May 2016

Social Referent Influences on Hormonal Contraceptive Decisions

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SOCIAL REFERENT INFLUENCES ON HORMONAL CONTRACEPTIVE DECISIONS

by

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A Thesis Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Master of Science

in Psychology

at

University of Wisconsin-Milwaukee

May 2016

ABSTRACT

SOCIAL REFERENT INFLUENCES ON HORMONAL CONTRACEPTIVE DECISIONS

by

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The University of Wisconsin-Milwaukee, 2016
Under the Supervision of Professor Diane Reddy

Despite evidence that social referents could be influencing hormonal contraceptive decisions in adult women, the current research has done little to investigate this area. The purpose of the current work was to begin to identify whether women's hormonal contraceptive decisions may be influenced by their social referents' support for hormonal contraceptive use and social referents' contraceptive behaviors. Sexually active women (*n*=194), aged 18-34, completed an online survey examining their sources of contraceptive information, feelings towards pregnancy, contraceptive use/preferences, contraceptive knowledge, and medical mistrust. In addition to this, as part of the survey they identified three important women in their lives and provided information on their perception of each social referent's contraceptive use and support for contraceptives. Participants also listened to one of four audio vignettes where a doctor character and a friend character each provided either positive or negative support for a fictitious hormonal contraceptive. Participants rated their attitudes towards the fictitious contraceptive after listening to the vignette. It was hypothesized that participants' perception of the social referents' support of their personal hormonal contraceptive use and participants' perceptions of referents' hormonal contraceptive behaviors would impact the odds that participants used hormonal contraceptives at last intercourse, but that this relationship would be moderated by contraceptive knowledge. It was also hypothesized that individuals who received

conflicting information about a fictitious hormonal contraceptive from the physician and friend characters in the audio vignettes (with one for the contraceptive use, the other against) would hold different contraceptive attitudes when compared to those who heard both characters agree about the contraceptive. It was expected that the relationship between vignette condition and attitudes towards the fictitious contraceptive would be moderated by medical mistrust.

A number of participants identified social referents as sources of contraceptive information with 35.1% listing mothers and/or female guardians as a source, 23.2% listing their best friend, 22.7% listing friends, and 12.9% listing their sisters. In a logistic regression, social referents' perceived support of hormonal contraceptive use was found to increase the odds that the women reported using hormonal contraceptives at last sexual intercourse. Social referents' perceived contraceptive behaviors and participants' contraceptive knowledge scores were not found to be related to participants' contraceptive use at last sexual intercourse. Hierarchical regressions investigating the outcomes of the audio vignettes suggested that the friend and physician characters' contraceptive support is statistically related to attitudes towards the fictitious contraceptive; however, the relationship between the vignette conditions and contraceptive attitudes was moderated by participants' levels of medical mistrust. These findings point towards social referents as a potential influence on hormonal contraceptive decision-making in adult women. Future research is warranted to better determine and understand the role of social referents in hormonal contraceptive decision-making.

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ACKNOWLEDGEMENTS

Many thanks to the University of Wisconsin-Milwaukee community for making this project, and my education, a reality. Thanks to my adviser, Diane Reddy, for guiding me, providing me with the frank advice I needed (even when I didn't want to hear it), and viewing my tendency to say exactly what I am thinking as simply something that made her life more interesting. I am well aware that this experience could not have been as positive without her support. Thanks to my committee members, Raymond Fleming and Susan Lima, for providing me with time, energy, and expertise. Even with so many other demands on their time, I could not have asked for a committee to give more to this process or to offer me more encouragement and advice. It was truly a wonderful experience, and I'm not certain how many graduate students can honestly say that about writing their thesis.

So many people offered their assistance and emotional support throughout the process. Many thanks to Wei-Ju Chen for making it her personal mission to make certain that I could pass my thesis proposal. Her ability to question every methodological/statistical choice I made helped me see my project in a completely different light. And bonus points for doing it without making me cry! Thank you to Heidi Pfeiffer for the invaluable assistance throughout the process. It really is impossible to pick just one thing to thank her for. Thanks to Leah Stoiber for every minute of emotional support. (Of which there were so many!) And for never once suggesting that maybe, in fact, I did not need another cup of coffee. Thank you, Morgan Hodge and Emily Prosser, for your feedback throughout the development of this project. Thank you, Caitlin Kienzler, for offering and providing proofreading assistance at the very end of this long road.

Thanks to Peter Kienzler, my brother and best friend, for an endless supply of funny stories to distract me from my thesis when I needed a break. Thanks to Melody Clark Rollins for involving me in her life while she was having a wedding and a baby, providing me with endless distractions. Thanks to Nikki Spencer for the endless supply of funny kid stories and reality checks. Thanks to Blair Broughton. (She knows why.) This thesis is only as good as it is because I had time to step away from it. I appreciate everyone that knew when I needed that away time the most.

Thanks to my partner, Don, who really took the most abuse while I was completing this project. Thanks for never once making me feel guilty when I had to hang up the phone so that I could "write my thesis." Even if he rightly suspected I was probably just going to stare at the computer screen, or reorganize my notes for the umpteenth time, and wait for inspiration. Thanks for never once questioning whether I was capable of getting this done. And thanks to him for pretending to have infinite patience. Even when we both knew it had actually run screaming from the room hours before and he was hanging in there out of sheer force of will. Supporting me in doing this has been the most wonderful version of "I love you."

Finally, thanks to my parents. Thanks to my mom, Mary Kienzler, for offering unconditional love and complete confidence in my ability to complete my thesis. I have no idea where that confidence came from, but I suspect if I had asked, the answer would have been something along the lines of, "Because of course you will," or, "Because I'm your mother." So

really, the why doesn't matter, but the constant support absolutely does. And thank you to my dad, Dennis Kienzler. I could thank him for all of his support while I completed this thesis, but that wouldn't even really begin to cover what he did to get me to this point. His constant, unwavering support growing up, through college, and through more middle of the night phone calls than any other parent has probably had to endure in the history of parenting got me to adulthood. And when he discussed how proud he was of me for defending my thesis, he specifically refused to take any credit. He said he did not take credit for his children's accomplishments. Well, he has earned it. He has absolutely earned credit. I would not be here without him. I simply would not have made it. So thank you.

SOCIAL REFERENT INFLUENCES ON HORMONAL CONTRACEPTIVE DECISIONS

Unintended, or unplanned, pregnancies are still a common occurrence in the United States, despite the existence of effective barrier and hormonal contraceptives. As recently as 2008, 51% of all pregnancies were categorized as unintended. While adolescent pregnancy rates have been lowering in recent years, in 2008, 45% of pregnant women ages 25-29 in the United States had an unintended pregnancy and women ages 18-24 had the highest rate of unintended pregnancies of any age group (Finer & Zolna, 2014). Despite the fact that contraceptive use is fairly common, true contraceptive failure, defined as the failure of an effective contraceptive that is used as recommended, is not a common cause of unplanned pregnancy (Mosher, Jones, & Abma, 2012; Trussell, 2011). Not using contraceptives, not using effective contraception, or using effective contraceptives imperfectly are linked with a greater number of unplanned pregnancies (Mosher et al., 2012; Trussell, 2011).

Unintended pregnancies are associated with at-risk behaviors during pregnancy and after pregnancy. Women with unintended pregnancies tend to learn that they are pregnant later and seek prenatal care later than women who intend to get pregnant (Dott, Rasmussen, Hogue, & Reefhuis, 2010; Kost, Landry, & Darroch, 1998; Mosher et al., 2012; Weller, Eberstein, & Bailey, 1987). Studies have found that women who have intended pregnancies are less likely to smoke, be exposed to secondhand smoke at home, or use illicit drugs than women with unintended pregnancies (Dott et al., 2010; Kost et al., 1998; Mosher et al., 2012; Weller et al., 1987). Women who have intended pregnancies are also more likely to take folic acid and multivitamins and to reduce their caffeine intake compared to women with unintended pregnancies (Dott et al., 2010; Hellerstedt et al., 1998; Kost et al., 1998; Weller et al., 1987). Women who have an unintended pregnancy are at increased risk of maternal depression and

anxiety symptoms (Bouchard, 2005; Grussu, Quatraro, & Nasta, 2005; Leathers & Kelly, 2000; Nelson & O'Brien, 2012), with some mood disturbances documented as continuing to a year postpartum (Grussu et al., 2005). Infants from unintended pregnancies have greater odds of having a low birth weight and being born preterm (Mosher et al., 2012; Sharma, Synkewecz, Raggio, & Mattison, 1994). Given the health and psychological risks that are associated with unplanned pregnancies, it is important for women and their partners to take steps to lessen their chances of having an unintended pregnancy.

Contraceptives lessen women's risk of unplanned pregnancy (Ranjit, Bankole, Darroch & Singh, 2001; Trussell, 2011). In the United States, 60% of those who experience an unintended pregnancy were not using contraceptives at the time of conception (Mosher et al., 2012). Certain factors have been found to influence women's effective contraceptive use. Women that are more knowledgeable about contraceptive options are less likely to have unprotected sex (Frost, Lindberg, & Finer, 2012), and women who are satisfied with their contraceptives tend to use them more consistently (Frost & Darroch, 2008). Among those who access contraceptive options, research has documented that hormonal contraceptive options result in less unintended pregnancies for the typical user compared to barrier and other contraceptive options (Ranjit et al., 2001; Trussell, 2011). It should be noted, however, that hormonal contraceptives are not perfect for the typical hormonal contraceptive user. Improper use of hormonal contraceptives is documented as relatively common (Lete et al., 2008; Potter, Oakley, de Leon-Wong, & Canamar, 1996; Ranjit et al., 2001; Rosenberg, Waugh, & Burnhill, 1998; Trussell, 2011). For instance, one study found that only 33% of women using the hormonal birth control pill were taking it as prescribed during a one month cycle (Potter et al., 1996). Nine percent of women that use the birth control pill or the NuvaRing in a typical (rather than perfect) way will become

pregnant in the first year of use, but for comparison, the typical use pregnancy rates for male condoms is 18% within the first year of use (Trussell, 2011). With perfect use of male condoms the pregnancy rate for women is 2%, compared to birth control pills at .3%, vaginal rings at .3%, and the hormonal intrauterine contraceptive devices (IUDs) at .2% (Trussell, 2011). While hormonal contraceptives are clearly more effective in preventing unplanned pregnancies, it isn't solely the effectiveness of an option that should be the focus. The user's satisfaction with the option, and the accuracy with which one uses the contraceptive, should be considered when choosing a contraceptive option.

There are a variety of contraceptive options, including a variety of hormonal contraceptive options, which use different implementation procedures and create different levels of disruption during sexual behaviors. Still, there are significant barriers in contraceptive knowledge that may hinder women's ability to locate a contraceptive choice that fits their needs. Low contraceptive knowledge is a common problem for both genders (Akers, Schwarz, & Corbie-Smith, 2010; Biggs & Foster, 2013; Eisenberg, Bearinger, Sieving, Swain, & Resnick, 2004; Frost et al, 2012; Garces-Palacio, Altarac, & Scarinci, 2008; Harris, 2013; Hladky, Allsworth, Madden, Secura, & Peipert, 2011; Spies, Askelson, Gelman, & Losch, 2010). Frost et al. (2012) found that one quarter of women and half of the men in their study had low levels of general contraceptive knowledge, and 40% believed that using contraception did not really make a difference in preventing unplanned pregnancies. Many adults in this study also reported that they did not feel knowledgeable about injectable contraceptives, oral contraceptives, condoms, and the IUD. Only 8% of women attending family planning clinics in Biggs and Foster's (2013) study accurately assessed their risk of becoming pregnant. Twenty-four percent of women underestimated their risk of getting pregnant from unprotected sex. Forty-four percent

overestimated their risk of conception while using condoms, 39% greatly overestimated their risk of getting pregnant while using oral contraceptives, and 44% overestimated their risk using IUDs. Women tend to be the more knowledgeable about the contraceptive they have chosen compared to other available contraceptive options (Biggs & Foster; 2013; Harper, Brown, Foster-Rosales, & Raine, 2010). If contraceptive knowledge is limited for at least some members of the population, and adults have a variety of contraceptive options (that may or may not work well for them), then the question becomes: How are women choosing their contraceptives?

Social Influences on Health Behaviors and Contraceptives

Social referents and social networks have been investigated for their influence on many health-related areas. They have been found to influence individual health behaviors including: alcohol use, physical activity, obesity, eating habits, accessing routine medical checks and other medical care, sexual risk behaviors associated with HIV, condom use, tobacco smoking, and marijuana use (Ali, Amialchuk, & Dwyer, 2011b; Coronges, Stacy, & Valente, 2011; Dedobbeleer, Morissette, & Rojas-Viger, 2005; Fujimoto & Valente, 2013; Holahan et al., 2012; Hruschka, Brewis, Wutich, & Morin, 2011; Kim, Fleming, & Catalano, 2009; Leahey, LaRose, Fava, & Wing, 2011; Marquez, Elder, Arredondo, Madanat, Ji, & Ayala, 2014; Pachuki, Jacques, & Christakis, 2011; Seo & Huang, 2012; Shiovitz-Ezra & Litwin, 2012; Strader, Beaman, & McSweeney, 1992; Tucker et al., 2012). Given the number of health-related behaviors that have been found to be influenced by social referents, it is unsurprising that investigators would consider these influences' potential effects on contraceptive decisions, particularly adolescent contraceptive decision-making (Akers et al., 2010; Ali, Amialchuk, & Dwyer, 2011a; Fallon, 2010; Harris, 2013; Jones, Biddlecom, Hebert, & Mellor, 2011; Kim, Gebremariam, Iwashyna, Dalton, & Lee, 2011; Melo, Peters, Teal, & Guiahi, (in press); Meneses, Orrell-Valente,

Guendelman, Oman, and Irwin, 2006; Sable & Libbus, 1998; Strader et al, 1992; Yee & Simons, 2010; Young Pistella & Bonati, 1998).

What is surprising is the limited amount of information investigators have collected on the extent of social referent influences on adult women's hormonal contraceptive decision-making. It is important to understand if and how social referents may influence contraceptive choice because such a significant portion of the population has limited or low contraceptive knowledge (Biggs & Foster, 2013; Frost et al., 2012; Hladky et al., 2011; Spies et al, 2010). As individuals tend to be most knowledgeable about their own contraceptives (Biggs & Foster, 2013; Harper et al., 2010), there is a risk of social referents only being able to offer limited information about contraceptives other than their own. This could create an unintentional bias in women towards the use of their social referents' contraceptive choices and an inadvertent, accidental limitation on the number of effective contraceptive options that women access for their own needs. Identifying whether and when social influences affect women's contraceptive choices is essential in assisting women in locating satisfactory and effective contraceptives for their use.

Family and parental influence on hormonal contraceptive choice remains largely unexplored in the adult literature, though these limitations are likely to be partly related to adolescent findings on parental influence on contraceptive choices. The literature suggests that at least some adolescents discuss contraceptives with their immediate and extended family members (Akers et al., 2010; Fallon, 2010; Harris, 2013; Jones et al., 2011; Kim et al., 2011; Meneses et al., 2006; Young Pistella & Bonati, 1998), but among adolescents, parents may influence sexual behaviors only up to age 15 (Kim et al., 2011). Researchers note that parents may even be reluctant to offer contraception or contraceptive advice to adolescents, as they are

concerned that this might be seen as encouraging sexual behavior (Akers et al., 2010). Meneses et al. (2006) found that 15.1% of mothers reported a lack of communication with their adolescent daughters about the use of contraception, and 9.5% of mothers reported that they did not feel that they knew enough about sex to talk to their daughters about it. Furthermore, 9.6% of these mothers believed that their daughters would get the necessary information about sex from other sources. Unfortunately, research confirms that parents are not always the most accurate source of contraceptive information (Eisenberg et al., 2004; Harris et al., 2013).

Researchers have noted that some adolescents' parents are more likely to discuss contraception once the adolescent has had a pregnancy (Akers et al., 2010; Young Pistella & Bonati, 1998), which could fuel an argument that parental discussion of contraception could potentially reemerge in adulthood in some populations, as pregnancies and other changes occur with their adult children. Qualitative work done by Yee and Simons (2010) supports the idea that mothers and sisters can be important sources of information in contraceptive choices made by Hispanic and African American adult women, but whether this influence is more universal is unknown. The current literature offers an incomplete picture of the influence of family members on adult women's hormonal contraceptive decision-making.

Additionally, the extent that peers influence adult hormonal contraceptive choice has not been made a focus in the current literature, despite the evidence that adults discuss aspects of family planning with their friends. Women's social networks have been found to influence the decision to use condoms (Dedobbeleer et al., 2005; Strader et al., 1992). Forrest and Frost (1996) and Frost et al. (2012) found that women were more likely to use contraception if their friends considered contraception to be important, but did not identify whether there was any relationship between peers' support of a specific type of contraception and the type of contraceptive option

that women chose to use. Adolescents and young women in qualitative studies have identified peers as an influence on their contraceptive decision-making (Fallon, 2010; Jones et al., 2011; Melo et al., 2014; Sable & Libbus, 1998; Yee & Simons, 2010). More specifically, adolescents and young adults have identified their peers' personal experiences as information that they are interested in accessing during conversations about contraceptive choice (Fallon, 2010; Melo et al., in press; Yee & Simons, 2010). Johnson, Pion, & Jennings (2013) found that only 4% of the participants in their study believed that friends were the most important influence on their contraceptive choice; however, this only provides information on social influences' perceived impact on contraceptive choice, and their actual impact is currently unknown. And while 28% of women in the same study reported discussing contraceptive choices with their friends, whether that 28% reflects the number of women who receive some information about contraception from their friends vicariously, rather than direct discussion, is unknown. These findings point toward social referents as potentially important sources of information on contraception, but research provides limited information on the extent to which social referents influence hormonal contraceptive choice or under what circumstances this influence may assert itself.

Relying on Doctors to Provide Contraceptive Education

It could be argued that physicians should be relied upon to provide accurate contraceptive education and that the influence of doctors on women's hormonal contraceptive choices is far more important than the influence of one's social circle. Doctors are essential to accessing most hormonal contraceptive options. (Plan B being a notable exception in at least some communities.) Relying on doctors to provide hormonal contraceptive information and assist women in accessing hormonal contraceptive choices can lead to positive outcomes; however, evidence suggests that doctors' influence on contraceptive choices does have its limitations.

Doctors and other contraceptive providers report discussing patients' experiences, side effects and patients' satisfaction with their current method of contraception during their appointments (Landry, Wei, & Frost, 2008). Women are more likely to report any contraceptive use at their last sexual encounter if they also reported having received contraceptive counseling from a medical provider (Lee, Parisi, Akers, Borrerro, & Schwarz, 2011). Women who received a high quality of care when they received their contraceptive counseling were more likely to report using contraception at follow-up (RamaRao, Locustae, Costello, Pangolibay, & Jones, 2003). (Later findings from Frost, Singh, and Finer (2007) suggest that certain provider caregiving characteristics being satisfactory, rather than overall satisfaction with care, is the link. But the relationship still involves satisfaction with the providers' services.) Women who reported satisfaction with their provider, including positive perception of the humanness of the provider, have less negative attitudes towards the pill and more consistent contraceptive pill use (Forest & Frost, 1996; Frost & Darroch, 2008; Kallen & Stephenson, 1981; Rosenberg, Waugh, & Burnhill, 1998).

Nonetheless, physicians' influence has specific limitations and may even negatively affect women's contraceptive choices in certain situations, limiting the options they have and curtailing their choices. Doctors may not be discussing (or patients may not realize that they are attempting to discuss) more than a couple of contraceptive options with their patients. Harper, Brown, Foster-Rosales, and Raine (2010) found that in a sample of 15-24 year olds, 75% of the patients reported that their doctors only discussed 1-2 contraceptive options with them, while 14% reported that their medical provider discussed all available options. There may be a variety of reasons for the restriction of information by the doctors, but these limitations mean that patients may not be aware of all the contraceptive options before a contraceptive is chosen.

Medical providers are aware of the limitations placed on them and have expressed concerns with the limitations on their time to educate women on contraceptives (Landry et al., 2008) Physicians have reported that changing insurance payments in order to account for additional contraceptive counseling is important to improved contraceptive care (Landry et al., 2008).

While doctors can address contraceptive choices, women must have access and be receptive to contraceptive counseling. Johnson et al. (2013) found that only 56% of their United States participants used their doctors as a source of advice on contraceptive use, suggesting that some women are not receiving, or possibly are not receptive to, contraceptive counseling from a medical provider. While this may mean that women are accessing condoms or other methods that are not physician dependent, it suggests that 44% of women are not accessing their doctors as a resource to make an important health decision. This significantly lessens the doctor's role as a contraceptive health resource. Harper et al. (2010) found that 89% of low-income women ages 15-24 reported choosing their contraception without receiving input from their doctor. These women may have been accessing hormonal contraceptive choices through a physician, but they are making their contraceptive decision prior to and/or without regards to direct medical advice. Together these findings support the contention that, for at least certain populations of women, physician contraceptive counseling may not be as influential in their contraceptive decision-making, and they raise questions about how these contraceptive choices are being made. This seems particularly likely to be the case in populations where women would have to actively pursue access to doctors who can provide hormonal contraceptive choices, such as those who are uninsured or do not receive regular medical care, thus being more likely to need to make the decision that they wish to use a hormonal contraceptive prior to discussing contraception with a doctor.

In addition to these concerns, physicians have been found to be less effective communicating with ethnic and minority patients (Schouten & Meeuwesen, 2006). Some African Americans have expressed medical mistrust, specifically they have expressed fears of being used as test subjects for unsafe contraceptives or that individuals pushing contraceptives in the African American community may be trying to restrict the African American population (Bogart & Thorburn, 2006; Rocca & Harper, 2012; Thorburn & Bogart, 2005). Latina women are also more likely than white, non-Latina women to believe that the government encourages contraceptive use to limit minority groups' populations (Rocca & Harper, 2012). It is not surprising that African American women who endorse these beliefs are less likely to use a contraceptive that requires a medical provider (Thorburn & Bogart, 2005). The medical community is not allaying these fears. African American women and Hispanic women are more likely than non-Hispanic white women to report having been encouraged by a clinician to use contraceptives, while Hispanic women are most likely to report being counseled to use sterilization (Becker & Tsui, 2008; Borrero, Schwarz, Creinin, & Ibrahim, 2009; Downing, LaVeist, & Bullock, 2007). Women from minority groups have reported feeling coerced by providers, especially when medical providers disagreed with the woman's contraceptive preference, and to report experiencing both discrimination and poor communication with providers (Yee & Simon, 2011).

Concern about the trustworthiness of both medical providers and the government officials involved in the recommendation to use contraceptives is not restricted to groups considered to be racial and ethnic minorities. While African Americans report greater levels of general medical mistrust compared to white individuals, there is evidence that white individuals may also be experiencing varying levels of medical mistrust (Armstrong et al., 2008; Price, Kirchofer,

Khubchandani, Kleinfedler, & Bryant; 2013). When looking specifically at contraception, Frost et al. (2012) found that 6 out of 10 adults expressed mistrust of the government support for contraceptives and/or concerns that contraceptives are being promoted to minority groups in an inappropriate way. Rocca and Harper (2012) found that 23.4% of the women in their study expressed some level of disagreement with the statement, "Government ensures birth control safety." This included 21% of their white participants, 32.2% of their African American participants, 24.9% of their Latina participants, and 15.3% of those in other racial and ethnic categories. An additional 37.8% of their participants only somewhat agreed that 'Government ensures birth control safety." When asked about the statement "Government promotes birth control to limit minorities," 31.5% of participants agreed with that statement to some degree (24.8% of white participants, 42.1% of African Americans, and 51.4% of Latinas). Given the widespread concerns about the trustworthiness of those offering medical information and care, it would be unsurprising for women to reach out to friends and family members for accurate contraceptive information.

Purposes of the Current Study

The current study had two main, and interrelated, purposes. The first was to begin to identify whether social referents could be affecting an individual's choice of hormonal contraceptives. Accordingly, this study investigated whether there was a correlation between women's use of hormonal contraceptives and their belief that their social referents use hormonal contraceptive options. Perceptions of social referents' approval of hormonal contraceptive use was also investigated for its potential relationship with hormonal contraceptive choice in participants.

The second focus of this study was to investigate what types of contraceptive choices women make when they receive conflicting advice from a doctor and a social referent. To investigate the types of contraceptive choices that occur in this scenario participants were provided with an audio vignette in which a social referent character and a physician character agree or disagree about a fictional contraceptive option. Responses to the audio vignette were assessed in order to investigate whether contraceptive decisions differ when women are provided with conflicting information from the two characters compared to when the two characters in the audio vignette are in agreement. In addition, whether medical mistrust may influence contraceptive decision-making in an audio vignette when the doctor character and the social referent character are in disagreement about the appropriateness of a contraceptive option was examined.

Hypotheses

Hypothesis 1. Women were more likely to report using hormonal contraceptives if they believe the important female social referents in their lives were using hormonal contraceptives or would approve of the use of hormonal contraceptives. In addition to this, contraceptive knowledge was expected to moderate the relationship between contraceptive use and social referent influence. As women's levels of contraceptive knowledge decrease, women were expected to be more likely to use hormonal contraceptives if they believe that their social referents are using contraceptives or would approve of hormonal contraceptive use.

Hypothesis 2. Medical mistrust was expected to moderate the relationship between vignette condition and participants' willingness to use the fictitious hormonal contraceptive. When asked to make a decision about using a fictitious type of hormonal contraception presented in the audio vignette, women assigned to the condition where a social referent and physician

agreed that a hormonal contraceptive would work well for the female target would be more likely to state that they would be willing to use the contraceptive than women in the condition where the social referent character and the physician character agreed that the contraceptive was not healthy for the female target in the audio vignette, regardless of level of medical mistrust. However, in the audio vignette where the physician character believes that the contraceptive would be appropriate for the female target, but the social referent character believes the contraceptive would not be appropriate, women with higher levels of medical mistrust would be less likely to use the contraceptive, compared to women with lower levels of medical mistrust.

Hypothesis 3. Medical mistrust was expected to moderate the relationship between vignette condition and the participants' rating of fictitious contraceptive safety. Individuals assessing the safety of a fictitious hormonal contraceptive option in the audio vignette were more likely to believe it was safe if both the doctor and the social referent characters agreed that it was a good contraceptive option, compared to when both the doctor and the social referent characters believed that it is not a good contraceptive option. However, when the doctor and the social referent characters disagreed about the contraceptive option's appropriateness, those with higher levels medical mistrust were more likely to believe that the contraceptive option was safer if the social referent character states that it was a good option, compared to individuals with lower levels of medical mistrust.

Method

Participants were 194 sexually active, heterosexual women ages 18-34 from the University of Wisconsin-Milwaukee (UWM). Pregnant women were excluded from the analysis to avoid potential emotional distress related to requiring them to complete the positive feelings towards pregnancy scale and because their most recent sexual activity is unlikely to be reflective

of their contraceptive practices prior to and following pregnancy. Women who cannot use hormonal contraceptives or who reported that they are sterile or have been sterilized were also excluded from the sample, as they are unable to use hormonal contraceptives at this time. Women who reported that they were actively trying to get pregnant currently were also excluded from the sample.

Materials and Procedure

Participants completed a Qualtrics survey with an audio vignette. They were recruited through the University of Wisconsin-Milwaukee Department of Psychology's Sona System and were offered extra credit towards their course work for their participation in the survey. Women were asked to complete the material in the following order: demographic information, contraceptive preferences and history, feelings towards pregnancy questions, audio vignette and related audio vignette questions, an assessment of the influence and contraceptive behavior of important women, contraceptive knowledge assessment, and a medical mistrust assessment.

Demographics. Women were asked to provide their race, relationship status and length of time in their relationship, religious affiliation, estimated income, their access to health insurance and their access to affordable hormonal contraceptives. Women were also asked their age, which offered a secondary check to ensure that only women within the demographic were included in the sample. The full demographic questionnaire is in Appendix A.

Contraceptive Preference and History. Women's immediate contraceptive history and preferences were assessed (Appendix B). Women were asked what contraceptives they used the last time they had sexual intercourse, as well as the types of contraception they prefer to use to prevent pregnancy. They were given an extensive list of contraceptive options, including: birth control pills, cervical cap, condoms, female condoms, diaphragm, hormonal arm implant,

hormonal intrauterine device (IUD), non-hormonal IUD (example: copper IUD), hormonal patch, hormonal shot, natural family planning, Plan B, spermicide, sponge, sterilization (yourself), sterilization (your partner), withdrawal, vaginal ring, other, and none. Women were also asked whether a doctor had ever stated that they should not use hormonal contraception. They were asked to identify where they obtain contraceptive information from a list, including: doctor or another healthcare provider, significant other/sexual partner, mother/female guardian, father/male guardian, sister, brother, aunt, uncle, male cousin, female cousin, best friends, friends, books, Internet, other.

Positive Feelings Towards Pregnancy Scale. Pregnancy ambivalence is an important measure to control for, as women are less likely to use contraceptives if they feel ambivalent about becoming pregnant (Bimla Schwarz, Lohr, Gold, Gebert, 2007; Frost & Darroch, 2008; Frost et al., 2007). When one considers some previous ambivalence measures (e.g. Frost & Darroch, 2012; Frost et al. 2007; Higgins, Popkin, & Santelli, 2012), they appear to be more accurately measuring is positive feelings towards pregnancy and feelings towards potential negative aspects about becoming pregnant, both of which may or may not contribute towards ambivalence about becoming pregnant. Ambivalence requires a weighted judgment of pros and cons, which probably varies between women based on the importance they give various aspects of their lives, and is defined by feeling either that some positive aspects outweigh the importance of avoiding pregnancy, or that some negative aspects outweigh the importance of becoming pregnant. While one can account for negative and positive aspects of pregnancy in women's lives, it seems that this may not offer an accurate reflection of women's ambivalence towards becoming pregnant. For this reason, the term "positive feelings towards pregnancy" was used in the current study, as it cannot be assumed that the women in this study feel ambivalent about

pregnancy, but it is recognized that their positive feelings towards pregnancy may influence their likelihood of using any type of contraceptive.

Questions about positive feelings towards pregnancy have been created by the adoption of an existing pregnancy ambivalence questionnaire and accompanying research. Two of these questions were adapted from Higgins et al. (2012) pregnancy ambivalence questions. Additional questions addressed perceptions of the support for pregnancy and its effects on her goals, factors that have been identified as influencing women's positive feelings toward pregnancy (Askelson, Losch, Thomas, & Reynolds, 2015; Forrest & Frost, 1996; Kendall et al., 2005; Rocca & Harper, 2012). (See Appendix C for the newly created survey questions.) Individuals were also assessed for how likely they believe it is that they will be pregnant in the next year. All questions had an appropriately labeled Likert scale (scored 1 to 7). Total scores were used to assess positive feelings towards pregnancy. The resulting positive feelings towards pregnancy scale had good inter-item consistency (Cronbach's alpha = .72).

Doctor/Friend Influence Audio Vignettes and Questions. An audio vignette was provided to women after the assessment of their contraceptive history. The audio vignette provided women with information about a fictitious hormonal contraceptive option, Hormonal Contraceptive A, through the voices of two audio vignette characters. These characters are identified in the audio vignette as a friend (social referent) and a physician. Both characters were women, to avoid possible effects on the audio vignette assessment questions that could be created by the gender of the physician. The social referent character and the physician character provided either similar (for or against) or conflicting opinions (one for and one against) about the participants' hypothetical use Hormonal Contraceptive Option A (scripts in Appendix D). Each participant received one of these four possible audio vignettes.

Each character in the audio vignette provided a perspective of the three aspects of contraception women have identified as important to contraceptive choice: whether the contraception is easy to use, whether it is effective and whether it has side effects (Garbers, Meserve, Kottke, Hatcher, & Chiasson, 2013; Sable & Libbus, 1998). They were provided in the following combinations: social referent likes contraceptive/physician likes contraceptive, social referent likes contraceptive/physician dislikes contraceptive, social referent dislikes contraceptive/physician likes contraceptive, social referent dislikes contraceptive/ physician dislikes contraceptive. Each individual received one of these combinations.

Immediately following the audio vignette, participants were assessed regarding their reactions towards Hormonal Contraceptive A (Appendix E). They were assessed for the level of interest they would have in using this type of contraceptive, how safe they believed this contraceptive was, and whether they would recommend its use to others. Participants were asked "Would you be interested in taking Hormonal Contraceptive A based on the information given?" and answered the questions using a Likert scale of 1 (very uninterested) to 7 (very interested). They were also asked, "I feel taking Hormonal Contraceptive A would be _____." with the possible answer options of 1 (very unsafe) to 7 (very safe). Participants were also assessed for the likelihood that they would recommend that friends or family consider Hormonal Contraceptive A. Participants answered "How likely would you be to recommend that a friend or family member consider using Hormonal Contraceptive A?" on a Likert scale from 1 (very unlikely) to 7 (very likely).

Participants were assessed for additional vignette effects. Participants were asked, "How likely would you be to recommend this doctor to someone else for birth control?" and "How likely would you be to recommend that someone else ask the friend in the audio recordings about

birth control?" They responded to these questions on a scale from 1 (very unlikely) to 7 (very likely). Participants were also asked "To what extent do you think this doctor provided appropriate birth control advice?" and "To what extent do you think the friend on the audio recording provided appropriate birth control advice?" Participants answered these questions on a scale of 1 (very inappropriate) to 7 (very appropriate). These questions allowed exploration for any potential effects the audio vignette may have had that were not focused solely on the participants' feelings towards contraceptive use.

Social Referent Influence Questions. Participants were asked to think of three women who are important to them and with whom they discuss important information. (A similar prompt was used in Lefkowitz and Espinosa-Hernandez (2007) when participants were asked to identify a close friend). Participants were then given an identical set of survey questions for each of these three women (Appendix F). Participants were asked to list their relationship with each of these women and to identify whether these individuals have discussed birth control with them. Participants were then asked whether they knew what type of birth control each woman uses and what type of birth control that would be. Participants were asked for their view of their social referents' support for the participants' potential hormonal contraceptive use and potential barrier contraceptive use. They were provided with a 7 point Likert scale from (1) very unsupportive to (7) very supportive. Participants were asked whether their social referent would consider their choice of contraceptive acceptable, which had a Likert scale from (1) very unacceptable to (7) very acceptable.

Contraceptive Knowledge Questions. Contraceptive knowledge was assessed using 22 of the 23 True/False questionnaire items used in an article by Frost et al. (2012) to measure contraceptive knowledge in adults. The question regarding IUDs potential to move outside of the

uterus was removed from the questionnaire due to the easy availability of contradictory information that is provided by the website for a popular IUD, Mirena. The Mirena website informs readers that it is possible for the Mirena to move around inside the body after its placement, including moving outside the uterus (Mirena, 2015). This contradictory information means that an individual can be well informed about the birth control from an acceptable source and provide an incorrect answer. (In fact, this researcher has been unable to determine which source of information is technically correct.) In order to have the most accurate and fair measure of contraceptive knowledge this question was removed from the assessment. In addition, this questionnaire allows individuals to answer "true," "false," and "don't know." The option of stating that they do not know provides participants with an option that does not require them to guess, providing the potential for more accurate assessments of contraceptive knowledge. Otherwise participants who are guessing would have the potential to inflate their contraceptive knowledge scores artificially. The level of contraceptive knowledge was assessed by the number of correct answers an individual provides.

Medical Mistrust Scale. Medical mistrust of providers was measured using a modified 7-item Medical Mistrust Index from LaViest, Isaac, and Williams (2009). The scale has been found to have a Cronbach's alpha of .76 in previous research (LaViest, Isaac, and Williams, 2009). This scale was modified to change "health care organizations" to "health care providers" to more accurately capture concerns about medical provider behaviors that might influence a specific contraceptive choice, separate from concerns about the broader health care organizations. With this change, the current study had a Cronbach's alpha of .79. Level of medical mistrust was assessed based on total medical mistrust scores, with higher scores equating to higher medical mistrust.

Statistical Analyses

All analyses in the study were completed using IBM SPSS programs. Listwise deletion was used as part of the analyses to account for incomplete cases. Incomplete cases (which came from two portions of the survey: contraceptive knowledge and positive feelings towards pregnancy) did not have an identifiable pattern, and made up 1.5% of the full sample.

Social Referents' Influence. Logistic regression was used to determine if the odds of using hormonal contraceptives increases if participants believe important social referents in their lives used a hormonal contraceptive option or supported the use of hormonal contraceptives. The initial outcome variable of interest was whether or not an individual uses a hormonal contraceptive. Predictors within the logistic regression included number of social referents who used hormonal contraceptives, the average score for how supportive the social referents would be for the use of hormonal contraceptives, the total scores on the positive feelings towards pregnancy scale, the total scores on the medical mistrust scale, and the total number of correct answers for the contraceptive knowledge questions. Interactions between contraceptive knowledge and the two measures of social referent influences were also included in the model. Medical mistrust, average contraceptive support, and contraceptive knowledge were centered in the analyses to lessen the effects of multicollinearity in the model.

A second logistic regression was planned with identical predictors and the individual's preference for hormonal contraceptives as the outcome. However, 90.7% of participants reported a preference for some type of hormonal contraceptive. Consequently, this logistic regression was not completed because with so few comparison cases it would not provide an accurate model.

Differences between the Audio Vignette Conditions. Hierarchical multiple regression analyses were used to compare the effects of doctor/friend experimental conditions on hormonal

contraceptive choices. Each regression focused on one potential outcome variable: interest in using the fictitious hormonal contraceptive, safety of the fictitious hormonal contraceptive, and recommendation to others to consider using the fictitious hormonal contraceptive. Each regression analysis had an initial block containing positive feelings towards pregnancy, number of social referent women reported to be using hormonal contraceptives, and the average support score for using hormonal contraceptives. The second block included the vignette conditions, medical mistrust scores, and the interaction between vignette conditions and medical mistrust. Vignette conditions were dummy coded, with the doctor/friend agreement for the use of contraception being coded as the comparison condition. Medical mistrust was centered in the analyses to lessen the effects of multicollinearity in the model.

Oversampling was initially done to ensure that the needs of both the hierarchical multiple regressions and the logistic regression analyses could be met. This, in addition to the removal of participants who did not meet the sample requirements, led to uneven sample sizes between vignette conditions. The condition where the physician character and the friend character agreed to the use of the hormonal contraceptives had a final sample size of 49. The vignette condition where the doctor character was against hormonal contraceptive use and the friend character supported it had a final sample size of 49. The doctor being for contraceptive use and the friend against contraceptive use vignette had a final sample size of 43. The friend character and the doctor character both being against contraceptive use vignette had a final sample size of 53. Consequently, participants with completed surveys were randomly removed from the three largest vignette condition samples so that each vignette condition had equal sample sizes for coding (*condition n= 43, total N=172*) (Tabachnick & Fidell, 2013). The hierarchical multiple regression analyses were completed using these equal samples.

Additional Questions in the Audio Vignette Conditions. There were additional questions built into the post-vignette questions in order to assess any differences that might be created by the audio vignette conditions that were not related to the assessment of the contraceptive. A MANOVA, using the hierarchical multiple regression sample, was completed to investigate the differences between each audio vignette condition, with the scores associated with each of these four questions as the dependent variables: participants' perceptions of the appropriateness of the friend character's advice, perceptions of the appropriateness of the doctor character's advice, how likely participants would be to recommend this doctor to someone else for contraceptive advice, and how likely they were to recommend that someone else ask this friend for contraceptive advice. To adjust for the violation of the assumption of multivariate normality the dependent variables of the vignette conditions were transformed using a square root transformation.

Significant MANOVA findings were followed up using the Roy-Bargmann Stepdown Analysis to determine which dependent variable most accurately predicted the differences between groups. The participants' scores for the appropriateness of the information that the social referent in the vignette provided was included in the stepdown analysis first, as it is a crucial part of the effectiveness of the vignette conditions. Additionally, previous research does not offer information on how social referent input on hormonal contraceptives is viewed, so an understanding of differences of any magnitude is essential to correctly interpreting the vignette. The additional steps were entered in the following order: recommendation that someone else ask this friend for advice, whether doctor provided appropriate advice, and recommendation that someone else ask this doctor for birth control advice. A Bonferroni-type adjustment was used to

correct for Type 1 error rate during the Roy-Bargmann Stepdown Analysis (Tabachnick & Fidell, 2014).

Results

Demographics

Participants had a mean age of 21.19. With regard to relationship status, 40.7% indicated a dating relationship, 34.5% reported not being in a relationship, 16.5% reported being in a committed relationship (unmarried), 5.2% reported being married, and 3.1% reported being engaged. Among women who reported the length of their current relationship (*n*=185), the mean length was 20.51 months and the median was 10 months. A majority of participants were white non-Hispanic (68%). Biracial and multiracial participants made up 8.8% of the sample, African American participants 7.2%, Hispanic participants 7.2%, 5.7% identified as Asian/Pacific Islander, 2.5% indicated other, and .5% stated they preferred not to answer this question. Participants provided their religious affiliations. Most participants identified as Christian, with 27.3% of participants identified as Catholic, 20.1% as Protestant Christian, 6.2% indicated Christian but did not to identify a denomination. Agnostic participants made up 8.2% of the sample, 4.1% reported being Atheist, and 16.1% identified as other. Some participants did not identify a religious affiliation, with 18.6% of the sample reporting that they had no religious affiliation and 6.7% preferring not to identify their religion.

The vast majority of participants (90.7%) reported that they had health insurance, while 2.6% reported that they did not know if they were insured. The vast majority of participants (92.8%) also reported that they have access to affordable hormonal contraceptive options and 4.6% of participants reported that they did not know if they had access to affordable hormonal contraceptive options. A majority of participants (42.8%) reported a household income of less

than $850 a month. Eighteen percent of participants reported an income of $850-$1,700, 8.2% reported an income of $1,700-$2,500, 7.7% an income of $2,500-$3,500, and 4.6% reported an income of $3,500-$4,200.

Participants' scores on hormonal contraceptive knowledge and medical mistrust were compared to the previous literature. Participants in this study reported an average medical mistrust score of 17.31 (*SD*= 3.39). The range of medical mistrust scores was 7-28, the entire range possible by the scale when all questions are completed. The average score of this sample was slightly lower than the mean (18.68) reported by LaViest et al. (2009). Participants had a mean contraceptive knowledge score of 13.25 (*SD*= 3.64), with a range of scores from 3-21. While Frost et al. (2012) did not provide an average for women's contraceptive knowledge, this sample has fewer individuals scoring high in contraceptive knowledge per their criteria (greater than 16). This sample, compared to Frost et al. (2012), had a higher number of female participants who scored below 10 (24.4% versus 13%), a lower number of female participants that scored between a 16 and 18 (23.8% versus 34%), and a lower number of female participants that scored above a 19 (5.7% versus 16%). Means and standard deviations for all predictors used in the analyses are available in Table 1.

Contraceptive Use and Preferences

Participants were asked to list all of the contraceptive options that they prefer to use to prevent pregnancy. A vast majority of participants (90.7%) reported preferring to use at least one type of hormonal contraceptive to prevent pregnancy. Among the hormonal contraceptives listed 72.2% of participants listed the hormonal contraceptive pill, 15.5% the intrauterine device, 8.2% the hormonal arm implant, 15.5% Plan B contraceptive pill, 12.4% hormonal contraceptive injection, 3.6% hormonal contraceptive patch, and 2.1% the vaginal contraceptive ring.

Participants also reported preferences for non-hormonal contraceptive methods with 52.1% of participants listing male condoms, 13.9% withdrawal, 9.3% non-hormonal intrauterine device, 3.1% reported preferring sterilization for themselves, 3.6% sterilization for their partner, 1.5% Natural Family Planning, 1% spermicide, 1% female condoms, 1% diaphragm, and .5% preferred the sponge. A number of women (3.1%) in this study reported preferring not to use any form of contraceptive.

In addition to being asked for their preferences, participants were also asked what type of contraceptive they used the last time they had sexual intercourse. Compared to the 90.7% of women that listed a hormonal contraceptive as one of their preferences when preventing pregnancy, only 70.6% reported using a hormonal contraceptive at last intercourse. Among the participants using a hormonal contraceptive at last intercourse, 75.2% reported using birth control pills, 10.2% used a hormonal intrauterine device, 9.5% used the hormonal contraceptive shot, 4.4% reported having a hormonal arm implant, and 4.4% used the Plan B contraceptive pill. Participants who used hormonal contraceptives also reported some non-hormonal method use. The non-hormonal methods they used included male condoms (40.9%), withdrawal (10.9%), and diaphragms (1.8%).

Participants that did not use hormonal contraception did report using other methods. The most popular was condoms (63.2%), but participants also reported using non-hormonal IUDs (5.3%) and having partners who are sterilized (.7%). Participants who did not use hormonal contraceptives also reported using withdrawal (12.3%). A significant percentage (28.1%) of those that opted not to use hormonal contraceptives reported using no contraceptive or pregnancy prevention tool. These individuals made up 8.3% of the overall sample.

Participants' Reported Influences

Participants identified their sources of information on contraceptives as part of the survey. A majority of participants (90.7%) reported using doctors or health care providers as a source of contraceptive information. In addition to this overwhelming support for the importance of physicians' information, social referents were also identified as sources of information on contraceptives. Participants' partners or significant others were reported as a source of contraceptive information by 9.8% of the sample. Among participants 23.2% reported that their best friends were a source of information and 22.7% listed other friends as a source of information. They reported female relatives as a source of contraceptive information, including 35.1% listing mothers and/or female guardians, 12.9% sisters, 2.6% female cousins, and .5% aunts. Perhaps surprisingly, some participants listed male family members including listing a father or male guardian (.5%), brother (.5%), and male cousin (.5%). Other sources of information were also identified. Among participants, 32% reported using the Internet to locate contraceptive information and 5.2% reported using books.

Social Referent Influences on Contraceptive Decision-Making.

A logistic regression was completed in order to assess what predictors increased the odds of a participant using hormonal contraceptives at last sexual intercourse (Hypothesis 1). Two control variables were included in the model predicting contraceptive use: medical mistrust and positive feelings towards pregnancy. Five predictors were included in the model: (1) the number of social referents the participants identified as using hormonal contraceptives, (2) the average social referents' support for hormonal contraceptive use, (3) contraceptive knowledge score, (4) the interaction between contraceptive knowledge and the number of women identified as using

hormonal contraceptives, and (5) the interaction between contraceptive knowledge and the average social referent support for hormonal contraceptive use.

The control variables, positive feelings towards pregnancy and medical mistrust, were entered into the first step of the hierarchical regression model and together created a significant model, explaining 5.8% of the variance (Nagelkere's R^2), $\chi^2(2, N=191)= 7.88$, $p<.05$. The inclusion of the rest of the predictor variables improved the model, the full model accounting for 18.3% of the variance (Nagelkere's R^2), $\chi^2(5, N=191)= 18.29$, $p<.01$. The overall model (including control variables) was statistically significant, $\chi^2(7, N=191) = 26.18$, $p< .001$. The overall model's classification correctly identified 36.4% of those who did not use contraceptives and 95.6% of those who did, classifying a total of 78.5% of cases correctly. The Hosmer and Lemeshow test for goodness-of-fit was non-significant for the overall model, $\chi^2(8, N=191)= 10.40$, $p>.05$.

In partial support of the first hypothesis two predictors in the model, positive feelings towards pregnancy and average social referents' support of hormonal contraceptive use, were significant according to the Wald criterion and significance test. (Table 2 provides statistics, including odds ratios and Wald criterion, for all variables in each block of the model.) For every one point rise in the positive feelings towards pregnancy scale there is a decrease in the odds of using hormonal contraceptives by a factor of .93 when all other predictors are held constant, Wald= 7.53, $p<.01$. For every one point rise in the average score for social referents' support of hormonal contraceptive use, there is an increase in the odds that the participants would use hormonal contraceptives by a factor of 1.37 when all other predictors are held constant, Wald = 5.57, $p< .05$.

Conflicting Advice and Contraceptive Decision-Making

Medical mistrust was expected to moderate the relationship between participants' vignette conditions and their reported attitudes toward the fictitious hormonal contraceptive. Hierarchical multiple regression analyses were used to investigate the nature of this expected relationship. Positive feelings towards pregnancy, the number of significant women that use hormonal contraceptives, and the average social referents' hormonal contraceptive support scores were included as control variables in the first step in each hierarchical regression model. Medical mistrust, vignette condition, and the interaction between these variables were included in the model as predictor variables in the second step in the regression. Table 3 provides the means and standard deviations for each outcome discussed in this section, sorted by vignette condition.

Interest in Using New Contraceptive. Participants' interest in using the fictitious hormonal contraceptive was the first contraceptive attitude investigated. The control variables in the model accounted for 5.2% of the variance (Adjusted R^2) in the ratings of interest in the fictitious contraceptive. The model containing only the control variables was statistically significant, $F(3, 168)= 4.14$, $p<.01$. Including medical mistrust, vignette condition, and their interaction in the model adds significantly to the variance explained, $F(7,161)= 22.35$, $p<.001$. The overall model assessing the relationship between participants' interest in using the fictitious hormonal contraceptive, using the control and predictor variables, accounted for 49.8% of the variance (Adjusted R^2) in scores, F (10, 161)= 17.99, $p<.001$. When focusing on the control variables in the overall model, the number of important women that used hormonal contraceptives and positive feelings towards pregnancy scores were not significant predictors of the participants' willingness to use the contraceptive (Table 4). The average support for

contraceptive use was a significant predictor of willingness to use the contraceptive (b= .32, t=3.53, p=.001). When all other predictors in the model are held constant, for every one point rise in the average support of hormonal contraceptive use score a .32 point rise in the interest in using the fictitious hormonal contraceptive can be expected.

As expected in the initial hypothesis, a significant interaction between vignette condition and medical mistrust was found (Figure 1); however, the nature of the interaction was not consistent with the second hypothesis. The reference group (physician and friend agree the participant should use contraceptive) had a significant slope of -.172 (b= -.172, t= -2.81, p<.01). For individuals in the reference group, for every one point rise in the medical mistrust score a corresponding .172 drop in the participants' predicted interest score can be expected. Among participants who heard the friend support contraceptive use while the physician did not support contraceptive use, the slope was not significantly different from the reference vignette slope, with a slope of -.03 (b = .15, t= 1.65, p>.05). For participants who heard the physician support contraceptive use while the friend did not, the slope differed significantly from the reference group with a slope of 0.06 (b = .24, t=2.48, p<.05). When participants heard the physician and the friend agree that the contraceptive had a negative effect, the slope was statistically different from the reference group, with a slope of .165 (b = .34, t=3.44, p=.001).

The mean medical mistrust scores for each vignette condition were found to have some significant differences between them when all of the other predictors in the model are held at constant levels. When the physician supported contraceptive use but the friend did not, the group's predicted mean interest score was significantly different from the reference group's mean, the score being less than the reference group's score by 2.95 points (b = -2.95 t= -9.10, p>.001). When the physician did not support contraceptive use but the friend did, the participants

had a predicted interest score that was not significantly different from the reference group's interest score (b = -.526, t= -1.63, p>.05). When the fictitious friend and physician agreed that the participants should not use contraceptives the vignette condition's predicted score was significantly different from the reference group's, being 3.14 points less (b = -3.14, t= -9.60, p<.001).

Assessment of Contraceptive's Safety. The hierarchical regression model investigating participants' assessment of the safety of the fictitious hormonal contraceptive included identical predictors to the model assessing participants' interest in taking the hormonal contraceptive. The model step containing only the control variables explained .3% of the variance in participants' safety scores, which was not a statistically significant explanation of the variance, $F(3, 168)= 1.72$, p>.05. Adding medical mistrust, vignette condition, and the interaction between the two predictors contributed significantly to the model, $F(7,161)= 25.92$, p<.001. The overall model offered an explanation of 54.4% (Adjusted R^2) of the variance in the safety scores, $F(10, 161)= 19.2$, p<.001. In the overall model, the control variables (positive feelings towards pregnancy scores, the total number of important social referents that use hormonal contraceptives, and the average social referents' support of hormonal contraceptive use scores) were not significant predictors of participants' ratings of contraceptive safety (Table 5).

An interaction between medical mistrust and the vignette conditions was found in the model (Figure 2), as was predicted in the third hypothesis. Again, however, the nature of this interaction was not as predicted. The slope of the regression line for the vignette condition where the physician and the social referents agreed that the participant should use the hormonal contraceptive (the reference group) was -.15 and was statistically different from zero (b= -.15, t=-2.61 p=.01). For the reference group, when all other predictors are held constant, a .15 point

drop in the individual's predicted interest in hormonal contraceptives can be expected for every one point rise in medical mistrust scores. When the participants heard a vignette where the physician was against contraceptive use and the friend was for contraceptive use, the slope of the line (.01) was not statistically different from the reference group (b= .15, t= 1.85, p>.05). When the participant heard the vignette where the physician was for contraceptive use and the friend was against it there was no significant difference in the slope (-.001) compared to the reference group's slope (b= .15, t= 1.67, p> .05). In the physician and friend both against contraceptive use condition the slope was significantly different from the reference group, with the slope equaling .12 (b= .27, t= 2.92, p<.01).

When all other predictors were held at a constant level and medical mistrust is held at its mean, there were significant differences found between the predicted safety scores for the vignette conditions when they were compared to the reference group. Safety ratings for individuals who heard the vignette where the physician was against contraceptive use and the friend was for contraceptive use were significantly different, with the predicted reference group's score being 2.98 points higher (b= -2.98, t= -9.89, p<.001). The predicted score of the vignette condition where the doctor was for contraceptive use and the friend was against contraceptive use was not significantly different from the score of the reference condition (b= - .56. t= -1.85, p>.05). When the physician and social referent both agreed that the participant should not use the hormonal contraceptive, the safety rating score was 3.19 points less than the reference group; this is significantly different (b= -3.19, t= -10.48, p<.001).

Recommendations to Others. A hierarchical multiple regression was completed to investigate differences in participants' willingness to recommend the new hormonal contraceptive to a friend using predictors identical to the hierarchical regressions above. Control

variables (positive feelings towards pregnancy, number of important women using the hormonal contraceptives, and the average support for hormonal contraceptive use) were first entered into the model. The control variables accounted for 3.7% (Adjusted R^2) of the variance in the model, $F(3, 168)= 3.21$, $p<.05$. Medical mistrust, vignette condition, and the interaction between the two were then entered into the model and contributed a statistically significant amount of variance, $F(7, 161)= 12.55$, $p<.001$. The overall model, including all variables, was statistically significant offering an explanation of 35% of the variance (Adjusted R^2), $F(10, 161)= 10.213$, $p<.001$. The average social referent support for using hormonal contraceptives, positive feelings towards pregnancy, and the number of social referents that used hormonal contraceptives were not statistically significant predictors within this overall model. (Model predictors' statistics are displayed in Table 6.)

An interaction between medical mistrust and vignette condition was present in the model (Figure 3). When the fictional doctor and friend are in agreement that the participant should use the contraceptive (reference group), for every one point rise in the participants' medical mistrust score (assuming the other predictors remain stable) there is a predicted .15 drop in their likelihood of recommending the contraceptive to someone else ($b= -.15$, $t= -2.35$, $p<.05$). The condition in which the doctor was against contraceptive use but the friend was for contraceptive use had a slope of -.11 that did not statistically differ from the reference group ($b= .04= t= .41$ $p>.05$), and the condition where the doctor is for contraceptive use and the friend is against contraceptive use had a slope of -.04, which did not significantly differ from the reference group either ($b= .11$, $t=1.14$, $p>.05$). When the doctor and the social referent agreed the participant should not use the hormonal contraceptive the slope of the participants' recommendations did significantly differ from the reference group with a slope of .08 ($b=.23$, $t=2.3$, $p<.05$).

When all other predictors are held constant, there was a significant difference between the predicted recommendations of each group at their mean medical mistrust scores. The vignette condition where the friend is for contraceptive use and the doctor is against is significantly different from the physician and friend support contraceptive use condition (reference group), with a predicted mean of 2.24 fewer points (b= -2.24, t= -6.82, p<.001). The physician for contraceptive use and the friend against condition is significantly different from the physician and friend support contraceptive condition with a mean score that is .79 points lower (b= -.79, t= -2.42, p< .05). Participants in the vignette condition where both the physician and the friend were against contraceptive use had a mean recommendation score of 2.59 points less than the reference group, which significantly differed (b= -2.59, t= -7.83, p<.001).

Differences in Assessment of Friend/Doctor Behavior. A MANOVA analysis investigated the potential effects of vignette conditions on the participants' perceptions of the physician and friend providing contraceptive information in the audio recording. Included as dependent variables in the analysis were the participants' rating of the appropriateness of the friend character's contraceptive advice, the appropriateness of the physician character's contraceptive advice, the likelihood they would recommend that another person discuss contraceptives with the friend character, and the likelihood they would recommend that another person discuss the contraceptive with the physician character. Using Pillai's trace, a significant effect of vignette condition was found on the participants' perceptions of the audio characters, V=.20, $F(12, 501)$=3.00, p<.001.

Roy-Bargmann Stepdown Analysis found a significant effect of vignette condition on one of the dependent variables in the analysis. The participants' perceptions of the appropriateness of the friend characters' advice varied between vignette conditions, Roy-Bargmann Stepdown F(3,

168)= 5.80, Bonferroni-type adjusted $p<.05$. Univariate analysis for this dependent variable was also significant, Univariate $F(3, 168)= 5.93$, Bonferroni-type adjusted $p<.05$. Participants who heard the vignette condition where the physician and the social referent agreed that the participant should use the contraceptive provided the friend characters' advice question with a mean transformed square root score of 2.05 (*SD*=.39). Participants who heard the friend argue for the hormonal contraceptive, while the doctor argued against, provided a mean transformed square root score of 1.77 (*SD*=.37). Participants who heard the friend character state the participant should not use hormonal contraceptives, while the doctor character stated that they should, had a transformed square root mean rating of 1.73 (*SD*=.40) for the friend's appropriateness. When the physician and the friend characters agreed that the participant should not use hormonal contraceptives, the transformed square root mean was 1.84 (*SD*=.42).

None of the other dependent variables were found to be significant in the stepdown analysis. The univariate analysis for the participants' transformed square root score of their likelihood of recommending that someone else ask this friend for contraceptive information was not significant, Univariate $F(3,168)= 3.57$, Bonferroni-type adjusted $p>.05$. This significance finding was identical to the stepdown analysis. Once the variance from the participants' rating of the appropriateness of the friend's contraceptive advice was accounted for, there was no significant effect of group membership, Roy-Bargmann Stepdown $F(3, 167)=1.20$, Bonferroni-type adjusted $p>.05$. There was no significant effect of group membership on the participants' transformed square root scores for the appropriateness of the physicians' advice in the univariate analysis, Univariate $F(3, 168)= 2.21$, Bonferroni-type adjusted $p>.05$. This was supported by the stepdown analysis once the variance for the initial two questions was accounted for, Roy-Bargmann Stepdown $F(3, 166)= 1.67$, Bonferroni-type adjusted $p>.05$. Participants' transformed

score of the likelihood that they would recommend that someone else speak to this doctor about birth control did vary significantly between groups in the univariate analysis, Univariate $F(1, 168)=5.803$, Bonferroni-type adjusted $p<.05$. In contrast, the participants' transformed score of the likelihood that they would recommend the doctor to another person did not significantly vary between vignette conditions, once the variance of the other dependent variables was accounted for, Roy-Bargmann Stepdown $F(3,165)= 3.54$, Bonferroni-type adjusted $p>.05$.

Discussion

While not all of the hypotheses originally put forth in this study were supported, contraceptive use and attitudes towards contraceptives were linked to social referent influence when investigating both participant use and vignette effects. Overarching the hypotheses in this study was the theory that there is a relationship between social referent input and individual contraceptive use. This suspected relationship is supported by the totality of the findings. As noted in the results, a large number of participants list friends, best friends, and female family members as sources of information for contraceptives. Also as expected, the average support that the participants felt their three social referents would give to their hormonal contraceptive use did significantly increase the odds that they reported hormonal contraceptive use at last sexual intercourse. The perceived social referents' support for hormonal contraceptives was also found to be positively related to individuals' interest in using the hormonal contraceptive in the vignette conditions.

Whether or not the participants thought their important social referents' used hormonal contraceptives was not associated with participants' hormonal contraceptive use when analyzing participants' most recent hormonal contraceptive use or their attitudes regarding the vignette's fictitious contraceptive. However, the social referents' perceived hormonal contraceptive support

did increase the participants' predicted odds of using hormonal contraceptives. These findings suggest that the participants' perceived support for hormonal contraceptive use is really the important part of the relationship between social referents and individuals' contraceptive behaviors. The choice of contraception may be viewed as a very individualized need (as put forth by Melo et al., in press), where the social referents' behaviors are less relevant to the individual because the social referents' needs may be viewed as different than the individual's needs. In this scenario it would make sense that those referents' views of what is best for the individual would impact hormonal contraceptive use, rather than the social referents' behaviors.

Contraceptive knowledge did not moderate the relationship between hormonal contraceptive use at last sexual activity and the social referents' hormonal contraceptive support in the current study. It is possible that contraceptive knowledge did not moderate this relationship because those with higher levels of contraceptive knowledge (and therefore those most aware of their contraceptive options) can use that knowledge to choose the type of contraceptive that they want (hormonal and otherwise) based on other information (feelings towards pregnancy and referent support for instance). The findings that contraceptive knowledge did not predict hormonal contraceptive use at last sexual intercourse does not clash with previous findings. Women tend to be most knowledgeable about their own contraceptive (Biggs & Foster, 2013; Harper et al.; 2010). Women with low contraceptive knowledge, but who receive support to use hormonal contraceptives and have low positive feelings towards pregnancy, may simply choose to use the hormonal contraceptive that they are most knowledgeable about. (Or become knowledgeable about that hormonal contraceptives after they begin to use it.)

Conflicting Advice between Physician and Social Referent

The initial hypotheses regarding the effects of conflicting information from physicians and social referents on hormonal contraceptive decisions were not completely supported by the findings in this study. However, the importance of further investigations into the effects of social referents and medical mistrust on hormonal contraceptive decision-making was supported by these findings. The relationship between attitudes to hormonal contraceptives and conflicting information about hormonal contraceptives appears to be complex, particularly when one takes into account individuals' medical mistrust. The judgment of interest in using a hormonal contraceptive and the evaluation of its safety in the current experimental manipulation offers a pattern of findings that supports the idea that physicians are important to contraceptive decision-making when they are able to provide information about hormonal contraceptive options, but it suggests that social referents are still impactful. Also of note, when considering interest in taking the new fictitious hormonal contraceptive, the average important social referents' support score was included as a control variable prior in the analyses. This support score was found to be a significant predictor of interest in the fictitious hormonal contraceptive score, suggesting a social referent impact above and beyond the audio vignette friend character's impact on contraceptive interest.

In the analysis of the vignettes physician support of the hormonal contraceptives was an important factor impacting interest in the new hormonal contraceptive options. Interestingly, medical mistrust negatively affects contraceptive interest levels when the friend agrees with the physician that the individual should use hormonal contraceptives, suggesting that the support of the friend for the physician's opinion does not neutralize the effects of medical mistrust. Contrary to the initial hypothesis, the friend disagreeing and stating that the contraceptive was a

bad idea actually lessened the effect of medical mistrust on interest in the hormonal contraceptive. This finding is not as expected and suggests that the social referent's contrary opinion actually assisted the participant in forming an opinion about the contraceptive in a way that lessened medical mistrust's impact on the outcome. There is nothing in the current literature that offers an explanation of why this might have occurred.

The social referent and physician agreeing on the negative impact of a new hormonal contraceptive had an opposite interaction with medical mistrust when compared to both characters agreeing for the use of the hormonal contraceptive. Agreeing against the contraceptive led to the participants' reported interest in using the contraceptive to rise as medical mistrust rises. As the individual levels of medical mistrust rise, predicted interest scores in this case actually moved closer to the predicted interest scores of those who have similarly high levels of medical mistrust and have experienced a physician and a social referent agree that the contraceptive is a good idea. This relationship makes sense as, in both relationships, those with high medical mistrust seem less inclined to agree with the physician than others. They are less inclined to rate a contraceptive poorly if the physician dislikes it or well if a physician likes it.

Assessment of the safety of a new contraceptive showed many similarities to the interest in the new contraceptive. Among individuals with average levels of mistrust who had the physician and friend agree that they should use this contraceptive, the contraceptive was rated as safer than individuals who did not. When it came to safety, however, there were no differences in the effects of medical mistrust (statistically speaking) between the physician and friend disagreeing on contraceptive use vignettes and the characters agreeing that the person should use the contraceptive vignette. When the physician and friend agree that a person should use contraceptives, higher levels of medical mistrust did negatively impact an individual's safety

rating on the contraceptive. Similarly to the hormonal contraceptive option's interest rating, when the social referent and the physician agree that an individual should not use the hormonal contraceptive, higher medical mistrust positively impacts the safety ratings. Why social referents would impact interest scores in the way that they did, but not impact safety ratings in an identical fashion is difficult to say. It may be that a participant's choice of contraceptive being individualized (as discussed above) based on their specific needs makes social referent information more valid when making a judgment of interest in using the contraceptive, but not when making the safety ratings. A person may judge a contraceptive as safe, but choose not to use it for themselves for an unrelated, individualized reason.

Recommendation to others to use a contraceptive was included as an additional indicator of individuals' attitudes towards contraceptives. There were significant differences between vignette conditions when focusing only on those individuals who had mean levels of medical mistrust, with the condition where the friend and the social referent agreeing that the individual should use contraceptives having significantly higher scores on their willingness to recommend another person consider using the hormonal contraceptive than when compared to the other groups. However, as the medical mistrust rose, recommendation scores actually dropped for all participants (there were no statistically significant differences between these slopes), with the exception of the category where the social referent and the physician agreed that the individual should not use hormonal contraceptives. In this case, individuals' with higher levels of medical mistrust reported a higher likelihood to recommend the contraceptive, compared to those with lower levels of medical mistrust. This change in the relationship between mistrust and recommendations for this condition is quite natural. The physician is against the contraceptive, so if an individual is mistrustful of physicians, then the influence of their recommendation would

carry less weight. It should be noted, however, that this relationship is very small in comparison to the relationship between medical mistrust and the two previous attitude measures, and may not practically (or statistically) amount to being different than a flat line, making this the one relationship where both characters agree, but medical mistrust has little impact on the participants' attitudes towards the contraceptive. This suggests that participants are hesitant to recommend a contraceptive that both the physician and the friend dislike, no matter how mistrustful of medical providers they may be.

Limitations of the Current Study and Potential Future Studies for Pursuit

In the current study, the relationship between social referent hormonal contraceptive behaviors/support and the participants' hormonal contraceptive use was calculated using the participants' perceptions of their social referents. No information from the participants' identified social referents was collected directly from those social referents. The argument could be made that the participants' perception of the referents' behavior is more important than the social referents' actual behavior. After all, women cannot be influenced by behavior of which they are not aware. It is, however, impossible to say whether participants believed that their social referents would support their hormonal contraceptive use, or that the referents use hormonal contraceptives because that is what the participants use. In some cases, women may believe that their social referents' support and behaviors must be like their own and report them that way, without evidence from the social referents. For this reason, further research is necessary to investigate the relationship between women's hormonal contraceptive use, their beliefs about social referents' behaviors/support, and social referents' actual behavior/support.

The study also began to collect data about the effects of conflicting messages between physicians and social referents and how medical mistrust could potentially influence hormonal

contraceptive decision-making. The current study's use of experimental vignette conditions provides only a snapshot of contraceptive decision-making within a situation where the individual has limited resources with which to make the decision. Women are unable to ask multiple sources about this contraceptive, to read or reference media materials on the contraceptive, to discuss it with their partners, or to change their initial assessments of the contraceptive and make a different choice later. These are all steps that many women have the option of choosing to take when making contraceptive choices in everyday life, which cannot be accounted for within the experimental manipulation.

In addition to the natural limitations of experimental studies, unintended differences that could be created by vignette conditions were examined. Participants in the current study were found to have a varying view of how appropriate the social referent's contraceptive advice was, depending on their vignette condition. This finding was not duplicated for the physician character. This suggests that the manipulation by the friend character may have been less effective than the manipulation created by the physician character. The title of physician, regardless of knowing the person who carries it individually, may carry a certain amount of weight. An individual identified as a friend, but with no additional information about their intelligence, personality, motives, etc., may not have carried the same amount of weight, thereby provoking different reactions from participants depending on the context. As social referents' personal experiences have been cited in previous work as valuable information in contraceptive decision-making (Melo et al., in press; Yee & Simons, 2010), a lack of information on the referent's reliability as a contraceptive informant and their motives in providing contraceptive information may have impacted the findings of this study. Future studies that further elucidate the type of relationship between a woman and her referent, characteristics of the social referent,

and their influence on hormonal contraceptive decision-making are needed to have a more complete understanding.

Implications of the Current Study

The current literatures' focus on physicians' impact on hormonal contraceptives is absolutely understandable, and the importance of the physicians' role in hormonal contraceptive decision-making is not undermined by the findings in this study. The findings do, however, support the supposition that social referents may be influencing hormonal contraceptive decision-making in a way that is not well understood. The current study found a link between participants' contraceptive use/attitudes and social referents' hormonal contraceptive support that warrants further investigation. This study's experimental vignettes suggest that social referents may be influencing the formation of hormonal contraceptive attitudes when their information is added to the contraceptive information provided by physicians. This supports a widening of the existing literature to avoid focusing solely on physicians' influence within the context of contraceptive decision-making. There is a need for a greater focus on the impact of social referents on adult hormonal contraceptive decision-making in future research in order to more fully understand how women are making important contraceptive decisions.

Conclusion

The current study was designed to begin the process of identifying whether social referents could be influencing adult women's hormonal contraceptive choices, and to investigate the attitudes women hold towards hormonal contraceptives when conflicting information about that contraceptive is provided by a physician and a social referent. This study found that the perception of important social referents' support of hormonal contraceptive use does correlate with increased likelihood of women using hormonal contraceptives, after controlling for the

influence of the participants' positive attitudes towards pregnancy and general medical mistrust. Experimental evidence also supports the potential of social referents to impact hormonal contraceptive decision-making when participants are also receiving information from a health care provider. These findings support the work with adolescents and young adults in previous studies that identified friends and family members as potential influences on contraceptive choices (Fallon, 2010; Jones et al., 2011; Melo et al., 2014; Sable & Libbus, 1998; Yee & Simons, 2010). While further studies are needed to continue to elucidate the relationship between social referents and hormonal contraceptive decision-making, these initial findings support a widening of the current literature to include a broader circle of individuals when investigating hormonal contraceptive decisions made by adult women.

Tables

Table 1

Differences in Predictor Variables by Hormonal Contraceptive Use

Variables	No Hormonal Contraceptive Use		Used Hormonal Contraceptive		Total Sample	
	M	*SD*	*M*	*SD*	*M*	*SD*
Contraceptive Knowledge Score	12.40	3.6	13.6	3.62	13.25	3.64
Medical Mistrust	17.51	3.17	17.23	3.48	17.31	3.39
Positive Feelings Towards Pregnancy	17.96	7.81	15.12	5.32	15.94	6.25
Referent H. Contraceptive Support	5.55	1.61	6.31	1.14	6.09	1.34
No. of Referents Using H. Contraceptives	1.84	.96	2.23	.79	2.12	.86

Table 2

Contraceptive Use and Social Referent Influence Logistic Regression Model

Variables	*B*	*SE*	*Wald*	*Sig.*	*Exp(B)*
	Block 1: Control Variables				
Medical Mistrust	-.015	.049	.092	.761	.985
Positive Feelings Towards Pregnancy	-.070	.026	7.392	.007**	.932
Constant	2.322	.957	5.884	.015*	10.193
	Block 2: Full Model				
Medical Mistrust	.009	.052	.029	.865	1.009
Positive Feelings Towards Pregnancy	-.076	.028	7.533	.006**	.927
No. of Referents Using H. Contraceptives	.358	.225	2.530	.122	1.430
Referent H. Contraceptive Support	.316	.134	5.566	.018*	1.371
Contraceptive Knowledge Score	.017	.053	.102	.750	1.017
Interaction: No. of Referents & Knowledge	-.048	.059	.647	.421	.954
Interaction: Referent Support & Knowledge	-.010	.032	.096	.757	.990
Constant	2.136	1.309	4.228	.040*	8.462

Note.
** p value < .05*
***p value < .01*

Table 3

Hormonal Contraceptive Vignette Outcomes

	Doctor For Friend For		Doctor For Friend Against		Doctor Against Friend For		Doctor Against Friend Against	
Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*S D*
Interest In Contraceptive	4.98	1.74	4.56	1.93	2.09	1.31	2.00	1.41
Safety Ratings For Contraceptive	5.30	1.35	4.81	1.42	2.35	1.43	2.21	1.50
Recommendation To Use Contraceptive	4.81	1.56	4.12	1.68	2.65	1.59	2.28	1.45
Recommend Doctor for Info	5.56	1.16	5.00	1.46	5.02	1.75	4.19	1.93
Recommend Friend for Info	4.05	1.84	3.16	1.62	2.86	1.54	3.07	1.61
Doctor Advice Is Appropriate	5.88	1.16	5.35	1.29	5.60	1.61	5.14	1.75
Friend Advice Is Appropriate	4.37	1.54	3.14	1.42	3.26	1.31	3.56	1.52

Table 4

Participants' Interest in Using Contraceptive Regression Model

Variables	Unstandardized Coefficients *B*	*Std. Error*	Standardized Coefficients *Beta*	*t*	*Sig.*
		Block 1: Control Variables			
Positive Feelings Towards Pregnancy	-.017	.026	-.050	-.669	.504
No. of Referents Using H. Contraceptives	.260	.196	.104	1.330	.185
Referent H. Contraceptive Support	.321	.124	.202	2.589	.010*
Constant	1.155	.897		1.288	.200
		Block 2: Full Model			
Positive Feelings Towards Pregnancy	-.036	.019	-.103	-1.852	.066
No. of Referents Using H. Contraceptives	.112	.144	.045	.778	.437
Referents H. Contraceptive Support	.321	.091	.202	3.525	.001**
Dummy Variable 1	-2.953	.325	-.608	-9.098	.000***
Dummy Variable 2	-.526	.323	-.108	-1.625	.106
Dummy Variable 3	-3.143	.327	-.647	-9.599	.000***
Medical Mistrust	-.172	.061	-.277	-2.807	.006**
Interaction: Mistrust & Dummy 1	.147	.089	.126	1.645	.102
Interaction: Mistrust & Dummy 2	.236	.095	.176	2.479	.014*
Interaction: Mistrust & Dummy 3	.337	.098	.240	3.435	.001**
Constant	3.407	.694		4.907	.000***

Note. Dummy Variable 1 compares the doctor arguing against/the friend for vignette and the referent vignettes. Dummy Variable 2 compares the doctor for/friend against contraceptive vignette and the referent vignette. Dummy Variable 3 compares both the friend and the doctor agreeing against the contraceptive and the referent vignette.

** p value < .05; **p value < .01; *** p value<.001*

Table 5
Participants' Assessment of Contraceptive Safety Regression Model

Variables	Unstandardized Coefficients *B*	*Std. Error*	Standardized Coefficients *Beta*	*t*	*Sig.*
		Block 1: Control Variables			
Positive Feelings Towards Pregnancy	.005	.025	.017	.217	.828
No. of Referents Using H. Contraceptives.	.259	.189	.109	1.370	.172
Referent H. Contraceptive Support	.158	.120	.105	1.319	.189
Constant	2.059	.865		2.380	.018*
		Block 2: Full Model			
Positive Feelings Towards Pregnancy	-.011	.018	-.033	-.606	.546
No. of Referents Using H. Contraceptives	.097	.134	.041	.727	.468
Referent H. Contraceptive Support	.163	.085	.109	1.928	.056
Dummy Variable 1	-2.980	.301	-.649	-9.886	.000***
Dummy Variable 2	-.555	.300	-.121	-1.849	.066
Dummy Variable 3	-3.185	.304	-.694	-10.476	.000***
Medical Mistrust	-.149	.057	-.253	-2.609	.010*
Interaction: Mistrust & Dummy 1	.154	.083	.139	1.853	.066
Interaction: Mistrust & Dummy 2	.148	.088	.117	1.674	.096
Interaction: Mistrust & Dummy 3	.267	.091	.201	2.924	.004**
Constant	4.304	.645		6.673	.000***

Note. Dummy Variable 1 compares the doctor arguing against/the friend for vignette and the referent vignettes. Dummy Variable 2 compares the doctor for/friend against contraceptive vignette and the referent vignette. Dummy Variable 3 compares both the friend and the doctor agreeing against the contraceptive and the referent vignette.
** p value < .05; **p value < .01; *** p value <.001*

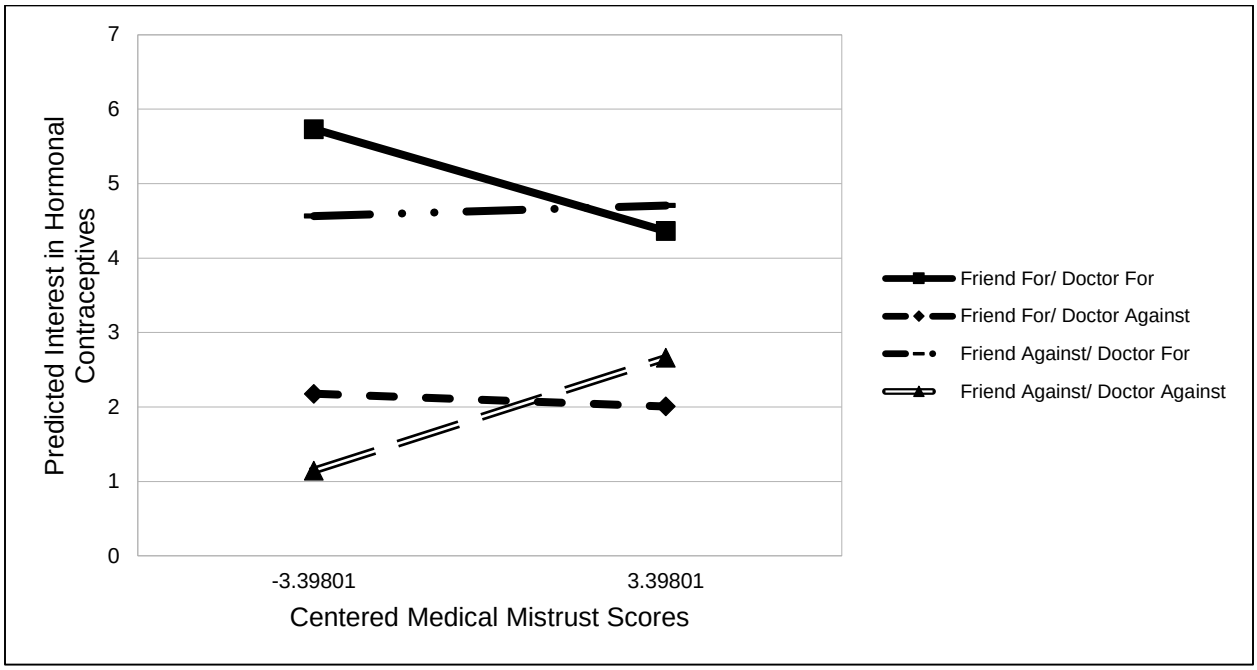
Table 6
Participants' Willingness to Recommend Contraceptive Regression Model

Variables	Unstandardized Coefficients *B*	*Std. Error*	Standardized Coefficients *Beta*	*t*	*Sig.*
		Block 1: Control Variables			
Positive Feelings Towards Pregnancy	.000	.023	.001	.015	.988
No. of Referents Using H. Contraceptives	.392	.175	.176	2.238	.027*
Referent H. Contraceptive Support	.153	.111	.108	1.376	.171
Constant	1.682	.803		2.095	.038*
		Block 2: Full Model			
Positive Feelings Towards Pregnancy	-.016	.020	-.051	-.801	.424
No. of Referents Using H. Contraceptives	.270	.145	.121	1.859	.065
Referent H. Contraceptive Support	.145	.092	.103	1.577	.117
Dummy Variable 1	-2.238	.328	-.519	-6.821	.000***
Dummy Variable 2	-.791	.327	-.183	-2.420	.017*
Dummy Variable 3	-2.591	.331	-.600	-7.828	.000***
Medical Mistrust	-.146	.062	-.264	-2.350	.020*
Interaction: Mistrust & Dummy 1	.037	.090	.036	.414	.679
Interaction: Mistrust & Dummy 2	.109	.096	.092	1.135	.258
Interaction: Mistrust & Dummy 3	.228	.099	.183	2.297	.023*
Constant	3.629	.702		5.169	.000***

Note. Dummy Variable 1 compares the doctor arguing against/the friend for vignette and the referent vignettes. Dummy Variable 2 compares the doctor for/friend against contraceptive vignette and the referent vignette. Dummy Variable 3 compares both the friend and the doctor agreeing against the contraceptive and the referent vignette.
** p value < .05; **p value < .01; *** p value < .001*

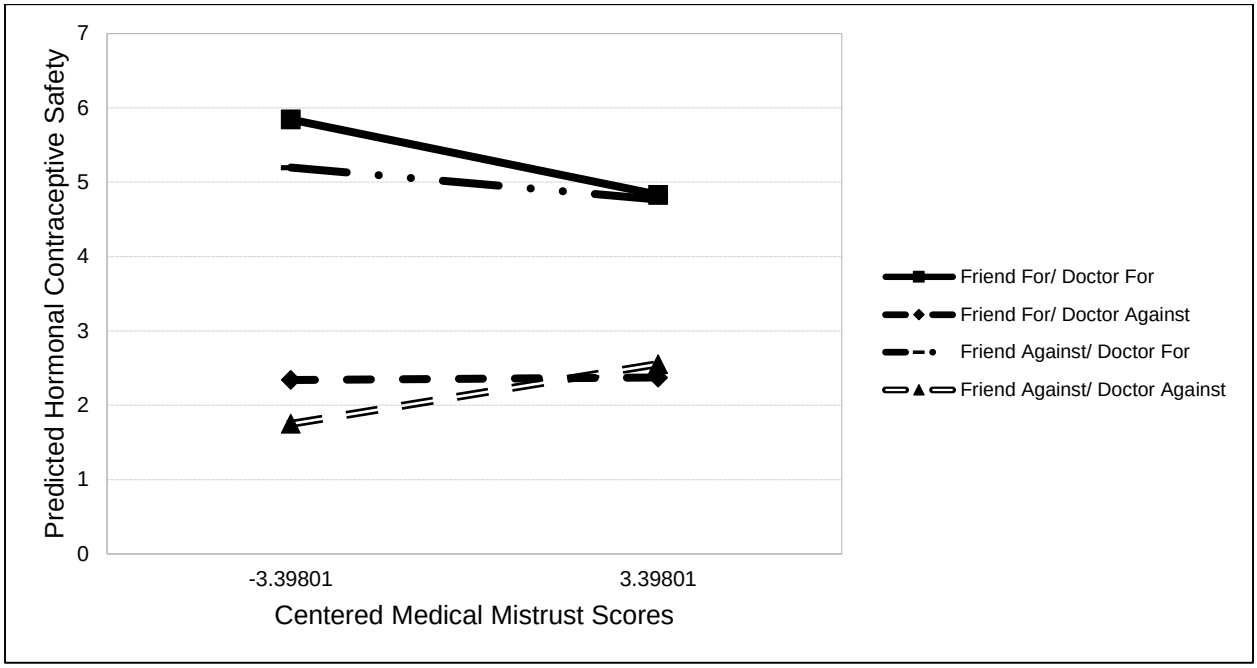
Figures

Figure 1. Effect of Medical Mistrust and Vignette Interaction on Interest.



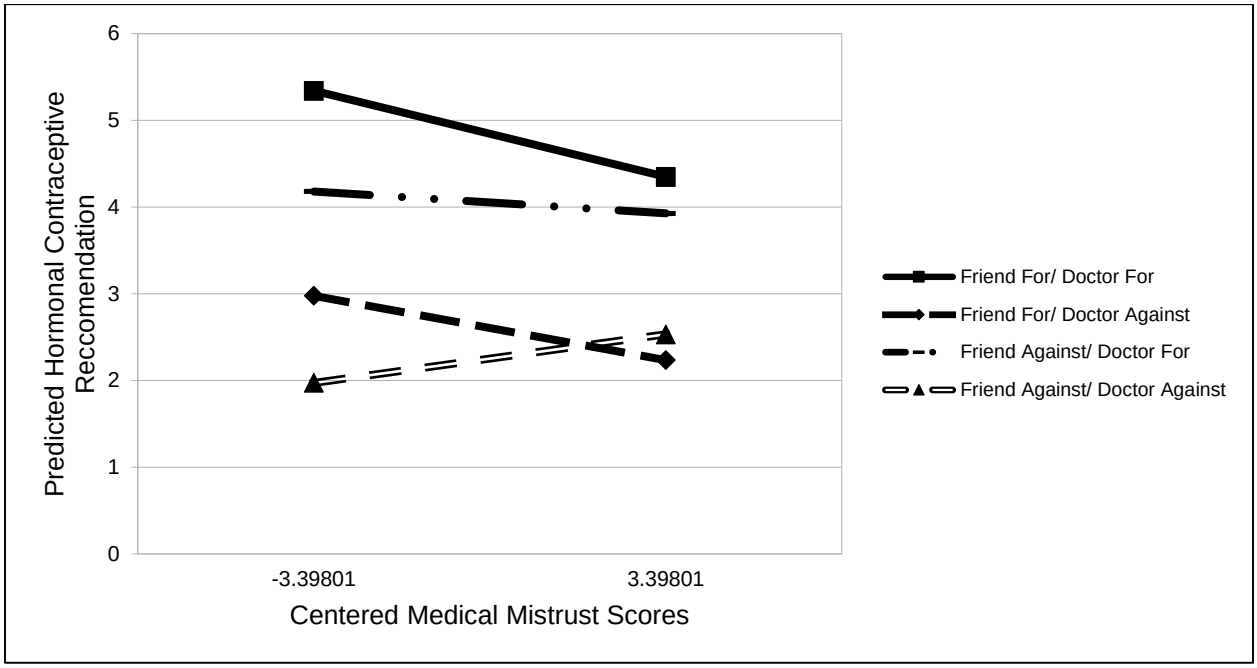
Note. Medical mistrust end points set at one standard deviation above and below the centered mean. Other predictors in the equation set at their respective means.

Figure 2. Effect of Medical Mistrust and Vignette Interaction on Safety Scores



Note. Medical mistrust end points set at one standard deviation above and below the centered mean. Other predictors in the equation set at their respective means.

Figure 3. Effect of Medical Mistrust and Vignette Interaction on Recommendation



Note. Medical mistrust end points set at one standard deviation above and below the centered mean. Other predictors in the equation set at their respective means.

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Appendices

Appendix A: Demographics Questions

1. Race/Ethnicity (Check All That Apply)
    - African American/ Black
    - Asian/ Pacific Islander
    - Hispanic
    - Native American/ Native Alaskan
    - White Non-Hispanic
    - Middle Eastern
    - Other (Please list)_____
    - Prefer not to answer this question.

2. What is your age?
    _____ years

3. Relationship Status
    (Choose the relationship status YOU feel best describes your relationship.)
    - Single
    - Dating
    - Engaged
    - Married
    - Committed Relationship (Not Married)

4. How long have you been in this relationship?
    _____ years _____months

5. Religion (Check All That Apply)
    - Agnosticism
    - Atheism
    - Buddhism
    - Catholic
    - Hinduism
    - Islam
    - Judaism
    - Paganism/ Neo-Paganism
    - Protestant Christian
    - None
    - I prefer not to answer this question.
    - Other _____

6. Estimated Income
   Please estimate the take-home income for your household from the last month. (Roommates and others who do not assist you in paying personal bills [i.e. your groceries, your share of utilities/rent] do not need to be included in your estimate.)
   - $0- $850
   - $850- $1,700
   - $1,700-$2,500
   - $2,500-$3,500
   - $3,500-$4,200
   - $4,200-$5000
   - $5000-$5800
   - $5800-$6600
   - Greater than $6600
   - Unknown

7. Do you currently have health insurance?
   Yes/No/I don't know

8. Do you have access to affordable hormonal birth control choices?
   (Examples of hormonal birth control options include birth control pills, arm implants, IUDs, Plan B, birth control shots.)
   Yes/ No/ I don't know

Appendix B: Contraceptive History Questions

1. What type of birth control would you **prefer** to use to prevent pregnancy? (Please pick the one option you like best. You do not need to have ever used this type before.)
    - None
    - Birth Control Pill
    - Cervical Cap
    - Condoms
    - Female condoms
    - Diaphragm
    - Hormonal Arm Implant
    - Hormonal IUD/ Mirena
    - Non-Hormonal IUD (example: Copper IUD)
    - Hormonal Patch
    - Hormonal Shot
    - Natural Family Planning
    - Plan B
    - Spermicide
    - Sponge
    - Sterilization (yourself)
    - Sterilization (your partner)
    - Withdrawal
    - Vaginal Ring
    - Other _____

2. What type of birth control did you use the last time you had sexual intercourse? (Check all that apply.)
    - Not sexually active.
    - Did not use contraceptives- Currently trying to get pregnant
    - Did not use contraceptives- I would be okay with getting pregnant.
    - Did not use contraceptives-I am pregnant.
    - None
    - Birth Control Pill
    - Cervical Cap
    - Condoms
    - Female condoms
    - Diaphragm
    - Hormonal Arm Implant
    - Hormonal IUD/ Mirena
    - Non-Hormonal IUD (Copper IUD)
    - Hormonal Patch
    - Hormonal Shot
    - Natural Family Planning
    - Plan B
    - Spermicide

- Sponge
- Sterilization (yourself)
- Sterilization (your partner)
- Withdrawal
- Vaginal Ring
- Other _____

3. Have you ever been told by a medical care provider that it is not safe for you to use hormonal birth control? (Examples of hormonal birth control options include birth control pills, arm implants, IUDs, Plan B, birth control shots.)

   Yes/ No/ Unsure/ I cannot use certain types of hormonal birth control

4. Where do you go for information on birth control? (Check all that apply.)
   - Doctor or another healthcare provider
   - Significant other/ Sexual Partner
   - Mother/ Female Guardian
   - Father/ Male Guardian
   - Sister
   - Brother
   - Aunt
   - Uncle
   - Male Cousin
   - Female Cousin
   - Best Friend
   - Friends
   - Books
   - Internet
   - Other_____

Appendix C: Positive Feelings Towards Pregnancy Questions

1. How likely is it that you will become pregnant in the next year?
   1 (very unlikely) to 7 (very likely)/ I am pregnant

2. If you found out you were pregnant today what kind of effect would that have on your current goals or plans? (Do not need to answer if you are pregnant.)
   1 (very negative effect) to 7 (very positive effect)

3. If you found out today you were pregnant how would your family feel? (Do not need to answer if you are currently pregnant.)
   1 (very displeased) to 7 (very pleased)

4. How supportive would this partner be of your pregnancy? (Do not need to answer if you are pregnant.)
   1 (very unsupportive) to 7 (very supportive)

Appendix D: Vignette Scripts

Instructions

Imagine you are considering using a new type of hormonal birth control, Hormonal Contraceptive A**.** You decide to discuss your birth control options with your doctor and a close friend who knows you well. You ask each of them what they think of this birth control option for you.

Doctor Supports Medication

Welcome to our office, I'm so glad you could be here today.
I have finished reviewing your medical record and the notes from the nurse.
It says here that you are interested in Hormonal Contraceptive A to prevent pregnancy.
Many individuals are concerned about having something that is healthy for them, fits their lifestyle, and has minimum risk of side effects.
Hormonal Contraceptive A looks to be a good choice for you.
Based on your medical history it should be a safe option for you.
There are possible side effects, such as headache and blood clots.
These are possible with any hormonal contraceptive option and I am not concerned that these side effects will affect you with this medication.
Given your medical history there is no indication that you will have any difficulty with side effects from this particular medication.
Also, it is simple to take, as it needs to be taken once a week, which people find very easy.
Of course, we can discuss other options in addition to Hormonal Contraceptive A.

Doctor Against Medication

Welcome to our office, I'm so glad you could be here today.
I have finished reviewing your chart and the notes from you nurse.
It says here that you are interested in Hormonal Contraceptive A to prevent pregnancy.
Many people are concerned about having something that is healthy for them, fits their lifestyle and has minimum risk of side effects.
Hormonal contraceptive A does not seem to be a good choice for you.
Based on your medical history it may be an unsafe option for you.
In addition to this, there are possible side effects, such as headache and blood clots.
These are possible with any hormonal contraceptive option, but I am concerned that they will affect you with this particular medication.
Given your medical history there is some indication that you will have difficulty with side effects from this particular medication.
Also, it is simple to take, but it needs to be taken once a week, which people find very challenging.
Don't be discouraged.
Keep in mind that we can discuss other options in addition to Hormonal Contraceptive A.

Friend Supports Medication

You know, I heard about that birth control.
It sounds like a good one, my cousin uses it and she loves it.

I heard someone on the news talking about the side effects, but that doesn't mean that you will have problems.
I know the birth control I'm taking now is supposed to make you gain weight, but I've never had any problems with it. Hormonal Contraceptive A is supposed to be really convenient.
I mean, you only have to remember it once a week; that sounds very convenient.
It's not too complicated, most people can remember to take a medication weekly.
I would choose this birth control personally.
Have you talked to the doctor about any other birth control?

Friend Against Medication

You know, I heard about that birth control.
It sounds like an awful one, my cousin used it and she hated it.
I heard someone on the news talking about side effects, and that is concerning.
You don't want to have problems with side effects.
I know that birth controls are all supposed to make you gain weight, and mine has made me gain weight.
Hormonal Contraceptive A doesn't sound too convenient.
I mean, it has got to be challenging to remember to take something weekly.
That doesn't sound very convenient.
It's just too complicated; most people can't remember to take a medication weekly.
I would choose a different birth control personally.
Have you talked to the doctor about any other birth control?

Appendix E: Post-Vignette Questions

After considering the information provided by your doctor and friend in the audio please answer the questions below as accurately as possible.

1. Would you be interested in taking Hormonal Contraceptive A based on the information given? (If you currently take a hormonal medication make this decision as if your current choice of medication is no longer available to you.)

1 (very uninterested) to 7 (very interested)

2. You feel taking Hormonal Contraceptive A would be _____.

1 (very unsafe) to 7 (very safe)

3. How likely would you be to recommend that a friend or family member consider using Hormonal Contraceptive A?

1 (very unlikely) to 7 (very likely)

4. How likely would you be to recommend this doctor to someone else for birth control?

1 (very unlikely) to 7 (very likely)

5. How likely would you be to recommend that someone else ask the friend in the audio recording about birth control?

1 (very unlikely) to 7 (very likely)

6. To what extent do you think this doctor provided appropriate birth control advice?

1 (very inappropriate) to 7 (very appropriate)

7. To what extent do you think the friend on the audio recording provided appropriate birth control advice?

1 (very inappropriate) to 7 (very appropriate)

Appendix F: Important Women Contraceptive Use Questions

Before you continue, think of **UP TO THREE** important women you know in your personal or professional life with whom you are comfortable discussing personal information. They can be women that you have discussed your birth control use with.
Please answer the questions below for each woman separately. It may help to start by making a list of important women (1-3) and check off each woman as you answer the related questions.

Woman 1 (Questions repeated for Woman 2 and Woman 3.)

1. What is your relationship with this woman?

    - Friend
    - Best Friend
    - Acquaintance
    - Mother
    - Sister
    - Aunt
    - Cousin
    - Grandmother
    - Other Family Member
    - Co-Worker
    - Other _____

2. Does this important woman discuss birth control use with you?
    Yes/ No/ I cannot remember.

3. Does this important woman use birth control or has she used it in the past?
    Yes/ No/ I don't know

4. Do you know what kind of contraception this woman uses? (Either currently or in the past.)
    Yes/ No/ I'm not sure

    a. If you think you know what type of birth control this individual uses now or has used in the past, what kind of birth control is it? (Please check all types of birth control that you believe this individual has used.)
        - None
        - Birth Control Pill
        - Cervical Cap
        - Condoms
        - Female condoms
        - Diaphragm
        - Hormonal Arm Implant
        - Hormonal IUD/ Mirena
        - Non-Hormonal IUD (Copper IUD)

- ○ Hormonal Patch
- ○ Hormonal Shot
- ○ Natural Family Planning
- ○ Plan B
- ○ Spermicide
- ○ Sponge
- ○ Sterilization (yourself)
- ○ Sterilization (your partner)
- ○ Withdrawal
- ○ Vaginal Ring
- ○ Other _____

5. How supportive would this woman be of you using barrier methods such as condoms, female condoms, or cervical caps?
   1 (very unsupportive) to 7 (very supportive)

6. How supportive would this woman be of you using hormonal birth control methods such as the oral contraceptive pill, or the hormonal patch?
   1 (very unsupportive) to 7 (very supportive)

7. Do you think this woman finds your current birth control choice acceptable? (If your friend knows what you use, do they find it acceptable?)
   1 (very unacceptable) to 7 (very acceptable)