The Pennsylvania State University

The Graduate School

College of the Liberal Arts

EXAMINING AN INTERVENTION TO REDUCE UNDER-DIAGNOSIS OF CAD FOR OLDER WOMEN

A Dissertation in

Psychology and Women's Studies

by

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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2012

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ABSTRACT

Women are under-diagnosed for coronary artery disease (CAD) compared to men; the reasons for under-diagnosis are unclear. Diagnosing CAD may foster stereotype usage because presenting symptoms of CAD can be ambiguous and physicians are under time constraints to make diagnoses. I propose that stereotypes about women being portrayed as more emotional than men, and that women's emotions reflects a dispositional attribute rather than a contextual factor, influence how a physician perceives and diagnoses a female patient. Furthermore, I propose that acknowledging and contextualizing one's emotions, through a process called skilled self-labeling (SSL), can disrupt this bias. To test these predictions, I showed medical students and residents a video vignette of a standardized patient presenting with CAD and asked participants to diagnose the patient. The patient was either female or male, and presented CAD with either no emotion, with anxiety that was ignored, or with anxiety and SSL. Confirming predictions, only women were affected by the anxious display; specifically, while women in the no emotion condition were diagnosed similarly to men, women who ignored their anxiety were under-diagnosed. Using SSL eliminated this under-diagnosis effect. Results suggest emotion stereotypes as a mechanism for why under-diagnosis of CAD occurs for women, and offers patients SSL as a means of empowerment so as to interrupt these stereotypes and help physicians provide more accurate diagnoses. Furthermore, these results inform future research concerning the development of interventions, translating feminist social psychological work to the health domain, and improving health care for older adults.

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ACKNOWLEDGMENTS

This thesis was funded in part by the Pennsylvania State University's College of Liberal Arts Dissertation Award and the Society for the Psychological Study of Social Issues' Grants-In-Aid award. Special thanks goes to Stephanie Shields, head of my dissertation committee, for her role in providing feedback and mentorship throughout the development of me in graduate school and of course this dissertation. Many thanks also go to Paul Haidet, Director of Medical Education Research at the Hershey College of Medicine, for his role in providing feedback during the development of my dissertation, connecting me with various staffs, directors, and departments to make data collection possible, and helping my wrangle each of my participants. I am sincerely grateful to my doctoral committee, Karen Gasper, William Gerin, Nancy Dennis, and Susan Squier for their mentorship and support as the dissertation was being developed, and their valuable comments on the thesis. I also thank the actresses and actors who posed as my anxious patients, Lisa Budwig, Margie Cassel, Kevin Krum, Roger Lentz, John Shidledecker, and Susan Oscilowski, and to Ken Campbell for tirelessly filming and editing my videos. Finally, I am indebted to my family and friends for keeping me sane and grounded during all the highs and lows of data collection and writing.

Introduction

Coronary artery disease (CAD) is the most common cause of death for women aged 60 and older in the U.S (USDHHS, 2007), accounting for more deaths than all types of cancers combined (AHA, 2009). Accurate diagnosis is critical to treatment, however, compared to men women are under-diagnosed for CAD and often not treated until the disease has progressed to levels at which aggressive treatment, such as surgery, is required (e.g., Wenger, 1994; Richards, McConnachie, Morrison, Murray, & Watt, 2000). The disparity in CAD diagnosis has been known since the 1980s (Judelson, 1994), yet the mortality rate due to CAD has decreased for men but has increased for women (AHA, 2002). Thus, despite attempts to intervene and improve diagnosis, the explanatory mechanisms for why women go under-diagnosed remain unknown.

I propose that stereotypes about women and men's emotions influence how a physician perceives and diagnoses a female patient. I first argue that diagnosing CAD is a ripe environment for stereotypes to be activated and applied (namely, that the presenting symptoms for CAD can be ambiguous and physicians do not have enough time to make a diagnosis). Next, I suggest that stereotypes about emotions play a prominent role in the diagnostic process, as emotions are both naturally present in the physician's office and stereotypes about emotions depict women as more emotional than men. The result is that when physicians see a female patient who is emotional, they are primed to think that these emotions are essential for diagnosis and include emotionality as a symptom to treat along with the patient's original presenting symptoms. Finally, I argue that if emotion is acknowledged and contextualized, emotions will no longer impact diagnosis because they are no longer included as a symptom to treat.

The overall goal of this work is to apply a feminist, social psychological framework to the health domain. A central goal of feminist research is to identify and eradicate systems of

inequality that are based on social group membership, especially sexism (Gurevich, 2001). The physician's office is a site of power (Fisher, 1988) and physicians can be influenced by stereotypes (Stanford, 2003). Thus, the present proposal focuses on a specific way that stereotypes about women's emotions affects women's health, and then examines a way to counteract the negative effect of these stereotypes.

The Context of Under-diagnosis: Primary Care Physicians

It is important to note that I am examining primary care settings, where gender disparities in the diagnosis of CAD emerge most clearly (Raine 2001; Richards et al. 2000). Primary care physicians (PCPs) serve as "gate keepers," managing a patient's care by making decisions about initial diagnoses and how to use medical services (e.g., referrals to a cardiologist) (e.g., Franks & Clancy, 1992; Gross, Tabenkin, & Brammli-Greenberg, 2000). Compared to men, PCPs are less likely to give women lipid-lowering drugs to help prevent CAD from progressing (e.g., Hippisley-Cox, Pringle, Crown, Meal, & Wynn, 2001; Mikhail, 2005), or to refer women for an echocardiogram (Agvall & Dahlstrom, 2001). Interventions to educate physicians and patients on the dangers of CAD for women have improved the overall accuracy of diagnosis (NCCD, 2005), but the improvement is significantly greater for men than women (Peltonen, Lundberg, Huhtasaari, & Asplund, 2000; Shaw et al., 2006).

Why CAD?

Diagnosing CAD creates a prime environment for biases to influence how women's symptoms are diagnosed and treated. I highlight two reasons. First, diagnosing CAD is difficult as the presenting symptoms for CAD are diverse (e.g., chest pain, shortness of breath, and fatigue) and could fit a large differential set. Problematically, these symptoms best characterize men's presentations and are the symptoms that comprise the diagnostic guidelines for CAD

(Hayes & Prior, 2003). While some women do present these symptoms and fit the "traditional" diagnosis (e.g., around 50% of women's CAD cases have the traditional symptomatology; Canto et al., 2000; Miller, 2003; Pope et al., 2000), women can also present differently than men (Philpott, Boynton, Feder, & Hemingway, 2001), including presenting with nausea and dizziness (e.g., Penque et al., 1998), unusual fatigue (McSweetney, Cody, & Vrane, 2001), weakness (McSweetney, Cody, O'Sullivan, Elberson, Moser, & Garvin, 2003), or back pain (Mikhail, 2005). Each of these "atypical" symptoms greatly expands the suggested diagnosis pool. The result is that physicians often report being uncertain that women's symptoms are indicative of CAD (Arber et al., 2006).

Second, physicians are under significant time constraints to gather enough information about a patient to make a diagnosis (Mechanic, McAlpine, & Rosenthal, 2001). These time constraints are due to the large range of information that physicians need to assess in order to determine why chest pain, among the other possible symptoms, is occurring. Regarding just the chest pain itself, physicians must determine how long it has been present, how did it begin, what is the character of the pain, does the pain radiate anywhere else in the body, what symptoms are associated with the pain, whether the pain comes and goes or is it there all the time, if anything makes the pain better or worse, and if the pain has been experienced previously (Benger, 2008). Additional necessary information includes taking a detailed patient history that includes both risk factors for heart disease (e.g., cholesterol levels, blood pressure, smoking history, diabetes, exercise habits, stress levels, and alcohol use), family history of heart disease and other disorders, and a physical exam. Coupled with the fact that no single test can confirm a CAD diagnosis (Coronary Artery Disease, 2011), PCPs must decide how to allocate their focus. This environment consisting of time constraints increases physicians' cognitive load and fosters an

environment in which stereotypes are more likely to be used (Sanders, 1981; Sanders, Baron, & Moore, 1978).

In sum, I suggest that because there is more uncertainty about women's symptoms, and not enough time to gather a full case history, physicians, consciously or not, use other cognitive strategies (e.g., stereotypes) to help piece together gaps in information and make informed decisions. I propose that physicians use women's emotions as information to fill in these gaps.

Why Focus on Emotions?

This proposal focuses on emotions because they are a natural part of everyday life and the communication process (Lazarus & Lazarus, 1994), and are common for a physician's office where concerns about health, and the uncertainty that accompanies those concerns, create an environment for the experience and potential display of emotions. Yet, the amount of emotion displayed by women and men is not equivalent as women are perceived as presenting more anxiety than men (Pigott, 2003; Robbins, Spence, & Clarck, 1991), and women talk more about stress and emotional issues with their physicians than men do (Kroenke & Spitzer, 1998).

The importance of emotions for women goes beyond the mere presence of emotions. First, stereotypes about women's emotions abound in Western society, beginning with the basic perception that women are more emotional than men (Fischer & Manstead, 2000). In addition, women's emotional displays are more likely to be perceived as exaggerated than men's (Shields & Crowley, 1996). These stereotypes are problematic as emotions are associated with a lack of rationality and competence (Shields 2005; 2007), and these stereotypes can result in women being perceived as incompetent. Most germane to the present proposal, in line with the fundamental attribution error (Ross, 1977), women's emotional displays are attributed to their

disposition and not to the situational context (e.g., Shields, Steinke, & Koster, 1995). Thus, the emotions that women present with are likely to be perceived as something inherent.

Second, physicians use women's emotions differently than men's. Physicians focus more on psychosomatic symptoms of women than men (Adams, Buckingham, Lindenmeyer, & McKinlay, 2008), asking female patients to describe their emotions and the reasons for them more than male patients. Related, physicians are likely to interpret women's symptoms as having a psychosomatic origin (Lockyer & Bury, 2002; Martin, Gordon, & Lounsbury, 1998). Thus, physicians are inclined to look to and use emotions an explanation for women's symptoms.

How Emotions Affect CAD Diagnosis for Women

In sum, I suggest that stereotypes about women's emotionality as exaggerated and dispositional interact with the ambiguous symptoms of CAD and the high-stress nature of the physician's office (which both are likely to activate and foster stereotype usage) to negatively affect diagnosis rates of CAD. These stereotypes lead physicians to place extra importance on women's emotions and lead to the perception that the emotions are a symptom. In other words, physicians may rely more on how those symptoms are presented, rather than on the symptoms themselves, thus including the emotionality as part of the symptom set that must be treated. It is important to note that this is likely a relatively automatic process in that perceptions of nonverbal behaviors, such as emotional displays, influence impressions of others within seconds (Ambady & Rosenthal, 1992; 1993; Carney, Colvin, & Hall, 2007).

While no research has explicitly tested emotions as the reason for why women are under-diagnosed for CAD, some studies hint at its possibility. How patients present their symptoms influence what symptoms PCPs notice and treat (Badger et al., 1994). More directly related to heart disease, a female patient who presented in a business-like, unemotive way was diagnosed

for cardiac illness 50% of the time compared to only 13% of the time for a patient who presented in a histrionic way (i.e., brightly dressed, wore lots of jewelry, used considerable voice inflection and gesticulation) (Birdwell, Herbers, & Kroenke, 1993). Similarly, when medical students and PCPs saw written vignettes of men and women presenting as stressed along with their CAD symptoms, diagnosis of CAD for men was 75% compared to only 17% for women (Chiaramonte & Friend, 2006, Study 2). Furthermore, the stressed women's symptoms were rated as much more likely to have a psychological rather than physical origin compared to men's symptoms. Thus, this work indicates that when symptoms can be attributed to a psychological cause (stress or other psychosocial factors), under-diagnosis of CAD occurs for women.

Alternate Explanations: Is It Physician Gender or Interaction Style?

A common explanation for women's under-diagnosis of CAD is that the gender of the PCP and the gender of the patient may interact such that women are least likely to be diagnosed with CAD by male physicians (e.g., Brukner, 2003). It has been suggested that diagnosis by female physicians may improve the accuracy of the diagnosis because they may encourage patients to talk more about themselves, may be more receptive to nonverbal communication, and may engage in longer consultations than male physicians (Lorber & Moore, 2002; Roter, Lipkin, & Korsgaard, 1991).

As this work itself suggests, however, gender of physician effects are likely due to a pattern of communication that improves diagnosis (i.e., the patient-centered or psychosocial model; Roter et al., 1991), rather than gender of physician. Indeed, using a patient-centered style of communication to diagnosis CAD provides more accurate diagnoses, whereas physicians who do not are less accurate (Adams et al., 2008). Patient-centered communication works because it involves contextualizing a patient's life and results in a better understanding of symptoms (Roter

et al., 1991). Importantly, interaction style is malleable and patients can influence how physicians understand them. The proposed study tests whether an emotion-focused intervention called skilled self-labeling (SSL), which has patients acknowledge and contextualize their emotions, could improve diagnosis rates for women.

Skilled Self-Labeling

I propose that women's diagnoses can be improved by patients providing a context for emotions observed by the physician, thus mitigating the effects of the patient's displayed emotion on diagnosis. I have found that protagonists who used SSL are perceived as more competent than protagonists who ignore their emotion (Zawadzki & Shields, 2012). SSL may be effective for patients because emotions are often present in the physician's office (Schag & Heinrich, 1989), yet physicians rarely discuss a patient's emotions. Emotion words comprise only 0.15% of communication in standardized patients' diagnostic interviews (Shields et al., 2005). Physicians often report that even when they see a patient as emotional it is not necessary to acknowledge the emotions (Lang, Floyd, Beine, 2000; Suchman, Markakis, Beckman, & Frankel, 1997). The unaddressed presence of emotion may have the effect of activating gender-emotion stereotypes. Physicians might then be less confident in women's descriptions of their symptoms and may rely more on how those symptoms are presented rather than on the symptoms themselves. If emotion can be framed in a way that it does not activate stereotypes or prevents the stereotypes from being applied, then women would be more likely to be perceived as competent, and less likely to have the emotions they exhibit affect diagnosis.

SSL is a proactive emotion communication strategy that acknowledges the presence and role of emotion, but also separates the emotion from the symptom constellation that the patient is presenting. SSL allows a patient to explain the reason for the emotionality, rather than to allow

the emotional behaviors to be interpreted by others. Furthermore, SSL engages a perceiver to view emotional displays as part of the communication process - a situational attribution - rather than as inherent to the communicator - a person attribution. For example, most medical visits entail a physician asking patients to describe their presenting complaint. Patients can preface the presentation of their symptoms by saying, for example, "I know I may look nervous right now, I am just very concerned about my health." This inoculating statement shifts the focus of the meaning of the emotions so the physician has a context for the emotional display. The emotion can be seen as produced by the need to talk about this sensitive topic (i.e., the patient is anxious right now), rather than as something intrinsic to the patient (i.e., the patient is chronically anxious). SSL disconfirms the perception that the patient's emotion is what merits treatment. Thus, I propose that SSL is an intervention that disrupts the gender-based bias that promotes misdiagnosis of CAD, and that its use will enable women to receive earlier diagnoses and treatment of CAD.

It is important to note that SSL is not meant to place the burden for under-diagnosis on women, but rather an opportunity to empower patients in a domain where they are in a disadvantaged position. Patients lack the knowledge and skills needed to evaluate their own treatment and therefore rely on physicians to be accurate in their diagnosis (Fisher, 1988), yet physicians are influenced as much by stereotypes as anyone else (Stanford, 2003). The medical domain is one slow to change as a whole (Stanford, 2003), and patients need tools to help them achieve their needs (Waitzkin, 1991). SSL is meant to be one tool available to women. Below, I described an ideal two-pronged approach to changing bias in diagnoses of CAD that is directed to both physicians and patients.

The potential for SSL to be used by patients and accepted by physicians. SSL is likely to be an effective intervention in the physician's office from both the physician's and patient's perspective. I draw on the work of De Bocanegra and Gany (2004) who review what types of patient care lead to optimal health outcomes. They suggest that policy change to eliminate disparities in healthcare between men and women needs to address both physicians' and patients' biases.

Regarding physicians, SSL would help to identify places for physicians to "critically evaluate their own assumptions and underlying values about what constitutes a 'good' patient" and consider how they affect their communication strategies (De Bocanegra & Gany, 2004, p. 23). SSL is designed not to place an extra burden on physicians, but rather to work through the normal channels of the diagnostic process. In addition, it is intended to draw upon a set of interpersonal skills that were fostered in physicians during medical school. SSL allows a patient to share information in a narrative-based approach in which a patient's medical history is "built" rather than "taken" (Haidet & Paterniti, 2003). Such an approach is the goal of patient-centered communication, where physicians hope to provide care that is concordant with the patient's needs and preferences (e.g., Epstein et al., 2005). This approach results in better healthcare and patient satisfaction (Haidet & Paterniti, 2003).

Regarding patients, SSL would help patients "be trained to be active participants in their medical care" (De Bocanegra & Gany, 2004, p. 22). Activated patients take an involved role in the physician-patient communication process by asking questions and discussing care with their physicians. These patients influence the treatment offered (Kravitz et al., 2005) and information provided (Cegala, Street, Randall, & Randall, 2007), and have better health-related behavioral and clinical outcomes (Bodenheimer, 2005; Street, 2007). In a behavioral activation intervention

with migraine sufferers, a web-based tool helped patients learn about their migraines so they could participate in their own medical care (Sciamanna et al., 2006). Doing so did not harm the physician-patient relationship, and patients received better healthcare from their physicians. Furthermore, most patients report that they would welcome the chance to talk about their emotions with their physicians (Frankel, 1995; Hall, Roter, & Rand, 1981; Roter, Frankel, Hall, & Sluyter, 1997).

Empirical basis for SSL. The present proposal builds on a program of research examining that beliefs about self-regulation of emotion matter in terms of how a person will be perceived (e.g., Zawadzki, Warner, & Shields, *in press*). The extension of this work is that the presence of emotion in a person will not always produce the same judgments by an observer of that emotion, but rather that the emotional person can potentially do something to influence how their behavior in an emotion-evoking context will be interpreted. SSL is proposed as one way to influence how emotions are perceived.

Acknowledging and contextualizing one's emotion using SSL increases perceptions of competence. In one study, participants rated written vignettes of female targets using either SSL to talk about her anxiety, ignoring her anxiety, or who displayed no emotions (Zawadzki & Shields, 2012). For example, in one of the vignettes, a target was practicing a speech with a friend and either paused to think about the speech (no emotion condition) or got anxious as she thought about having to speak in public. The target then either said nothing about the emotions and continued to practice the speech (ignore condition), or said, "I know I am anxious right now, but it is only because I want to give a good speech" (SSL condition). Participants rated the competence of the target in the situation (two items, $\alpha = .85$: e.g., "How likely do you think the target will give a good speech?") on a 1 (Not at all) to 7 (Very Much) Likert-type scale. Targets

who used SSL (M = 5.06, SD = 1.12) were rated as more competent than targets ignoring their emotions (M = 4.59, SD = 1.04, $p < .02$, d = .43) and just as competent as targets displaying no emotions (M = 5.28, SD = 1.03, $p > .24$), $F(2, 198) = 6.90$, $p < .002$, $\eta_p^2 = .07$. In other words, while displaying emotions negatively impacted perceived competence, contextualizing emotions eliminated those negative effects of expressing emotions.

In a pilot study conducted for this proposal, participants were given written vignettes of an older woman in a physician's office presenting with fatigue and headaches and showing either (1) no emotion, (2) anxiety and ignoring it, or (3) anxiety and using SSL. Participants rated the competence of the target (8 items: "The patient appeared [confident, independent, etc.]."; Fiske, Cuddy, Glick, & Xu, 2002) and appropriateness of the target's emotions (5 items, e.g., "Some important emotions seemed to be missing from the patient's response (reverse-coded)."; Warner & Shields, 2009) on a 1 (Not at all) to 7 (Very Much) Likert-type scale. Results demonstrate that when older women use SSL (M = 5.18, SD = 1.16) they are perceived as more competent than women in the ignore emotion condition (M = 4.31, SD = 0.89, $p < .02$, d = 0.84), and just as competent as women in the no emotion condition (M = 4.81, SD = 0.69, $p > .23$), $F(2, 48) = 3.47$, $p < .04$, $\eta_p^2 = .13$. Also, when women use SSL (M = 5.77, SD = 0.99) they are perceived as having more appropriate emotional displays than women in the no emotion (M = 4.79, SD = 1.01, $p < .01$, d = 1.37) and ignore emotion conditions (M = 4.91, SD = 0.79, $p < .02$, d = 1.53), $F(2, 48) = 5.14$, $p < .01$, $\eta_p^2 = .18$. Ratings of appropriateness are important because emotional displays deemed more appropriate are also deemed more credible (e.g., Kaufman, Drevland, Wessel, Overskeid, & Magnussen, 2003).

In sum, these studies demonstrate that emotional displays do not always negatively impact how a person is perceived. Notably, when targets acknowledge and contextualize their

emotions (i.e., engaged in SSL), they are rated as more competent and as having more appropriate emotional displays than targets who ignore their emotions.

The Present Study

In the present study, medical students and residents were asked to diagnose a patient presenting with CAD in a video vignette. Key to the study was that two characteristics of the patient were varied in the videos. First, participants could either see a male or female patient. Second, the patient could display one of three emotional displays: (1) no emotion, (2) anxiety and ignore display, and (3) SSL and anxiety. These conditions enable the assessment of whether emotion is a mechanism for why under-diagnosis occurs. Specifically, when no emotion is present, emotions should not influence diagnosis and men's and women's diagnosis rates should be equivalent. When emotion is present, however, women should be under-diagnosed for CAD. Finally, when emotion is acknowledged and contextualized using SSL, that emotion should no longer be seen as relevant for diagnosis and the under-diagnosis should disappear. Thus, by testing whether this bias can be disrupted, SSL offers a way for women to be empowered to counter the negative effects that emotional stereotyping of women has on physician's diagnosis. In sum, the proposed design allowed the testing of the following hypotheses:

> *Hypothesis 1*: *Women who show anxiety but ignore it will have lower diagnosis rates of CAD compared to women not showing emotion and men showing anxiety. Men will be unaffected by the anxious display.*
>
> *Hypothesis 2: Women who acknowledge and contextualize their anxiety using SSL will have higher diagnosis rates of CAD compared to women showing but ignoring their anxiety.*

A key alternative hypothesis concerns whether or not the participant's gender will impact diagnosis. While earlier research pointed to physician gender as the culprit (e.g., Brukner, 2003), recent research has suggested that communication style, such as the endorsement of patient-centered communication, better explains why under-diagnosis occurs (Adams et al., 2008). To test which factor matters, participants were asked to report their gender and then to fill out a scale that assessed their endorsement of patient-centeredness. Participant gender will be included as an exploratory variable in all analyses with the expectation that participant gender will not moderate any of the observed effects. Endorsement of patient-centeredness will controlled for in all relevant analyses, and follow-up tests will be conducted to understand the importance of this variable. Thus, the following prediction is made:

Hypothesis 3: Patient gender will not moderate the observed patterns in Hypotheses 1 and 2, while endorsement of patient-centered will be related to diagnoses.

After providing a diagnosis, participants will also be asked to rate the extent to which they would recommend a series of different testing. Prior work suggests that physicians often report uncertainty surrounding women's symptoms, and do not test for CAD (Arber et al., 2006). This is surprising given a medical climate where physicians routinely practice defensive medicine, such as by ordering extra tests (Terry, 2010), and the stakes for missing a CAD diagnosis are high. Thus, I examine whether emotion display influences the recommended testing. I predict the following:

Hypothesis 4: The recommended testing will mirror the likelihood of CAD diagnoses predicted in Hypotheses 1 and 2, with women who show but ignore their anxiety having less testing for CAD than women who use SSL.

Finally, after providing a diagnosis and testing recommendations, participants will be asked to rate the extent to which they used emotions to make a diagnosis and how much they perceived the patient's symptoms has having a physical vs. psychological causes. I expect that while women who use SSL will be rated as having just as much emotion present as patients in the anxiety condition, the importance of those emotions will differ by condition. Specifically, when SSL is used, those emotions will be rated as less important to make a diagnosis, and the patients symptoms will be rated as more "serious", that is as having a more physical cause. In sum, I predict the following:

Hypothesis 5: The extent to which the participant uses the patient's emotion for a diagnosis, and attributes to the patient's emotion to a psychological vs. physical cause, will explain why women showing but ignoring their anxiety are rated as having a lower likelihood of having CAD compared to women who use SSL.

In testing these hypotheses I stick with a more classic presentation of CAD (Hayes & Prior, 2003) to help maximize the chance of CAD diagnosis. Thus, the proposed effects are likely to be a conservative estimate of underdiagnosis as each symptom from women's "atypical" presentation greatly increases the possibility of error and increases the likelihood of emotions being seen as a viable diagnosis.

In addition to controlling for patient-centered (as described in Hypothesis 3), I will ask participants to report how old they perceive the patient to be and control for that in all relevant analyses. The age of the patient is a common risk factor for CAD with risk increasing as one ages (Castelli, 1984).

Finally, my participants in the study are medical students and residents as they offer a cost effective way to test SSL as an intervention to be used with physicians. They are an

appropriate population to study as the effect that women who reported feeling stressed in diagnostic interviews received reduced diagnoses of CAD compared to men was similar for medical students (Chiaramonte & Friend, 2006) and physicians (Chiaramonte, 2008).

Method

Overview and Design

Participants first watched a video of a patient presenting with chest pain and other symptoms indicating CAD. Then they diagnosed the patient, rated how emotional they viewed the patient, and answered some questions about themselves. Participants watched one of six possible patient presentations, giving a 2 (gender of patient) x 3 (patient's emotion display: no emotion, anxiety present, anxiety with SSL) between-subjects design.

Participants

The final sample consisted of 82 medical students and residents from the Hershey College of Medicine (50 women, 32 men; aged 24–63, M = 28.1). Compensation was provided for participation (i.e., $10 gift card and entry in a raffle to win an iPad2). The study was IRB-approved (see Appendix A for consent information). Participants primarily identified as Caucasian (73.3%), Asian/Asian American (20.7%), Hispanic (2.4%), and African/African American (2.4%). Participants were spread evenly across their medical training (i.e., third year, fourth year, resident) and did not differ by gender, race, the extent to which they endorsed patient-centeredness, and the rated likelihood of CAD (see Table 1). The residents were older than the third and fourth year students, which makes sense given that they are further along in their careers. As a result, for the analyses reported I collapsed across level of medical training.

Eight additional participants were enrolled but excluded from final data analysis. One was excluded for failing to provide a rating of the likelihood of CAD, and the other seven

because they failed to rate CAD as at least somewhat likely as a diagnosis (a response of at least 4 on a 7 point scale). This criterion was set based on the fact that the patient presentations were designed to indicate CAD as an obvious possibility, thus indicating that these participants failed to perceive the patient's case as intended. Furthermore, these seven participants were statistical outliers in terms of rating the likelihood of CAD as a diagnosis, falling at least 2.27 standard deviations from the mean on likelihood of CAD (overall: $M = 5.97$, $SD = 1.32$). The excluded participants (5 women, 3 men; aged 24-30, $M = 26.25$) identified as Caucasian (62.5%), Asian/Asian American (12.5%), and African/African American (12.5%). Four were third year, three second year, and one a resident. Importantly, at least one participant was excluded from each condition, with no more than two of the excluded participants from any one condition.

Table 1. Breakdown of Gender, Age, Race, and Patient-centeredness by Level of Medical Training

	3rd Years (n = 29)	4th Years (n = 30)	Residents (n = 23)
Gender (% Women)	75.9[a]	56.7[a]	47.8[a]
Age (M, SD)	26.52 (2.92)[a]	26.57 (1.87)[a]	31.96 (8.46)[b]
Race			
% Caucasian	69.0[a]	83.3[a]	65.2[a]
% African-American	0.0	3.3	4.3
% Latina/o	3.4	3.3	0.0
% Asian	24.1	10.0	30.4
Patient-centeredness (PPOS)	2.39 (0.48)[a]	2.47 (0.67)[a]	2.74 (0.75)[a]
CAD Likelihood	6.17 (0.97)[a]	6.33 (0.84)[a]	6.30 (0.56)[a]

Note. PPOS stands for Patient-Provider Orientation Scale. Superscripts of the same letter indicate that the different levels of medical training did not differ from one another. Gender ($p > .10$), race ($p > .26$), patient-centeredness ($p > .13$), and likelihood of CAD ($p > .73$) did not differ by group, while residents were older than third and fourth year students ($ps < .001$), who did not differ from one another ($p > .99$). Relation between level of training and gender and race was tested with independent samples chi-square tests, while age and patient-centeredness was tested with a one-way ANOVA with follow-up comparisons tested using a Tukey test.

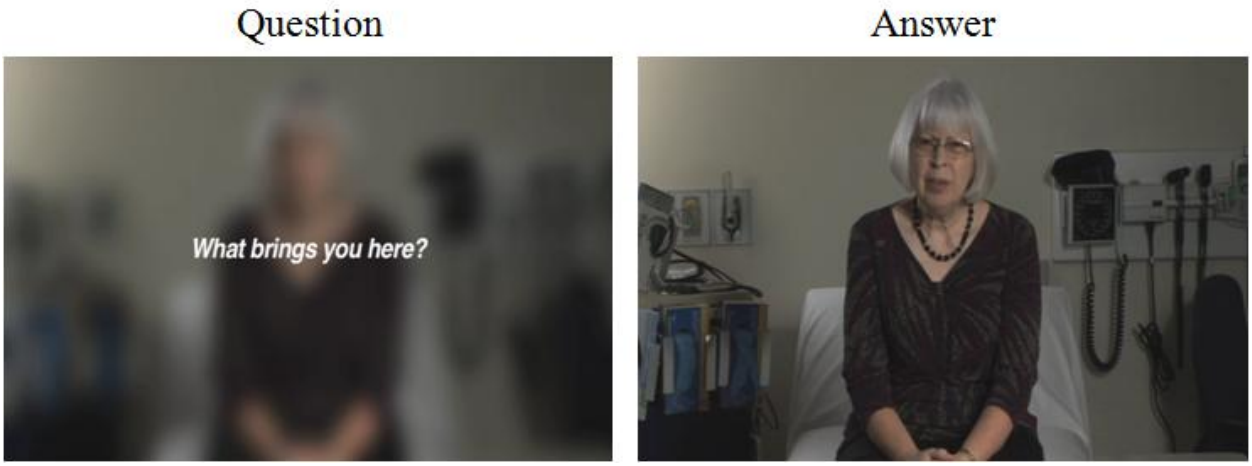
Materials

Pre-video patient information. Before watching the video of the patient presentation, participants were given the following information about the patient that was described as having been collected by a physician's assistant (information was modeled on Chiaramonte & Friend, 2006). Male patients were described as 55 years old, 6'0" tall, and weighing 207 pounds. Female patients were described as 62 years old, 5'5" tall, and weighing 160 pounds. Women were aged older than men because women's initial presentation of CAD tends to occur later in life for women than men (AHA, 2002; Wenger, 2003), and thus the different ages equalizes the perception of risk. The weight and height were adjusted to be more appropriate for women and men, but resulted in women and men being equally overweight (based on body mass index). In addition, both women and men were described as being on the lower end of having hypertension (140/90mmHg), having a slightly elevated heart rate (90 beats/minute), as being a light smoker, and having no regular exercise schedule. This patient information was designed to indicate that the patient was somewhat unhealthy and had risk indicators for cardiovascular problems, but with no dire health risks that would immediately warrant a certain diagnosis, test, or treatment (e.g., the participant's blood pressure would suggest the use of anti-hypertensive medications, yet weight loss would also be a viable recommendation).

Patient presentation videos. The patient presentation videos were comprised of 33 scenes. For each scene, a question was first displayed on the screen and then the patient was shown answering the question. When the question was displayed, the question would appear in white bold letters with a blurry view of the patient in the background (see Figure 1). When the patient answered the question, the question would disappear and the patient would come into focus. The videos were filmed in a physician's office, with the patient in plain clothes sitting at

the end of the patient's table, and with other medical equipment in the background. The scripts for the video were based on Schulman et al.'s (1999) possible angina scenario, and modified slightly to clarify to the extent to which other activities in the patient's history had also caused the presenting chest pain.[1] The patient presentations lasted between six and seven minutes.

Figure 1. Example of How the Question and Answer Looked in the Videos



Regarding the CAD symptom content of the videos, the patients presented primarily with moderate amounts of chest pain and tightness in chest. The pain was then discussed in more detail, including where the pain occurred (i.e., in the middle of the chest), what brought the pain on (i.e., exercise, stress, just happens randomly), how the pain came on (i.e., suddenly), and how long it lasted (i.e., occasionally ends quickly, no more than 10 minutes, goes away after relaxing). See Appendix B for the scripts used to film. In addition to the chest pain, the patient also described shortness of breath and fatigue as symptoms. Taken together, these symptoms

[1] Modifications were made after discussions with a cardiac surgeon resident and two physicians in general internal medicine, and were deemed necessary to increase the realism of the video.

indicate CAD as a strong option for both men and women (Chiaramonte & Friend, 2006), but also offer the possibility of other diagnoses (e.g., panic disorder).[2]

Regarding the emotion content of the videos, they differed in one of three ways. (1) For the no emotion condition, the patient answered the questions in a friendly, but business-like manner. (2) For the anxiety present but ignored condition, in 9 of the 33 scenes the patient presented a mild to moderate amount of the anxiety; the remaining 24 scenes were the same scenes as the no emotion condition. The anxiety scenes were spread throughout the video in pairs in which the patient would steadily increase a display in one scene and then decrease in the next, thus allowing a more natural waxing and waning of anxiety rather than a constant anxious display. Table 2 illustrates when emotion occurred by scene for each of the three experimental conditions. Furthermore, anxiety was only displayed when the accompanying answer indicated some uncertainty about the symptom and when it occurs, thus providing a possible context for the emotion display (e.g., "Well it can come on at anytime. I've been just sitting there reading and it happens; and if I'm really stressed or something like that it can happen too."). Anxiety was displayed through various channels including facial expressions (e.g., biting of lower lip), speech (e.g., ummms, slight stuttering), and gestures (e.g., hand wringing). (c) For the SSL condition, the videos were the same as the anxiety and ignore condition, except that twice the patient added a statement that contextualized the emotion display. For the initial anxious display, the patient added, "I know I seem nervous right now, I just am worried about the discomfort and want to know what is going on." For a later anxious expression, the patient added, "The unpredictability of it is why I am a bit anxious right now."

[2] The cardiac surgeon resident and two physicians in general internal medicine who provided feedback on the scripts all rated CAD as at least somewhat to fairly likely (ratings were made prior to discussing the scripts).

Patients in the video were highly experienced members of the standardized patients program at the Hershey College of Medicine simulation center and had been standardized patients for a minimum of three years. Three different male and female actors were filmed, although only two men and two women were ultimately used in the study.[3] Prior to filming, I met with the patients to describe the purpose of the study, to explain how they should describe their symptoms, and practice what their emotional display should look like. They were then given the scripts for each condition and two weeks to practice. On the day of filming, patients rehearsed the no emotion condition and practiced several variations of anxiety displays. Filming took about two hours per patient, and the standardized patients were compensated $85.

Table 2. Depiction of When Anxiety and SSL Occurred in the Videos by Scene

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
None																																	
Anx																																	
SSL																																	

Note: The numbers on the top row indicate the scene. None refers to the no emotion condition, Anx refers to the anxiety present condition, and SSL refers to the contextualized anxiety condition. Yellow indicates when no emotion was present. Green indicates when anxiety was displayed. Blue indicates when patients used SSL to contextualize their anxious display.

Due to the difficulty in accessing medical students and residents, extensive pre-testing of the videos was unfeasible. To assess which of the standardized patients to use (of the three men

[3] One of the male standardized patients had significant decrements in sound quality due to excessive movement; one of the female standardized patients was too young to believed as around sixty years old.

and three women), and to ensure that the proper emotion was displayed across conditions, a panel of three researchers and medical practitioners independently watched and commented on the videos. The panel commented specifically on whether the emotion was present and perceived as authentic, whether the patient looked the appropriate age, and on any other issues that would advise against using one of the patients. Each person from the panel agreed that there was little emotion present in the no emotion condition, and that anxiety was clearly present in the other two conditions. In addition, each member rated two of the women and two of the men as more realistic and authentic than the third female and male patient. Finally, no individual scenes were identified as problematic.

Post-video surveys. After watching the video, participants first indicated the patient's most likely diagnosis. Next, to bolster the cover story of understanding how symptom presentation influences memory, participants listed as many of the patient's symptoms as they could remember, the age of the patient, the patient's gender, and perceived socioeconomic status (SES) of the patient (as either low SES, middle SES, or high SES).

The main dependent variables were assessed next (see Appendix C). Participants first indicated the likelihood of a series of diagnoses that included CAD, two emotion-based diagnoses ($\alpha = .61$: panic disorder and depression), and four filler diagnoses (i.e., pulmonary embolism, pneumonia, costochondritis, and acid reflux). Importantly, it was stressed to participants that each rating should be made independent of the others (i.e., likelihood of all the diagnoses should not be ranked). Participants then rated the extent to which they recommend a series of tests that broke into two uncorrelated subscales ($r = .11$, $p > .31$): *direct testing*, which comprised items that would lead to a CAD diagnosis ($\alpha = .59$; do lab work, refer to cardiologist, hospitalize), and *non-direct testing* ($\alpha = .69$; refer to pulmonologist, psychiatrist,

gastroenterologist). Participants responded to items using a 1 (Not at All) to 7 (Very Much) scale. When relevant, items were combined such that higher numbers indicated greater likelihood of an emotion-based diagnosis, and greater recommended direct and indirect testing.

Following these scales, participants then were again asked to list up to five symptoms that they recalled. However, unlike the initial recall, now for each symptom recalled participants rated the extent to which the symptom was caused by physical or psychological causes using a 1 (Mostly Physical/Organic) to 4 (Mostly Psychogenic/Psychological) scale. The five ratings were combined such that higher numbers indicate a greater attribution of the patient's symptoms to psychological causes ($\alpha = .60$).

Following these scales, the participants rated the patient's emotions in two ways. First, they rated the extent to which they perceived the participant as appearing anxious among a set of filler emotions (4 items, $\alpha = .94$: "The patient appeared [anxious, scared, worried, nervous].") using a 1 (Not at All) to 7 (Very Much) scale. Second, they rated the extent to which they used the patient's emotion to make a diagnosis (4 items, $\alpha = .84$: "How important were the patient's emotions for the diagnosis you made?" "Did the patient's emotions affect the way you diagnosed the patient?" "How much did you use the patient's emotions to help you make a diagnosis?" "How much did you view the patient's emotions as a symptom to treat?") using a 1 (Not at All) to 7 (Very Much) scale.

Finally, participants filled out information about themselves. They first responded to demographic questions (i.e., age, gender, race, and position/class standing). They then responded to the 18-item Patient-Provider Orientation Scale (PPOS) (Krupat, Putnam, & Yeager, 1996) using a 1 (Not at All) to 7 (Very Much) scale. The PPOS measures the extent to which the PCP engages in patient-centered communication through items that tap the extent to which physicians

include patients in the diagnostic process and try to understand a patient's life (e.g., "When doctors ask a lot of questions about a patient's background, they are prying too much into personal matters." "If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important."). The PPOS is designed to form two subscales measuring sharing, the extent to which the participant believes that the patient desires information and should be part of the decision-making process, and caring, the extent to which the participant sees the patient's life circumstances and feelings as critical elements to the treatment process. This second subscale was most germane to the present analysis, however, had low reliability ($\alpha = .37$). Thus I performed a principal axis factor analysis with a varimax rotation. The scree plot indicated that a single factor emerged that combined items from both sub-scales (see Appendix D). This single scale was then averaged together, with higher numbers indicating more patient centeredness ($\alpha = .72$), and used as a covariate in all relevant analyses.

Procedure

Participants were tested individually and worked through the study at their own pace. They were told that the purpose of the study was to understand clinical decision-making, and to examine how the format of symptom presentation influences symptom recall. After being consented, participants were asked to watch a video of a patient presenting some symptoms while imagining themselves as a PCP. They were told that there was some information about the patient that they should read before starting the video, and that there was space provided in the survey packet to take notes while watching it. Finally, they were told that after viewing the video they would be asked to diagnose and provide treatment recommendations for the patient, to fill out surveys about how they made the diagnosis and how they viewed the patient, and finally to answer some questions about themselves. Participants watched the videos by themselves on

laptop computers with no more than three other participants in the room working on their own computer and surveys at the same time. Sessions typically lasted from 25 to 30 minutes.

Results

A power analysis determined that an ideal sample of 30 participants per cell would be required to detect interaction effects with alpha set at .05 and beta equal to .30. The desired sample size was not achieved and so the analyses are under-powered to detect the proposed effects. As a result, marginal effects will also be presented and discussed. To help interpret whether the discussed effects are meaningful, I present Cohen's *d* or *r* effect sizes whenever relevant. Interpretation of the size of the effect using Cohen's *d* is as follows: .20 (small effect), .50 (medium effect), and .80 (large effect) (Cohen, 1992). Interpretation of the size of the effect using *r* is as follows: .10 (small effect), .30 (medium effect), and .50 (large effect) (Cohen, 1992).

To ensure that the two standardized patients were comparable for each condition, a 2 (Patient 1 vs. Patient 2) X 3 (emotion display: none vs. anxiety vs. SSL) ANOVA was run on CAD likelihood; separate models were run for female and male patients. For the female patients, there was no main effect of patient or interaction of patient by emotion display condition, *F*s < 0.40, *p*s > .67, indicating that it is appropriate to combine the two female patients. For male patients, while there was no main effect of patient, $F < 0.24$, $p > .63$, there was a significant interaction of patient by emotion display, $F(2, 34) = 3.40$, $p < .05$, $\eta_p^2 = .17$. Follow-up pairwise comparisons revealed that the two male patients were no different in the no emotion ($p > .63$) or anxiety present condition ($p > .27$), but that one male patient was rated significantly more likely to have CAD in the SSL condition than the other male patient ($p < .03$). Although this was

unexpected, it was not believed to be too problematic as men were expected to be rated as highly likely to have CAD across all conditions. Thus, I combined the male patients as well.

Manipulation Checks

Looking first at the memory of the patient questions, among the listed symptoms all participants reported chest pain. Also, all participants correctly remembered the patient's gender. Looking at the perceived SES of the patients, I ran a 2 (patient gender) x 3 (emotion display: none vs. anxiety vs. SSL) between-subjects ANOVA. Female patients (M = 2.00, SD = 0.00) were rated as having higher SES than male patients (M = 1.88, SD = 0.33), $F(2, 76) = 5.97$, $p < .02$, $\eta_p^2 = .07$. There was no main effect of emotion display nor did emotion display interact with patient gender, Fs < 1.00, ps > .37. Given that there was no interaction for perceived SES, and the patient's gender and presence of chest pain were correctly remembered, these variables are not considered further.

To test whether the amount of emotion was manipulated as intended, I ran a 2 (patient gender) x 3 (emotion display: none vs. anxiety vs. SSL) between-subjects ANOVA with how anxious the patient was perceived as the outcome variable. Indicating a successful manipulation, there was a main effect of emotion display, such that patients in both the anxiety (M = 4.97, SD = 1.28, $p < .001$, d = 1.04) and SSL (M = 5.97, SD = 0.81, $p < .001$, d = 1.99) conditions were rated as displaying more anxiety than patients in the no emotion condition (M = 3.48, SD = 1.57); unexpectedly, patients in the SSL condition were rated as displaying more anxiety than patients in the anxiety condition ($p < .004$, d = .93), $F(2, 76) = 28.81$, $p < .001$, $\eta_p^2 = .43$. There was also a main effect of patient gender such that female patients (M = 5.24, SD = 1.33) were rated as more emotional than male patients (M = 4.42, SD = 1.76, d = .53), $F(1, 76) = 8.48$, $p < .005$, $\eta_p^2 = .10$. The interaction effect was not significant, $F(2, 76) = 0.46$, $p > .63$.

In sum, these results suggest a successful manipulation, as patients in the no anxiety condition were rated below the midpoint of the scale for anxiety, and were rated less emotional than patients in the anxiety and SSL conditions, who were both rated above the midpoint of the scale. Furthermore, as proposed, the use of SSL did not abolish the perception of the patient as emotional, and in fact resulted in the patients being perceived as more anxious. One potential problem was that female patients were rated more emotional than male patients, even in the no emotion condition, which confirms the belief that women are perceived as more emotional than men (e.g., Fischer & Manstead, 2000). Importantly, the interaction was not significant, suggesting that while base rates of emotionality might differ, both female and male patients were perceived as more emotional in the anxious and SSL conditions.

Correlations among Diagnosis, Treatment, and Emotions Variables

To examine whether emotions impact diagnosis in general, I looked at a series of correlations (see Table 3). The results of these correlations confirmed the idea that CAD and emotions conflict. First, the more likely the emotion-based diagnoses (i.e., panic and depression) were rated, the less likely CAD was rated. Importantly, the likelihood of the filler diagnoses (not included in Table 3) were unrelated to the likelihood of CAD (rs = -.03 to .15, ps > .18), suggesting a unique relationship between emotions and CAD. Next, looking at testing, the more CAD was seen as likely, the more that direct testing was recommended and the less likely non-direct testing was recommended. In contrast, the more likely the emotion-based diagnoses were rated the less likely direct testing was recommended, and the more likely non-direct testing was recommended.

Table 3. Correlations between All Measured Variables

	M (*SD*)	CAD	Emot Diag.	Test Direct	Test Indirect	Anx.	Use Emot.	Attr. to Psych.
CAD	6.27 (0.82)	--	-.35**	.42***	-.24*	.04	-.28*	-.37***
Emot. Diag	3.72 (1.32)		--	-.19^{+}	.54***	.24*	.45***	.46***
Test Direct	4.90 (1.22)			--	.11	-.07	-.20^{+}	-.32**
Test Indirect	2.15 (1.02)				--	.13	.18	.33**
Anx.	4.84 (1.60)					--	.29**	.25*
Use Emot.	3.34 (1.23)						--	.31**
Attr. to Psych.	1.94 (0.56)							--

Note. $^{+}p < .10$; *$p < .05$; ** $p < .01$; *** $p < .001$. CAD refers to the likelihood of CAD as a diagnosis. Emot. Diag. refers to the likelihood of panic attack plus depression as diagnoses. Test direct and indirect refers to whether direct or non-direct diagnostic tests were recommended. Anx refers to how anxious the patient was perceived. Use emot. refers to how much the participant reported using the patient's perceived emotions to make a diagnosis. Attr. to psych. refers to the extent to which the patient's symptoms were attributed to physical or psychological causes.

Moving on to the perceived emotionality of the patient, while ratings of anxiety were unrelated to CAD, the perceived anxiety level of the patient was positively correlated with the likelihood of emotion-based diagnoses and the extent to which the participant reported using the patient's emotions to make a diagnosis. In turn, the more emotions were used to make a diagnosis, the less likely CAD was rated, the more likely the emotion-based diagnoses were rated, and the less likely direct testing was recommended. Finally, the more that the patient's symptoms were attributed to psychological causes, the less likely CAD was rated, the more likely emotion-based diagnoses were rated, the less direct and more non-direct testing were recommended, the more anxious the patient was perceived, and the more emotions were used to make a diagnosis.

Hypotheses 1-3: Likelihood of CAD Diagnoses by Patient Gender and Emotion Display

To test Hypotheses 1-3, I ran a 2 (patient gender) x 3 (emotion display) x 2 (participant gender) between-subjects ANCOVA with likelihood of CAD as the dependent variable, and the patient's perceived age and the participant's endorsement of patient-centeredness as control variables. Patient centeredness was a significant covariate ($p < .08$), while age was not ($p > .34$). The only significant effect was the predicted patient gender by emotion display interaction (see Table 4), $F(2, 62) = 3.14$, $p < .06$, $\eta_p^2 = .09$, which I then used planned comparisons to test Hypotheses 1 and 2.

Hypothesis 1: Women's diagnosis of CAD would be negatively affected by emotion displays. Hypothesis 1 was supported with two sets of comparisons. First, male patients were unaffected by emotional display with high ratings of CAD likelihood in all three emotion display conditions (ps > .26). Second, while women did not differ from men when no emotion was displayed ($p > .70$), women displaying anxiety were rated as less likely to have CAD than men displaying anxiety ($p < .009$, $d = 1.09$) and women in the no emotion condition ($p < .05$, $d = .82$).

Table 4. Interaction of Patient Gender by Emotion Display on Likelihood of CAD Diagnosis

	Emotion Display of Patient		
	No Emotion *M* (*SD*)	Anxiety *M* (*SD*)	SSL *M* (*SD*)
Female Patient	6.35 (0.88)[a]	5.62 (0.89)[b]	6.55 (0.88)[a]
Male Patient	6.21 (0.87)[a]	6.57 (0.85)[a]	6.52 (0.91)[a]

Note. Superscripts of the same letter indicate that the cells did not differ from one another.

Hypothesis 2: SSL would improve women's diagnoses. A set of comparisons supported Hypothesis 2. Women who used SSL were more likely to have CAD than women in the anxiety display condition ($p < .009$, $d = 1.05$). In addition, women who used SSL did not differ on ratings of CAD likelihood from men who use SSL ($p > .93$) and women in the no emotion condition ($p > .55$).

Hypothesis 3: Patient-centeredness explains under-diagnosis while participant gender does not. Support for Hypothesis 3 was found in that there were no main or interaction effects with participant gender, Fs < 1.04, ps > .31, suggesting that participants' gender did not matter in terms of diagnosing CAD. In contrast, as noted above, participants' patient-centeredness was a marginally significant covariate. A follow-up correlation between likelihood of CAD and patient-centeredness was run, revealing a positive relationship, $r(82) = .19$, $p < .10$. In other words, as expected, the more patient-centered the participant was, the more likely the participant correctly diagnosed CAD.

Hypotheses 4: Patient Gender and Emotion Display Affects Direct and Indirect Testing

Hypothesis 4 predicted a similar pattern of results for direct and indicted testing; namely, that women displaying but ignoring anxiety would receive less direct and more indirect testing than women using SSL. To test this hypothesis, I ran the same 2 x 3 x 2 ANCOVA with direct testing and indirect testing as outcome variables in separate models. There were no main or interaction effects for either direct, Fs < 2.17, ps > .14, or indirect testing, Fs < 2.25, ps > .13. In other words, while emotion display affected the likelihood of diagnosis, it did not affect testing recommendations.

Hypothesis 5: Using Emotions and Attributing Symptoms to Psychological Causes

Hypothesis 5 predicted that the extent to which the participant used women's emotions as a basis for diagnosis and attributed their emotions to psychological causes, will explain why women displaying anxiety received lower diagnosis rates than women in the SSL condition.

The same ANCOVA design was used to test the extent to which the participant used the patient's emotions to make a diagnosis. There was a main effect of emotion display, $F(2, 62) = 3.59$, $p < .04$, $\eta_p^2 = .10$. Surprisingly, participants used patients' emotion more in the SSL

condition (M = 3.70, SD = 1.06) than in the no emotion (M = 2.83, SD = 1.41, $p < .02$, d = .70) and anxiety conditions (M = 2.96, SD = 1.12, $p < .04$, d = .68). The anxiety and no emotion conditions did not differ from each other ($p > .69$). There was also a main effect of participant gender such that women (M = 3.55, SD = 1.29) reported using the patient's emotion more than men (M = 2.77, SD = 1.05, d), $F(1, 62) = 7.01$, $p < .02$, $\eta_p^2 = .10$. This main effect was qualified by a participant gender by patient gender interaction, $F(2, 62) = 3.38$, $p < .08$, $\eta_p^2 = .05$, which was driven by women (M = 3.76, SD = 1.24) using female patients' emotions more than men (M = 2.46, SD = 0.94, $p < .003$, d = 1.18), whereas women (M = 3.33, SD = 1.30) and men (M = 3.09, SD = 1.15, $p > .54$) did not differ in use of male patients' emotions.

The same ANCOVA design was also used to examine the extent to which the cause of the patient's symptoms were attributed to emotional causes. There was a main effect of emotion display, $F(2, 61) = 6.91$, $p < .002$, $\eta_p^2 = .19$. Compared to the no emotion condition (M = 1.59, SD = 0.48) participants attributed the patients' symptoms to psychological causes more in the anxiety (M = 2.10, SD = 0.49¸ $p < .002$, d = 1.05) and SSL (M = 2.08, SD = 0.60¸ $p < .003$, d = .90) conditions; contrary to predictions, the anxiety and SSL conditions did not differ from one another ($p > .91$).

Discussion

Summary of Results and Implications

Overall these results suggest that emotions help explain why CAD goes under-diagnosed. First, in terms of the correlations, when emotion-based diagnoses were rated as more likely, when the participant reported using emotion to make a diagnosis, and when the participant attributed the patient's symptoms to psychological causes, then ratings of the likelihood of CAD decreased. Interestingly, ratings of patient anxiety were unrelated to diagnoses, but were related

to how likely the participant reported using emotions to make a diagnosis. In sum, these results suggest that CAD and emotion-based diagnoses are incompatible and even antagonistic.

Following up these findings, results from the ANOVA clearly demonstrated the negative impact that emotion has for women's diagnoses of CAD. When no emotion was present, women did not differ from men in terms of diagnosis rates, a finding that replicates other conceptually similar studies (e.g., Chiaramonte & Friend, 2006). However, the physician's office is a place where emotions are common, as "patients view medical experiences as intertwined with the issues of their everyday lives" (Levinson, Gorawara-Bhat, & Lamb, 2000, p. 1021). Thus, the anxiety condition might be a more accurate reflection of what a typical diagnostic interview with a PCP looks like.

Hypothesis 1. Women's diagnosis of CAD would be negatively affected by emotion. In terms of the present study, it is in the anxiety but ignore condition where we see under-diagnosis. In support of Hypothesis 1, when women displayed anxiety (without SSL), they were less likely to be diagnosed for CAD compared to women showing no emotion and compared to men showing anxiety. Considering that the physician's office is a site of power where patients lack the knowledge and skills needed to evaluate their own treatment and therefore rely on physicians to be accurate in their diagnosis (Fisher, 1988), physicians are failing their female patients. Although physicians have the intention to correctly diagnose patients, they are just as readily influenced by stereotypes that reproduce and/or maintain systems of oppression (Stanford, 2003). As Davis (1990) writes, "all too often the enemies of our physical and emotional well-being are social and political" (p. 19). The present study helps to inform this theoretical work by demonstrating how sexism may be operating in the physician's office and to identify places to intervene. In this case, physicians are using their stereotypes of women and

emotions when viewing the anxious female patients and are attributing the emotions present as part of the symptom set that must be treated.

Hypothesis 2. SSL would improve women's diagnoses. Yet, emotions did not always negatively impact diagnosis. In support of Hypothesis 2, the negative effect of emotion was erased when women contextualized their anxiety using SSL. Female patients in the SSL condition were just as likely to receive a CAD diagnosis as women not expressing emotion and as men in the SSL condition. This is especially striking considering that patients in the SSL group (women and men) were rated more emotional than patients in the anxiety condition, yet that emotion clearly did not have an impact on the patient's diagnosis. These findings demonstrate that the SSL allows the possibility to make emotions salient but in a way that does not impact diagnosis. One possibility to be explored in future work is that SSL helps to identify places for physicians to evaluate their own assumptions and how these assumptions affect their communication strategies (De Bocanegra & Gany, 2004).

More broadly, these results inform feminist research by identifying an opportunity to empower women in a medical domain that is slow to change (Stanford, 2003), especially older women who are typically marginalized in U.S. society (e.g., Ainsworth, 2002; Penhale, 2003). The burden to change cannot fall only or even mostly on women, but given the existing biases in diagnosing CAD, until medicine can be improved, patients need to be empowered to help physicians improve accuracy (Waitzkin, 1991). Physicians are increasingly relying on statistics and general patterns to make diagnoses (Woodward, 2009), and failing to factor in whether treatments mesh with a patient's life (Hawkins, 1999). Black & Seale (2010) propose that a discursive style that involves both self-reflection and proactive agency in response to illness is transformational in that it shifts the speaker's sense of power from a normal position of low

power to one where the speaker's perspective demands attention and action. SSL provides patients with tools to actively participate in their consultation and engage in this transformational discursive style. Importantly, this type of discursive style results in better communication with physicians and better received healthcare (Street & Haidet, 2011).

Hypothesis 3. Patient-centeredness explains under-diagnosis while participant gender does not. One of the earliest and perhaps still most prevalent explanations is that the physician's gender influences diagnosis such that male physicians are unable to properly diagnose women (Brukner, 2003). Yet the results testing Hypothesis 3 demonstrated that participant's gender did not directly impact or interact with the patient's emotion display condition or the gender of the patient to influence diagnosis. These null results should be interpreted with caution due to the small sample size. That said, more recent work suggests that interaction style better explains under-diagnosis than the gender of the physician (Adams et al., 2008). In fact, one aspect of interaction style that was measured in this study (i.e., the extent to which the physician adopted a patient-centered communication style) was positively related to CAD diagnosis. SSL complements patient-centered communication by allowing a patient to share information in a narrative-based approach in which a patient's medical history is "built" rather than "taken" (Haidet & Paterniti, 2003). This approach characterizes patient-centered communication, a communication style in which physicians aim to provide care that is concordant with the patient's needs and preferences (e.g., Epstein et al., 2005).

Hypothesis 4. Patient gender and emotion display affects direct and indirect testing. While the predicted effects of emotion were observed for diagnosis, these effects did not translate to significant effects for testing recommendations. That is, anxiety without SSL received the same recommendations for testing (direct and indirect) as other conditions. One

possible explanation is that the questions were too vague (e.g., blood work could be recommended for a number of diagnoses besides CAD), thus introducing unexplainable variance leading to non-significance. The low reliabilities of the direct and indirect testing scales suggests this as a possibility. Future work might be better served by asking about specific tests. For example, tests for CAD would include an echocardiogram, a stress test, and a lipid panel.

A second explanation for the lack of effects could be that there is pressure for physicians to practice defensive medicine (i.e., ordering and/or performing excessive tests to avoid an incorrect diagnosis and risk a lawsuit) (Terry, 2010). The students and residents may have exhibited a tendency to rate all direct testing highly so as to prevent making a mistake. Partial support for this explanation is found in the result that across all conditions direct testing was rated above the midpoint of the scale. If this explanation were true, this would be an interesting outcome as it would suggest that even though one's initial diagnosis is incorrect, the excessive testing would put in place a mechanism to ultimately arrive at a correct diagnosis. Nevertheless, months can go by between meeting a PCP and seeing a referred specialist, which supports the notion that women are diagnosed later in the course of CAD than men (Brukner, 2003). During delay in receiving the proper treatment, damage is still occurring, explaining why when women are diagnosed, it is often not until the point until aggressive treatment, such as surgery, is required (e.g., Wenger, 1994; Richards et al., 2000).

Hypothesis 5. Using emotions and attributing symptoms to psychological causes. The most unexpected findings concerned those tested in Hypothesis 5, namely that participants used the patients emotions in the SSL condition to make a diagnosis more than patients in the anxiety condition, and that participants attributed the anxiety and SSL patients' symptoms to psychological causes equally. I expected that emotions would play a less prominent role for

patients in the SSL vs. anxiety condition (i.e., emotions would be used less and physical symptoms would be used more), and this difference in perception of emotions would be the explanatory factor for why women in the SSL condition were diagnosed more accurately than women in the anxiety condition. It is possible that what matters is not how the emotions themselves are perceived and used, but rather how the displayed emotions influence how the patient is perceived. Women's emotional displays may be more likely attributed to their disposition and not to the situational context than men (Shields et al., 1995). The extent to which the emotions were attributed to dispositional vs. situational reasons could be the explanatory mechanism for how emotions affected diagnosis. Unfortunately, this dispositional vs. situational construct was not measured in the present study and should be included in future work.

Other Considerations

SSL was performed twice during the interview, once in response to an opening question, and then about halfway into the interview. The early presentation of SSL was to prevent stereotypes of women's emotions from being applied to women's symptoms. It is unclear whether the second statement was necessary. For example, SSL might indeed need to occur very early to have an effect on a physician's impression formation of the patient, and that once the emotion is contextualized all subsequent emotional displays are attributed to the same reason. Alternatively, it might be the case that it would be more effective to use SSL each time that emotion was presented. However, the repeated acknowledging and contextualizing of emotion could have reverse effects resulting in the perception that a person is more emotional in a situation. Future work should assess the effectiveness of different timing and frequencies of SSL.

As discussed in the methods, a single case history was used where the symptom presentation of the pain indicated that the likelihood of CAD was a strong possibility. Depending

on the study, around 50% of women report in this more conventional style (Canto et al., 2000; Pope et al., 2000; Miller, 2003). Yet, as many as half of all cases involve women presenting additional symptoms such as nausea and dizziness (e.g., Penque et al., 1998), unusual fatigue (McSweetney et al., 2001), weakness (McSweetney et al., 2003), or back pain (Mikhail, 2005). These additional symptoms would lead to more ambiguity in one's case, which would likely lead to more use of stereotypes to make a diagnosis. Shields (2002) argues that when a situation is clearly unambiguous, gendered beliefs about emotion, like other gendered beliefs, are less likely to inform perceptions than when the situation is ambiguous. Thus, the present study likely represents a conservative estimate of the effect of emotions on diagnosis. Future work would benefit by making the case history more ambiguous.

The participants in this study watched the case history and thus were not given the choice of what question they could ask. While this method has been used successfully in other experimental research on diagnostic processes (e.g., Chiaramonte & Friend, 2006; Schulman et al., 1999), participants may have felt that they were not getting the same kind of information they would have if they had done an in-person consultation. In fact, when given an opportunity to describe what other information they would have wanted, every participant in the present study listed wanting some additional information (e.g., more information about family history). Thus, it is possible that not having more information limited people's ability to make a diagnosis. Yet, I would argue that providing a strict case may have actually helped physicians hone in on the correct diagnosis. Rather than be sidetracked by a follow-up question, participants were consistently re-focused on the main symptom, chest pain. For example, in an in-person consultation, if the physician heard a symptom they would attribute to stress, a likely follow-up question could be, "Are you experiencing any stress in your life?" Being that most people would

answer yes, other follow-up questions would be asked to better understand that stress. These questions might increase the possibility that the presenting symptoms get attributed to a psychosomatic cause rather than a physical one. Not allowing deviating questions suggests another reason that the observed results may in fact be a more conservative estimate of how emotions negatively impact diagnosis for women.

Also, as discussed earlier, medical students rather than physicians were asked to make diagnoses. This was done to reduce costs and increase the likelihood of getting participants. Prior work suggested that medical students would be no less accurate than PCPs (Chiaramonte, 2008; Chiaramonte & Friend, 2006). Yet it is possible that PCPs are more skilled and could produce more accurate results. For example, while not about heart disease, a study found that when diagnosing a difficult case, PCPs were recalled more facts about the case and inferred less than medical students (Coughlin & Patel, 1987). Interestingly, the PCPs were only more accurate in recall when the case was presented in a standard way (i.e., information was presented in the following order: patient's personal data, medical history, physical findings, and laboratory findings). When this order was randomized, physicians did not differ from medical students in terms of amount of recall and inference. Given this study, it is possible that physicians would be more accurate when women presented in a typical fashion, but would not differ from medical students when the case was more ambiguous.

It is important note that all the patients were non-Hispanic Caucasian, thus raising two questions. First, are all women under-diagnosed for CAD compared to men? As discussed above, while the label emotional is applied in different ways to different women (Landrine, 1985), the stereotype of women as more emotional than men is fairly ubiquitous (Fischer & Manstead, 2000). One possible exception is that Asian women are often stereotyped as competent yet cold

or not warm (Lin, Kwan, Cheung, & Fiske, 2005). One's perceived warmth is related to traits such as friendliness and honesty, and is indicative of being perceived as approachable and likable (Abele, Cuddy, Judd, & Yzerbyt, 2008). While perceived warmth has not been directly tested in terms of the perceived emotionality in a person, it is likely that there is a fair bit of overlap as women who express emotions, such as smiling, are rated as more likable than women who do not (Cashdan, 1998). If indeed emotionality is the key mechanism for why under-diagnosis of CAD occurs in women, this would suggest that perhaps Asian women would not go under-diagnosed for CAD compared to other women. Currently, research has only examined the under-diagnosis and under-treatment of African-American women and men compared to Caucasian men (e.g., Schulman et al., 1999). Continued epidemiological work would be warranted to help understand the proposed patterns.

Second, the question arises as to whether SSL would be effective with different types of patients. The use of intersectionality theory helps us examine this question. Stereotype formation and operation is affected by the mutually, constitutive relations among social identities (Crenshaw, 1997). One stereotype of women is that they are incompetent, yet this depends of the type of women, for example, as housewives are rated as more incompetent than businesswomen (Fiske et al., 2002). In this project, I focused on how stereotypes of women's emotions interact with stereotypes of competence and age. A prevailing stereotype of older adults is a perceived lack of competence (Cuddy, Norton, & Fiske, 2005), which only increases as one ages (Kite, Stockdale, Whitley, & Johnson, 2005). Older women in the physician's office face extreme prejudices regarding how their competence is perceived. This perceived lack of competence influences how physicians perceive and interact patients; for example, physicians often ignore an incompetent patient's interests (Malloy, 2006). In addition, stereotypes of older adults past

retirement often result in them being pitied, which results in reduced independence (Cohen, 1990), and/or feelings of helplessness and self-induced dependence in their relationships, including with physicians (Nussbaum, Pitts Huber, Krieger, & Ohs, 2005). Being pitied and having feelings of helplessness can have negative effects on one's health. With the goal of SSL to empower patients and raise perceived competence, older women are an ideal population to study. Yet, many other identity intersections also suffer from stereotypes about incompetence and must deal with powerlessness. Low status, outgroup members are often stereotyped as having animalistic emotions, and not able to control their more complex feelings (Leyens et al., 2001; 2003). People facing poverty are likely to be perceived as less competent and treated with pity or contempt, as are those handicapped (Fiske et al., 2002). These stereotypes likely also interact with perceptions of emotionality and affect the care that physicians provide. SSL is proposed as an intervention that is able to empower all individuals. Future work should examine how stereotypes affect physicians' diagnoses for different intersections of women presenting with symptoms for illness that can have multiple etiologies (e.g., anxiety, mild depression, asthma).

Future Directions

In addition to the other considerations mentioned above, this study lays the foundations for a large program of research. Below I outline three directions where this research can be taken, starting with the most immediate and smallest in scope, (1) a follow-up study examining actual interactions between physicians, then (2) moving to other diseases where these same processes might be at work (namely the diagnosis of depression in men), and finally (3) expanding to a model explaining why under-diagnosis occurs.

Follow-up with physicians and actual patients. As discussed above, participants in my study both expressed desire for more information, and were given information that focused them mainly on the parameters of the patient's chest pain. While the predicted under-diagnosis effect was observed, it is likely that given the opportunity physicians may have pursued other information that would not have been helpful to make a CAD diagnosis and would have steered the physician towards a different outcome. The methodology of the proposed study could not capture this dynamic process. A clear next step will be to see how the presence of emotions influences a physician's line of questioning, which could be accomplished by examining actual diagnostic interviews between PCPs and patients presenting with chest pain. Some of the things that would be coded for beyond treatment and diagnostic information would be the extent to which a patient's concerns are minimized or the patient is interrupted by a physician, and the physician's overall attitude in talking with patients. For example, in a study of 200 female cardiac patients, over half of the patients reported being dissatisfied because their physicians were rude, condescending, abrupt, or inattentive (Marcuccio, Loving, Bennett, & Hayes, 2003).

Under-diagnosis for other diseases: Men and depression. Another direction that this research can be taken is to examine whether similar processes that affect under-diagnosis of CAD are also operating to negatively impact diagnoses for other illnesses or diseases. I propose that depression is one such outcome. In a review of the prevalence and diagnosis rates of various illness, Falagas, Vardakas, & Vergidis (2007) report an 85% under-diagnosis rate for depression. While this incredibly high rate is influenced in part by patients avoiding seeking medical help due to the stigma of a psychiatric condition (Hirschfeld et al., 1997), there is also a severe lack of recognition of depression in patients by physicians. For example in one study, among those patients with depressive symptoms and who did seek help, 69% were still not diagnosed by their

physicians (Lepine, Gastpas, Mendlewicz, & Tylee, 1997). These high numbers indicate that individuals of all different identity intersections are being under-diagnosed, below I focus on why older men may be under-diagnosed.

As men age their likelihood for depression increases, yet they go under-diagnosed (Tan & Pu, 2003). As with CAD, depression takes a long time to diagnose (Thomas-Maclean, Stoppard, Miedema, & Tatemichi, 2005), and physicians may be less skilled at recognizing when depression is occurring as these diagnoses are typically done by psychiatrists. Furthermore, one reason that depression might go under-diagnosed is that patients or physicians attribute psychosomatic symptoms to physical causes rather than emotional reasons (Williams & Richardson, 1993). In other words, the opposite process of what I propose happens with CAD, emotions, and women might explain why men go under-diagnosed for depression. Given that men are stereotyped as unemotional (Shields, 2002), present less emotion and talk about emotional issues less than women to their physicians (Kroenke & Spitzer, 1998; Pigott, 2003; Robbins et al., 1991), and that the time constraints to diagnose depression make it more likely that stereotypes will be used, this attribution of men's emotional symptoms to physical causes becomes plausible. In support of this idea, one study found that under-diagnosis of depression in men only occurred for physicians but not for mental health practitioners (Potts, Burnam, & Wells, 1991). In other words, only among a group where ambiguity surrounded symptoms (i.e., physicians who have less expertise than mental health practitioners in dealing with depression) did under-diagnosis occur.

Building a model for why under-diagnosis occurs. As my dissertation topic itself indicates, and the description of depression above, a great amount of under-diagnosis occurs in medical settings. In fact, the National Institute of Health routinely puts out calls for proposals

asking researchers to help explain why there are health disparities for various illnesses and diseases. While under-diagnosis is not the only cause of a health disparity, under-diagnosis of one group of individuals compared to another contributes to health disparities. There is much theorizing as to the other causes of health disparities, including biological causes (Risch, Burchard, Ziv, & Tang, 2002) or societal influences, such as low SES (Szanton, Gill, & Allen, 2005), but little theorizing exists as to why under-diagnosis occurs. Using CAD as a case study, in future work I plan to devise a model explaining why under-diagnosis occurs.

Key features for this model of under-diagnosis are as follows. (1) Limited time for physician's to gather enough relevant information, which fosters an environment where cognitive shortcuts, such as stereotypes, are likely to be used. With the amount of interaction time between physician and patient being more limited, this issue becomes increasingly relevant. (2) Diagnosis is reliant on patient self-report. If the physician does not trust the patient to provide an accurate accounting of their symptoms, but needs the patient's account to make a diagnosis, the physician may be more likely to "read into" what a patient is saying and over-emphasize or de-emphasize a symptom. (3) There is ambiguity with presenting symptoms in that the differential set has symptoms (e.g., fatigue) that overlap with many diseases. This allows stereotypes to be included as additional information, thus shifting the focus on how those symptoms are understood. (4) There is either no clear test to confirm the disease or testing needs to be done through referral (thus creating pressure on the physician to be correct before referring).

Conclusions

A central goal of feminist research is to identify and eradicate systems of inequality that are based on social group membership, especially sexism (Gurevich, 2001). Part of this process, as in the present study, is to understand how stereotypes affect judgments made about others, and

to find ways to prevent stereotypes from being activated and applied when making decisions. A feminist focus has been used extensively in the workplace to explain why equally qualified women still make around 78 cents to the dollar of men (Arons, 2008), and why equally intelligent and motivated female students still tend to underperform compared to male students in STEM fields (Spencer, Steele, & Quinn, 1999). Feminist empirical research has not been extensively conducted in the medical domain. Vast initiatives have been undertaken to identify and explain health disparities between race, gender, age, and class across a variety of illnesses. Yet, while these initiatives have revealed how differences in physiology or access to resources can explain disparities, they have not turned to how a physician's stereotypes about a patient might influence the diagnosis and treatment offered for that patient. Much of the feminist work that has been done in the medical domain has identified something akin to a dehumanizing process, where patient's individuals concerns during a diagnostic interview are ignored or devalued, and where the compatibility between treatment and a patient's life is not addressed (Hawkins, 1999; Woodward, 2009). Yet, how these problems can be addressed and rectified in a way that does not place excessive burdens on patients or physicians has largely been absent from this feminist work. In proposing and finding support for SSL, my dissertation was able to bring an important feminist social psychological perspective to the health domain.

The present study offers a new direction towards understanding a serious and complex problem. CAD is under-diagnosed and under-treated in older women, and as a result CAD is by far the number one killer of older women. This study found evidence that women's emotionality affects the way that they are diagnosed. It also found support that acknowledging and contextualizing one's emotions using SSL improves diagnosis of CAD. SSL demonstrates the possibility of using psychological interventions to address a serious health risk. If CAD could be

diagnosed earlier, some of the pejorative effect of heart disease could be eliminated and life expectancy would increase (NCHS, 1999). In addition, by treating CAD early, costly medical procedures could be avoided. These results inform future research concerning the development of interventions, translating social psychological work to the health domain, and improving health care for older adults.

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Appendix A

IRB-Approved Verbal Consent Form

IRB No. 36705EP
Version Date: 05-17-11

Title of Project: Examining How Patient Characteristics Influence Diagnosis

Principal Investigator: Matthew Zawadzki, MA, MS
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1. Purpose of the Study: The purpose of this research is to examine the clinical decision-making process.

2. Procedures to be followed: If you agree to participate, you will first fill out some questionnaires about yourself. You will then watch a video of a patient presenting with some symptoms. Afterwards, you will be asked to offer a diagnosis, provide treatment recommendations, and then to fill out some surveys about how you made your diagnosis. Finally, you will fill out a few brief questionnaires about the patient.

3. Discomforts and Risks: There are no risks in participating in this research beyond those experienced in everyday life.

4. Benefits: You might learn more about your diagnostic style by participating in this study. The benefits to society include helping to provide information to better understand how diagnoses are made.

5. Duration: It will take approximately 30 minutes to complete.

6. Statement of Confidentiality: Your responses in this experiment will be confidential. No one, not even the experimenter, will be able to match your responses to your identity. Only IRB approved experimenters will have access to the data from this study. The following may review and copy records related to this research: The Office of Human Research Protections in the U.S. Department of Health and Human Services, Penn State University's Institutional Review Board, Penn State University's Office for Research Protections, the Institutional Review Board and the Human Subjects Protection Office at Hershey Medical Center.

7. Right to Ask Questions: Please contact Matthew Zawadzki at (814) 865-1671 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have questions regarding your rights as a research participant or concerns regarding your privacy, you may contact the research protection advocate in the Hershey Medical

Center Human Subjects Protection Office at 717-531-5687. You may call this number to discuss any problems, concerns or questions; get information or offer input.

8. Compensation: In exchange for participation, you will be compensated in two ways. First, you will be entered into a drawing to win an iPad 2. One prize will be awarded at the end of the study. Second, you will be given your choice of food options at Panera, which will be provided to you on the day you complete the study. If you do not want to order anything from Panera, you can choose to receive a $10 giftcard to Panera instead.

9. Voluntary Participation: Your participation is voluntary. You can withdraw from the study at any time by notifying the principal investigator. You can decline to answer specific questions. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

Tell the researcher your decision regarding whether or not to participate in the research.

Appendix B

Scripts Used for Filming

No emotion display

The patient responds to all questions in a business-like voice, without seeming upset or anxious.

Scene 1: Opener

(1) Doctor: What brings you here?

Patient: I'm having some discomfort in my chest and I didn't know what it meant; I thought I'd better see a doctor, so here I am.

Scene 2: What do you feel?

(1) Doctor: Could you describe for me exactly what you feel?

Patient: Well, I've been having this feeling in my chest. It just sort of sits there. It's hard for me to describe.

(2) Doctor: Is it a pain or is it more like a pressure or a tightness?

Patient: Neither really. I don't know how to describe it.

(3) Doctor: Is it a sharp sensation like something is stabbing?

Patient: No, it's not real sharp, it's, I don't know, it's uncomfortable. I guess it's just sort of a pain.

(4) Doctor: On a scale of 1 to 10 with 10 being the worst, how would you rate the severity of the discomfort?

Patient: I don't know...about a 7. I can stand it, but it's really uncomfortable.

Scene 3: Where do you feel it?

(1) Doctor: Can you tell me where you feel it?

Patient: It starts in the middle about here (indicate location in middle of chest).

(2) Doctor: Do you feel it anywhere else?

Patient: Not too much, it just sits in my chest.

(3) Doctor: Do you feel it up in your neck or in your stomach?

Patient: No, not really in either. I feel it mostly just above my stomach, right around here (indicate location in middle of chest).

(4) Doctor: What about on your back?

Patient: I don't know. Maybe once, but I'm not sure about that. It is usually just in my chest.

Scene 4: What makes it worse?

(1) Doctor: Is there anything in particular that brings it on?

Patient: Well, it can come on at anytime. I've been just sitting there reading and it happens; and if I'm really stressed or something like that it can happen too.

(2) Doctor: What about if you exert yourself?

Patient: I haven't really noticed. I don't exert myself that much anymore.

(3) Doctor: Do you not exert yourself more for a reason?

Patient: Well, I guess. My chest would sometimes hurt more when I did.

(4) Doctor: And when you would stop exerting yourself, did the pain go away?

Patient: Ummm, maybe, eventually. It has been a while since I tried.

(5) Doctor: How about eating, does that make it better or worse?

Patient: Neither. Eating doesn't affect it.
(6) Doctor: Does a walk after a meal have any effect?
Patient: No, well, I don't know, I don't normally go for walks after I eat.
(7) Doctor: Do you get it sitting in a chair doing nothing?
Patient: Yeah, depending on the kind of day I had.
(8) Doctor: Any particular situations make it worse?
Patient: Well, I remember I had a really bad day at the office and that day it was noticeably worse.

Scene 5: What makes it feel better?
(1) Doctor: Is there anything that you can do to make it better?
Patient: Well, usually if I sit calmly I find it passes. I really just have to relax for it to go away.
(2) Doctor: Any other activities that you think would make it better?
Patient: I don't know. I haven't been able to do anything to make it better except relax.
(3) Doctor: Have you tried taking antacids like Maalox or Mylanta?
Patient: No, I hadn't thought of that.

Scene 6: How long did the episode last?
(1) Doctor: Is the discomfort something that comes on suddenly, or is it gradual?
Patient: Well, it's like I'm not paying attention, and then there it is all of a sudden. So, I guess it's not really a gradual thing.
(2) Doctor: Is it always the same kind of pain?
Patient: I think so but it's hard to tell.
(3) Doctor: How long does the discomfort last?
Patient: Sometimes it goes away quickly, but most of the time it takes a couple of minutes.
(4) Doctor: What is the longest period of time the pain has lasted?
Patient: Oh, it's never been more than, say, 10 minutes at the most.
(5) Doctor: Do you feel short of breath when you have this discomfort?
Patient: Yeah, I do. I can't really catch my breath when it happens. I've never had trouble breathing before.
(6) Doctor: Is it that you can't take a deep breath because it hurts or are you short of breath?
Patient: I'm not sure really. It's hard to tell. I just can't catch my breath.
(7) Doctor: Do you get light-headed with it?
Patient: No, I don't remember feeling light-headed.
(8) Doctor: What happens afterwards?
Patient: I get really tired and just want to sit.
(9) Doctor: Do you stay tired for a while or does it go away quickly?
Patient: It lasts for a while.

Scene 7: How long has this been going on?
(1) Doctor: How long have you been having this discomfort?
Patient: It's been going on for a few weeks now.
(2) Doctor: Do you get it every day?
Patient: Well, no, not every day, but it's been happening on and off for about 3 weeks.
(3) Doctor: Is this the first time you've had this problem?
Patient: Yes.
(4) Doctor: Have there been any recent changes in your job or any of your other activities?
Patient: No, my job is secure. I just go about my usual routine in the office every day.

Anxiety display

The patient responds to marked emotion questions with slight to moderate trepidation in voice and while expressing anxiety on her/his face.

Scene 1: Opener

(1) Doctor: What brings you here?

Patient: I'm having some discomfort in my chest and I didn't know what it meant; I was kind of nervous about it [*start nervous display*]. I thought I'd better see a doctor, so here I am.

Scene 2: What do you feel?

(1) Doctor: Could you describe for me exactly what you feel?

Patient: Well, I've been having this feeling in my chest. It just sort of sits there [*continues mild nervous display*]. It's hard for me to describe.

(2) Doctor: Is it a pain or is it more like a pressure or a tightness?

Patient: Neither really. [*End nervous display*] I don't know how to describe it.

(3) Doctor: Is it a sharp sensation like something is stabbing?

Patient: No, it's not real sharp, it's, I don't know, it's uncomfortable. I guess it's just sort of a pain.

(4) Doctor: On a scale of 1 to 10 with 10 being the worst, how would you rate the severity of the discomfort?

Patient: I don't know...about a 7. I can stand it, but it's really uncomfortable.

Scene 3: Where do you feel it?

(1) Doctor: Can you tell me where you feel it?

Patient: It starts in the middle about here (indicate location in middle of chest).

(2) Doctor: Do you feel it anywhere else?

Patient: Not too much, it just sits in my chest.

(3) Doctor: Do you feel it up in your neck or in your stomach?

Patient: No, not really in either. I feel it mostly just above my stomach, right around here (indicate location in middle of chest).

(4) Doctor: What about on your back?

Patient: I don't know. Maybe once, but I'm not sure about that. It is usually just in my chest.

Scene 4: What makes it worse?

(1) Doctor: Is there anything in particular that brings it on?

Patient: Well, it can come on at anytime. [*Nervous display increases*]. I've been just sitting there reading and it happens; and if I'm really stressed or something like that it can happen too.

(2) Doctor: What about if you exert yourself?

Patient: I haven't really noticed. [*End nervous display.*] I don't exert myself that much anymore.

(3) Doctor: Do you not exert yourself more for a reason?

Patient: Well, I guess. My chest would sometimes hurt more when I did.

(4) Doctor: And when you would stop exerting yourself, did the pain go away?

Patient: Ummm, maybe, eventually. It has been a while since I tried.

(5) Doctor: How about eating, does that make it better or worse?

Patient: Neither. Eating doesn't affect it.

(6) Doctor: Does a walk after a meal have any effect?

Patient: No, well, I don't know, I don't normally go for walks after I eat.

(7) Doctor: Do you get it sitting in a chair doing nothing?

Patient: Yeah, depending on the kind of day I had.

(8) Doctor: Any particular situations make it worse?
Patient: Well, I remember I had a really bad day at the office and that day it was noticeably worse.

Scene 5: What makes it feel better?
(1) Doctor: Is there anything that you can do to make it better?
Patient: Well, usually if I sit calmly I find it passes [*Small increase in nervousness*]. I really just have to relax for it to go away.
(2) Doctor: Any other activities that you think would make it better?
Patient: I don't know. [*Decrease in nervousness*] I haven't been able to do anything to make it better except relax.
(3) Doctor: Have you tried taking antacids like Maalox or Mylanta?
Patient: No, I hadn't thought of that.

Scene 6: How long did the episode last?
(1) Doctor: Is the discomfort something that comes on suddenly, or is it gradual?
Patient: Well, it's like I'm not paying attention, and then there it is all of a sudden [*more nervous display*]. So, I guess it's not really a gradual thing.
(2) Doctor: Is it always the same kind of pain?
Patient: [*Decreasing nervous display*] I think so but it's hard to tell.
(3) Doctor: How long does the discomfort last?
Patient: Sometimes it goes away quickly, but most of the time it takes a couple of minutes.
(4) Doctor: What is the longest period of time the pain has lasted?
Patient: Oh, it's never been more than, say, 10 minutes at the most.
(5) Doctor: Do you feel short of breath when you have this discomfort?
Patient: Yeah, I do. I can't really catch my breath when it happens. I've never had trouble breathing before.
(6) Doctor: Is it that you can't take a deep breath because it hurts or are you short of breath?
Patient: I'm not sure really. It's hard to tell. I just can't catch my breath.
(7) Doctor: Do you get light-headed with it?
Patient: No, I don't remember feeling light-headed.
(8) Doctor: What happens afterwards?
Patient: I get really tired and just want to sit.
(9) Doctor: Do you stay tired for a while or does it go away quickly?
Patient: It lasts for a while.

Scene 7: How long has this been going on?
(1) Doctor: How long have you been having this discomfort?
Patient: It's been going on for a few weeks now.
(2) Doctor: Do you get it every day?
Patient: Well, no, not every day, but it's been happening on and off for about 3 weeks.
(3) Doctor: Is this the first time you've had this problem?
Patient: Yes.
(4) Doctor: Have there been any recent changes in your job or any of your other activities?
Patient: No, my job is secure. I just go about my usual routine in the office every day.

Anxiety & SSL display

The patient responds to marked emotion questions with slight to moderate trepidation in voice and while expressing anxiety on her/his face. At two points (i.e., Scene 1 and Scene 4) the patient acknowledges and contextualizes the emotions.

Scene 1: Opener

(1) Doctor: What brings you here?

Patient: I'm having some discomfort in my chest and I didn't know what it meant; I was kind of nervous about it [*start nervous display*]. I thought I'd better see a doctor, so here I am. I know I seem nervous right now, I just am worried about the discomfort and want to know what is going on.

Scene 2: What do you feel?

(1) Doctor: Could you describe for me exactly what you feel?

Patient: Well, I've been having this feeling in my chest. It just sort of sits there [*continues mild nervous display*]. It's hard for me to describe.

(2) Doctor: Is it a pain or is it more like a pressure or a tightness?

Patient: Neither really. [*End nervous display*] I don't know how to describe it.

(3) Doctor: Is it a sharp sensation like something is stabbing?

Patient: No, it's not real sharp, it's, I don't know, it's uncomfortable. I guess it's just sort of a pain.

(4) Doctor: On a scale of 1 to 10 with 10 being the worst, how would you rate the severity of the discomfort?

Patient: I don't know...about a 7. I can stand it, but it's really uncomfortable.

Scene 3: Where do you feel it?

(1) Doctor: Can you tell me where you feel it?

Patient: It starts in the middle about here (indicate location in middle of chest).

(2) Doctor: Do you feel it anywhere else?

Patient: Not too much, it just sits in my chest.

(3) Doctor: Do you feel it up in your neck or in your stomach?

Patient: No, not really in either. I feel it mostly just above my stomach, right around here (indicate location in middle of chest).

(4) Doctor: What about on your back?

Patient: I don't know. Maybe once, but I'm not sure about that. It is usually just in my chest.

Scene 4: What makes it worse?

(1) Doctor: Is there anything in particular that brings it on?

Patient: Well, it can come on at anytime. [*Nervous display increases*]. The unpredictability of it is why I am a bit anxious right now. I've been just sitting there reading and it happens; and if I'm really stressed or something like that it can happen too.

(2) Doctor: What about if you exert yourself?

Patient: I haven't really noticed. [*End nervous display.*] I don't exert myself that much anymore.

(3) Doctor: Do you not exert yourself more for a reason?

Patient: Well, I guess. My chest would sometimes hurt more when I did.

(4) Doctor: And when you would stop exerting yourself, did the pain go away?

Patient: Ummm, maybe, eventually. It has been a while since I tried.

(5) Doctor: How about eating, does that make it better or worse?

Patient: Neither. Eating doesn't affect it.

(6) Doctor: Does a walk after a meal have any effect?
Patient: No, well, I don't know, I don't normally go for walks after I eat.
(7) Doctor: Do you get it sitting in a chair doing nothing?
Patient: Yeah, depending on the kind of day I had.
(8) Doctor: Any particular situations make it worse?
Patient: Well, I remember I had a really bad day at the office and that day it was noticeably worse.

Scene 5: What makes it feel better?
(1) Doctor: Is there anything that you can do to make it better?
Patient: Well, usually if I sit calmly I find it passes [*Small increase in nervousness*]. I really just have to relax for it to go away.
(2) Doctor: Any other activities that you think would make it better?
Patient: I don't know. [*Decrease in nervousness*] I haven't been able to do anything to make it better except relax.
(3) Doctor: Have you tried taking antacids like Maalox or Mylanta?
Patient: No, I hadn't thought of that.

Scene 6: How long did the episode last?
(1) Doctor: Is the discomfort something that comes on suddenly, or is it gradual?
Patient: Well, it's like I'm not paying attention, and then there it is all of a sudden [*more nervous display*]. So, I guess it's not really a gradual thing.
(2) Doctor: Is it always the same kind of pain?
Patient: [*Decreasing nervous display*] I think so but it's hard to tell.
(3) Doctor: How long does the discomfort last?
Patient: Sometimes it goes away quickly, but most of the time it takes a couple of minutes.
(4) Doctor: What is the longest period of time the pain has lasted?
Patient: Oh, it's never been more than, say, 10 minutes at the most.
(5) Doctor: Do you feel short of breath when you have this discomfort?
Patient: Yeah, I do. I can't really catch my breath when it happens. I've never had trouble breathing before.
(6) Doctor: Is it that you can't take a deep breath because it hurts or are you short of breath?
Patient: I'm not sure really. It's hard to tell. I just can't catch my breath.
(7) Doctor: Do you get light-headed with it?
Patient: No, I don't remember feeling light-headed.
(8) Doctor: What happens afterwards?
Patient: I get really tired and just want to sit.
(9) Doctor: Do you stay tired for a while or does it go away quickly?
Patient: It lasts for a while.

Scene 7: How long has this been going on?
(1) Doctor: How long have you been having this discomfort?
Patient: It's been going on for a few weeks now.
(2) Doctor: Do you get it every day?
Patient: Well, no, not every day, but it's been happening on and off for about 3 weeks.
(3) Doctor: Is this the first time you've had this problem?
Patient: Yes.
(4) Doctor: Have there been any recent changes in your job or any of your other activities?
Patient: No, my job is secure. I just go about my usual routine in the office every day.

Appendix C

Outcome Variables Assessed in Study

INSTRUCTIONS: Please respond to the following questions about diagnosis and treatment for the patient using the scale provided below. Write your responses to the left.

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at All			Somewhat			Very Much

About Diagnosis

_____ This patient is suffering from **pulmonary embolism**.
_____ This patient is suffering from **pneumonia**
_____ This patient is suffering from **depression**.
_____ This patient is suffering from **costochondritis**.
_____ This patient is suffering from **coronary artery disease**.
_____ This patient is suffering from **panic disorder**.
_____ This patient is suffering from **acid reflux**.

About Treatment

_____ This patient should be **referred for lab work**.
_____ This patient should be **referred to a cardiologist**.
_____ This patient should be **referred to a pulmonologist**.
_____ This patient should be **referred to a psychiatrist**.
_____ This patient should be **referred to a gastroenterologist**.
_____ This patient should be **hospitalized**.

INSTRUCTIONS: Please list the top five symptoms that you considered were the most relevant for your assessment. Next to each symptom, please circle the extent to which these symptoms were perceived as mostly physical/organic, somewhat physical/organic, somewhat psychogenic/psychological, mostly psychogenic/psychological.

1	**2**	**3**	**4**
Mostly Physical/ Organic	Somewhat Physical/ Organic	Somewhat Psychogenic/ Psychological	Mostly Psychogenic/ Psychological

(1) _____ 1 2 3 4
(2) _____ 1 2 3 4
(3) _____ 1 2 3 4
(4) _____ 1 2 3 4
(5) _____ 1 2 3 4

INSTRUCTIONS: Please indicate your agreement with the following items using the scale provided below. Write your responses to the left.

1	2	3	4	5	6	7
Not at All			Somewhat			Very Much

_____ The patient appeared **content**.
_____ The patient appeared **anxious**.
_____ The patient appeared **happy**.
_____ The patient appeared **calm**.
_____ The patient appeared **sad**.
_____ The patient appeared **scared**.
_____ The patient appeared **angry**.
_____ The patient appeared **worried**.
_____ The patient appeared **neutral**.
_____ The patient appeared **nervous**.
_____ The patient appeared **indifferent**.

INSTRUCTIONS: Please indicate your agreement with the following items using the scale provided below. Write your responses to the left.

1	2	3	4	5	6	7
Not at All			Somewhat			Very Much

_____ How important were the patient's emotions for the diagnosis you made?
_____ Did the patient's emotions affect the way you diagnosed the patient?
_____ How much did you use the patient's emotions to help you make a diagnosis?
_____ How much did you view the patient's emotions as a symptom to treat?

Appendix D

Patient-Provider Orientation Scale (PPOS) (Krupat, Putnam, & Yeager, 1996)

INSTRUCTIONS: Please indicate your agreement with the following items using the scale provided below. Write your responses to the left.

1	2	3	4	5	6	7
Not at All			Somewhat			Very Much

*Items in bold are included in final scale created.

Sharing Subscale

_____ **The doctor is the one who should decide what gets talked about during a visit.**
_____ **Although health care is less personal these days, this is a small price to pay for medical advances.**
_____ **The most important part of the standard medical visit is the physical exam.**
_____ **It is often best for patients if they do not have a full explanation of their medical condition.**
_____ **Patients should rely on their doctors' knowledge and not try to find out about their conditions on their own.**
_____ **When doctors ask a lot of questions about a patient's background, they are prying too much into personal matters.**
_____ **If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.**
_____ Many patients continue asking questions even though they are not learning anything new.
_____ Patients should be treated as if they were partners with the doctor, equal in power and status.

Caring Subscale

_____ Patients generally want reassurance rather than information about their health.
_____ **If a doctor's primary tools are being open and warm, the doctor will not have a lot of success.**
_____ **When patients disagree with their doctor, this is a sign that the doctor does not have the patient's respect and trust.**
_____ A treatment plan cannot succeed if it is in conflict with a patient's lifestyle or values.
_____ **Most patients want to get in and out of the doctor's office as quickly as possible.**
_____ **The patient must always be aware that the doctor is in charge.**
_____ It is not that important to know a patient's culture and background in order to treat the person's illness.
_____ Humor is a major ingredient in the doctor's treatment of the patient.
_____ **When patients look up medical information on their own, this usually confuses more than it helps.**

Matthew Jason Zawadzki
Curriculum Vita

Educational History

2012	Ph.D., Social Psychology and Women's Studies, The Pennsylvania State University
2009	M.S., Social Psychology, The Pennsylvania State University
2006	M.A., Quantitative Methods in the Social Sciences, Columbia University
2004	B.A., Psychology and Philosophy, Iona College

Academic Honors, Awards, and Grants

2012	Outstanding Publication by a Psychology Student, *Penn State University*
2010 & 2011	Geis Memorial Award Finalist, *Society for the Psychology of Women*
2010	Grants-in-Aid Award, *Society for the Psychological Study of Social Issues*
	College of Liberal Arts Dissertation Support Grant, *Penn State University*
2009	Carolyn Wood Sherif Research Grant, *Penn State University*
2008	Graduate Research Grant, *National Psi Chi*

Publications

Espinsoa, R., Spruill, T. M., Zawadzki, M. J., Vandekar, L., Garcia-Vera, M. P., Sanz, J.,…Gerin, W. (2011). Can blood pressure measurements taken in the physician's office avoid the "white coat" bias? *Blood Pressure Monitoring, 16,* 231-237.

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