps. The analysis of the data revealed that attitudes toward security features and attitudes toward menstruation as a taboo was significant, and it provided support for the first hypothesis. This supported hypothesis helps to suggest that female undergraduate millennials' attitudes toward menstruation in the U.S. sociocultural milieu, which involves concealing menstruation via language and actions in both the private and public spheres, correlates to their attitudes toward the importance of menstrual-tracker mobile apps having security features. Overall, the respondents showed a slight agreement that it is important that menstrual-tracker mobile apps have security features ( $M = 3.53, SD = 1.05$ ). Based on this average attitude, perhaps the female undergraduate millennials in this study feel overall that having some type of privacy on smartphones when it comes to menstrual cycles or health is important, which compares to another study where female undergraduate millennials reported high rates of mobile app privacy concerns overall (Rowan & Dehlinger, 2014).

The analysis of the data revealed that attitudes toward body control features and attitudes toward menstruation as a taboo, however, was not significant. The respondents' average attitude leaned slightly toward neither agree nor disagree that it is important that menstrual-tracker mobile apps have body control features ( $M = 3.06, SD = 0.92$ ). This average attitude indicates ambivalence, and they have not yet overall developed an informed opinion of whether or not

body control features are important to have on menstrual-tracker mobile apps. More research should look at current menstrual-tracker mobile app users' attitudes toward the importance of having body control features on such apps to acquire more decisive results.

The analysis of the data revealed that attitudes toward discussion features and attitudes toward menstruation as a taboo was significant, and it provided support for the last hypothesis. This supported hypothesis also helps to suggest that female undergraduate millennials' attitudes toward menstruation in the U.S. sociocultural milieu correlates to their attitudes toward their comfort level with discussion features in menstrual-tracker mobile apps. The average attitude of the respondents leaned slightly toward feeling comfortable using discussion features on menstrual-tracker mobile apps to discuss menstruation ( $M = 2.90, SD = 0.85$ ). More research should look at different generations of women's attitudes toward their comfort level of using discussion features on menstrual-tracker mobile apps to see if the taboo of discussing menstruation is trending in a direction where it is diminishing.

It is surprising that even though nearly every respondent reported having a mobile phone with Internet access, which suggests a familiarity with the existence of mobile apps, only 21% of the respondents reported that they own a menstrual-tracker mobile app. The researcher thinks this could be because of a possible lack of usage of menstrual-tracker mobile apps. This may be due to many reasons, such as respondents might think that the menstrual-tracker mobile apps are not reliable to use, they might not have a strong reason to use a menstrual-tracker mobile app or track their periods in general (64% of respondents use birth control, 100% of respondents are not trying to get pregnant, and 85% have regular periods), or they could be using a simpler means to track their periods (calendars). The survey might have increased awareness about menstrual-

tracker mobile apps, as 38% of respondents expressed interest in having a menstrual-tracker mobile app on their mobile phone.

The results of this study contribute to feminist theory, as this study emphasized the importance of studying women's points of view; the androcentric view that permeates our culture surrounding menstruation could have influenced their attitudes toward menstruation as a taboo, which could have influenced the correlations with security features, discussion features, and body control features. Because of this androcentric view, some female undergraduate millennials may not have admitted that they have more negative attitudes toward menstruation, and they could have overestimated the importance of security features.

### **Implications of Findings**

With the rising use of mobile apps, app builders and software developers, especially male software developers who are the majority in the tech industry, need to keep in mind their audience when developing and designing menstrual-tracker mobile apps for women, which can include transgender males. Millennials and younger generations are technology savvy, Internet-connected, and they can access a wide array of information at their fingertips using smartphones; women are half of that population that can benefit from using these apps, but they are being under served. This is a big market with big business potential that is being untapped. This study showed that a significant portion of adult females showed interest in using a menstrual-tracker mobile app when they learned more about the existence of such apps from this survey. App developers and tech companies would do well to be mindful of this and build apps for this female population.

Period-tracker mobile apps can be powerful tools for biological females to learn more about menstrual cycles, pregnancy, breastfeeding, birth control, sexual activities, sexual diseases,

sexual infections, the reproductive anatomy of both men and women, and overall reproductive health for their own bodies. These apps can also be powerful tools for biological females to communicate openly with other people, their significant others, and health practitioners. If the menstrual-tracker mobile apps are indeed reliable and accurate tools, health practitioners could recommend these apps to help individuals monitor their own reproductive functions. In the United States, the menstruation taboo still exists, sometimes biological females may not or cannot receive the information they want to know about reproductive functions from school or their family, and these apps can potentially provide a safe haven for biological females to ask questions and discover answers pertaining to their own sexual health and reproductive functions.

If app developers created options for users to enter a wide array of symptoms in these apps that do not perpetuate stereotypes, then women could use these apps to enter their symptoms of irregular cycles, birth control devices, or suppressing menstruation in general; researchers and sexual health educators could benefit from menstrual-tracker mobile apps by using this data to conduct longitudinal studies. Sexual educators would be able to provide information that is more comprehensive to biological females in schools and universities and to answer more questions if they had this research as well.

The respondents in this study overall slightly agreed that it is important that menstrual-tracker mobile apps have security features, such as a passcode or other security measures, layouts that are not pink or floral that make it obvious that the apps are for periods, and a title without the word “period” in it. App developers should consider this attitude when designing app titles and layouts – they are nearly mocking reproductive health when they design apps with floral, feminine layouts and other stereotypical features. App developers should consider creating professional and neutral-colored app layouts because biological females and transgender men

can use period-tracker mobile apps for a variety of reasons, primarily for reproductive functions, which is not something app developers should take lightly. Biological females make big decisions that revolve around their own health and reproductive functions, such as having sexual intercourse or getting pregnant, and these apps can help them in these areas.

Perhaps if all menstrual-tracker mobile apps did not perpetuate stereotypical notions about menstruation from the U.S. culture and assisted with educating individuals of all ages and genders about reproductive health, then these apps could help more users feel comfortable about their own body and reproductive functions, which could help them to have more in-person discussions with others about menstruation. Both men and women need to work together in creating and developing menstrual-tracker mobile apps, which could potentially help break down barriers and increase conversations surrounding menstruation and the reproductive functions of women's bodies in the workplace and in general.

### **Previous Research Comparison**

Much research has explored women's attitudes toward menstruation, and the overall attitude of women toward menstruation was negative in previous studies. In this study, however, the overall attitude toward menstruation leaned slightly toward disagreeing that menstruation is a taboo ( $M = 2.86$ ,  $SD = 0.39$ ).

The average attitude in the menstrual suppression scale in this study, which was on a 5-point scale, leaned slightly toward agreeing that menstruation should be suppressed ( $M = 3.33$ ,  $SD = 0.62$ ), and this average attitude is comparable to another study more than 10 years ago in which the undergraduate females slightly agreed toward suppressing menstruation, which was on a 7-point scale ( $M = 4.57$ ,  $SD = 1.79$ ) (Johnston-Robledo et al., 2003). Future research should

further investigate undergraduate females' attitudes toward menstrual suppression to see if the trend is consistent or diminishing.

At this time, menstrual-tracker mobile apps are relatively new and to the researcher's knowledge, very little research has looked at female undergraduate millennials' attitudes toward these apps. From this study, 50% of the total respondents expressed interest in using a menstrual-tracker mobile app or currently use a menstrual-tracker mobile app, which is comparable to the 46% of undergraduate females from another study that expressed interest in using an app to track their menstrual cycles (Richman et al., 2014).

From this study, 61% of the respondents who reported that they currently use a menstrual-tracker mobile app reported in the open-ended question that they use the app to log their periods and/or to better predict future periods, which is comparable to 63% of respondents from another study that reported that they also use such a mobile app just to observe their menstrual cycle (Bretschneider, 2015). A lower percentage of the respondents in this study (49%), however, reported that they find it important that menstrual-tracker mobile apps have an option to track moods compared to 67% of respondents from another study (Bretschneider, 2015).

This survey provided an initial probe in exploring the relationship between female undergraduate millennials' attitudes toward menstruation and their attitudes toward the usage and features of menstrual-tracker mobile apps. The researcher's knowledge on this topic expanded greatly, as she learned that female undergraduate millennials' average attitude slightly disagreed with menstruation as a taboo, and their attitudes toward menstruation as a taboo also correlates with their attitudes toward their comfort level with discussion features and toward the importance of having security features.

## **Limitations of Study**

The researcher used an online survey to investigate the hypotheses. Limitations of using an online survey included: designing the online survey to be accessible on different technology devices, the reliability and validity of self-reported data, and reaching students who receive several requests for information on a daily basis (Dillman et al., 2014).

Social desirability is another limitation, which is respondents selecting answers that “put one in a good light with the person who asks the questions; it is often motivated by wanting to make a good impression in a social interaction (or avoid a negative one)” (Dillman et al., 2014, p. 99). Some respondents may have a more negative view toward menstruation because of the androcentric view discussed from feminist theory, and they may have selected “disagree” for some items in the survey to make themselves appear that they are comfortable with menstruation to appease the researcher. Some female undergraduate millennials might also have responded that security features are important to them and that they are comfortable with discussion features to appease the researcher as well.

The researcher also used a convenience sample, a type of nonprobability sample with no external validity, so the results of the findings are not generalizable for all female undergraduate millennials in the United States. This survey’s sample was fairly homogeneous: all of the respondents were not pregnant, the majority of the respondents identified their gender as female, and the majority were Caucasian, heterosexual, using some type of birth control, and having regular periods. Menstrual-tracker mobile apps are also a relatively new technology, and their attitudes toward such mobile apps might not yet be fully developed.

The researcher did not include an exhaustive and mutually exclusive list in the online survey asking the respondents the top reasons why they use and do not use a menstrual-tracker

mobile app, which would have helped to gain more insight into their awareness and usage of these apps.

### **Recommendations for Future Research**

Researchers could conduct a longitudinal analysis of female millennials' attitudes toward menstruation and menstrual-tracker mobile apps as they grow older and began to try to get pregnant to start a family. Perhaps these female millennials' attitudes toward menstruation and these apps will change, as they will have a stronger need or desire to use menstrual-tracker apps to track their ovulation and menstrual cycles, and they could begin to feel more comfortable about their bodies as well.

A future study with a larger and random sample size of female undergraduate millennials from every region in the United States with various backgrounds of ethnicities, sexual orientations, and socioeconomic statuses would be needed to make generalizable conclusions about their attitudes toward menstrual-tracker mobile apps, their attitudes toward menstruation, and the relationship between them. The sample size should also include more respondents who are biological females but do not identify their gender as female, who are pregnant or trying to get pregnant, who have irregular periods, who are not using birth control, and who are currently using menstrual-tracker mobile apps.

Future research could include a survey similar to this study with additional questions that ask the respondents their reliability and awareness of menstrual-tracker mobile apps. The survey could include a sample of biological females with regular or irregular periods as well as people of different ages, genders, sexes, and education levels to explore their attitudes toward menstrual-tracker mobile apps and menstruation and compare the findings with this study.



Researchers could also conduct a content analysis of users' comments in the discussion forums of several different menstrual-tracker mobile apps to study their attitudes toward menstruation and their attitudes toward the apps to avoid an observer-expectancy effect and to gain further insight. The content analysis could also look at the accuracy of health definitions and other health-related aspects in several of these apps.

Lastly, the researcher recommends a future study using interviews as the method to gain a deeper insight into female undergraduate millennials' attitudes toward menstruation and menstrual-tracker mobile apps and potentially interviewing people of different ages, genders, sexes, and education levels. The study could also include interviewing health practitioners and sexual health educators about their attitudes toward menstruation and these apps. Interviewing app developers would also be helpful to explore their attitudes toward menstruation and these apps and to gain insight about what influenced them to create and design menstrual-tracker mobile apps the way they did or how they would create and design future menstrual-tracker mobile apps.

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APPENDIX A  
RECRUITMENT TIMELINE

Monday, March 21st: The researcher announced in Rhema Zlaten's JTC 300 section at 10 a.m., Darrell Blair's JTC 300 sections at 11 a.m. and 12 p.m., and Dr. Joseph Champ's JTC 100 sections at 12:45 p.m. and 1:45 p.m. about the survey email invitation.

Tuesday, March 22nd: Qualtrics sent the survey invitation email to both of Dr. Joseph Champ's JTC 100 sections, Rhema Zlaten's JTC 300 section, and both of Darrell Blair's JTC 300 sections. The invitation email included pertinent information, such as the survey link and the survey's purpose. The email also explained to students why the researcher values their input.

Friday, March 25th: All students received a reminder email that will ask them to take the survey if they have not done so, and the email thanked those who did complete the survey.

Friday, April 1st: Survey closed at 5 p.m., a week following the reminder message.

APPENDIX B

RECRUITMENT POWERPOINT SLIDE



## **Women's Health Topic Survey**

- **Who:** Sydney Thompson, Graduate Student
- **What:** Women's Health Topic survey
- **When:** Starting this week
- **Where:** Invitation will be sent to your email
- **Why:** Earn 5 extra credit points

**Survey is completely voluntary**

**My email: [Syd.Thompson@colostate.edu](mailto:Syd.Thompson@colostate.edu)**



## APPENDIX C

### SURVEY ANNOUNCEMENT SCRIPT

Hello!

I'm Sydney Thompson, a graduate student in the Public Communication & Technology program. For my thesis, I'm working on a study to examine how female college students view a women's health topic.

The survey asks questions about how you view this female health topic and for your input on mobile apps used for this female health topic. The survey is 10-15 minutes long, it's anonymous, and it's an opportunity to earn 5 extra credit points. I'm hoping you will be willing to provide your input!

The survey will take you to a different link to fill out your information for the extra credit points. The survey will be sent to your email this week, and it's voluntary. If you are screened out of the survey or you do not wish to take the survey, you can reply to the survey invitation email to do an alternative extra credit assignment if you wish. If you have any questions, please email me at [Syd.Thompson@colostate.edu](mailto:Syd.Thompson@colostate.edu).

Thank you!

## APPENDIX D

### SURVEY INVITATION EMAIL

Dear [Student Name],

I am reaching out to you to ask for your help with a survey for my thesis about a women's health topic. You have been chosen to complete a short questionnaire about your input on the women's health topic and mobile apps for this women's health topic.

You will be rewarded with 5 extra credit points in your JTC [100 or 300] class for completing the survey; at the end of the survey, it will take you to a separate link that is not connected to the survey to fill out your name and email. Your name will not be associated with your survey question responses.

The survey will only take 10-15 minutes to complete. To begin the survey, please click this link:

[LINK]

This survey is confidential, and your participation is voluntary. Every question in the survey is optional, and you may choose to skip a question if you prefer not to answer it. If you have any questions, comments, or concerns, please contact me by replying to this message or calling 605-222-7816.

I sincerely appreciate your help with the survey.

If you are screened out of the survey or you do not wish to take the survey, you may complete an alternative assignment to earn the 5 extra credit points. Please reply to the email if this interests you.

If you are not interested in participating or believe you were contacted in error, click this link:  
[OPT OUT LINK]

Thank you,

Sydney Thompson  
[Syd.Thompson@colostate.edu](mailto:Syd.Thompson@colostate.edu)  
Graduate Student  
Public Communication & Technology  
Colorado State University

APPENDIX E

REMINDER EMAIL

Dear [Student Name],

I recently reached out to you asking for your participation in an online survey about a women's health topic. If you have taken the survey, thank you for your participation. If you have not taken the survey, I hope you'll please do so at your earliest convenience.

Just a reminder, due to the nature of my thesis, the survey is only for female college students. The survey takes all students to the extra credit form even if they are screened out. If you are screened out of the survey because you do not meet the criteria or you do not wish to take the survey, you may reply to this email to complete an alternative assignment to earn the 5 extra credit points for your JTC [100 or 300] class.

The survey will only be available until 5 p.m. (MT) on Friday, April 1st, and the alternative assignment is due this day and time as well.

The survey results will help me gain insight into how female college students view a women's health topic and mobile apps for this women's health topic.

**To access the survey, please click on this link:**

[LINK]

Or copy and paste the URL below into your Internet browser:

[LINK]

If you have any questions, comments, or concerns, please contact me by replying to this message or calling 605-222-7816.

If you are not interested in participating or believe you were contacted in error, click this link:

[LINK]

Sincerely,

Sydney Thompson  
[Syd.Thompson@colostate.edu](mailto:Syd.Thompson@colostate.edu)  
Graduate Student  
Public Communication & Technology  
Colorado State University

## APPENDIX F

### MENSTRUATION TABOO SURVEY QUESTIONNAIRE

4/5/2016

Qualtrics Survey Software

#### Consent Form

You are invited to participate in a brief survey about menstruation (periods) and apps that are designed to track menstruation. You will be asked questions about your smartphone usage, your opinions about menstruation, your opinions about apps that are designed to track menstruation, and your demographics. Your responses will help identify concerns about menstruation and whether apps that are designed to track menstruation alleviate menstruation concerns.

It will take about 10-15 minutes to complete. You will receive 5 points of extra credit as a thank you for your thoughtful responses.

Your data will be anonymous. Your name will be collected separately from your survey data only so we can ensure you receive the extra credit points. Your participation in this study is completely voluntary. There is no penalty for not participating. You have the right to withdraw from the study at any time without consequence, and you can skip any question that you would prefer not to answer.

**Whom to contact if you have questions about the study:** Sydney Thompson, Public Communication & Technology graduate student. Syd.Thompson@colostate.edu.

**Whom to contact about your rights as a research participant in the study:** Colorado State University Research Integrity & Compliance Review Office (RICRO), RICRO\_IRB@mail.colostate.edu; 970-491-1553

I have read the procedure above and agree to participate in the survey.

I have read the procedure above and do NOT volunteer to participate in the survey. (Clicking this option will automatically end the survey.)

#### Screening Questions

<https://co1.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview>

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**What is your age in years?**

**With which gender do you identify?**

Male

Female

**Which gender were you assigned at birth?**

Male

Female

**Do you have a period (menstrual cycle) on a regular basis?**

Yes

No

**Are you using any type of birth control that helps regulate your periods? (birth control pills, birth control shots, implants, IUD's, etc.)**

Yes

No

**Are you pregnant?**

Yes

No

I don't know

**Are you trying to get pregnant?**

Yes

No

**Are you trying to avoid pregnancy?**

Yes

No

**Smartphone Usage**

**Do you own a cell phone?**

Yes

No

**Can you access the Internet (apps, email, Facebook, Google, etc.) on your cell phone through either cell service or wifi?**

Yes, I can access the Internet on my phone

No, I cannot access the Internet (apps, email, Facebook, etc.) on my phone

**Do you use your cell phone to look up health information?**

Yes

No

**To your best estimation, how often do you look up health information on your cell phone?**

Several Times a Day

About Once a Day

3-5 days a week

1-2 days a week

Every few weeks

Less Often

**A menstrual tracker mobile app, or period-tracker app, has a variety of uses and benefits. Various menstrual-tracker mobile apps can do the following:**

- **Track fertility cycles to help users get pregnant**
- **Remind users to take their birth control pills or change their tampons**
- **Track moods, energy levels, sexual activity, sex drive, insomnia, flow, spotting, and other symptoms before, during, and after menstruation**
- **Predict future menstrual cycles**
- **Discuss menstruation with others who use the app in a discussion forum**
- **Reach out to nurses to ask questions**

**Do you currently have on your smartphone an app of any kind that is designed to help you track your period?**

Yes

No

**Why are you using a period-tracking app?**



**To your best estimation, how often do you use your period-tracker mobile app on your smartphone?**

I use it only when I'm on my period

I use it both when I'm on my period and when I'm not on my period

I never use it

**To your best estimation, how often do you use your period-tracker mobile app on your smartphone?**

Several times a day

About once a day

3-5 days a week

1-2 days a week

Every few weeks

Less often

**Would you be interested or not interested in using a free app on your phone that is designed to help you track your period?**

Not Very Interested

Not Interested

Neither Not Interested nor Interested

Interested

Very Interested

I don't know



**The following questions are about apps that are designed to track periods. Please answer these questions according to your own personal views and opinions.**

**If you wanted to use an app that is designed to track your period, how important or not important is it to you...**

	Not Very Important	Not Important	Neither Not Important nor Important	Important	Very Important
that you can enter your spotting on the app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
that you can enter your moods on the app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
that you can enter your food cravings on the app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
that the app has a passcode or other security measure to access the app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
that the app's layout doesn't make it obvious that it's for tracking periods (pink/purple colors, flowery symbols)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The app's title doesn't have the word "period" in it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**If you wanted to use an app that is designed to track your period, how comfortable or uncomfortable would you be with...**

	<b>Very Uncomfortable</b>	<b>Uncomfortable</b>	<b>Neither Uncomfortable nor Comfortable</b>	<b>Comfortable</b>	<b>Very Comfortable</b>
<b>Discussing periods with other women using the app's discussion forum</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Setting the app to send messages about your period to your partner (Some apps can send messages to other people, not just the person who has it on her phone.)</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>discussing how the app can be improved with the app developers on the app's discussion forum</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Language Taboo**

**The following questions are about discussing periods (menstruation) with others. Please answer these questions according to your own personal views and opinions.**

**Do you agree or disagree with the following statements?**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>I feel it's okay to discuss periods with men.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I would prefer not to talk openly about periods.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>It is important to talk about periods with men.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Do you agree or disagree with the following statements?**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>It is important to discuss the topic of periods in college classes with both men and women.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>It is uncomfortable for us women to talk about periods.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>It is important to keep periods a secret.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Do you agree or disagree with the following statements?**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>We women should avoid talking about our periods when men are present.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>It is important to talk about periods at home openly.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I feel comfortable talking about periods at the workplace.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Some people like to use code words or phrases like "that time of the month" when talking about their period, but other people use more explicit terms such as "period."**

**Do you generally use code words or phrases such as "that time of the month" when talking to the following types of people?**

	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
<b>I use code words for my period when talking to family members</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I use code words for my period when talking to friends</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I use code words for my period when talking to colleagues</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**I'm comfortable using the word "period" when discussing menstruation with...**

<b>Strongly</b>	<b>Neither Agree nor</b>	<b>Strongly</b>
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	Disagree	Disagree	Disagree	Agree	Agree
<b>Family Members</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Friends</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Colleagues</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Action Taboo**

**The following questions are about periods (menstruation). Please answer these questions according to your personal views and opinions.**

**Do you agree or disagree with the following statements?**

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
<b>It is important to buy feminine hygiene products (tampons, pads, etc.) without being seen.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I avoid exercising when I'm on my period.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I avoid swimming when I'm on my period.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Do you agree or disagree with the following statements?**

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
<b>I would feel ashamed if I "leaked" period blood through my</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

clothes.

I avoid wearing white clothing when I'm on my period.

    

When I'm on my period, I do things to hide the fact that I'm menstruating.

    

Do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I blush when I see an advertisement about sanitary pads when I am with a man.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is embarrassing when a man finds out that a woman is having her period.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoid touching my genital region when I'm on my period.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions ask for your opinions toward menstrual suppression.

**Menstrual suppression means women using birth control methods, such as shots, pills, or devices to suppress their periods (menstruation).**

**Some health professionals argue that menstrual suppression is completely healthy and some argue that more research should be done on the consequences of menstrual suppression.**

**Please answer the following questions according to your own personal views and opinions.**

**Do you agree or disagree with the following statements?**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>I think that suppressing menstruation is a good idea.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Even it was free and completely safe, I would not be interested in eliminating my menstrual periods.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I am interested in learning more about menstrual suppression.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Extensive research should be done on menstrual suppression.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I would be willing to suppress my menstruation.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>If my period disappeared, I wouldn't miss it.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>It seems strange to argue that frequent menstruation could be harmful to women's health.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## **Demographics**

**What is your ethnicity? (Mark one or more boxes)**

Caucasian

Hispanic, Latino, or Spanish origin

Black or African American

American Indian

Alaska Native

Native Hawaiian

Asian or Pacific Islander

Other (Please Specify)

**What is your total household income?**

Less than \$10,000

\$10,000 to \$19,999

\$20,000 to \$29,999

\$30,000 to \$39,999

\$40,000 to \$49,999

\$50,000 to \$59,999

\$60,000 to \$69,999

\$70,000 to \$79,999

\$80,000 to \$89,999

\$90,000 to \$99,999

\$100,000 to \$149,999

\$150,000 or more

**What is your religion?**

Christian

Muslim

Jewish

Buddhist



Hindu

Atheist

Unaffiliated

Other (Please specify)

**How often do you take part in religious services?**

Daily

Weekly

1-3 times a month

A few times a year

Less often

Never

**What is your sexual orientation?**

Heterosexual

Gay or Lesbian

Bisexual

Questioning

Other (Please Specify)

Powered by Qualtrics

APPENDIX G  
DEMOGRAPHICS TABLE

Table 3

*Demographics*

	<i>n</i>	%
<u>Age</u>		
18	35	14%
19	62	24%
20	69	27%
21	60	23%
22	25	10%
23	5	2%
24	2	1%
<u>Ethnicity</u>		
Caucasian	201	78%
Latino or Hispanic	17	7%
Black or African American	6	2%
Hawaiian	2	1%
Asian	15	6%
Multiracial	16	6%
Other	1	1%
<u>Sexual Orientation</u>		
Heterosexual	228	88%
Gay or Lesbian	6	2%
Bisexual	15	6%
Questioning	3	1%

Other	5	2%
<u>Religion</u>		
Christian	134	52%
Muslim	4	2%
Jewish	3	1%
Buddhist	3	1%
Atheist	15	6%
Unaffiliated	86	33%
Other	13	5%
<u>Religious Services Attendance</u>		
Daily	5	2%
Weekly	45	17%
1-3 times a month	24	9%
A few times a year	59	23%
Less often	42	16%
Never	83	32%
<u>Income</u>		
Less than \$10,000	71	28%
\$10,000 to \$19,999	20	8%
\$20,000 to \$29,999	11	4%
\$30,000 to \$39,999	14	5%
\$40,000 to \$49,999	11	4%
\$50,000 to \$59,999	16	6%
\$60,000 to \$69,999	16	6%
\$70,000 to \$79,999	10	4%
\$80,000 to \$89,999	7	3%
\$90,000 to \$99,999	11	4%
\$100,000 to \$149,999	27	11%
\$150,000 or more	41	16%

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APPENDIX H

REGULAR PERIODS AND BIRTH CONTROL USAGE ASSOCIATIONS WITH  
 MENSTRUAL-TRACKER MOBILE APP OWNERSHIP

Table 4

*Regular periods and birth control usage associations with menstrual-tracker mobile app ownership*

	<i>n</i> (%)	Owns a period app (% yes)
<u>Birth control usage</u>		
Yes	164 (64%)	25 (15%)
No	92 (36%)	29 (32%)
<u>Regular periods</u>		
Yes	216 (84%)	50 (23%)
No	40 (16%)	4 (10%)

APPENDIX I

EFFECTS ON MENSTRUAL ATTITUDES ON SECURITY FEATURES, BODY CONTROL  
 FEATURES, AND DISCUSSION FEATURES

Table 5

*Effects on menstrual attitudes on security features*

	$\beta$	$p$
Birth control usage	.106	.062
Regular periods	-.037	.514
Pregnancy avoidance	-.054	.371
Age	.011	.853
Ethnicity	.040	.495
Sexual orientation	-.013	.833
Low income	.268	.289
Medium income	.190	.448
High income	.393	.110
Unaffiliated religion	-.056	.471
Other religions	-.016	.810
Regular religious attendance	-.152	.025
Not regular religious attendance	-.021	.769

Table 6

*Effects on menstrual attitudes on body control features*

	$\beta$	$p$
Birth control usage	-.032	.619
Regular periods	.036	.565
Pregnancy avoidance	-.045	.504
Age	-.004	.952
Ethnicity	.026	.693
Sexual orientation	-.108	.121
Low income	-.304	.284
Medium income	-.448	.111
High income	-.311	.259
Unaffiliated religion	-.146	.097
Other religions	.012	.871
Regular religious attendance	-.034	.656
Not regular religious attendance	.011	.893

Table 7

*Effects on menstrual attitudes on discussion features*

	$\beta$	$p$
Birth control usage	-.079	.195
Regular periods	.043	.477
Pregnancy avoidance	-.057	.379
Age	.017	.779
Ethnicity	-.047	.453
Sexual orientation	.011	.870
Low income	.064	.815
Medium income	-.069	.800
High income	.052	.846
Unaffiliated religion	-.099	.242
Other religions	-.093	.206
Regular religious attendance	.043	.557
Not regular religious attendance	.047	.538