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Embodiment and Perceived Power in Women's Health-Related Interactions

A Dissertation submitted in partial satisfaction
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Dedication

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ABSTRACT OF THE DISSERTATION

Embodiment and Perceived Power in Women's Health-Related Interactions

by

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Objective: The current technology of cervical cancer screening via pelvic exam and Pap test is sophisticated enough to detect and treat most cases of cervical cancer, subsequently thwarting the development of invasive and fatal forms of cervical cancer. However, failure to maintain a regular screening schedule remains a major obstacle to early detection. Women often report feeling vulnerable as patients during this procedure, suggesting that psychosocial experiences may contribute to underutilization of Pap tests. The theory of embodied cognition posits that bodily experiences can influence seemingly abstract or visceral mental states via nonconscious processes. The current study explores how patients' individual differences relate to their experiences of a laboratory-based simulation of a reproductive health screening. Another goal of this study is to target women's experiences via an embodied prime (i.e., seating posture). *Method:* Participants

were randomly assigned to hold either open or closed postures, or received no instructions regarding specific seating posture during a mock medical interaction with a researcher. *Results:* The findings of the current study indicate that patients' seating postures interacted with individual difference variables to predict subjective appraisals of the medical simulation and health-related outcomes. *Conclusions:* Individual differences play an important role in women's reproductive health screening experiences. Embodied interventions may be a valuable resource to improve patients' health-related experiences and potentially facilitate adherence to screening recommendations.

Keywords: embodiment, power posing, women's health, cervical cancer, Pap test

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Introduction

Patients often experience anxiety and distress about visiting their doctor (Kash, Holland, Halper, & Miller, 1992; Kőszegi, 2003). In the context of medical interactions, these negative psychosocial experiences can have a number of adverse consequences, including decreased patient satisfaction (Court, Greenland, & Margrain, 2009), increased pain sensitivity (Arntz & DeJong, 1993), appointment truancy (Taani, 2002), nonadherence to treatment recommendations (Corah, 1998), and impaired recall and attention regarding the details of an event (Mathews & MacLeod, 2005). Anxiety and distress in medical contexts are particularly costly, given the probability that important, sometimes life-altering, information is conveyed during interactions between patients and healthcare providers. Even relatively low-risk medical contexts, like routine medical check-ups, may solicit heightened levels of anxiety. Furthermore, certain medical contexts entail highly personal or invasive physical procedures, which may set the stage for even greater levels of patient distress.

In this study, I focus on one paradigmatic context of patients' anxiety, distress, and generally negative psychosocial experiences: women's reproductive health screening via Pap test and pelvic exams. Typical reproductive health screenings may include a tactile inspection of the lower abdomen and pelvic area, examination of the cervix, collection of a cell sample from the vaginal canal and cervix (i.e., Pap test), as well as a tactile breast inspection (National Cancer Institute, 2014). In addition to intimate physical contact with private parts of the body, reproductive health screening procedures also

often necessitate disclosure of information that can be highly emotional and subject to stigmatization (e.g., patients' sexual history).

Nonadherence: The Usual and Unusual Suspects

Pap tests and pelvic exams are the primary means of detecting cervical cancer, and the consequences of not adhering to regular screening schedules can be profound. In the worst-case scenario, failing to maintain a regular screening schedule may result in advanced (and often terminal) stages of cervical cancer. Experts predict 12,360 new cases and 4,020 deaths resulting from cervical cancer in the year 2014 (American Cancer Society, 2014), which suggests the need for experts to consider new solutions for the problem of underutilization and nonadherence.

An initial step toward conceptualizing new solutions for improving women's reproductive health practices is to consider "the usual suspects," or the commonly studied obstacles to healthcare. For example, modern medical approaches place a strong emphasis on technological advancements (Verghese, 2008). Many medical researchers tend to reflexively advocate for technological innovation as a primary means to address the problems associated with reproductive health screening (Sawaya & Grimes, 1999). However, the current technology used for the standard Pap test can sufficiently detect most forms of cervical cancer before they become invasive and life threatening (Nelson, Averette, & Richart, 1989). However, reliance on technological advancement in healthcare carries its own set of disadvantages. Experimentation with screening technology may present new, unknown risks to patients. A technology-driven approach to healthcare also is likely to require certain costs, without consideration of more

economical strategies and tools to address problems with reproductive health screening. Most importantly, such advances fail to address the problem of underutilization (e.g., irregular screening schedules, failure to follow up on abnormal test results; Sawaya & Grimes, 1999).

Another commonly studied health barrier is limited access to care. While not having access to screening procedures will certainly obstruct women from maintaining a regular screening schedule, previous studies suggest that access to screening may not be the primary obstacle to Pap test adherence. Researchers find that even among patients who have full access to care (e.g., those covered by an HMO; Rolnick, LaFerla, Wehrle, Trygstad, & Okagaki, 1996; Sung, Kearney, Miller, Kinney, Sawaya, & Hiatt, 2000), patients' still underutilize Pap tests and struggle to maintain a regular screening schedule, as recommended by doctors. Interestingly, one study found that even medical residents specializing in OB/GYN, who arguably "know better," tend to underutilize Pap test screening (Williams, Santoso, Ling, & Przepiorka, 2003).

Taken together, these findings suggest that despite technological advancements and increased access to care, underutilization and nonadherence enable and sustain the prevalence of invasive cervical cancer in the US (Coughlin & Uhler, 2002; Funke & Nicholson, 1993; Rivers, Salovey, Pizzarro, Pizzarro, & Schneider, 2005; Sung et al., 2000; Vogt, Glass, Glasgow, LaChance, & Lichtenstein, 2003). Moreover, it appears that perhaps the most obstinate barriers to women's reproductive health can be attributed to intrapsychic variables (Kowalski & Brown, 1994). Accordingly, in one study, the majority of people who fail to show up for a scheduled medical appointment (65%) stated

psychological barriers as a reason for their truancy (Lacy, Paulman, Reuter, & Lovejoy, 2004). These findings warrant investigation into the influence of subjective health appraisals in the context of reproductive health screening.

Patients' Subjective Experience as Information

The experience of women's reproductive health screening can be highly sensitive and often emotional in nature. As such, patients' subjective experiences may shape or even trump their objective knowledge about the efficacy of screening. In an effort to tap into variables that are otherwise difficult to capture, some researchers have argued for a shift in the focus of health psychology research towards examining more nonconscious processes in relation to health-related cognition and behavior (Sheeran, Gollwitzer, & Bargh, 2012; Taylor, 2011). Supporting this recommendation, the commonsense model of illness representation suggests that people derive their beliefs about health from observation, experience, and evaluation of perceived symptoms and physical sensations (Leventhal, Weinman, Leventhal, & Phillips, 2008), as opposed to purely factual and intangible data about one's health (e.g., test results, objective health risks).

Patients' subjective experiences also inform health decision making. Specifically, the decision to initiate health behavior change (e.g., scheduling a pelvic exam for the first time) is commonly based on projected expectations for future outcomes, while the decision to maintain health behaviors (e.g., attending annual pelvic exams, following up with abnormal results) is based on patients' satisfaction with previous results (see Rothman, 2000). Based on this proposed relationship between subjective health experiences and health-related outcomes, women who have had negative experiences

with this exam will have negative expectations for subsequent exams. Indeed, narrative studies find that women commonly anticipate pain, and report feeling indecent, "small," "defenseless" and generally uncomfortable about the potential sexual connotations of the exam (Hoyo, Yarnall, Skinner, Moorman, Sellers, & Reid, 2005; Larsen, Oldeide, & Malterud, 1997; Millstein, Adler, & Irwin, 1984).

These findings have important implications for advancing research to promote women's reproductive health and screening utilization, suggesting that information-based strategies based on patients' deductive reasoning (e.g., presenting statistics on cervical cancer and the efficacy of Pap tests) cannot overcome subjective barriers to screening utilization. Rather, interventions should take into account the highly emotional and often visceral nature of patients' subjective experiences and how they may potentially shape future health decisions (i.e., maintaining adherence to a regular screening schedule).

Furthermore, the topic of women's reproductive health is highly stigmatized within the general public (Frederickson & Roberts, 1997; Glasier, Gülmezoglu, Schmid, Moreno, & Van Look, 2006; Roberts & Pennebaker, 1995), which presents a challenge to the task of extracting comprehensive data from laboratory studies and self-report questionnaires on this subject. The consequences of this stigmatization may be reflected by the dearth of research on the psychosocial barriers to women's reproductive health. However, a few notable researchers have made strides in studying women's subjective accounts of their screening experiences. One study (Larson et al., 1997) interviewed a small sample of women ($N = 13$) about their experiences and identified an emergent theme of uncertainty, evidenced in participants' sense of reassurance upon gaining

information and clarity about their health and statements that the exam was “not as bad” as they anticipated (e.g., bracing for the worst; Sweeny, Carroll, & Shepperd, 2006). Similarly, other studies have compared the narratives of women who regularly utilize screening with those who do not and found that women who underutilize screening reported dependence on physical symptoms to indicate a need for screening, greater cynicism about the medical profession, and reliance on alternative therapies to negate the need for screening (Savage & Clark, 1998; see also Smith, French, & Barry, 2003). One goal of the present study was to further explore women’s subjective experiences of reproductive health contexts, using a laboratory-based medical simulation of a typical screening visit (including interview, examination, and consultation).

Embodiment as Intervention

Previous research suggests that subjective, “commonsense” beliefs and experience are relevant to patients’ appraisals and decisions. In addition to investigating patients’ subjective experiences of reproductive health screening, another goal of this study is to pilot an intervention to address psychosocial barriers to reproductive health contexts. Echoing the recommendations of previous researchers (Sheeran et al., 2012; Taylor, 2011), I will present a small-scale intervention targeting nonconscious processes that shape the highly abstract subjective experiences of reproductive health screenings contexts. Specifically, I will examine the efficacy of an embodied intervention to improve women’s subjective health experiences. Theories of embodied cognition state that intrapsychic states are shaped by internal bodily experiences (Barsalou, 1999; Niedenthal,

2007). This study is the first to employ an embodied intervention to improve patients' experiences of reproductive health screening.

Research on nonverbal behavior provides support for the connection between mind, body, and behavior. Notably, one study examined patients' nonverbal behavior during a gynecological exam and found that anxiety was observable in patients' hand placement during the insertion of the speculum, such that anxious patients commonly used their hands to cover their eyes, legs, pelvis, or shoulders or to clench the exam table (Reddy & Wasserman, 1997). Although the focus of this study was primarily descriptive in nature, these findings clearly demonstrate how bodily expression can inform an understanding of patients' otherwise inaccessible experiences.

Many doctors intuitively use patients' bodily position as a source of information about otherwise invisible mental states. In a classic anecdote (Sapolsky, 1997), two cardiologists noticed the unique wear on the upholstery of the chairs in their waiting room among their patients who suffered from coronary heart disease. The chairs were imprinted with a pattern formed by their patients who were consistently sitting on the edge of their seats. This nonverbal expression of anxiety was so ubiquitous that it was included in the formal assessment of Type A personality: "He frequently sits poised on the edge of a chair. He may stretch out his feet, cross them, or just keep them bent under his chair" (Rosenmen, 1979).

Research on nonverbal behavior primarily depicts embodied expressions as an outcome of cognition. Alternatively, theories of embodied cognition focus on the role of bodily position in shaping cognition (Ghane & Sweeny, 2013; Niedenthal, 2007).

Theories of embodied cognition assume that intrapsychic experiences require mental reenactment of physical bodily states (Barsalou, 1999; Niedenthal, 2007). As such, changes made to the body can alter the subjective, psychological experience of an event. For example, in one classic study of embodied cognition, participants instructed to engage in arm flexion (which simulates the act of reaching for something) reported a sense of liking and approval when asked to make an appraisal of an unrelated event, while participants instructed to engage in arm extension were more likely to report dislike and disapproval (Cacioppo, Priester, & Bernston, 1993). Such results suggest that people refer to sensorimotor feedback accompanying their experiences to draw information about their own intrapsychic states. Similarly, in another paradigm commonly used in research on embodied cognition, researchers have been able to induce sadness by manipulating participants' faces to form frowns (Duclos et al., 1989). Extending these findings, studies suggest that identification of abstract, psychological information improves when psychological (listening to cheerful tone) and sensorimotor (e.g., smiling) cues are congruent (Niedenthal, 2007).

The ubiquity of patient vulnerability and powerlessness in the context of reproductive health screening suggests an intuitive adaptation for embodied interventions that use "power posing." Power posing refers to a specific phenomenon in embodied cognition that implies the strategic implementation of open and expansive postures to influence participants' perceptions of themselves as powerful and dominant. Specifically, researchers have found that power posing leads to increased confidence and success in an evaluative context (Cuddy, Wilmuth, & Carney, 2012), as well as changes to key

biomarkers linked with power and dominance (i.e., decreased cortisol and increased testosterone; Carney, Cuddy, & Yap, 2010).

The Current Study

The goals of the current study were three-fold: 1) to explore women's experiences of a laboratory-based medical simulation of women's reproductive health screening, 2) to identify systematic differences between participants' experiences, and 3) to examine the effectiveness of an embodied intervention targeting participants' sense of vulnerability and powerlessness during the medical simulation. I hypothesized that bodily postures would operate alongside personal and situational factors to influence participants' subjective appraisals of a health-related interaction. Specifically, I hypothesize that participants who hold less powerful postures and participants who are predisposed to feel vulnerable and powerless during a medical interaction will report feeling more powerlessness and vulnerability during the simulation. Furthermore, it follows that holding open and expansive postures will improve subjective experiences of the medical simulation, particularly for people who are susceptible to negative experiences of reproductive health contexts.

This study aims to provide deeper insight into the psychosocial nuances of women's reproductive health screening experiences. This study is the first to take into account patients' psychosocial and embodied experiences during an emotionally sensitive health context, thereby presenting a fresh approach to an ongoing, pervasive, and potentially life-threatening health issue. As such, these findings are intended to provide a

foundation for further exploration into embodied interventions to promote women's reproductive health.

Method

This study was approved by the University of California, Riverside (UCR) ethical review board and adheres to the current ethical standards for research with human subjects. Participants were female undergraduate students at UCR. All participants gave full consent to participate in this study. Before coming into the laboratory, participants (N = 186, M_{age} = 19.43, all female; 3% African American, 42% Asian/Pacific Islander, 39% Hispanic/Latino, 7% White/Caucasian, 9% Multiracial/Other) completed an initial screening questionnaire (see Table 1 for full participant characteristics).

Baseline Measures

The initial screening questionnaire included measures assessing participants' personal characteristics and health practices. All items measuring continuous variables were scored on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, unless otherwise noted.

Baseline anxiety. To begin, participants completed a 10-item measure of baseline anxiety. The full list of items is as follows: "I feel distressed / scared / anxious / tense / worried / nervous / afraid / upset / stressed out / a sense of dread" (α = .94, M = 3.05, SD = 1.53).

Personality. Participants completed the 8-item Big Five Neuroticism Subscale. The full list of items is as follows: "I see myself as someone who... is relaxed / handles stress well / can be tense / worries a lot / is emotionally stable / not easily upset / remains calm in tense situations / gets nervous easily" (α = .74, M = 3.10, SD = 0.63). Participants

also completed the 10-item personality inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). This questionnaire includes 2-item measures of conscientiousness (e.g., "I see myself as dependable, self-disciplined"; α = .49, *M* = 2.87, *SD* = 0.75) extraversion (e.g., "I see myself as extraverted, enthusiastic"; α = .64, *M* = 2.16, *SD* = 0.93), openness to experience ("I see myself as open to new experiences, complex"; α = .25, *M* = 2.70, *SD* = 0.67), and agreeableness ("I see myself as sympathetic, warm"; α = .30, *M* = 2.77, *SD* = 0.67). We did not use the two items assessing neuroticism because we instead used the full subscale described above.

Self-esteem. Next, participants completed the 10-item Rosenberg (1965) self-esteem scale. Sample items from this scale include, "I feel that I am a person of worth, at least on an equal plane with others" and "I feel that I have a number of good qualities" (α = .89, *M* = 3.85, *SD* = 0.66).

Health information avoidance. Participants then completed the 10-item Health Information Avoidance Scale (Howell & Shepperd, 2014). Sample items from this scale include: "There is some information that I would rather not learn about my health" and "When it comes to my health, sometimes ignorance is bliss" (α = .86, *M* = 1.55, *SD* = 1.04).

Reproductive health. Participants then completed a series of questions about their reproductive health. The full list of items is as follows: "Have ever had you Pap test?" *(yes / no / decline to state);* "How long has it been since your last Pap test?" (*More than two years / Two years / One year / A few months / A few days*); "Total number of Pap tests you have had" (open-ended); "Have you ever had an abnormal result from your

Pap test?" "Have you ever had unprotected sex?" *(yes / no / decline to state);* "Have you ever been pregnant?" *(yes / no / decline to state);* "Have you ever had a sexually transmitted disease?" *(yes / no / decline to state)*; and "Have you ever experienced sexual abuse?" (*yes / no / decline to answer*).

Body image. Participants completed the Body Shape Questionnaire (BSQ; Dowson & Henderson, 2001), which measures negative self-perceived body image. Sample items from this scale include: "Has being undressed, such as when taking a bath, made you feel fat?" and "Have you ever noticed the shape of other people and felt that your own shape compared unfavorably?"; α = .97, M = 3.40, SD = 1.33).

Demographics. Finally, participants provided demographic information including their sexual orientation, age, race/ethnicity, and English language fluency.

Simulation Procedures

Within 1 week after completing the initial questionnaire online, participants attended a laboratory simulation session. This simulation followed the typical progression of a doctor's visit, beginning with participants seated in a waiting room. Next, a research assistant led participants to a room designed to look like a doctor's office, equipped with an exam table, medical supplies (e.g., ear thermometer, stopwatch, long single-tipped cotton swabs, latex gloves, hand sterilizer), and informational flyers about reproductive health (see Figure 1). The research assistant sat in a rolling chair and the participant was seated in an armchair for a brief verbal interview (see "Embodiment conditions" for further details) regarding their reproductive health and sexual history. The interview questions were identical to the questions in the baseline questionnaire regarding

reproductive health and sexual history (e.g., “Have you ever been pregnant?” “Do you practice safe sex?”). However, the purpose of the verbal interview was to lend believability to the simulation and make salient the potentially discomforting level of intimacy that characterizes reproductive health interactions.

Next, participants took part in a mock “physical examination,” which, for obvious ethical reasons, did not entail the same level of intimacy as an actual pelvic exam. During the exam, the researcher obtained participants’ temperature (via ear thermometer) and pulse (conducted manually). Next, the researcher performed a tactile scan of the participants’ stomach region, using gloved hands to brush the participants’ stomach in small circles. For the touch exam, participants were asked to remain fully clothed and lay flat on their back as the researcher placed their hands on the stomach to “feel for any abnormalities.” Due to the sensitive nature of this type of personal contact, before conducting the touch exam, the researcher reiterated that the study could be cancelled at any time without consequence. However, no participants requested to be dropped from this study nor ask the researcher to cease the tactile inspection.

Finally, in lieu of tailored doctor’s recommendations, the researcher gave general information about and recommendations for women’s preventive health practices, adapted from the official guidelines provided by the National Cancer Institute (2014). Upon completing the simulation procedures, participants completed a brief survey about their experiences of the simulation (see Follow-up Measures for details). Finally, participants were debriefed on the purpose of the experimental simulation. The researcher initially entered the experiment room wearing a strange hat. As a final behavioral

measure of participants' sense of comfort and power, the purpose of the "strange hat" paradigm was to test whether the participants would feel comfortable enough to address this flamboyant gesture. This variable was coded such that any mention by the participant of the strange hat was coded as 1, whereas participants who did not mention the hat received a code of 0 for this variable.

In the event that participants inquired about further reproductive health information, they were given referral resources for campus and local health clinics to schedule screening appointments, as well as resources to learn more about national reproductive health recommendations.

Embodiment conditions. The prime used in this experiment is based on anecdotal accounts of patient behavior (Sapolsky, 1997) and previous studies of embodiment (Carney et al., 2010; Cuddy, et al., 2012; Schnall & Laird, 2007). For the duration of the verbal interview period (ending just before the mock physical exam procedures), participants were randomly assigned to an *open*, *closed,* or *no treatment/control* condition. Participants in the *open* condition were instructed to sit "with your back against the chair, arms on your lap, and both feet on the ground, just like this […]" (see Figure 2). Participants in the *closed* condition were instructed to "scoot to the front end of the chair, drawing your feet underneath the chair, and wrapping your hands around the armrest, just like this […]" (see Figure 3). Participants in the *no treatment/control* condition did not receive any instructions regarding their sitting position.

Follow-up Measures

The post-experiment survey included several measures to examine the effect of the embodied manipulation on simulation outcomes, as well as relationships between simulation outcomes and baseline measures of participants' personal characteristics. All items measuring continuous variables were scored on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, unless otherwise noted.

Follow-up intent (behavioral). To begin, participants were asked if they were interested in signing up for a voluntary, although highly recommended, meeting to learn more about women's reproductive health issues *(yes / no)*. During the debriefing session, participants were informed that this session will not actually take place; however, they were given referral resources if they wanted to learn more about reproductive health issues or to make an appointment for screening.

Perceived validity. Participants completed an 8-item measure of the perceived validity of the medical simulation. The full list of validity items is as follows: "My conversation with the interviewer was important to me"; "My conversation with the interviewer was helpful to me"; "I learned some important information"; "I learned some accurate information"; "The interviewer was a well-trained professional"; "I liked my interviewer"; "I respected my interviewer"; and "I felt comfortable around my interviewer" (α = .93, M = 4.04, SD =0.84).

Participant involvement. Next, participants completed the 9-item Facilitation of Patient Involvement Scale (FPI; Martin, DiMatteo, Lepper, 2001), adapted to measure participants' perceived involvement in the medical simulation procedure. These items

were adapted to the context of the medical simulation. Sample items from this scale include "I felt comfortable to express all of my concerns as a 'patient'" and "I felt actively involved in the medical simulation" (*1 = none of the time, 5 = all of the time;* α = .59, *M* = 2.54, *SD* = 0.59).

Subjective appraisals of the simulation experience. Participants reported their subjective psychological and emotional experiences of the exam. Specifically, participants were asked to report on the extent to which they felt *anxious* ("I felt scared / afraid / tense / nervous / anxious / worried / stressed / a sense of dread"; α = .88, *M* = 2.11, *SD* = 1.11), *generally distressed* ("I felt distressed / upset"; α = .47, *M* = 1.62, *SD* = 0.90), *ashamed* ("I felt ashamed / embarrassed / fragile / vulnerable / indecent / unclean"; α = .81, *M* = 1.73, *SD* = 0.92), *powerless* ("I felt vulnerable / fragile / helpless / powerless"; α = .80, *M* = 1.83, *SD* = 1.07), *empowered* ("I felt powerful / strong / empowered"; α = .76, *M* = 3.56, *SD* = 1.17), and *comfortable* ("I felt like an active participant / free to ask questions / safe / protected"; α = .72, *M* = 5.38, *SD* = 1.10) during the simulation experience.

Self-reported health intentions. Participants completed an 11-item measure of their future reproductive health intentions. The full list of items is as follows: "I plan to learn more about my health risks as a woman within the next 6 months-1 year"; "I plan to learn more about preventing and treating STDs within the next 6 months-1 year"; "I plan to learn more about preventing and treating breast cancer within the next 6 months-1 year"; "I plan to learn more about preventing and treating cervical cancer within the next 6 months-1 year"; "If I ever find a lump in my breast, I plan to make an appointment as

soon as possible within the next 6 months-1 year"; "I plan to have a pelvic/Pap test every year or as necessary"; "If I have an abnormal test result in a future Pap test, I plan to make an appointment to follow up immediately within the next 6 months-1 year"; "If I ever have a question about safe sex practices, within the next 6 months-1 year, I plan to ask a doctor"; "I plan to take action to protect against sexually transmitted diseases within the next 6 months-1 year (e.g., using condoms, getting tested, etc)"; "I plan to take action to protect against breast cancer within the next 6 months-1 year (e.g., self-exams, clinical exams)"; "I plan to take action to protect against cervical cancer within the next 6 months-1 year (e.g., regular medical check ups, etc)"; (α = .90, M = 4.27, SD = 0.67).

Posture discomfort. Finally, participants completed a 4-item measure of posture discomfort (i.e., "This posture was uncomfortable"; "This posture was strange"; "This posture is not how I usually sit"; "This posture was difficult for me to hold"; (α = .85, M = 3.96, SD =1.72).

Results

The Role of Individual Differences

To begin, I conducted bivariate correlational analyses to examine relationships between trait-like individual difference variables (i.e., baseline anxiety, personality, self-views, health information avoidance, demographic information) and health history (i.e., Pap test history). I further examined relationships between individual difference variables, including health history, and follow-up measures (i.e., intent to sign up for a follow-up session, perceived validity, participant involvement, subjective appraisals of

the simulation experience, self-reported intent, posture discomfort). Significant relationships have been highlighted below (see Table 3 for the full correlation matrix).

Baseline anxiety. Participants who reported high baseline anxiety also reported having received fewer Pap tests (r = -.16, p < .05). Regarding correlations with follow-up measures, participants with higher levels of baseline anxiety also reported higher levels of anxiety (r = .31, p < .001), shame (r = .21, p < .05), and general distress (r = .26, p < .01), and marginally less empowerment (r =-.15, p = .08) during the simulation.

Personality. More neurotic participants reported higher levels of anxiety (r = .33, p < .001) and shame (r = .16, p = .05) during the simulation. Neuroticism was unrelated to health history.

More conscientiousness participants reported lower levels of shame (r =-.28, p < .001) and powerlessness (r =-.18, p < .05) and higher levels of empowerment (r = .17, p < .05) and comfort (r = .25, p < .01) during the simulation. Furthermore, more conscientious participants reported a greater sense of involvement (r = .17, p < .05) and stronger health intentions (r = .29, p < .001) following the simulation. Conscientiousness was unrelated to health history.

More extraverted participants were more likely to have received a Pap test prior to their participation in the medical simulation (r = .21, p < .01) and marginally more likely to report practicing unprotected sex (r = .14, p = .06). Regarding relationships with follow-up measures, more extraverted participants reported lower levels of anxiety (r =-.17, p = .05) during the simulation.

More agreeable participants reported marginally weaker future health intentions (r = -.14, p = .10). Agreeableness was unrelated to health history.

Participants higher in openness to experience were less likely to report practicing unprotected sex (r = -.16, p < .01). Participants higher in openness to experience also reported marginally weaker future health intentions (r =-.16, p = .05) following the simulation.

Self-esteem. Participants with higher levels of self-esteem were more likely to have had a Pap test prior to their participation in the simulation (r = .15, p < .05). Regarding the relationship between self-esteem and follow-up variables, participants with higher self-esteem reported lower levels of shame (r = -.33, p < .0001), anxiety (r =-.43, p < .0001), and powerlessness (r = -.28, p < .001) marginally lower levels of distress (r =-.15, p = .07), and higher levels of comfort (r = .20, p < .01) during the simulation.

Health information avoidance. Participants with greater health information avoidance tendencies reported higher levels of shame (r = .18< .05), anxiety (r = .28, p < .001), distress (r = .23, < .01), and powerlessness (r = .24, p < .01), and marginally lower levels of empowerment (r = .15, p = .08) during the simulation. Participants with greater health information avoidance tendencies also were less likely to volunteer for the follow-up session (r = .20, p < .05).

Body image. Participants with more unfavorable body image reported greater posture discomfort (r = .24, p < .01) and reported higher levels of anxiety (r = .17, p = .05) and shame (r = .15, p = .06) during the simulation.

Demographics. Finally, several relationships emerged among demographic variables. Older participants were more likely to have had a Pap test prior to the simulation ($r = .27$, $p < .0001$), had a more recent Pap test ($r = .21$, $p < .01$), and reported a greater number of Pap tests overall ($r = .38$, $p < .0001$). Older participants were also more likely to report practicing unprotected sex ($r = .22$, $p < .01$). Furthermore, older participants were marginally more likely to ask a question in the "strange hat" paradigm ($r = .15$, $p = .08$).

Participants who learned English as primary language reported less distress during the simulation ($M = 1.44$, $SD = 0.7$) compared to those who learned English as a second language ($M = 1.79$, $SD = 1.0$), $t(142) = -2.32$, $p = .02$, $r = -.19$. Asian/Pacific Islander participants reported lower levels of empowerment during the simulation ($M = 3.26$, $SD = 1.0$), compared to participants of other races ($M = 3.73$, $SD = 1.2$), $t(142) = 2.37$, $p = .02$, $r = -.19$. Asian participants were also marginally less likely to volunteer for the voluntary follow-up session ($M = 1.79$, $SD = 0.4$) compared to other participants of other races ($M = 1.64$, $SD = 0.5$), $t(142) = -1.90$, $p = .06$, $r = -.16$ (volunteer enrollment coded such that 1 = *yes*, 2 = *no*). Similarly, Latina participants ($M = 1.48$, $SD = 0.5$) were less likely than non-Latina participants ($M = 1.85$, $SD = 0.4$) to volunteer for the voluntary follow-up session, $t(143) = 5.13$, $p < .0001$, $r = -.39$.

Common constellation: Baseline anxiety, neuroticism, body image, and self-esteem. The findings from initial, exploratory correlations revealed several common correlates among baseline anxiety, neuroticism, body image, and self-esteem. Given the conceptual link between these variables, it is possible that the effect of these variables on

study outcomes may overlap. As such, I conducted multiple regression analyses predicting participants' appraisals of the simulation and health-related outcomes from baseline anxiety, neuroticism, body image, and self-esteem, simultaneously. Controlling for baseline anxiety, neuroticism, and body image, self-esteem independently predicted shame (B = -.*43*, p = .0023), powerlessness (B = -.46, p = .006), anxiety (B = -.59, p = .0003), comfort (B = .46, p = .007), satisfaction *(*B = -.18, p = .04), intent (B = -.22, p = .01), and marginally predicted distress (B = -.27, p = .06). In addition, controlling for neuroticism, body image, and self-esteem, baseline anxiety independently predicted appraisals of anxiety, (B= .14, p = .02) and distress (B= .17, p = .002). All other relationships fell well below significance after controlling for the other predictors.

The Direct Effect of Embodiment Conditions

Planned contrast comparisons were conducted to test *a priori* predictions regarding differences among the experimental embodiment groups (Rosenthal & Rosnow, 1985). Specifically, participants in the *open* condition were hypothesized to report feeling less anxious, distressed, ashamed, and powerless compared to participants in the *closed* and *no treatment/ control* conditions. Similarly, participants in the *open* condition were hypothesized to report feeling more empowered and comfortable to ask questions than participants in the *closed* or *no treatment/control* conditions. Planned contrast comparisons were also used to test predictions about health-related outcomes. I hypothesized that participants in the *open* condition would be more likely to report intentions to pursue future reproductive health maintenance behaviors, a greater sense involvement in the simulation, and they would be more likely to perceive the simulation

as being valid. Similarly, I hypothesized that participants in the open condition would be more likely to enroll in the hypothetical follow-up session, compared to participants in the *closed* or *no treatment/control* conditions.

Although in many cases the direction of these differences were supported by the data, contrast tests comparing participants in the *open*, *closed*, and *control* conditions (coded as -1, 0, 1, respectively) revealed no significant differences between conditions in their subjective appraisals of the simulation experience or their health-related outcomes (see Table 4 for differences between *M* and *SD* by condition).

Interactions between Individual Differences and Embodiment Conditions

Initial analyses did not reveal a significant effect of embodiment on participants' appraisals of the simulation or on any of the health-related outcomes. Yet, the relationships identified in the exploratory correlational analyses of individual difference variables suggest that participants' experiences of reproductive health contexts vary based on stable individual differences and health history. Therefore, despite the lack of a direct effect of embodiment, I tested for interactions between individual difference variables and embodiment condition as predictors of participants' appraisals and health-related outcomes. All significant interactions are discussed below. Graphical representations of interactions are included that depict the nature of each interaction. For continuous variables, values were calculated based on median split values for illustration purposes only (see Figures 4-19).

Baseline anxiety. The interaction between baseline anxiety and embodiment condition marginally significantly predicted posture discomfort, $F(2, 135) = 2.52$, $p =$

.08. Participants with lower levels of anxiety appeared to be more sensitive to the effect of the closed embodied prime on physical comfort, such that participants with lower levels of anxiety in the closed condition reported higher levels of discomfort compared to those in the open or control conditions. Participants with higher levels of anxiety reported similar levels of posture discomfort in both open and closed conditions (Figure 4).

Personality. Participants' ratings of posture discomfort were predicted by the interaction between neuroticism and embodiment, $F(2, 135) = 4.26$, $p = .02$. Among participants with higher levels of neuroticism, those in the open condition reported greater discomfort compared to those in the closed or control conditions. Participants with lower levels of neuroticism reported similar levels of posture discomfort in the open and closed conditions (Figure 5).

The interaction between neuroticism and embodiment also predicted participants' appraisals of distress, $F(2, 135) = 2.75$, $p = .07$. Among participants with higher levels of neuroticism, participants in the open embodiment condition reported less distress compared to those in the closed and control conditions, and participants in the closed condition reported the most distress. Among participants with lower levels of neuroticism, participants in the open condition reported similar levels of distress to those in the control condition, while participants in the closed condition reported the highest levels of distress (Figure 6).

The interaction between extraversion and embodiment predicted appraisals of distress, $F(2, 135) = 3.20$, $p = .04$. For participants with lower levels of extraversion, those in the neutral condition reported more distress compared to participants in the

closed and open conditions, and participants in the open condition reported less distress than those in the closed condition. However, for participants high in extraversion, participants in the open condition reported higher levels of distress than those in the closed and control conditions (see Figure 7).

The interaction between extraversion and embodiment also predicted participants' appraisals of powerlessness, $F(2, 135) = 3.08$, $p = .05$. Among participants high in extraversion, those in the open and closed condition experienced similar levels of powerlessness. However, for participants low in extraversion, those in the closed condition reported higher levels of powerlessness than the open and control conditions, and those in the open condition reported lower levels of powerlessness than those in the closed and control conditions. In other words, the results of the embodied prime seem to align with the hypothesized effect on powerlessness, but only for participants with lower levels of extraversion (Figure 8).

The interaction between openness to experience and embodiment marginally predicted participants' self-reported future health intentions, $F(2, 135) = 2.67$, $p = .07$. Specifically, for participants with lower levels of openness, participants in the open and closed conditions both reported greater behavioral intentions compared to those in the control condition. However, for participants with higher levels of openness to experience, participants in the open condition reported greater behavioral intentions than those in the closed and control conditions, while those in the closed condition reported the least behavioral intentions (Figure 9). Here again, my hypothesis regarding the effect of the

embodied prime on health intentions was supported, but only for participants high in openness to experience.

There were no significant interactions between embodiment and agreeableness or conscientiousness.

Self-esteem. The interaction between self-esteem and condition was a marginally significant predictor of appraisals of powerlessness, $F(2, 135) = 2.94$, $p = .06$. Specifically, participants with higher self-esteem reported similar levels of powerlessness across the open, closed, and control conditions. However, for participants with lower self-esteem, those in the closed condition reported a greater sense of powerlessness compared to the open and control conditions. Once again, this pattern suggests that some participants (e.g., those with lower self-esteem) were particularly more sensitive to the embodied prime, and participants with lower self-esteem who were assigned to the open condition received the greatest benefit of embodiment as an intervention for perceived powerlessness (Figure 10).

Furthermore, the interaction between self-esteem and embodiment also (marginally) predicted participants' responses to the voluntary follow-up session, $F(2, 135) = 2.73$, $p = .07$. Among participants with high self-esteem, those in the open and closed conditions were more likely to enroll for the voluntary follow-up session compared to those in the control condition. Among participants with low self-esteem, those in the open condition were the most likely to sign up for the voluntary follow-up session, while those in the closed condition were the least likely to sign up for the voluntary follow-up session (Figure 11).

Health information avoidance. The interaction between health information avoidance (as a trait-like individual difference) and embodiment marginally predicted appraisals of general distress, $F(2, 135) = 2.69$, $p = .07$. For participants who prefer to avoid health information, those in the control condition reported the most distress compared to the open and closed conditions, and those in the closed condition actually reported the least distress. For participants who reported being less avoidant, those in the control condition reported the least distress among the conditions, and participants in the closed condition reported less distress than those in the open condition (Figure 12).

The interaction between health information avoidance and embodiment also predicted participants' ratings of posture discomfort, $F(2, 135) = 2.89$, $p = .01$. Across all levels of information avoidance, those in the open condition reported less discomfort than those in the closed condition, and participants in the control condition reported the least discomfort. However, among participants who reported being more avoidant, participants appeared to rate the open and closed conditions as much more uncomfortable than the control condition. In other words, while the trend in the ratings of posture discomfort were similar for participants regardless of the extent to which they prefer to avoid health information, participants with lower levels of information avoidance reported lower levels of discomfort in the control condition compared to participants with higher levels of information avoidance, and they reported greater posture discomfort holding both open and closed postures (Figure 13).

Reproductive health. Individual differences in reproductive health practices and history interacted with embodiment to predict participants' appraisals and health-related

outcomes $F(2, 135) = 2.41$, $p = .09$. Volunteer rates for the hypothetical follow-up session were similar across conditions for participants who reported not practicing unprotected sex. However, among participants who reported practicing unprotected sex, participants in the closed condition were the least likely to enroll in the volunteer session, compared to participants in the open and control conditions (Figure 14). This pattern is similar to those reported above in which the hypothesized effect of embodiment emerged (in this case, the effect of closed posture on follow-up enrollment) but only for some participants (in this case, participants who practiced unprotected sex).

The interaction between the time since participants' last Pap test and embodiment marginally predicted appraisals of shame, $F(2, 139) = 2.55$, $p = .08$. For participants who had a more recent Pap test, those in the open condition reported less shame than those in the closed and control conditions. For participants who never had a Pap test or haven't had one in the last two years, participants reported similar levels of shame across conditions (Figure 15). Yet again, the hypothesized effect of embodiment emerged for a subset of participants, in this case the effect on shame among participants who had a more recent Pap test.

Body image. The interaction between body image and condition predicted participants appraisals of powerlessness, $F(2, 135) = 3.01$, $p = .05$. For participants with more favorable body image, appraisals of powerlessness were similar across all embodiment conditions. For participants with less favorable body image, those in the open condition reported lower levels of powerlessness than those in the closed and control conditions, and participants in the control condition reported the highest levels of

powerlessness overall (Figure 16). Here we see the hypothesized effect of embodiment on powerlessness among participants with a poor body image.

Demographics. The interaction between English language primacy and embodiment predicted participants' enrollment in the hypothetical voluntary follow-up session, $F(2, 135) = 5.89$, $p = .0035$. For participants who learned English as their first language, those in the open condition were less likely to sign up for a follow-up session compared to those in the closed or control conditions, and those in the control condition were the most likely to sign up for the follow-up session. Among participants who learned English as a second language, those in the open condition were the most likely to sign up for the follow-up session (Figure 17). Here the hypothesized effect on follow-up enrollment emerged for participants with English as their second language.

The interaction between ethnicity and embodiment predicted participants' ratings of posture discomfort, $F(2, 135) = 2.62$, $p = .08$. Among Latina participants, ratings of posture discomfort were similar across open and closed conditions. However, non-Latina participants appeared to rate the closed condition as more uncomfortable than the open condition (See Figure 18).

Similarly, the interaction between race and embodiment predicted participants' self-reported health intentions, $F(2, 135) = 2.86$, $p = .06$. Among Asian participants, those in the control condition reported the greatest follow-up intent, compared to the open and closed conditions. Among non-Asian participants, those in the open and closed conditions reported greater follow-up intent compared to those in the control condition,

and participants in the closed condition surprisingly reported the greatest follow-up intent (See Figure 19).

Discussion

In this study, I explored relationships between individual differences, subjective appraisals of the simulation, and health-related outcomes. Furthermore, this study was the first to assess the efficacy of an embodied intervention targeting subjective psychosocial experiences (e.g., powerlessness, anxiety). Finally, interactions between embodiment and individual difference variables were found to predict outcome variables of interest, such that the embodied intervention was effective for some groups but not others. My findings suggest that peoples' unique experiences of reproductive health contexts may be a reflection of their personal characteristics and the situational (embodied) factors that comprise health interactions.

Relationships Among Individual Difference Variables

In this study, several demographic variables correlated with reproductive health behaviors, such that older participants were more likely to have had recent and more frequent Pap tests, more likely to report engaging in unprotected sex, and more likely to ask a question during the "strange hat" paradigm. Although speculative, these relationships may be a reflection of older women's increased familiarity with health contexts and the role that they play as patients. Similarly, increased health knowledge and literacy may be another potential mechanism by which age and reproductive health behaviors are linked, such that older women are more aware of health risks and the recommended course of action for health maintenance.

Furthermore, race, ethnicity, and English language fluency and acquisition were linked with participants' subjective appraisals of the simulation experience and reproductive health outcomes. Participants who learned English as a second language experienced more distress during the simulation. Similarly, Asian participants reported feeling less empowered. Asian and Latina participants were less likely to report follow-up intentions, compared to other participants. These findings align with previous research on reproductive health disparities in both Asian and Latina populations (Hunter et al., 2003; Nguyen, McPhee, Nguyen, Lam, & Mock, 2002; Suarez, 1994).

Targeted Effectiveness of the Embodied Intervention

Contrary to my hypothesis, embodiment did not significantly influence participants' subjective appraisals or reproductive health-related outcomes when examined across all participants as a whole. Despite the absence of a straightforward effect of embodiment, I conducted further analysis predicting women's subjective appraisals and health-related outcomes from interactions between embodiment and individual difference variables and revealed evidence for a targeted effect of the embodied intervention.

A number of significant interactions emerged between embodiment and individual difference variables on key outcome measures. The nature of these interactions seemed to follow a few basic trends. To begin, interactions often revealed a pattern of embodiment aligning with hypothesized effects in conjunction with specific individual difference variables, such that women who held an open posture prior to the simulation reported better psychosocial and health outcomes compared to those who held a closed

posture. Specifically, characteristics that may be associated with negative reproductive health experiences were the most responsive to the embodied prime, particularly with regard to follow-up enrollment and appraisals of powerless and distress. Specifically, women with low self-esteem, who learned English as a second language, and who practice unprotected sex responded as hypothesized to the embodied intervention with higher follow-up intentions. Similarly, women with low self-esteem, who were lower in extraversion, and who had an unfavorable body image responded as hypothesized to the intervention with lower levels of powerlessness (and distress, in the case of extraversion) during the simulation.

In an apparently different pattern, women who had a more recent Pap test responded to the intervention with lower levels of shame. Upon initial consideration, it may appear that participants who have never had a Pap test or have not had one in more than 2 years may be more susceptible to having a negative reproductive health experience, and thus this interaction is a less obvious fit with the explanation that the intervention was effective for women who are vulnerable to these negative experiences. However, it is also the case that if women in our study had a recent negative experience, they may be more likely to have an aversive disposition toward future reproductive health contexts. The previously mentioned theory regarding health behavior maintenance and its foundation in previous health experiences lends support to this interpretation (Rothman, 2000). Taken together, many of the interaction effects in this study suggest that an embodied intervention may be particularly effective for participants who would otherwise

be susceptible to negative experiences and unfavorable reproductive health-related outcomes (e.g., nonadherence to follow-up recommendations).

Another common trend among the interactions identified is that certain postures were physically uncomfortable for certain groups of women. Low baseline anxiety, high neuroticism, high information avoidance tendencies, and non-Latina participants reported greater postural discomfort in certain conditions of the intervention. This trend appears to be a reflection of the naturalness, ease, and familiarity of certain postures. Although speculative, this finding may suggest that chronic patterns of embodiment may be linked with personality. This hypothesis is not unlike the observations linking Type A personality with sitting posture (Rosenmen, 1979). Research on embodiment thus far has not examined the implications of posture discomfort on other outcomes (e.g., appraisals of distress). Based on current empirical findings, there is no indication that posture discomfort has any consequence on psychosocial or health-related outcomes in response to embodied interventions. However, future research should examine whether posture comfort and "fit" with certain individual preferences for embodiment has any consequence on intervention efficacy.

Finally, in cases for which the interactions did not follow the aforementioned trends, it appears as though the intervention may have actually been operating as counter-productive to the outcome variables of interest. In such incidences, it appears as though the effect of the open embodied prime may have essentially "backfired," particularly with regard to distress during the simulation. This trend is visible in the interactions between embodiment and (high) extraversion, (high) information avoidance, and (high)

neuroticism, in which women reported greater distress following an open posture. It appears that an embodied intervention may actually be counterproductive or detrimental for certain participants. Although speculative, in the case of participants with high extraversion, it appears that the application of an intervention was not necessary, as these participants may not have experienced particularly negative outcomes if left to their own devices. As for the interactions with information avoidance and neuroticism, it is possible that the distress experienced by women holding the open posture may be due to the unfamiliarity of this posture (similar to the above-described logic explaining the postural discomfort findings). Alternatively, although speculative, this counterproductive effect may be an indication that women's attempt to maintain protective postures may serve an emotion regulation function in certain cases. In other words, perhaps holding defensive postures, in some cases, may actually give some people the sense that they are taking precautions to protect themselves against threat. Further research is needed to better understand instances in which interventions using open and expansive postures may backfire.

It is important to note that none of the aforementioned trends explain the interaction between openness to experience and participants' self-reported health intentions. In this interaction, participants with high levels of openness to experience appeared to benefit from the open embodied prime, which resulted in greater self-reported health intentions. This interaction is not an example of the embodied prime benefitting only those who are susceptible to negative outcomes, nor is it an example of a counter-productive effect. In this instance, among participants who were already more

open to new experiences, participants in the open embodiment condition reported greater intentions to engage in new health behaviors compared to those in the closed or control conditions. It is possible that these findings may represent an anomalous instance that may not be replicated in future studies. Alternatively, it is possible that, for certain individual differences, engaging in an embodied prime that aligns with participants' natural inclinations may serve as a catalyst for health behaviors.

In light of the novelty of this research subject and approach, future research is required to replicate these findings. However, this study provides a foundation for future research to consider the particular variables that stand apart in this study. This study is the first to demonstrate the dynamic relationship between embodiment and individual differences in women's reproductive health contexts. The "big picture" findings suggest that individuals uniquely experience reproductive health contexts, based on their personal predispositions, health history, and the situational (embodied) variables at play. Accordingly, embodied primes can serve to mitigate participants' sense of powerlessness and vulnerability, particularly for individuals who may otherwise be at risk for negative psychosocial outcomes associated with reproductive health contexts (e.g., participants with low self-esteem or unfavorable body image). As such, this study has important implications for any interventions targeting the context of reproductive health. It appears that certain individual differences may play a major role in shaping patients' experiences of reproductive health contexts, suggesting a series of potential moderators to consider when examining any kind of intervention targeting reproductive health experiences. In

essence, consideration of certain individual differences might "make or break" intervention efforts.

Given the subtlety of the embodied manipulation used in this study, the interaction effects that did emerge are notable and warrant further investigation. Despite the lack of a direct effect of embodiment, this study suggests that embodied interventions may still have the potential to improve how patients and doctors approach reproductive health contexts. Embodiment offers an opportunity for patients to assert themselves as active agents in procedures and conversations pertaining to their health. Particularly in light of the global, economic, and personal costs accrued by the incidence of cervical cancer, a cost-free intervention that utilizes personal resources (i.e., participants' own bodily cues) holds promise for further innovation in improving women's reproductive health contexts.

Limitations and Future Considerations

One obvious limitation of the controlled laboratory setting is the lack of ecological validity. There are clearly ethical restrictions against psychology researchers conducting an authentic pelvic exam in a lab setting. However, future studies would benefit from examining the influence of an embodied intervention in the context of an actual Pap test. Pap test procedures often entail instruments (e.g., stirrups, speculum) that may appear particularly threatening to patients. In fact, the role of embodiment might more relevant when the threat of bodily discomfort and unpleasant sensations are made salient by the presence of these instruments.

It can be argued, however, that the current study was still able to capture the characteristic of the typical gynecological visit that is most threatening to patients: anticipation. In fact, anticipation of and expectations for the pelvic exam are often more stressful than the exam itself (Larsen et al., 1997). Importantly, the protocol used in this simulation did elicit uncertainty and subsequent anticipation. Furthermore, the likelihood that Pap tests are inevitably more threatening than a laboratory simulation suggests that the results of the current study are actually conservative estimates of the true effect of embodiment in the "real world" context of reproductive health screening.

Another limitation of this study was the homogeneity of the sample. Although participants in this study do represent a range of ethnic and racial groups, the majority of participants in this study were heterosexual (93%) and relatively young (M_{age} = 19.43). All participants were undergraduate students attending UCR. Future research should collect information from more diverse sources to capture a complete spectrum of sexual orientation, age, employment, and cultural variables. Ultimately, doctors, patients, and researchers from all areas of healthcare can benefit greatly from a model or framework that delineates how embodied, environmental, and individual difference variables interact to predict patients' experiences of reproductive health contexts and how the accumulation of these experiences predict future health decisions, behaviors, and outcomes. This type of model would facilitate the development of interventions that target specific aspects of reproductive healthcare (e.g., psychosocial experiences, behaviors, and health outcomes). Accordingly, this study represents a shift towards a more thorough conceptualization of

women's reproductive health contexts, based on research that takes multidimensional and nonconscious factors into account.

The theory of embodied cognition suggests that bodily postures shape cognition and behavior. Following this theory, all patients are subject to the effects of embodiment, regardless of whether or not they are intentionally holding certain postures. Future research should include naturalistic observations of embodiment in the context of reproductive health screening. In accordance with the "full cycle approach," theory-based laboratory interventions should be paired with "real-world" observations to maximize the validity and effectiveness of social and health psychology research (Mortenson & Cialdini, 1995).

Similarly, future research should examine the longitudinal influence of embodiment on long-term maintenance of health behaviors. Perhaps by simply providing a more comfortable and empowering experience, researchers and medical caretakers can work together to promote adherence to cervical cancer screening guidelines. Although the proposed method of intervention is relatively small-scale, this type of intervention has the potential to yield major outcomes, such as reducing patients' overall risk of invasive cervical cancer.

Overall, the findings from this study suggest that women's health contexts are rich with psychosocial nuances. Furthermore, when targeting individuals who may be at risk for negative reproductive health experiences, embodied interventions may be useful in addressing consequential outcomes. Despite the significance of the problem, there is a dearth of research on the psychological barriers to cervical cancer screening, which

reflects hesitance on a broader sociopolitical level to discuss issues relating to women's reproductive health in a way that improves these experiences. Across patients and healthcare providers alike, there is an underlying assumption that certain health interactions are inevitably uncomfortable and that patients must either endure feelings of discomfort or avoid these procedures altogether. My research suggests that by taking into account patients' personal characteristics and their sense of physical empowerment and comfort, patients' experience of this context can be improved.

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Table 1. *Participant Characteristics*

Characteristic	Frequency
Sexuality	
Heterosexual	167
Homosexual	3
Bisexual	7
Asexual/Decline to state	2
Age	
18-21	172 (93%)
English as first language	
Yes	105
No	78
Unprotected sex	
Yes	65
No	114
Ever had Pap test	
Yes	51
No	132
Last Pap test	
> 2 years/never	133
2-1 year(s)	24
A few months	26
Total Pap tests	
0	118
1	39
2+	26
History of abnormal Pap result	
Yes	5
No	155
Not sure	23

Table 2. *Correlations Among Individual Difference Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Baseline anxiety	--																
2. Neuroticism	.31**	--															
3. Openness to experience	-.13	-.22**	--														
4. Agreeableness	-.12	-.17*	.29**	--													
5.Conscientiousness	-.12	-.11	.17*	.10	--												
6. Extraversion	-.00	-.11	.22**	.07	.01	--											
7. Self-esteem	-.17**	-.43**	.33**	.13	.38**	.30**	--										
8. Information avoidance	.15*	.20**	-.22**	-.15*	-.18	-.26**	-.32**	--									
9. Unprotected sex	-.04	.12	-.17*	-.06	-.08	-.14	-.09	.11	--								
10. Ever had Pap	-.04	-.06	-05	.06	-.06	.22**	.16*	-.12	-.27**	--							
11. Recent Paps	.03	.04	.01	.04	.00	-.11	-.11	.11	-.27**	.67**	--						
12. Total Paps	-.16	-.02	.04	-.08	.09	.00	.09	-.10	.12	-.37**	.24**	--					
13. Body image	.18*	.15*	-.07	-.08	-.10	.07	-.31**	.20**	.03	-.04	.09	-.05	--				
14. Age	-.12	-.07	.09	-.00	.08	-.03	.14	-.02	.22**	.29**	.21**	.38**	-.13	--			
15. English Learner	-.08	.08	.01	.00	.10	.17*	-.04	-.04	.14	.01	-.02	-.02	-.02	-.07	--		
16. Asian	-.00	.04	-.05	-.09	-.23**	-.14	-.15	.00	-.18*	-.05	-.05	-.03	-.07	.05	-.16*	--	
17. Latina	-.01	-.06	.01	.07	.11	-.01	.05	.01	.08	.01	.03	.06	.07	.02	-.12	-.63**	--

Notes: English learner coded as: 1 = English as first language learned, 2 = English learned as second language. Ever had Pap coded as: 1 = yes, 2 = no. * = p <.05, ** = p <.01

Table 3. *Correlations Between Individual Differences, Appraisals, and Health-Related Outcomes*

	Follow-up	Validation	Involvement	Anxiety Appraisals	Distress Appraisals	Shame Appraisals	Powerlessness Appraisals	Empowered Appraisals	Comfort Appraisals	Health Intentions	Posture	Hat Question
Baseline anxiety	-.02	-.11	.00	.31**	.26**	.21*	.13	-.15	-.10	-.05	.11	-.05
Neuroticism	.08	.11	.06	.33**	.00	.16	.12	-.09	.01	.11	.14	.03
Open to experience	-.16	-.02	.04	-.04	.02	.01	.05	.12	.09	.05	-.02	-.04
Agreeable	-.14	.03	.09	-.09	-.06	-.06	-.04	.13	.13	.14	.05	.08
Conscientiousness	-.03	.12	.17*	-.13	-.05	-.28**	-.18*	.17*	.25**	.29**	.14	.05
Extraversion	-.08	.06	.01	-.17	-.00	-.05	-.11	-.03	.14	.12	.01	.00
Self-esteem	-.08	.10	.11	-.43**	-.15	-.33**	-.29**	.02	.20*	.12	-.12	.07
Information avoidance	.20*	.18*	-.02	.28**	.23**	.18*	.24**	.15	-.08	-.10	.05	-.07
Unprotected sex	.06	.01	-.06	-.09	-.05	-.10	-.07	-.05	-.07	-.14	-.16	-.17
Ever had Pap	-.13	.03	-.16	.03	-.07	.07	.10	-.08	-.20*	-.12	.01	-.08
Recent Paps	.05	-.09	.15	-.08	.01	-.07	-.15	.11	.22**	.08	-.01	.10
Total Paps	.13	-.11	.04	-.09	-.08	-.11	-.08	-.06	.02	-.05	-.00	-.06
Body image	.06	.02	-.19*	.17	.02	.15	.13	-.08	-.04	.04	.24**	-.05
Age	.10	-.07	.05	-.02	-.01	-.04	-.03	-.01	.05	-.07	.05	-.15
English Learner	.08	-.04	-.12	-.09	-.19*	-.02	.03	.02	-.13	-.04	.09	.08
Asian	.16	-.10	-.10	.08	-.00	.10	.05	-.19*	-.13	-.14	-.12	.10
Latina	-.29**	-.00	.04	.03	.12	.04	.01	.11	.08	.13	.04	.08

Notes: English learner coded as: 1 = English learned as first language, 2 = English learned as second language. Ever had Pap, follow-up behavior, and hat question coded as: 1 = yes, 2 = no. * = p <.05, ** = p <.01

Table 4. *Means and Standard Deviations by Condition*

	Open	Closed	Neutral
Shame Appraisals	1.71 (0.9)	1.90 (1.1)	1.83 (0.9)
Anxiety Appraisals	2.01 (0.9)	2.29 (1.2)	1.96 (1.1)
Distress Appraisals	1.73 (1.0)	1.48 (0.7)	1.70 (1.0)
Powerlessness Appraisals	1.62 (0.8)	1.92 (1.2)	1.96 (1.2)
Empowerment Appraisals	3.63 (1.1)	3.55 (1.1)	3.50 (1.3)
Comfort Appraisals	5.22 (1.1)	5.43 (1.0)	5.51 (1.2)
Validation	3.84 (1.0)	4.05(0.8)	4.25(0.6)
Involvement	6.12(0.5)	6.10(0.6)	6.20(0.6)
Follow-up	1.66 (0.5)	1.77 (0.4)	1.66 (0.5)
Health Intentions	4.25 (0.6)	4.29 (0.6)	4.24 (0.8)

Figure 1. Laboratory exam room.

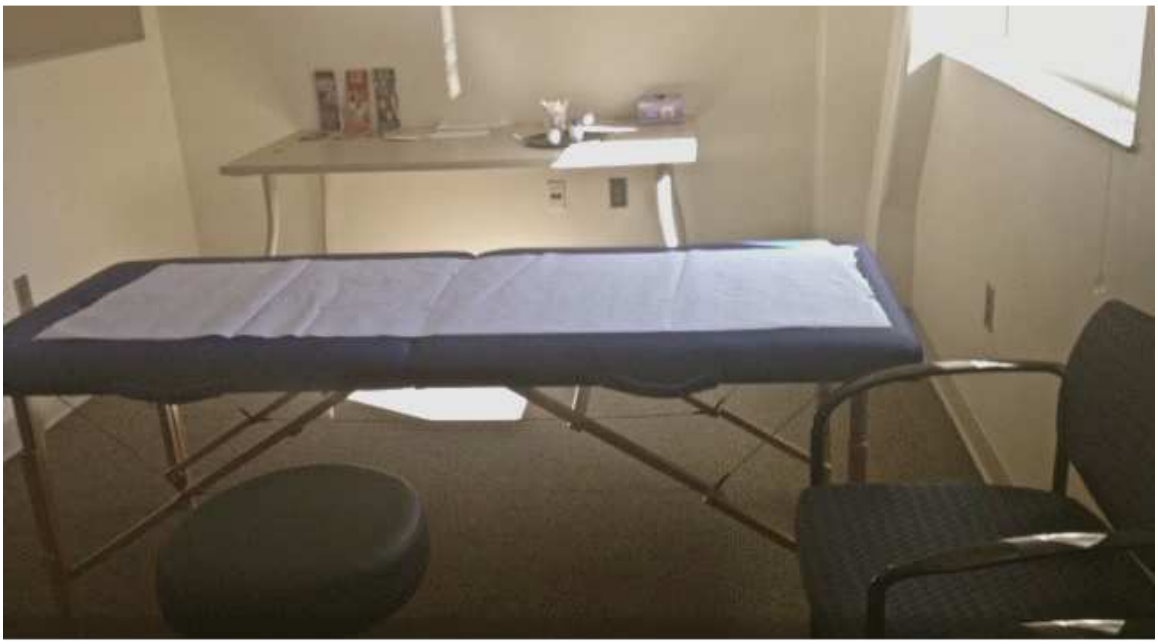


Figure 2. Example shown to participants in the *open* condition.

Figure 3. Example shown to participants in the *closed* condition.

Figure 4. Relationships between embodiment and posture comfort by baseline anxiety.

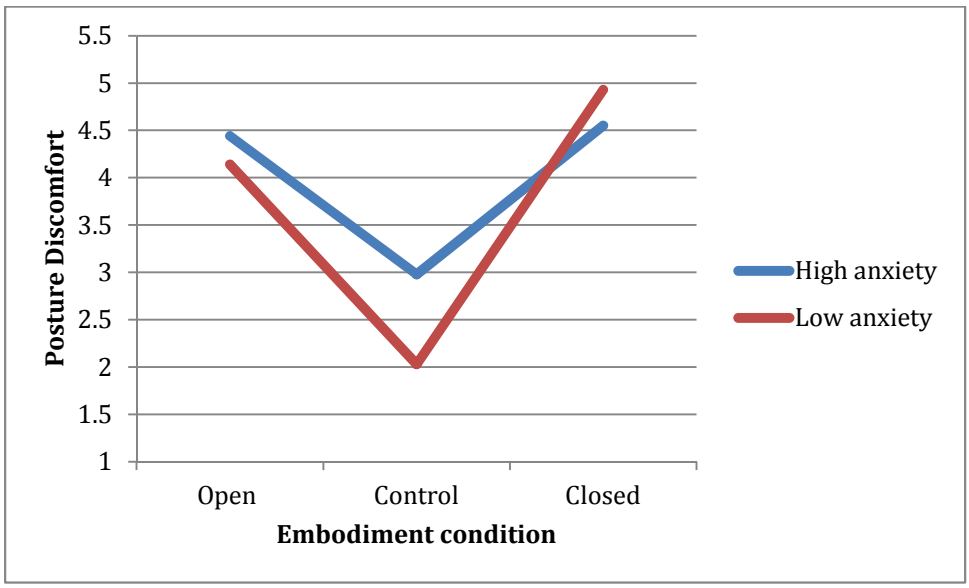


Figure 5. Relationships between embodiment and posture comfort by neuroticism.

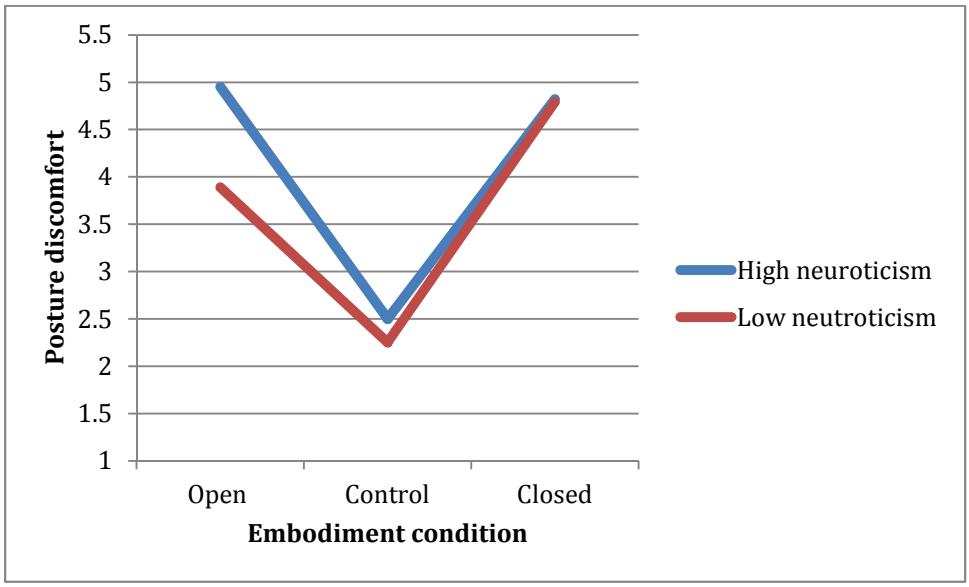


Figure 6. Relationships between embodiment and appraisals of distress by neuroticism.

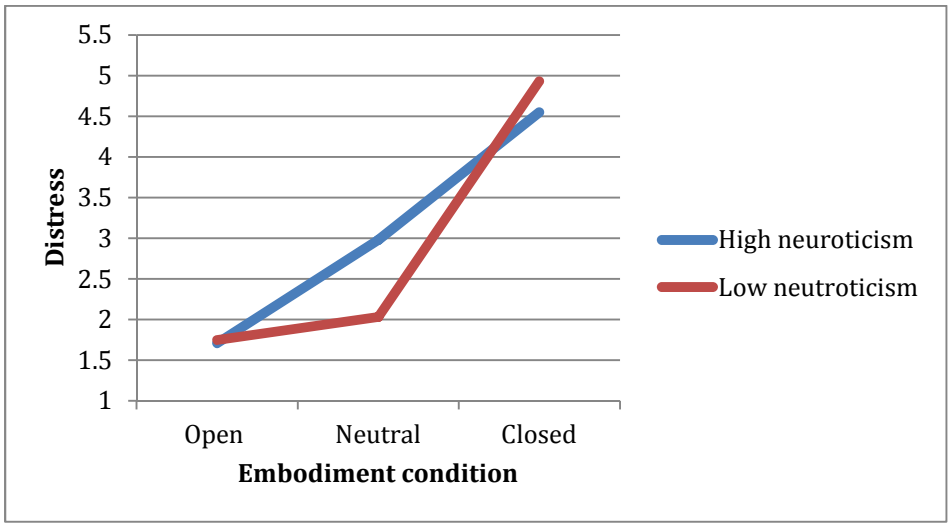


Figure 7. Relationships between embodiment and appraisals of distress by extraversion.

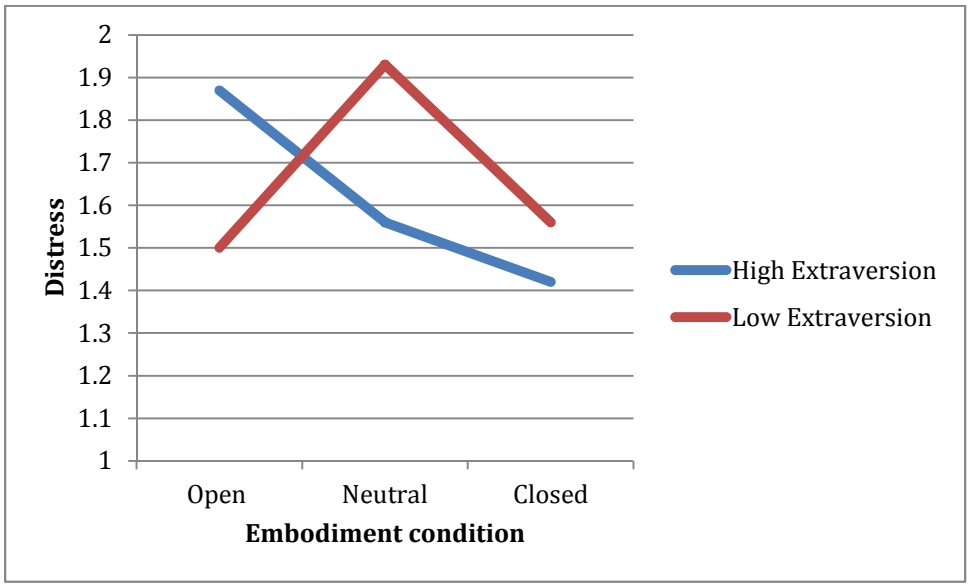


Figure 8. Relationships between embodiment and appraisals of powerlessness by extraversion.

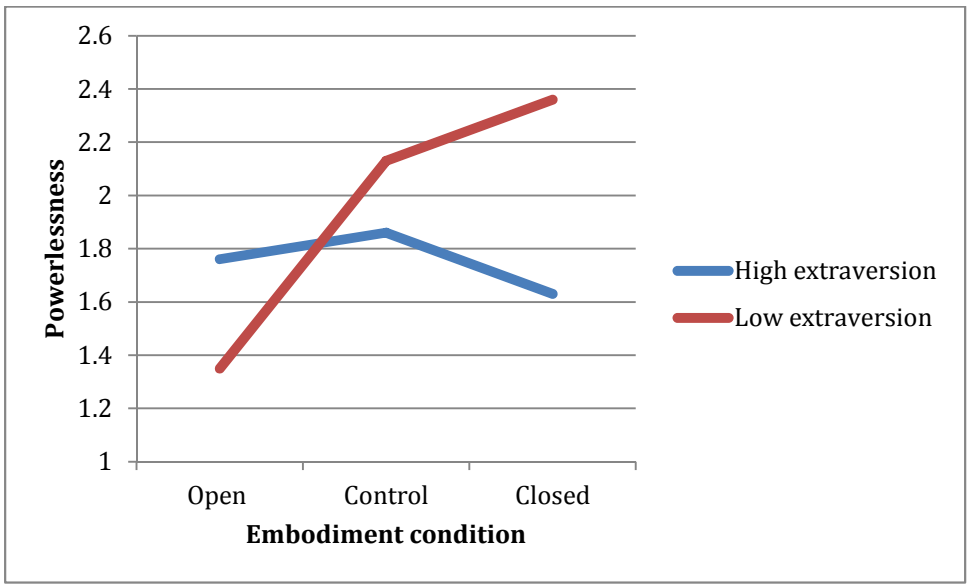


Figure 9. Relationships between embodiment and health intentions by openness to experience.

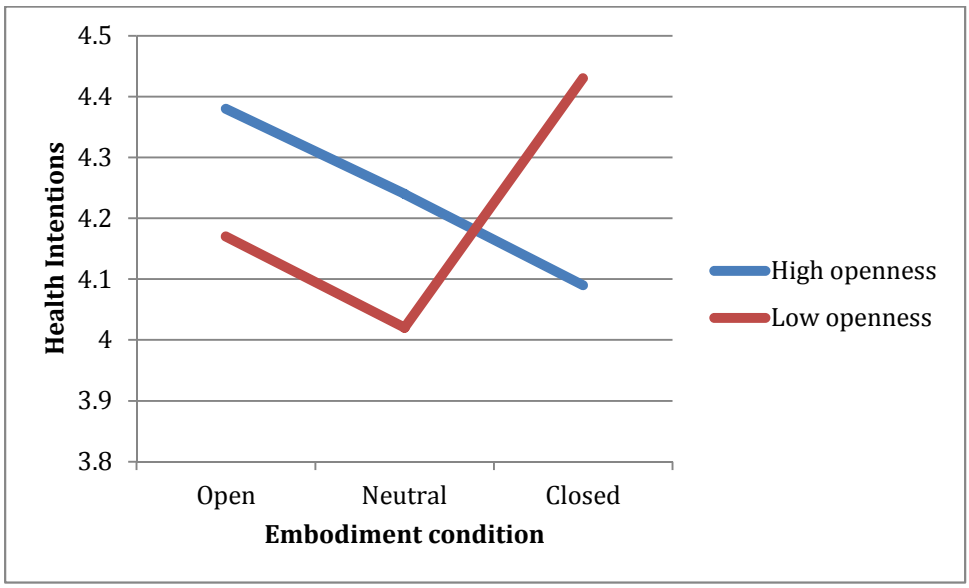


Figure 10. Relationships between embodiment and powerlessness by self-esteem.

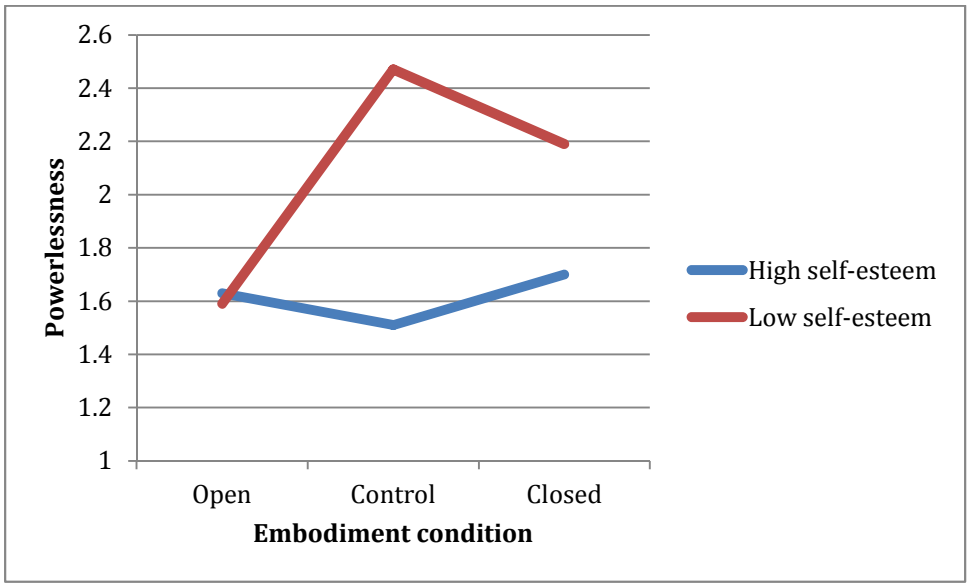
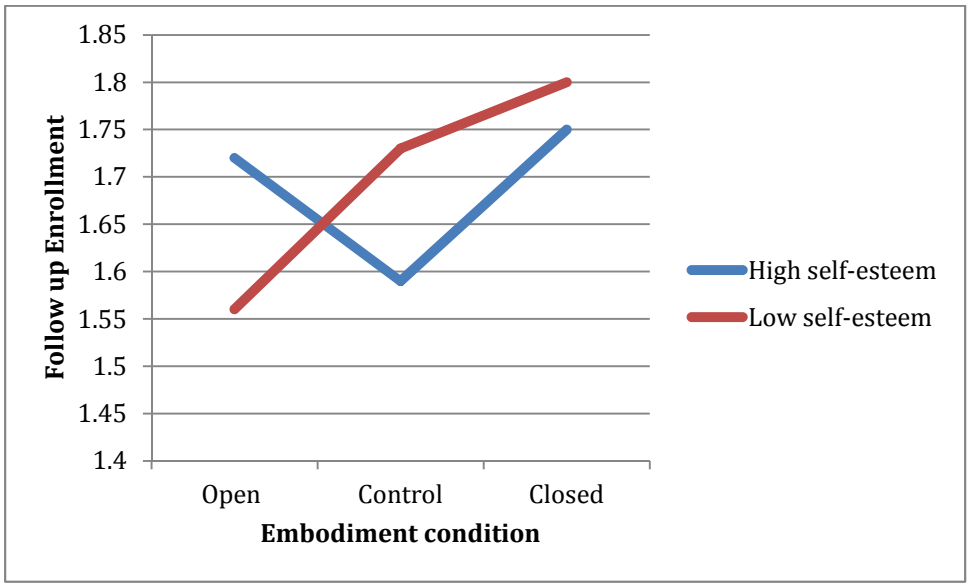


Figure 11. Relationships between embodiment and follow-up enrollment by self-esteem.



Note: Follow-up enrollment was coded such that 1 = yes, 2 = no.

Figure 12. Relationships between embodiment and appraisals of distress by information avoidance.

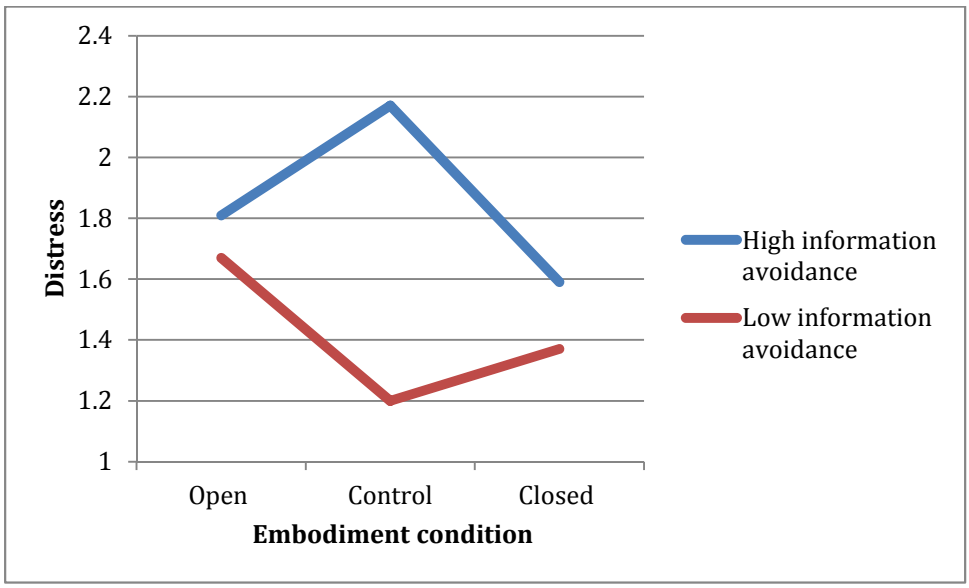


Figure 13. Relationships between embodiment and posture discomfort by information avoidance.

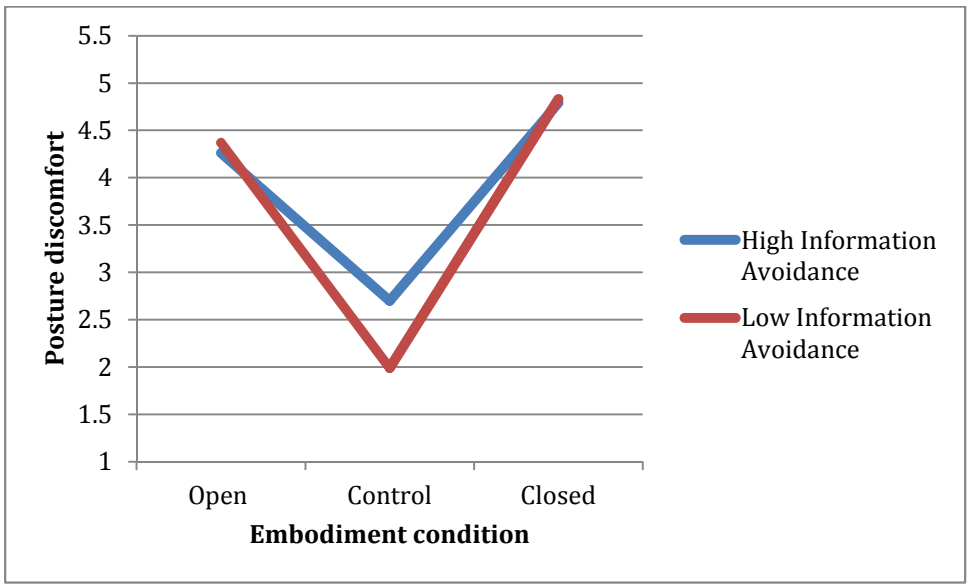
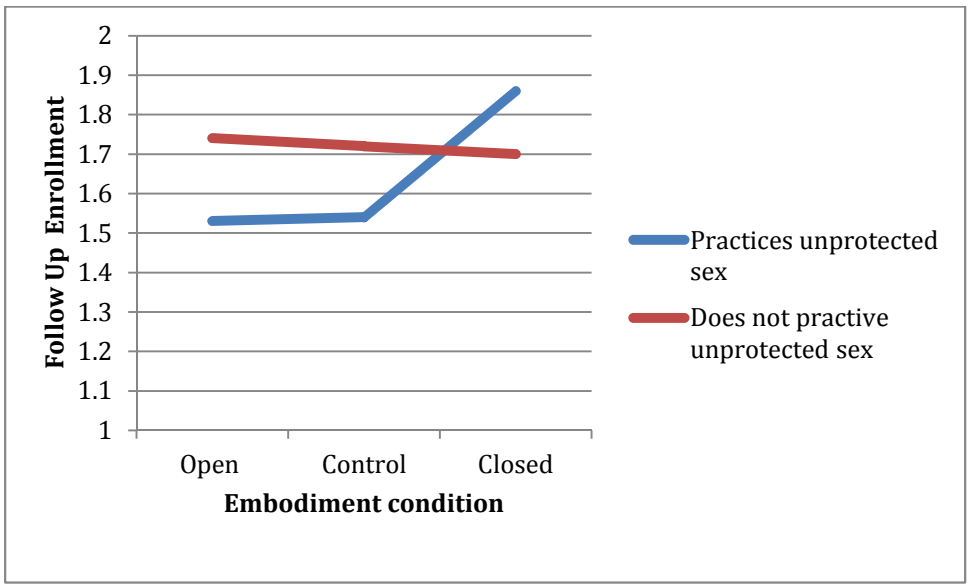


Figure 14. Relationships between embodiment and follow-up enrollment by reproductive health practices.



Note: Follow-up enrollment was coded such that 1 = yes, 2 = no.

Figure 15. Relationships between embodiment and shame by reproductive health practice

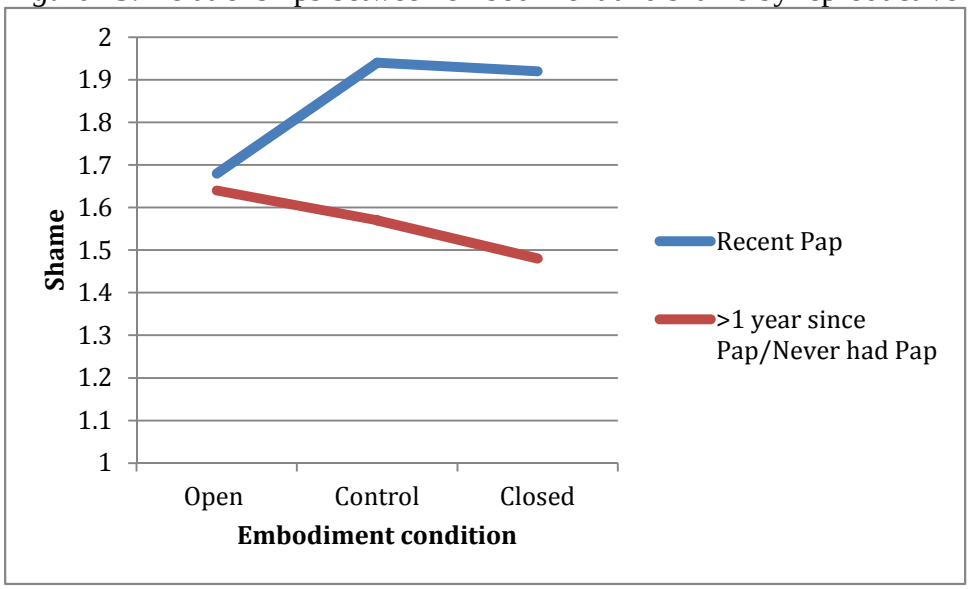


Figure 16. Relationships between embodiment and appraisals of powerlessness by body image.

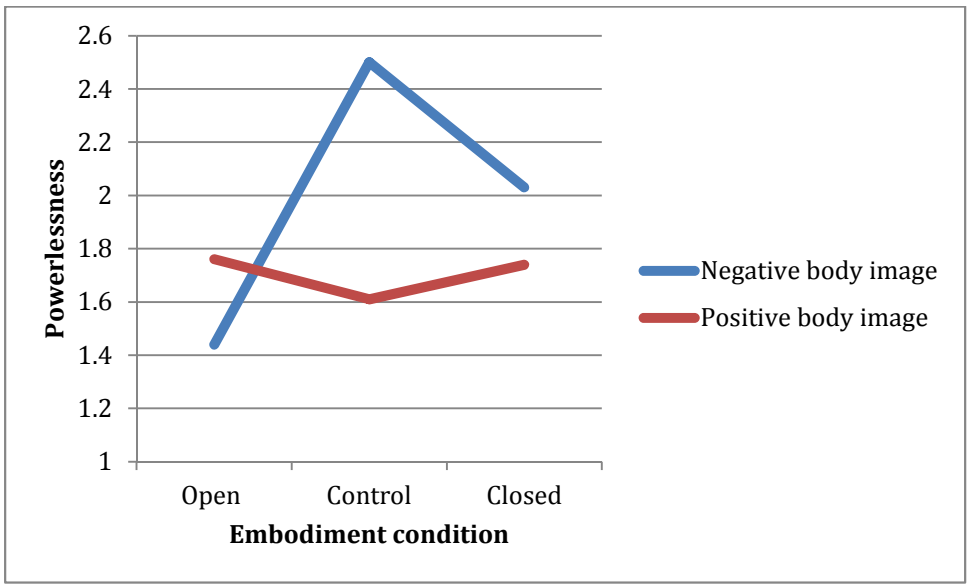
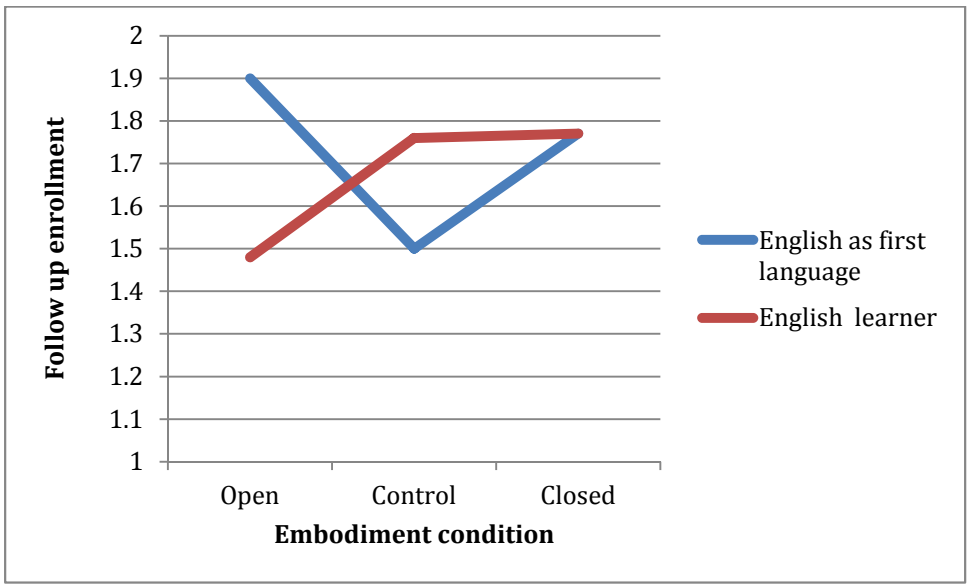


Figure 17. Relationships between embodiment and follow-up enrollment by English language primacy.



Note: Follow-up enrollment was coded such that 1 = yes, 2 = no.

Figure 18. Relationships between embodiment and posture discomfort by ethnicity.

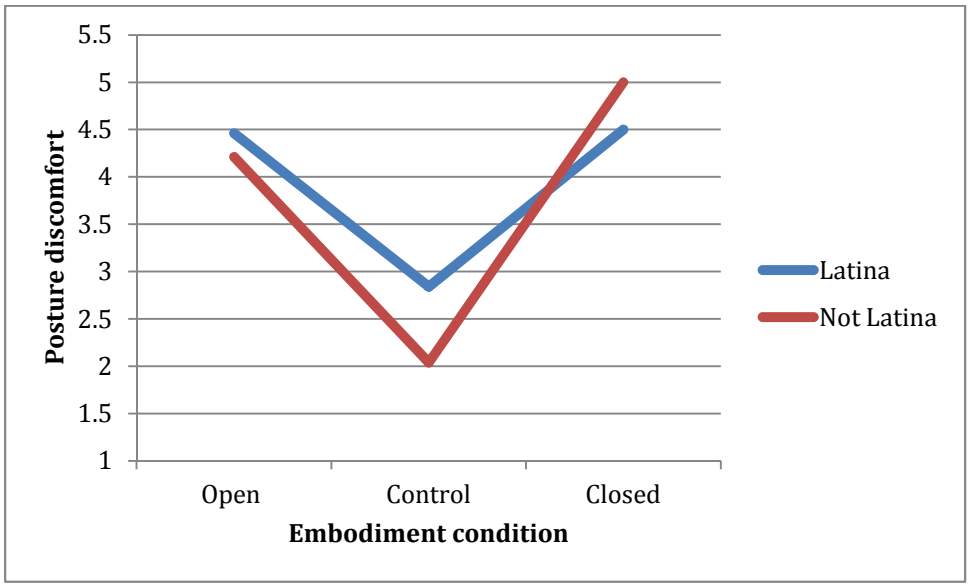


Figure 19. Relationships between embodiment and health intentions by race.