

Self-Awareness and Symptom Evaluation: Observations from the Seattle Midlife
Women's Health Study

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A dissertation
submitted in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy

University of Washington

2015

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Program Authorized to Offer Degree:
School of Nursing

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Abstract

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Approximately 65% - 75% of women experience one or more symptoms during the menopausal transition (MT) (Santoro, 2008), and much research has focused on hot flash (HF) frequency. However, individual women experience hot flashes at different levels of intensity and bother – not every HF is equally problematic. For this reason, examining HF severity is important. HF severity is an *evaluation* of perceived sensory information (physiologic symptoms) that is a separate and distinct process from

physically *registering* those symptoms (Petersen, van den Berg, Janssens, & Van den Bergh, 2011).

A cognitive model of symptom perception has been developed that includes concepts such as anxiety, stress, beliefs, and perceptions about the menopausal transition (Hunter & Chilcot, 2013). However, this model does not include self-awareness. An as yet unexplored and unanswered question is whether self-awareness might have a role in symptom evaluation. Self-awareness is posited as a possible component in symptom evaluation due to its identification as part of what “works” in yoga interventions (Gard, Noggle, Park, Vago, & Wilson, 2014). Yoga has been associated with decreased HF bother and unchanged HF frequency (Booth-LaForce, Thurston, & Taylor, 2007). It seems plausible that self-awareness might have a role in symptom evaluation in settings beyond yoga intervention trials. The purpose of this dissertation project is to explore self-awareness and its potential role in symptom evaluation. Two subscales from the Self-Consciousness Scale (Internal State Awareness and Self-Reflectiveness) are utilized to explore self-awareness. Additional concepts to be tested in a causal model of effects on HF severity are attitudes towards menopause, health perceptions, stages of reproductive aging, anxiety, and stress.

The first paper is a concept analysis of self-awareness, differentiating it from interoception, mindfulness, somatosensory amplification, and disassociation. Results include the defining attributes of self-awareness to be self-directed perception, interoception, emotion, and physicality. In all articles reviewed, it was clear that self-awareness always involved self-directed perception. The focus was on the self, not on others or one’s environment. Interoception has been described as “the material me”

(Cameron, 2001). The action of perceiving sensations such as coolness, warmth, heartbeat, dyspnea, and thirst are not only physical, somatic experiences. Interoception is both unconscious (the nervous system regulating heart rate) and conscious. Self-awareness is an emotional experience, too. We do not solely perceive coolness or warmth, we also relate to the temperature (coolness feels very differently if we are in the snow or if we are on a sunny beach). Likewise, feeling a sensation of warmth may be very appealing and comforting (an emotional experience) if we have just taken a plunge into cold water on New Year's Day (Fogel, 2009). Physicality refers to the fact that, literally, a person must be alive, with physical and mental functions intact, in order to be self-aware.

Also identified were antecedents (developmental process, age, education, bodily integrity, cognitive functioning, functional capacity of the nervous system to interocept, capacity to perceive and reflect) and consequences (evaluation of symptoms along a continuum from mild to moderate to severe, bothersome, or interfering). Self-awareness may influence subsequent health-seeking behaviors (practicing self-care, seeking healthcare, or pursuing unhealthy behaviors to mask/evade perceived symptoms). Empirical referents indicate how a researcher might test this concept "in the real world" and are indicated by questionnaires that have been designed to measure self-awareness (Self-Consciousness Scale; Somatic Interpretation Questionnaire; Multidimensional Assessment of Interoceptive Awareness).

The second paper tested the factor structure of the Self-Consciousness Scale (SCS) using confirmatory factor analysis (CFA). The purpose of this analysis was to ascertain the validity of the SCS in the Seattle Midlife Women's Health Study dataset. If

deemed valid, the SCS data would then be used in building and testing a causal model of HF severity. The SCS was developed by Fenigstein, Scheier, and Buss (1975), and has been used in multiple studies since it was first introduced. A four-factor model was hypothesized to best fit the data. Also hypothesized was that construct validity could be established for ISA and SR subscales with associated psychological concepts such as depression, anxiety, somatic amplification, and coping. ISA has been defined as *balanced self-awareness* and indicates a positive or neutral state of self-evaluation (Anderson, Bohon, & Berrigan, 1996; Trapnell & Campbell, 1999). SR has been defined as *self-oppression*, a ruminative type of self-mistrust (Anderson et al., 1996), and is positively correlated with depression, anxiety, and low self-esteem (Anderson et al., 1996; Chang, 1998; Trapnell & Campbell, 1999).

The four-factor model displayed poor fit indices (CFI = .81; TLI = .79; RMSEA = .07). However, good fit indices were found for individual subscales ISA (CFI = 1.00; TLI = 1.03; RMSEA \leq 0.001) and SR (CFI = 1.00; TLI = 1.03; RMSEA \leq 0.001), and for ISA and SR tested together (CFI = .95; TLI = .94; RMSEA = .05). The ISA and SR subscales appear to validly measure distinctly different concepts and merit use in further studies.

The third study built and tested a model of hot flash severity using structural equation modeling. Independent variables of ISA, SR, anxiety, health perceptions, attitudes toward menopause, stages of reproductive aging, and stress were evaluated for effects on HF severity. Maximum likelihood estimation was used to estimate missing data. Results in a trimmed model included significant pathways from ISA ($\beta = .17$), stages of reproductive aging ($\beta = .20$), and attitudes toward menopause ($\beta = -.15$)

directly affecting HF severity. SR showed direct effects on stress ($\beta = .51$), and stress demonstrated direct effects on anxiety ($\beta = .63$) and attitudes toward menopause ($\beta = -.30$). Covariance between ISA and SR was significant ($\beta = .62$).

Results from these papers suggest that ISA and SR are distinct concepts with different effects on HF severity. ISA directly effects HF severity and SR indirectly effects HF severity via a predictive relationship with stress. Stress significantly effects anxiety and attitudes toward menopause, which then demonstrates a significant effect on HF severity. Future studies targeted at carefully defining and testing these concepts are merited. Specifically, perceived stress, attitudes, and anxiety are mutable causes that may be tested in intervention studies to determine efficacy in decreasing symptom severity.

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ACKNOWLEDGEMENTS

Where does one begin with a litany of significant and meaningful support received over a lifetime? First, I thank and honor my parents, Allen O. and N. Arlene Taylor. From them I have learned the joys of hard work and the merit of pursuing one's dreams. I am lucky to have other parents, too: Marie and Allen Holt and Stan and Maria Seidner. Thank-you for bringing me into your families and treating me as your own. My grandparents, so instrumental in my growth and development, and early supporters of their doctor in the family, I also thank and acknowledge: Orrin and Alice Taylor, Evan and Marva Rasmussen.

However, the soul's touch of a beloved is perhaps the most profound experience possible. My dear Carlos Taylor-Swanson, to whom I bow in deep gratitude: thank-you for your patience, support and sense of humor. Truly there is absolutely no way I could have crossed this long-sought threshold without your support and listening ear: *parashe*. Gabe and Sofia: I love you, always, forever and a day. Thank-you for your patience too, with my many absences and departures. Please know that I'm always here for you: to the moon and back, googolplex and more. My love knows no bounds.

The gift of mentorship is profound, lasting and worthwhile. I have been the fortunate recipient of kind, wise and caring mentorship over many years. I am forever grateful to Ronda Nielson, who saw in me what I did not (I still employ skills I learned from you whenever I present at conferences!), and to Dr. Alan Fogel, my Honors Senior Thesis adviser, mentor, and friend now of 20 years. I enjoy our friendship and scholarly collaboration and I look forward to continued work and walks. Thank you for introducing me to dynamic systems theory; I am forever deeply altered and changed. Dr. Nancy

Fugate Woods has been an incredible mentor and guide both for the journey of the PhD and for figuring out how to balance family and academia with grace, intelligence, and enjoyment. Thank-you for your many hours, revisions of countless papers and always sage advice. To work alongside many of my professional heroes is a dream come true, not to mention an absolute joy: Drs. Lisa Conboy, Mary Koithan, Dave Pincus, Rosa Schnyer and Claire Cassidy: thank you for who you are and what you do.

I wish to acknowledge my dear "sisters" Dr. Akiko Etoh Vogel, Lynn Weinberg, and Vero Zidarich and the friendship and support received from Judith Nilan and Dennis Crowley. Thank you, deep gratitude for *hosetanta* at a time when it was most needed.

DEDICATION

This dissertation is dedicated to my patients. Their willingness to engage in open, honest dialogue has taught and inspired me. I am honored to be of service, and I look forward to being of service now as a clinician-researcher and professor.

CHAPTER ONE

INTRODUCTION

“I wish I could just pop my right leg off, like a Barbie doll, and put a new one on. It feels completely different than my left one!” This statement intrigued me. It was spoken by a patient in my outpatient acupuncture practice and set my mind on fire, wondering about self-awareness and its potential role in symptom evaluation. I wondered how it was possible for one leg to feel so completely different than the other, and what it meant physiologically, emotionally, and for a person’s sense of self. After listening to my patient, I provided her with an acupuncture treatment and a Chinese herbal formula prescription. She returned for follow-up one week later and told me, “My back pain is gone and my legs feel the same now! What a difference!” How could it be that, after one acupuncture treatment and one week’s time, this individual’s sense of her body was totally different? I set out to explore and to hopefully answer this question with the current study.

The first part of the study is a concept analysis of self-awareness that utilized Walker & Avant’s (2011) eight-step method of concept analysis. Self-awareness was defined as being comprised of *self-directed perception*, *interoception*, *emotion*, and *physicality*. Antecedents and consequences were identified, as well as model, borderline, and contrary cases.

The second study was a confirmatory factor analysis of the Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975). A four-factor model was hypothesized to

best fit the data, but was not confirmed. However, two subscales (Internal States Awareness and Self-Reflectiveness) displayed good fit indices and construct validity.

The third study built and tested a model of the effects of ISA, SR, stress, anxiety, attitudes toward menopause, health perceptions, and stages of reproductive aging on hot flash severity. Results in a trimmed model included significant pathways from ISA ($\beta = .17, p < .05$), stages of reproductive aging ($\beta = .20, p < .01$), and attitudes toward menopause ($\beta = -.15, p < .05$) directly effecting HF severity. SR showed direct effects on stress ($\beta = .51, p < .001$), and stress demonstrated direct effects on anxiety ($\beta = .63, p < .001$) and attitudes toward menopause ($\beta = -.30, p < .001$). ISA and SR demonstrated significant covariance ($\beta = .62, p < .001$).

CHAPTER TWO

A CONCEPT ANALYSIS OF SELF-AWARENESS AND ITS ROLE IN SYMPTOM PERCEPTION

Abstract

Aim. The aim of this paper is to analyze the concept of self-awareness as it applies to symptom perception.

Background. Self-awareness has been a subject of contemplation since antiquity and is defined here based on literatures in neuroscience, psychology, nursing and somatics. The role of self-awareness in symptom experience is described and possibilities for interventions targeting self-awareness are explored in this paper.

Methods. Multiple databases were searched, including CINAHL, PubMed, and PsychInfo, using the terms “self-awareness” and “symptom” with a date range of 2000 – 2014. The concept of self-awareness was examined using Walker & Avant’s (2011) eight-step method of concept analysis.

Results. The defining attributes of self-awareness are self-directed perception, interoception, emotion, and physicality.

Conclusion. Self-awareness is a mutable and testable concept that could be useful for future intervention studies in nursing and health sciences.

Background

Self-awareness is a concept rooted in antiquity's philosophical tradition - people have long contemplated who we are and how to understand our thoughts, feelings, emotions, and physical body. Mind and body were theorized as being separate by Rene Descartes' philosophy of dualism in the 17th-century. He famously wrote, "I think, therefore I am," and also posited the body as a machine that would move even if it had no mind (Cottingham, 1999). Descartes added complexity to his work by theorizing that body and mind are also intertwined – that sensations occurring to the body were perceived through the mind. From dualism emerged the philosophy of positivism, the notion that an objective reality outside the body can be observed by our minds, and this objective, observable reality is the only legitimate domain of inquiry. These philosophies serve as a foundation for modern science, including health sciences and nursing research.

More recent philosophy offers the notion of the *lived-body*, in which the body is not an object, but an embodied nucleus of one's consciousness and intentionality (Merleau-Ponty, 1964). Merleau-Ponty's phenomenological perspective emphasizes the body as the primary location from which we experience the world, rather than placing the mind and consciousness as the source of knowledge and experience. Other work has explored the concept of self-awareness, or "attentional focus on internal body sensations" (Mehling et al., 2011). Bringing attention to the physical body, this perspective is also not solely a cognitive experience.

Mind-body medicine, integrative health, integrative nursing, and complementary and alternative medicine (CAM) all address body and mind (and sometimes spirit) as

important aspects of health and well-being, targeting both with symptom management and disease treatment interventions. Each of these disciplines is gaining more attention in recent years (Clarke, Black, Stussman, Barnes, & Nahin, 2015). What might the role of self-awareness be in the field of symptom science? Does self-awareness affect symptom perception? This paper will explore the concept of self-awareness as it relates to symptom perception. Once defined, self-awareness could possibly serve as a testable, mutable concept in intervention studies focused on symptom experience, benefitting nursing and health research.

Introduction

Self-awareness may broadly be defined as an awareness of one's own personality or individuality and an ability or capacity to be introspective, to recognize oneself as individual, and to separate from environment and others (Merriam-Webster Dictionary, 2014). Drawing from developmental psychology and neurocognition, Fogel (2009) posits two aspects of self-awareness: conceptual and embodied. Conceptual self-awareness is *thinking* about our bodies and what we are experiencing. Embodied self-awareness is *feeling* our bodies and bodily sensations. The two are not mutually exclusive, as one informs the other. However, they are fundamentally different experiences, somewhat akin to what is described in general as the *mind* and the *body* (Fogel, 2009). *Interoception*, the ability to feel one's body and emotions, informs and is informed by embodied self-awareness. Embodied self-awareness includes interoception, emotion, and *proprioception*, the sense of our bodies in relationship to our environment, including objects, space, and other individuals.

A *symptom* is a subjective experience that is a change in one's biopsychosocial functioning, sensations, or thinking (Dodd et al., 2001). This can be compared to a *sign*, which is objectively observed by another person, typically a clinician who is evaluating a patient. Recent work exploring symptoms has evaluated the co-occurrence of symptoms, or symptom clusters (Miaskowski, Dodd, & Lee, 2004), and the role of cognition in symptom perception and subsequent symptom evaluation or appraisal (Hunter & Chilcot, 2013). Much work has been published parsing apart similar yet different concepts related to symptom perception, such as symptom frequency (how often the symptom is experienced). Symptom evaluation is studied with the concepts of symptom bother (how bothered a person is by a symptom) and symptom interference (how much a symptom interferes with a person's life, such as work or family responsibilities). Symptom bother and interference indicate how a symptom affects a person, as a frequent symptom may not bother a person much, and an infrequent but intense or poorly-timed symptom may be rated as highly bothersome (such as a post-menopausal woman experiencing facial flushing while performing a high-profile work role). Interventions such as yoga, mindfulness-based stress reduction, and cognitive behavioral therapy show promise as safe approaches to decrease symptom bother, even if symptom frequency is unchanged (Ayers, Smith, Hellier, Mann, & Hunter, 2012; Booth-LaForce et al., 2007; J. F. Carmody et al., 2011). If symptoms become less bothersome even if the frequency is unchanged, what has changed, and how may interventions be targeted to facilitate this change? One possibility is that an individual is able to perceive and interpret her symptoms in a different way.

While much work is being conducted on symptom science, a current National Institute of Nursing Research (NINR) priority area of funding, much is as yet unknown as well. To this end, NINR convened a panel of experts to develop innovative questions regarding symptom science ("Symptom Science", 2013). One gap in the literature is the role of self-awareness in symptom perception. One must perceive one's body in order to determine if something is amiss – to perceive symptoms. It seems plausible that someone highly self-aware might notice symptoms earlier or perhaps experience them as more intense, or, conversely, be better equipped to monitor ongoing symptoms and “cope” with them better, experiencing them as less problematic, as compared to someone who is not highly self-aware. We do not yet know if self-awareness has a role in this process. A concept analysis of self-awareness as it pertains to an individual's experience of symptoms has not yet been conducted, hence the purpose of this paper. This paper will present definitions of self-awareness from the fields of neuroscience, psychology, nursing, and bodywork, focusing on how these definitions relate to symptom appraisal.

Methods

This inquiry utilized Walker & Avant's (2011) eight-step method of concept analysis. These steps include the following:

1. Selecting a concept.
2. Determining the aims or purpose of the analysis.
3. Identifying all uses of the concept that can be discovered.
4. Determining the defining attributes.

5. Identifying a model case.
6. Identifying borderline, related, contrary, invented, and illegitimate cases.
7. Identifying antecedents and consequences.
8. Defining empirical referents.

Multiple databases were searched, including CINAHL, PubMed and PsychInfo, using the terms *self-awareness* and *symptom* and a date range of 2000 – 2015. Articles obtained from the search were selected for inclusion if they were written in English, were published in a journal, and had the full text accessible online.

Results

The initial search yielded 196 articles. Abstracts were reviewed and coded for inclusion criteria as well as according to the main topic addressed. Duplicates and commentaries were eliminated, yielding a total of 97 papers. Self-awareness was evaluated in contexts such as neurocognitive (45 papers on stroke, epilepsy, autism, schizophrenia, migraine headache, traumatic brain injury, acquired brain injury, Alzheimer's disease, or multiple sclerosis), psychological (28 papers on depression, anxiety, other topics, or suicide), somatic (4 papers musculoskeletal pain, falls risk, cerebral palsy, fibromyalgia), and other categories (20 papers on type1 diabetes, menopausal symptoms, or other concerns). In all papers, self-awareness was employed as a description of how much or how little a patient was aware of his/her functional capacity or deficits, as related to symptoms and diagnoses.

Self-Awareness in a Neurocognitive Context

Several reviewed studies examined self-awareness in individuals with neurocognitive symptoms and diagnoses such as stroke, Parkinson's disease, schizophrenia, epilepsy, Alzheimer's disease, dementia, traumatic and acute brain injury, and autism. These papers defined self-awareness in terms of participants' realization of the severity, extent, duration, or timing of their symptoms or illnesses. Self-awareness was evaluated because individuals with poor self-awareness of functional limitations might make decisions that do not reflect their actual abilities and put themselves at risk (Shany-Ur et al., 2014). In some studies, patient self-awareness was compared with caregiver awareness of patient limitations (Leritz, Loftis, Crucian, Friedman, & Bowers, 2004) or clinician observation of patient limitations (Medalia & Lim, 2004). Other investigators evaluated self-awareness with respect to symptom perception of migraine headache (Lipton, Stewart, & Liberman, 2002; Radtke & Neuhauser, 2012).

In all cases, self-awareness was with respect to perceiving functional capacity or limitations secondary to symptom or illness burden.

Self-Awareness in a Psychological Context

Literature reviewed where self-awareness was evaluated from a psychological context covered the role of self-awareness in relation to such situations as depression, anxiety, feelings of disembodiment, and suicidal ideation. One study operationalized self-awareness as seeing oneself in the mirror by placing a mirror so participants could see their reflections while viewing letters (Selimbegović & Chatard, 2013). The

investigators showed participants strings of letters. Participants were asked to identify which strings of letters comprised words, some of which were suicide-related words. Those individuals who saw their reflection recognized suicide-related words more quickly than participants who were not exposed to a mirror. Other researchers defined self-awareness as feeling embodied, and contrasted that with individuals who experienced depersonalization, as characterized by feelings of disembodiment and emotional numbing (Sierra & David, 2011). Social anxiety was found to be lower in individuals with low levels of self-awareness, when the concept was defined as the tendency to reflect on internal aspects of the self (George & Stopa, 2008). Others operationalized self-awareness as increased attention towards one's self as compared to one's surroundings (Petersen & Ritz, 2011).

The literature reviewed here from the field of psychology utilized four definitions of self-awareness. One regarded the concept as an individual seeing his/her own body, another as feeling in the body, yet another as cognitive reflection about the body, and the last considered self-awareness as attention focused on one's body compared to the environment.

Self-Awareness in a Somatic Context

Studies of physical or somatic concerns included evaluations of fibromyalgia, musculoskeletal pain, and falls risk. An investigation of pain experienced by people with fibromyalgia operationalized self-awareness as affective self-awareness, defined as awareness and expression of emotions (Hsu et al., 2010). Other researchers conducted a qualitative study of chronic musculoskeletal pain and defined self-awareness as an

existential sense of self or as related to experiencing the self as whole person (Steen & Haugli, 2001). A study of falls risk assessed self-awareness of personal risk of falling in older individuals, much as self-awareness regarding symptoms and possible resulting debility were assessed in many neurologic conditions, as noted above (Mihaljcic, Haines, Ponsford, & Stolwyk, 2014). Researchers evaluated whether patients accurately perceived their own risk of falling.

In sum, self-awareness is defined in somatic literature in three different ways: awareness and expression of one's emotions, awareness of the interconnectedness of different aspects of oneself, and awareness of one's fall risk.

Self-Awareness in the Context of Other Categories

Studies of other symptoms or conditions include evaluation of self-awareness in patients with type 1 diabetes and in those experiencing symptoms during the menopausal transition. In the case of individuals diagnosed with type 1 diabetes, awareness of one's bodily cues and signals as triggered by high, normal, or low blood sugar levels was studied, and an 8-week self-awareness intervention was provided. Study findings indicated that those who underwent the self-awareness intervention detected more cues of hypoglycemia and experienced improved metabolic control, as demonstrated by improved HbA1c blood levels (Hernandez, Hume, & Rodger, 2008). Self-awareness during the menopausal transition was defined with an umbrella category for attitudes towards menopause, satisfaction with physical appearance, and self-esteem (Bloch, 2002).

In this category of studies, self-awareness was defined as paying attention to cues from one's body and as a broad definition of attitudes and self-esteem.

Defining Attributes

Defining attributes or characteristics differentiate the concept of self-awareness from other similar concepts (Walker & Avant, 2011). A review of the literature, above, identified four characteristics associated with self-awareness: *self-directed perception*, *interoception*, *emotion*, and *physicality*. In all articles reviewed, it was clear that self-awareness always involved self-directed perception. The focus was on the self, not on others or one's environment.

Interoception has been described as "the material me" (Cameron, 2001). The action of perceiving sensations such as coolness, warmth, heartbeat, dyspnea, and thirst are not only physical, somatic experiences. Interoception is both unconscious (the nervous system regulating heart rate) and conscious. Conscious interoception, or interoceptive awareness, refers to a person's experience of his/her own body cues, such as respiration, perspiration, and satiety. Interoception is one component of both cognitive and embodied self-awareness (Fogel, 2009). One key distinction between the two terms is that cognitive self-awareness is *thinking* about one's self, and embodied self-awareness is simply *being*.

Craig defines interoception as the sense of the physiological condition of the material body. This includes autonomic sensory nerve input from the body as well as pain and touch perception. It is neuro-anatomically distinct from proprioception, which is

the perception of how the body is positioned relative to the world outside the body (Craig, 2003).

Self-awareness is an emotional experience, too. We do not solely perceive coolness or warmth, we relate to the coolness (which feels very differently if we are in the snow, or if we are on a sunny beach). Likewise, feeling a sensation of warmth may be very appealing and comforting (an emotional experience) if we had just taken a plunge into cold water on New Year's Day (Fogel, 2009). Experiencing one's emotions in the present moment is very much embodied self-awareness (Fogel, 2009). Emotion was not explicitly conceptualized and discussed in every article reviewed for this project. However, emotion is assumed to be an aspect of self-awareness in all cases except for extreme mental illness or lack of emotional experience or responsiveness.

Physicality refers to the fact that whether self-awareness was focused on physical or emotional aspects of one's person; in all cases the individual's alive physical body is requisite. Literally, a person must be alive, with physical and mental functions intact, in order to be self-aware.

Case Studies

Cases are presented to further define and describe the concept of self-awareness. Model cases are those that are most certainly an instance of the concept. Borderline cases are examples that contain most of the defining attributes of the concept, but not every attribute. Contrary cases are clear examples of how the concept is not defined (Walker & Avant, 2011).

Model Case

Patient A presents to an outpatient private clinic for acupuncture care. She tells her practitioner that her left leg has been hurting her for weeks (physicality). She notes that her left leg and right leg feel very different from one another (interoception). She states, "I wish I could just pop off my left leg, you know, like a Barbie doll. It hurts me so much, and it feels so different from the rest of my body. It sometimes feels dead, like dead weight. And it hurts a lot (self-directed perception)." She receives acupuncture and returns for a follow-up visit the following week. At the return office call, the patient states, "I cannot believe how my leg feels! I feel totally different! Now my two legs feel the same (interoception). The left one is not heavy and dead-feeling anymore. I feel more relaxed and happy without all that pain, too (emotion)." Patient A is in tune with her body and notes the changes in how her leg feels before and after receiving treatment. She perceives her feelings of happiness and joy when her pain is reduced.

Borderline Case

Patient B presents to an outpatient private clinic for care for primary dysmenorrhea (physicality). She tells her clinician that her periods are very painful, and sometimes the pain makes her catch her breath (interoception), but she tries to ignore the pain to get through her day (patient tries not to engage in self-directed perception). She only notices uterine cramping "when it gets to the point that I'm doubled over in pain and just cannot even walk. But before that point, I don't really feel anything. It is weird, like my pain goes from zero to sixty. When I am in pain, it sometimes makes me

cry, but I'm calm otherwise (emotion).” In this case, Patient B ignores interoceptive pain signals until her pain levels are so intense that she is writhing in pain.

Contrary Case

Patient C presents to an outpatient private clinic (physicality) for acupuncture to treat his back pain (interoceptive awareness, physicality). He asks the clinician, “Do you think I have bone metastases? I have had bad pain for two days now (somatic amplification, somatization)!”. Patient C does not engage in self-directed perception that remains in the realm of solely perceiving one’s symptoms. Rather, this patient is experiencing back pain and assuming the worst-case scenario and engaging in somatic amplification, which is experiencing normal visceral stimuli as rather intense, bothersome, or noxious (Callegari et al., 2007).

Antecedents and consequences

Antecedents are events or incidents that must occur prior to the concept occurring (Walker & Avant, 2011). In the case of self-awareness, antecedents are developmental process, age, education, bodily integrity, cognitive functioning, functional capacity of the nervous system to interocept, and capacity to perceive and to reflect. Developmental process and age refer to an individual’s changing self-reflection depending on his/her age, maturity, and developmental stage. Bodily integrity refers to having an intact body with the capacity to feel and for those feelings to be perceived by functional neurologic and cognitive systems. Lastly, a person must possess an ability to perceive and reflect on what they have perceived.

On the other hand, consequences are events or incidents that must occur after the concept, or as a result or outcome of the concept (Walker & Avant, 2011). Consequences of self-awareness include the evaluation of symptoms along a continuum from mild to moderate to severe, bothersome, or interfering. Self-awareness may affect symptom appraisal and influence subsequent health-seeking behaviors, such as self-care, seeking healthcare, or pursuing unhealthy behaviors such as drinking alcohol or using illegal drugs to mask or evade perceived symptoms.

Empirical Referents

Empirical referents are defined by Walker & Avant (2011) as “classes or categories of actual phenomena that by their existence or presence demonstrate the occurrence of the concept itself...they are the means by which you can recognize or measure the defining attributes” (p. 168). Four general characteristics were identified as defining attributes: *self-directed perception*, *interoception*, *emotion*, and *physicality*. One type of empirical referent is artistic expression, such as music, art, or literature. Many artistic endeavors have been devoted to the expression of an artist’s changing self-awareness. In a clinical setting, clinicians may observe their patient’s discussions of how they perceive or experience their body, much as the case studies above outlined patient experience. Clinicians may take note whether their patient describes cognitive self-awareness (thinking about their symptom experience) or embodied self-awareness (being in the experience of perceiving symptoms).

Researchers have developed questionnaires to measure concepts similar to self-awareness. The Somatic Interpretation Questionnaire, developed by Robbins and

Kirmayer (1991), is a tool to assess individuals' preference for different types of causal explanations for physical symptoms: somatic, psychological, or normalized attribution (Robbins & Kirmayer, 1991). Mehling and colleagues developed the Multidimensional Assessment of Interoceptive Awareness (MAIA) which assesses eight dimensions of body awareness (noticing, not distracting, not worrying, attention regulation, emotional awareness, self-regulation, body listening, and trusting) (Mehling et al., 2012). Body awareness is very similar to self-awareness as defined in this paper and is a term more frequently used in the somatic literature. Fenigstein and colleagues developed the Self-Consciousness Scale in the 1970s, which contains a subscale called *private self-consciousness* (Fenigstein et al., 1975). Subsequent researchers identified two factors that comprise the private self-consciousness scale: internal states awareness (ISA) and self-reflectiveness (SR) (Trapnell & Campbell, 1999). ISA is an adaptive and healthy form of self-awareness, whereas SR is similar to somatic amplification.

Additional Views and Related Concepts

There are several concepts that are related yet distinct from the concept of self-awareness, as well. Somatization and somatic amplification (SA) are different terms used for the same meaning: an exaggerated focus on physical symptoms, in that relatively everyday bodily sensations are interpreted as noxious, agitating, intense, or bothersome (Carpenter et al., 2014; Fogel, 2009; Lakhan & Schofield, 2013). The Somatosensory Amplification Scale has been developed and administered to midlife women, and SA was significantly correlated with HF interference, perceived control over HFs, sleep, and mood disturbance (Carpenter et al., 2014). SA is maladaptive, an

abstract and ruminative self-focus, as compared to self-awareness, which is learning to regulate one's attention to immediately-experienced feelings and sensations. An individual may interpret his/her sensations of abdominal tension or fullness as an ulcer, for example. In one study of menopausal women, those with higher somatization scores tended to over-report hot flashes and night sweats (Thurston, Blumenthal, Babyak, & Sherwood, 2005). In a pilot study, Hunter and colleagues found that somatic amplification was associated with negative beliefs (Hunter & Haqqani, 2011). Somatic amplification might be considered as conceptual self-awareness gone awry.

Dissociation might be considered to be at the far end of a continuum from self-awareness. The experience of self-awareness involves sensing our bodies and our emotions in the present moment. Dissociation involves not feeling one's body, and perhaps not even noticing one's environment. Dissociation is also different from somatic amplification, in which an individual feels bodily sensations, but an exaggerated focus, as well as rumination and catastrophic outcomes beliefs are held (Cioffi, 1991).

Discussion

Developmental psychology literature initially attempted to determine the point in time at which a person recognized his or her own self as themselves. Early studies involved putting rouge on a two year-old child's nose, having them look in the mirror, and observing if the child touches his/her own nose after seeing themselves in the mirror. The implication would be that the child realized the rouge was on his or her nose after seeing their reflection (Amsterdam, 1972). More recent work has explored the nuances in recognition of self and other occurring before the second year of life, and

even during gestation. The time at which an individual begins to recognize self seems to occur even before birth. Dynamic 4D ultrasound imaging has demonstrated that the fetal mouth opens in anticipation if a hand comes near it (Myowa-Yamakoshi & Takeshita, 2006). Due to the importance of self-awareness to human growth and development, determining a clear operational definition of self-awareness is merited, given that the literature reviewed here utilizes a wide berth of varying definitions. The operational definition of self-awareness is self-directed perception, interoception, emotion, and physicality.

Study Limitations

Self-awareness is a complex topic, and as such the operational definition proposed here must be tested to determine its utility. It is plausible that the definition may need to be refined over time, as it is applied in clinical research settings. Likewise, evaluating such a complex topic by reviewing a broad literature may have yielded an overly-broad definition. However, self-awareness has been pondered since antiquity, suggesting that casting a wide net for relevant articles would best net suitable information for this analysis.

Another limitation of this study is that culture is not explicitly studied or discussed. Self-awareness may vary by culture and cultural norms, and this has neither been studied nor discussed in the present concept analysis. It would certainly merit future study and evaluation.

Implications for Nursing and Healthcare

Self-awareness is operationally defined as self-directed perception and interoception, including one's emotions and physicality. It is not only a cognitive experience of *thinking* about one's symptoms or pain, but also an embodied experience of *being*. This concept may prove useful as a testable and mutable component that could be employed in intervention studies. For example, studies of chronic pain could introduce a self-awareness intervention that encourages participants to be present with their sensations of pain, to observe them. Participants could also be educated about somatic amplification, and to stay in a place of non-judgement and non-amplification about their chronic pain. Once better understood, these principles would be straightforward for nurses and other clinicians to utilize in a variety of clinical settings to help patients and improve outcomes.

Notes to Chapter II

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CHAPTER THREE

DISTINGUISHING BALANCED SELF-AWARENESS AND RUMINATION: ASSESSING SELF-CONSCIOUSNESS SCALE VALIDITY

Abstract

Background. The Self-Consciousness Scale (SCS) assesses the tendency to direct one's attention inward or outward and has been utilized since the mid-1970s (Fenigstein et al., 1975). The scale initially included three subscales: private self-consciousness, public self-consciousness, and social anxiety. Researchers subsequently identified two factors to comprise private self-consciousness: internal state awareness (ISA) and self-reflectiveness (SR), resulting in a four-factor structure to the scale. ISA is designed to measure reflection, or balanced self-awareness; SR is designed to measure rumination, or self-absorption. A five-factor model has also been identified and includes ISA, SR, social anxiety, and two factors comprising public self-consciousness: appearance self-consciousness and style self-consciousness.

Objectives. The purpose of this study was to evaluate the SCS factor structure and construct validity with data collected from a community sample of midlife women. It was hypothesized that a four-factor model would best fit the data. These analyses are undertaken to determine if the SCS is a reliable and valid measure of self-awareness and rumination in a sample of midlife women.

Method. A confirmatory factor analysis was conducted on data collected from 232 women participating in the Seattle Midlife Women's Health Study (SMWHS). Data collected included the Self-Consciousness Scale. Items used for construct validity analyses were from the Symptom Checklist-90-Revised (three subscales of the SCL-90-R: somatization, obsessive-compulsiveness and hostility), Life Orientation Test-Revised (LOT-R subscale: optimism), the Center for Epidemiologic Studies-Depression (CESD), and questions regarding anxiety, coping, and stress.

Results. Confirmatory factor analyses did not confirm any of the factor models. The ISA and SR subscales both demonstrate good fit indices, with ISA being established with CFI=1.00; TLI=1.03; RMSEA=0.00, while fit indices for SR were CFI=1.00; TLI=1.03; RMSEA=0.00. Good fit was also demonstrated when ISA + SR subscales were evaluated together (CFI=.95; TLI=.94; RMSEA=.05). Construct validity correlations were as hypothesized: SR significantly positively correlated with anxiety (.25, <.001), depression (.18, p<.05), and hostility (.21, p<.01); ISA was not correlated with psychological concepts; and public SC was positively correlated with somatization (.71, p<.05) and obsessive-compulsiveness (.76, p<.05). Additionally, ISA and SR were significantly positively correlated with one another (.41, p<.001).

Conclusion. This analysis did not confirm any of the factor models, and relationships between ISA, SR and public SC were identified in the construct validity analyses. The ISA and SR subscales appear to measure distinctly different concepts in a valid way. It is reasonable to use the ISA and SR subscales to assess concepts of balanced self-awareness (ISA) and rumination (SR). However, if all the concepts evaluated by the

SCS were to be assessed in a future study, the scale as a whole is of concern as we were not able to confirm the overall factor structure.

Background

Fenigstein, Scheier, and Buss developed the Self-Consciousness Scale (SCS) in the 1970s to assess self-consciousness, the consistent tendency of persons to direct attention inward or outward (Fenigstein et al., 1975). Self-consciousness has been defined by some authors as a trait while self-awareness has been defined as a stable state (Duval & Wickland, 1972; Fenigstein et al., 1975). Investigators have employed this scale in many studies over the years to study carotid atherosclerosis (Matthews, Owens, Kuller, Sutton-Tyrrell, & Jansen-McWilliams, 1998), self-objectification (Ainley & Tsakiris, 2013), and well-being (Harrington & Loffredo, 2011). Fenigstein and colleagues originally specified three subscales: private self-consciousness (SC), defined as paying attention to one's thoughts and feelings; public SC, which is thought to measure chronic awareness and concern over the self in a social setting; and social anxiety, defined as discomfort experienced in the presence of others.

Subsequently, several investigators identified and confirmed that four-factor (Anderson et al., 1996; Burnkrant & Page, 1984; Mittal & Balasubramanian, 1987; Piliavin & Charng, 1988) and five-factor models (Mittal & Balasubramanian, 1987) better fit their datasets. The four-factor model included public SC, social anxiety, and two factors that comprise private SC: internal states awareness (ISA) and self-reflectiveness (SR). The five-factor model included appearance SC (worrying about one's behavioral aspects of their public image) and style SC factors (worrying more about one's external

appearance) as sub-factors of the public SC subscale as well as ISA, SR, and social anxiety.

ISA and SR have been described in detail in the decades since Burnkrant and Page (1984) first identified them. ISA has been further defined as *balanced self-awareness*, indicating a more neutral and positive style of self-consciousness (Anderson et al., 1996). ISA has also been defined as *reflection*, indicating a positive or at least neutral state of self-evaluation (Trapnell & Campbell, 1999).

In all, ISA is a self-reflective trait; it is a neutral to positive type of self-awareness shown to have negatively correlated relationships with depression, anxiety, low self-esteem, and pessimism (Anderson et al., 1996; Chang, 1998; Trapnell & Campbell, 1999). Self-awareness has been defined as encompassing self-directed perception, interoception, emotion, and physicality (Taylor-Swanson, in prep). This could be restated as self-awareness being an emotion-filled perception or experience of one's being with respect to the environment. A concept similar to ISA is *mindfulness*, defined by Baer as a multi-factor concept including non-reacting to inner experience, observing sensations/perceptions, acting with awareness, labeling with words, and non-judging of experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Mindfulness-based stress reduction and cognitive behavioral therapy interventions have been associated with decreased symptom burden or bother and posit mindful attention as an active component in the reduction of symptom bother (Ayers et al., 2012; J. F. Carmody et al., 2011).

SR has been defined as *self-oppression*, a type of self-mistrust (Anderson et al., 1996) or *ruminatation* (Trapnell & Campbell, 1999) and indicates self-absorption. SR has

been positively correlated with depression, anxiety, low self-esteem, and pessimism (Anderson et al., 1996; Chang, 1998; Trapnell & Campbell, 1999). Concepts related to SR are somatization and somatic amplification. *Somatization* is a process by which people become overly absorbed in and amplify their inner experiences and may even worry that their sensations are signs of disease (Fogel, 2009). An individual may interpret her/his sensations of abdominal tension or fullness as an ulcer, for example. Thurston found that women with higher somatization scores tended to over-report hot flashes and night sweats (subjective compared to objective measures of hot flashes and night sweats) (Thurston et al., 2005). In a pilot study, Hunter and colleagues found that somatic amplification, anxiety, and body mass index were associated with negative beliefs about hot flashes and night sweats (Hunter & Haqqani, 2011). Somatization might be considered as similar to rumination gone awry.

Research is needed to evaluate if there is a specific role of self-awareness – both healthy self-awareness (ISA) and unhealthy rumination or self-reflection (SR) – in symptom perception. If self-awareness is a mutable cause or aspect associated with increased symptom bother, it is plausible to design interventions with the aim of decreasing symptom bother via changes in self-awareness. As noted above, mindfulness research posits mindful attention as a part of what “works” in mindfulness interventions. However the science has yet to fully explore self-awareness as a mutable cause of increased or decreased symptom bother perception. A valid and reliable measure of self-awareness is needed for this program of research. The purpose of this study is to determine if the four-factor structure that includes ISA and SR has a strong

model fit in a sample of midlife women, and if it might be worthwhile to employ such an instrument in future research programs.

Confirmatory factor analysis was employed in the current study to determine if the factor structure established in prior studies is replicated (Anderson et al., 1996; Burnkrant & Page, 1984; Chang, 1998). We hypothesized that a four-factor model would demonstrate the best fit as ISA and SR factors are thought to reflect distinctly different ways of being and therefore could not comprise a single factor (private SC). To this end, the aims of this study were to:

1. Replicate confirmatory factor analyses with three-, four-, and five-factor models.
2. Determine the construct validity of ISA, SR, public SC, and social anxiety by assessing their relationship to anxiety (single item); coping (single item); depression (CESD); optimism and pessimism (LOT Scale); and somatization, interpersonal sensitivity, and hostility (SCL-90-R).

Method

Sample

Participants were drawn from the Seattle Midlife Women's Health Study (SMWHS), a longitudinal study of midlife women. The SMWHS has been described in detail elsewhere (Mitchell & Woods, 2011). Women entered the study between 1990 and 1992. Eligibility for the parent study included females ages 35-55 with at least one ovary who had experienced a period within the previous 12 months, were not pregnant

or lactating, and were able to speak and read English. After an initial in-person interview (n=508) with a registered nurse specifically trained to interview, participants began providing annual data in the form of a health diary, questionnaire, and menstrual calendar (n=390).

Eligible participants for this study (n=232) were those who completed an annual health report in 1997 and 2000. Women were either in the late reproductive, early or late menopausal transition (MT) stages, or within 5 years of the final menstrual period (FMP) during the course of the study. Women not eligible for this study included those who did not complete an annual health report in 1997 and 2000.

The women who were eligible for inclusion were midlife women with a mean age of 41 years (SD=4.27) years at the beginning of the study, 16 years of education (SD=2.764), and a median family income \$37,400 (SD \$14,400). Most of the eligible participants were currently employed (87%); most were parents (69%); and 72% married or partnered, 21% divorced or widowed, and 7% never partnered or married. Eligible women described their ethnicity at the start of the study as 6.5% African American, 8.6% Asian American, 83.6% Caucasian and 1.3% as Hispanic or other. Refer to Table 3.1 for a comparison of those women eligible for this study and those considered ineligible. As demonstrated in Table 3.1, the two groups are of similar age. Women included in these analyses had slightly more education and higher annual income and were more likely to be white than those who were not eligible. The two groups were similar with respect to employment and marital status.

Measures

The concepts included in this study are: balanced self-awareness, rumination, public SC, social anxiety, anxiety, optimism, coping, depression, somatization, interpersonal sensitivity, and hostility.

We administered the SCS, which contains 23 items that span up to five subscales: private SC (comprised of ISA and SR in the four- and five-factor models), public SC (comprised of appearance SC and style SC in the five-factor model), and social anxiety. Participants completed the scale by rating each of 23 items from 0 (extremely uncharacteristic) to 4 (extremely characteristic). Three items required reverse scoring. The SCS was found to be reliable (23 items; $\alpha = .81$). Examples of items from each scale:

- The private SC subscale is composed of 10 items (e.g., “I reflect about myself a lot”).
- ISA is composed of four items (e.g., item 3: “I’m generally attentive to my inner feelings”).
- SR is composed of six items (e.g., “I sometimes have the feeling that I’m off somewhere watching myself”).
- Public SC is comprised of seven items (e.g., “I’m concerned about what other people think of me”).
- Appearance SC is assessed by three items (e.g., “I’m usually aware of my appearance”).
- Style SC is assessed by four items (e.g., “I’m concerned about the way I present myself”).

- Social Anxiety is assessed by six items (e.g., “Large groups make me nervous”).

Anxiety was assessed with a single question from the annual health report:

“Think back over the past two days and rate overall how severe was each symptom listed below – anxiety.” It was rated between 0 and 4 (0 not present, 1 minimal, 2 mild, 3 moderate, 4 extreme).

Optimism was measured using The Life Orientation Test-Revised (LOT-R), a 10-item measure of optimism versus pessimism, which was administered to participants. Of the 10 items, three measure optimism, three measure pessimism, and four serve as fillers. Respondents rate each item on a 4-point scale: 0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, and 4 = strongly agree. Higher scores indicate increased optimism (Scheier, Carver, & Bridges, 1994).

Coping was assessed with a single question from the annual health report (“describe ability to cope with demands”) that was ranked 1 to 5: a lot worse, little worse, the same, little better, a lot better.

Depression was assessed with the Centers for Epidemiological Studies-Depression scale (CESD) (Radloff, 1977). A mean score for the scale was used.

Somatization, obsessive-compulsiveness, and hostility were measured with the Symptom Checklist-90-Revised (SCL-90-R). The SCL-90-R is a 90-item self-report inventory developed from the MMPI. It is designed to measure psychopathology in samples of outpatients. The women rated each item on a 0 to 4 scale, where 0 was not at all and 4 was extremely. The SCL-90 has nine symptom scales; of these, somatization, obsessive-compulsiveness, and hostility are utilized in this study (Derogatis & Unger, 2010).

Analysis

Confirmatory factor analyses using Stata 14 (StataCorp LP, 2015) were used to test whether a three-factor, four-factor or five-factor model best fit the data. Each factor was initially evaluated for fit indices including chi square, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). The chi-square goodness of fit statistic assesses the magnitude of variance unexplained by the model, with a non-significant statistic indicating good fit. The chi-square index is sensitive to sample size, and since our sample was of a moderate size, we also included CFI and TLI fit indices that account for sample size. CFI and TLI values above .90 suggest a good fit of the model to the data. RMSEA values below .05 suggests well-fitting models also (Browne & Cudeck, 1993). In cases where fit indices were poor, modification indices were examined and changes were made to attempt to improve model fit. These changes included allowing correlated error between two items and are noted in Table 3.2 by asterisks. Shared correlated error was only allowed if the two items were of the same factor.

Pearson's correlations were calculated for ISA, SR, public SC, social anxiety, and psychological concepts of anxiety, optimism, coping, depression, somatization, interpersonal sensitivity, and hostility. These data are in Table 3.4.

Results

Confirmatory Factor Analysis of the SCS

All items were analyzed with confirmatory factor analysis (CFA). Unlike exploratory factor analysis, in which plausible factors are as yet unknown, use of confirmatory factor analysis is suitable due to prior studies establishing factors for the SCS (Anderson et al., 1996; Burnkrant & Page, 1984; Cramer, 2000; Mullen & Suls, 1982). CFA begins with an a priori hypothesized model and ascertains its feasibility as compared to other models. Factor loadings and standardized error were calculated for each of the 23 items. The factor loadings are grouped according to the four-factor model: ISA, SR, private SC, and social anxiety. Please refer to Table 3.2.

Based on past studies, the following three models were evaluated, with the hypothesis that a four-factor model would best fit the data:

1. Three factor – private SC (items 1, 3, 5, 7, 9, 13, 15, 18, 20 & 22), public SC (2, 6, 11, 14, 17, 19, 21), and social anxiety (items 4, 8, 10, 12, 16, 23).
2. Four factor – internal states awareness (items 3, 13, 20, 22), self-reflectiveness (items 1, 5, 7, 9, 15, 18), public SC (items 2, 6, 11, 14, 17, 19, 21), and social anxiety (items 4, 8, 10, 12, 16, 23).
3. Five factor – internal states awareness (items 3, 13, 20, 22), self-reflectiveness (items 1, 5, 7, 9, 15, 18), style SC (items 2, 6, 14, 19), appearance SC (items 11, 17, 21), and social anxiety (items 4, 8, 10, 12, 16, 23).

The three-factor model was evaluated first with each factor (private SC, public SC, and social anxiety) independently tested. The fit indices were not good when private SC was run with items 1, 3, 5, 7, 9, 13, 15, 18, 20, and 22. The largest modification indices indicated that the model fit might be improved by allowing correlated error between items 3 and 13, after which the chi-square was still statistically significant and RMSEA

>.05, indicating poor fit. No other modification indices were employed as none made sense empirically, and to do so may have resulted in over-fitting the model. The same method was applied to public SC, which was run with items 2, 6, 11, 14, 17, 19, and 21. Initial model fit was poor, and modification indices suggested improvement in model fit would be obtained by allowing correlated error between items 17 and 21. Allowing shared correlated error did render a good-fitting model. Social anxiety model fit (run with items 4, 8, 10, 12, 16, and 23) was improved by allowing correlated error between items 4 and 16. After each individual factor was tested, all three were run together to test the fit of the three-factor structure. Correlated error was allowed as above for all three factors; however, model fit for the whole three-factor model was still poor ($X^2 = 452.54$ (224), $p < 0.001$, CFI 0.79, TLI 0.77, RMSEA 0.07).

The four-factor model was evaluated in a stepwise fashion similar to the evaluation of the three-factor model. ISA was evaluated with items 3, 13, 20, and 22. Initial model fit was sufficient, and no modification indices were generated. Model fit was indicated by $X^2 = 1.65$ (2), $p < 0.59$, CFI 1.0, TLI 1.03, and RMSEA 0.00). SR was evaluated using items 1, 5, 7, 9, 15, and 18. Model fit was good without any modification indices ($X^2 = 4.32$ (9), $p < 0.89$, CFI 1.0, TLI 1.03, RMSEA 0.0). Public SC was evaluated using items 2, 6, 11, 14, 17, 19, and 21. Initial model fit was not good, and modification indices were followed to allow correlated error between items 17 and 21 (as in the three-factor model). Fit indices were still poor, but additional modification indices were not employed in order to avoid over-fitting the model. Social anxiety was evaluated with items 4, 8, 10, 12, 16, and 23. As with public SC, modification indices were indicated similarly to the three-factor model, and correlated error was allowed to be shared

between items 4 and 16. With this modification, fit was acceptable ($X^2=10.50$ (8), $p<0.23$, CFI 0.99, TLI 0.98, RMSEA 0.04). However, when the entire four-factor model was evaluated, even with the modification indices as noted for individual factors, the overall model fit was poor ($X^2=428.82$ (222), $p<0.001$, CFI 0.810, TLI 0.786, RMSEA 0.07).

Lastly, the five-factor model was evaluated in similar fashion to the three- and four-factor models. Initial assessments of ISA and SR were as in the four-factor model; neither factor required modification nor had problems with acceptable fit at the onset. Appearance SC was tested with items 11, 17, and 21, and demonstrated poor model fit; no modification indices were calculated by Stata. Style SC was evaluated with items 2, 6, 14, and 19, and initial poor model fit was improved with allowing shared correlated error between items 2 and 6. This improved model fit ($X^2=10.50$ (8), $p<0.23$, CFI 0.99, TLI 0.98, RMSEA 0.04). However, when the entire five-factor model was evaluated, even with the modification indices as noted for individual factors, the overall model fit was poor ($X^2=428.506$ (218), $p<0.001$, CFI 0.809, TLI 0.778, RMSEA 0.071).

Scale Intercorrelations

Several researchers have assessed correlations of ISA and SR with other mental health concepts. SR correlates positively with anxiety and depression (Anderson et al., 1996; Watson & Biderman, 1993) and correlates negatively with self-esteem (Piliavin & Chang, 1988) and optimism (Chang, 1998), whereas ISA correlates negatively with anxiety and depression (Anderson et al., 1996) and positively with self-esteem (Piliavin

& Charng, 1988) and optimism (Chang, 1998). Based on this literature, we hypothesized that we would observe significant correlations of the following:

1. ISA would positively correlate with increased levels of coping with demands and increased optimism and not correlate with increased levels of anxiety, depression, somatization, obsessive-compulsiveness, and hostility.
2. SR would negatively correlate with increased levels of coping and optimism and positively correlate with increased levels of anxiety, depression, somatization, obsessive-compulsiveness, and hostility.

As demonstrated in Table 3.4, several hypotheses are supported by these data. SR is significantly positively correlated with anxiety (.25, $p < .001$), depression (.18, $p < .05$), and hostility (.21, $p < .01$). Public SC is significantly correlated with somatization (.71, $p < .05$) and obsessive compulsiveness (.76, $p < .05$). Table 3.4 does not illustrate that ISA and SR are significantly positively correlated with one another as well ($r = 0.41$, $p < 0.001$).

Discussion

This analysis did not support any of the three-factor models, and hypothesized relationships between SCS subscales and psychological concepts were identified in the construct validity analyses. We hypothesized a four-factor model would best fit the data, confirming several prior studies of the SCS (Burnkrant & Page, 1984; Chang, 1998); this hypothesis was not supported. We found that individual factors displayed good model fit, specifically ISA, SR, public SC, style SC, and social anxiety. Good fit indices were

also observed when ISA and SR were modeled together. It is plausible that the five-factor model may have had better overall model fit if the appearance SC factor were structured differently as it is comprised of three items only. This is a limitation of this study and of the scale.

These data demonstrate that ISA and SR do examine distinctly different concepts, as is indicated by both individual factor fit indices and construct validity analyses. However, if all the concepts evaluated by the SCS were to be assessed in a future study, the scale as a whole is of concern as we were not able to confirm the overall factor structure. Concern about the validity of this scale has been expressed by various authors over the decades (Burnkrant & Page, 1984; Cramer, 2000; Watson, Morris, Ramsey, Hickman, & Waddell, 1996).

To our knowledge, the SCS has been administered to samples of midlife women in two prior studies. Burnkrant and Page (1984) evaluated the SCS with confirmatory factor analysis and identified ISA and SR as distinct factors that comprise private SC. The 360 adult women (mean age not reported) in their sample for study 1 were contacted through a church. Matthews et al. (1998) sampled 200 women who were menopausal for five or more years (mean age at baseline = 47.3 years) and examined carotid artery atherosclerosis. They administered the public SC subscale and found that women high in the traits of anger and holding in their anger, and who had higher public SC and hostile attitudes, had higher carotid artery thickness scores after 10 years. In our sample, public SC and hostility were not significantly correlated, however SR and hostility were significantly correlated (.213, $p < .01$). Our study was also unable to replicate Burnkrant and Page's four-factor model (1984).

In the years subsequent to the development of the SCS, several scales have been developed to measure concepts similar to self-awareness (body awareness and interoceptive body awareness) and rumination (somatization). The Somatic Interpretation Questionnaire, developed by Robbins and Kirmayer (1991), is a tool to assess individual preferences for different explanations for physical symptoms: somatic, psychological, or normalized attribution (Robbins & Kirmayer, 1991). Mehling and colleagues developed the Multidimensional Assessment of Interoceptive Awareness (MAIA), which assesses eight dimensions of interoceptive body awareness (noticing, not distracting, not worrying, attention regulation, emotional awareness, self-regulation, body listening, and trusting) (Mehling et al., 2012). Price and colleagues developed the Scale of Body Connection (SBC) with subscales to measure *body awareness* and *bodily dissociation* (Price & Thompson, 2007). Body awareness is very similar to self-awareness as defined here and is a term more frequently used in the somatic or bodywork literature (Schmalzl, Crane-Godreau, & Payne, 2014). The SBC has been used in studies examining Mindful Awareness in Body-Oriented Therapy (MABT), a manual, touch-based therapy, in populations such as women in substance-abuse treatment (Price, Wells, Donovan, & Rue, 2012) and individuals with HIV infection and concomitant emotional distress (Price, Diana, Smith-Dijulio, & Voss, 2013).

It is plausible that the MAIA instrument might be suitable to employ in the context of assessing interventions that affect symptom perception and symptom evaluation. The MAIA has two subscales that might suitably measure SR (*not distracting* and *not worrying*). The following item examines something akin to somatization: “I start to worry that something is wrong if I feel any discomfort.” Other subscales of the MAIA, such as

emotional awareness, self-regulation, and body listening, parallel ISA and might be a suitable instrument to evaluate ISA. The MAIA was employed in a study of sufferers of chronic lower back pain. Not worrying was correlated with catastrophizing, perceived stress, and depression in individuals with current pain (Mehling et al., 2013). To my knowledge, the MAIA has only been utilized in the context of lower back pain. Research utilizing the MAIA with a sample of midlife women would be helpful to assess validity of the tool in this population.

Likewise, the SBC could be a useful tool to employ in future research studies. With only two subscales and fewer items than the MAIA (20 versus 32 items), the SBC would be useful if fewer items were necessary to retain participants. The SBC would also be appropriate to study strictly two dimensions, *body awareness* and *bodily dissociation*. The MAIA would be appropriate if the research questions called for nuanced aspects of self-awareness and somatization. Regardless, both scales have suitable reliability and validity established and appear to successfully measure self-awareness and somatization separately.

Symptom science is an important focus of the National Institutes of Nursing Research. Much clinical focus is appropriately placed on symptom cure. However, in many diseases and those cases of chronic and multiple serious illnesses, symptom eradication is not tenable. If nursing researchers and health scientists are able to identify mutable causes of symptom burden and bother, suitable and safe interventions can be developed, tested, and employed in nursing practice. It is plausible that rumination (also termed somatization and somatic amplification) may be a mutable cause of increased symptom burden and bother and that interventions targeting

decreased rumination may result in decreased symptom burden and bother. The MAIA and the SBC might be suitable tools to employ in such research endeavors.

In addition to the limitations noted above, another limitation of this study is that culture was not explicitly defined or evaluated. It is plausible that ISA and SR are experienced differently by people of different cultures. To date, researchers have noticed differences in the two factors when comparing and contrasting responses from participants in the USA and Poland (Piliavin & Charng, 1988). Another limit is sample size; it is possible that with a larger sample we may have had more power to determine factor structures inherent in the data.

Table 3.1

Sample Characteristics of Eligible and Ineligible Women in the Confirmatory Factor Analysis of the Self-Consciousness Scale

	Eligible women (n=232)	Ineligible women (n= 276)	
Characteristics	Mean (SD)	Mean (SD)	P ^a
Age, y	41.42 (4.27)	41.97 (4.86)	0.18
Years of education	15.95 (2.76)	15.40 (3.04)	0.04
Family income, \$	37,400 (14,400)	34,700 (15,800)	0.05
Characteristics	n(%)	n(%)	P ^b
Currently employed			0.61
Yes	202 (87.1)	236 (85.5)	
No	30 (12.9)	40 (14.5)	
Race/ethnicity			<0.001
African American	15 (6.5)	43 (15.6)	
Asian/Pacific Islander	20 (8.6)	23 (8.3)	
White	194 (83.6)	197 (71.4)	
Other (Hispanic, mixed)	3 (1.3)	13 (4.7)	
Marital status			0.25
Married/partnered	166 (71.6)	182 (65.9)	
Divorced/widowed/ not partnered	49 (21.1)	76 (27.6)	
Never married/ Partnered	17 (7.3)	18 (6.5)	
^a Independent t test.			
^b χ ² test.			

Table 3.2

Items and Standardized CFA Loadings

	Standardized loading	SE
Internal State Awareness		
3 Generally, I'm not very aware of myself. (Item was reversed for scoring.)	.629	.074
13 I'm generally attentive to my inner feelings.	.610	.073
20 I'm alert to changes in my mood.	.506	.075
22 I'm aware of the way my mind works when I work through a problem.	.405	.078
Self-Reflectiveness		
1 I'm always trying to figure myself out.	.712	.047
5 I reflect about myself a lot.	.829	.040
7 I'm often the subject of my own fantasies.	.313	.070
9 I never scrutinize myself. (Item was reversed for scoring.)	.440	.064
15 I'm constantly examining my motives.	.671	.049
18 I sometimes have the feeling that I'm off somewhere watching myself.	.310	.071
Public Self-Consciousness		

2 I'm concerned about my style of doing things.	.329	.073
6 I'm concerned about the way I present myself.	.541	.061
11 I'm self-consciousness about the way I look.	.568	.058
14 I usually worry about making a good impression.	.757	.046
17 One of the last things I do before I leave my house is look in the mirror.	.318	.072
19 I'm concerned about what other people think of me.	.739	.046
21 I'm usually aware of my appearance.	.350	.070
<hr/> Social Anxiety <hr/>		
4 It takes me time to overcome my shyness in new situations.	.718	.050
8 I have trouble working when someone is watching.	.422	.064
10 I get embarrassed very easily.	.625	.050
12 I don't find it hard to talk to strangers. (Item was reversed for scoring.)	.421	.062
16 I feel anxious when I speak in front of a group.	.722	.049
23 Large groups make me nervous.	.737	.041

Table 3.3

Confirmatory Factor Comparison

	χ^2	df	P	CFI	TLI	RMSEA
Original structure						
Three factors*, **, ***	452.538	224	<0.001	0.792	0.766	0.073
Private*	60.866	34	0.003	0.928	0.905	0.063
Public**	36.753	13	<0.001	0.916	0.865	0.094
Social anxiety ***	10.502	8	0.232	0.991	0.984	0.038
Four factors **, ****	428.82	222	<0.001	0.81	0.786	0.070
ISA	1.65	2	0.587	1.00	1.033	0.000
SR	4.316	9	0.889	1.00	1.033	0.000
Public**, ****	9.474	12	0.662	1.000	1.016	0.000
Social Anxiety**	10.502	8	0.232	0.991	0.984	0.038
Five factors**	428.506	218	<0.001	0.809	0.778	0.071
ISA	1.065	2	0.587	1.000	1.033	0.000
SR	4.316	9	0.889	1.00	1.033	0.000

APP	0.000	0	<0.001	1.000	1.000	0.000
Style ****	0.012	1	0.914	1.000	1.034	0.000
Social Anxiety ***	10.502	8	0.232	0.991	0.984	0.038

* Correlated error allowed between items 3 and 13 (both items located on the private SC subscale).

**Correlated error allowed between items 17 and 21 (both items located on the public SC subscale).

*** Correlated error allowed between items 4 and 16 (both items located on the social anxiety subscale).

**** Correlated error allowed between items 2 and 6 (both items located on the public self-consciousness scale and style consciousness subscale).

APP = Appearance Self-Consciousness

ISA = Internal State Awareness

SR = Self-Reflectiveness

Style = Style Self-Consciousness

Table 3.4

Correlation Matrix of ISA, SR, Public SC and Social Anxiety with Mental Health Concepts

	ISA	SR	Social Anxiety	Public SC
Anxiety	.106	.250***	.357	-.160
Optimism	.098	-.105	-.373	-.527
Coping	.137	.059	.000	.450
Depression	.022	.176*	.623	-.116
Somatization	-.053	.090	.583	.705*
Obsessive- Compulsiveness	.017	.147	.343	.763*
Hostility	.014	.213**	.358	.353
p<0.001 ***, p<.10 **, p<.05 *				

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Notes to Chapter III

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CHAPTER FOUR

THE DEVELOPMENT AND TESTING OF A MODEL OF THE EFFECTS OF ISA, SR, STRESS, ANXIETY, STAGES OF REPRODUCTIVE AGING, HEALTH PERCEPTIONS, AND BELIEFS ON HOT FLASH SEVERITY

Abstract

Background. Although some non-pharmacologic therapies for symptoms (such as yoga or mindfulness-based stress reduction) rely on methods that promote self-awareness, little is known about the relationship of self-awareness and symptom experience, particularly in the symptom evaluation phase. Symptoms may be perceived to be severe, bothersome, or interfering.

Objective. The purpose of this study was to test the effects of internal states awareness (ISA), self-reflectiveness (SR), perceived stress, anxiety, attitudes, beliefs, and menopausal transition stage on hot flash (HF) severity.

Design. Women from the Seattle Midlife Women's Health Study (N=219) provided data for these analyses. Structural equation modeling was used to evaluate ISA, SR, perceived stress, anxiety, attitudes toward menopause, health perceptions, and menopausal stage with respect to HF severity.

Results. The measurement and structural models were tested with a maximum likelihood missing values estimator and displayed good model fit. Significant pathways were demonstrated between MT stage and HF severity ($\beta = .20, p < .01$), perceived stress and attitudes toward menopause ($\beta = -.30, p < .001$), perceived stress and anxiety ($\beta = .63, p < .001$), and SR and perceived stress ($\beta = .51, p < .001$). ISA predicted hot flash severity in a final trimmed model ($\beta = .17, p < .05$).

Conclusion. ISA was predictive of HF severity with a positive relationship, not with a negative predictive relationship, as originally hypothesized. This novel finding merits further study to further clarify how ISA affects symptom evaluation. Stress mediates a causal pathway between SR and attitudes toward menopause as well as SR and anxiety. As SR increases, stress increases, as does anxiety, and attitude worsens. Perceived stress, anxiety, and attitude are plausible targets for future intervention design and testing.

Introduction

As the “baby boom” generation ages, many more women than those from previous generations are entering the menopausal transition (MT), with roughly 40 million women estimated to have reached menopause at the end of the last millennium (Colby & Ortman, 2014). Approximately 65% - 75% of women experience one or more symptoms during the MT (Santoro, 2008). Common symptoms include sleep disturbances, cognitive concerns, pain, mood changes, and hot flashes.

Much research to date has focused on hot flash (HF) frequency, which is an indication of the number of hot flashes experienced. However, hot flashes are experienced by different women as more or less intense or bothersome – essentially, not every HF is equally problematic. For this reason, researchers are examining HF indicators in addition to frequency counts, such as HF severity – the extent to which flashes are experienced as intense or severe. Other similar concepts are HF bother, meaning the extent to which flashes are bothersome and may interfere with activities and affect daily quality of life (Otte et al., 2009), and HF problem, the extent to which hot flashes are problematic (Hunter & Chilcot, 2013). HF severity, HF bother, and HF problem all encompass an *evaluative* aspect of the experience of hot flashes.

Two projects have modeled the topic of *evaluation* and *perception* of hot flashes. First, Hunter and colleagues established a cognitive model accounting for hot flashes and night

sweats (Hunter & Chilcot, 2013). They tested for relationships between stress, anxiety, beliefs (social beliefs, control beliefs and sleep beliefs), hot flash and night sweat (HFNS) perceived frequency, HFNS physiological frequency (HFNS measured by sternal skin conduction), and HFNS problem rating (*evaluated* HFNS). One key finding is that HFNS beliefs were the strongest predictor of HFNS problem rating in the model. Another key finding is that HFNS physiological frequency did not have a relationship to HFNS problem rating. Taken together, this means that cognitive aspects, beliefs, and the experience of HFNS were a major factor in this model, and that physiologic or perceived HFNS did not have a relationship to evaluated HFNS.

Second, a model of objective HF frequency, subjective HF severity, and HF interference established a minimal relationship between objective HF frequency and subjective HF severity and no statistically significant relationship between objective HF frequency and perceived HF interference (Carpenter & Rand, 2008). This finding mirrors Hunter and colleagues' work: we see that symptom *evaluation* (HF interference) and symptom *perception* or *experience* (objective HF frequency) are not directly related to one another in the two models.

From Carpenter and Rand's reports, it would seem that the evaluation of HF severity is distinct from the perception of HF frequency (Carpenter & Rand, 2008). That is, there is a cognitive evaluation of perceived sensory information (physiologic symptoms) that is a separate and distinct process from physically experiencing or perceiving those symptoms (Petersen et al., 2011).

An as-yet unexplored question is whether self-awareness might have a role in a cognitive model of symptom evaluation. Self-awareness, or, more specifically, conceptual self-awareness, is defined by Fogel as "engagement in a thought process of categorizing, planning reasoning, judging and evaluating" perceived symptoms or sensations (Fogel, 2009). Self-awareness is defined by others as an attentional focus on internal body sensations (Mehling et al., 2009) and as encompassing self-directed perception, interoception, emotion, and physicality (Taylor-Swanson, in prep). Fenigstein, Scheier, and Buss developed the Self-Consciousness

Scale (SCS) to evaluate private and public self-consciousness (directing one's attention and thoughts about the self either inward or outward). Private self-consciousness was later identified to be comprised of two sub-scales: Internal States Awareness (ISA) and Self-Rumination (SR) (Fenigstein et al., 1975). ISA is defined as balanced self-awareness, indicating a more neutral and positive style of self-consciousness (Anderson et al., 1996). ISA has also been defined as reflection, indicating a positive or at least neutral state of self-evaluation (Trapnell & Campbell, 1999). SR has been defined as self-oppression, a type of self-mistrust (Anderson et al., 1996) or rumination (Trapnell & Campbell, 1999), and indicates self-absorption. SR has been positively correlated with depression, anxiety, low self-esteem, and pessimism (Anderson et al., 1996; Chang, 1998; Trapnell & Campbell, 1999).

A concept similar to self-awareness is *mindfulness*, defined by Baer as a multi-factor concept including non-reacting to inner experience, observing sensations/perceptions, acting with awareness, labeling with words, and non-judging of experience (Baer et al., 2006). Mindfulness-based stress reduction (MBSR) and cognitive behavioral therapy (CBT) interventions have been associated with decreased symptom burden or bother, positing mindful attention as an active component in the reduction of symptom bother (Ayers et al., 2012; J. F. Carmody et al., 2011). Yoga is also an intervention that promotes interoceptive self-awareness (Gard et al., 2014). Booth LaForce, Thurston, and Taylor (2007) documented a decrease in HF severity but unchanged HF frequency when participants practiced a regular yoga intervention. To date, there has been little empirical testing and no causal modeling of the relationship between self-awareness, other psychological factors, and symptom evaluation. This project aims to fill that gap.

Concepts to be tested in this model, in addition to ISA and SR, include attitudes of continuity towards menopause, health perceptions of resilience, anxiety, and perceived stress. Three of these four concepts have been identified as HF predictors in other studies. Women's negative attitudes toward menopause have been associated with more frequently reported

menopause-specific symptoms (Yanikkerem, Koltan, Tamay, & Dikayak, 2012) and poorer management of symptoms (Kwak, Park, & Kang, 2014) compared to women with positive attitudes. A systematic review located ten studies indicating that women with more negative attitudes towards menopause report more symptoms and three studies without significant association between attitudes and symptoms (Ayers, Forshaw, & Hunter, 2010).

We anticipate a woman's health perceptions regarding her resilience or susceptibility to illness to be predictive of increased HF severity. Drawing from literature on renal disease, an individual's perceptions about her own health, specifically about whether an individual is resistant or susceptible to illness, have been shown to predict adaptation to chronic kidney disease, even more than actual symptoms themselves (Knowles, Swan, Salzberg, Castle, & Langham, 2014). A literature search with "health perceptions" and "menopause" or "midlife women" did not yield any articles. For this reason, it is conceivable that this analysis is one of the first to include the health perceptions resistance and susceptibility subscale (Ware, 1976) in a study of HF severity experienced by midlife women.

Anxiety is associated with the evaluation of hot flashes and night sweats (HFNS) problem rating, rather than HF frequency, in Hunter and colleagues' model (Hunter & Chilcot, 2013). Higher levels of anxiety are also associated with increased HF severity (Mitchell & Woods, in press) and increased years of experiencing hot flashes (Avis et al., 2015). Thus, anxiety is included in the present model in an attempt to determine its possible causal role in HF severity.

There are many papers reporting on the effects of stress on hot flashes and night sweats. Increased levels of perceived stress were found to be associated with longer duration (in years) of hot flashes (Avis et al., 2015). Yet stress is predicted by depressed mood and perceiving one's health as poor; Woods, Mitchell, Percival, and Smith-DiJulio (2009) suggested researchers and clinicians include social circumstances in a woman's life when evaluating the menopausal transition (Woods, Mitchell, Percival, & Smith-DiJulio, 2009).

The current analysis explores the roles of ISA, SR, perceived stress, anxiety, attitudes of continuity toward menopause, health perceptions of resilience, and MT stage on HF severity. We hypothesize that SR and ISA would significantly predict HF severity. Furthermore, we anticipate ISA and HF severity to demonstrate a negative relationship, and for SR and HF severity to demonstrate a positive relationship with one another. We also hypothesize stress to mediate the relationship between SR and HF severity. Stress has been shown to be negatively correlated with private self-consciousness (ISA and SR together comprise the private self-consciousness subscale) in a study of college students. Self-awareness has been demonstrated to have a positive impact during times of stress and has explained resistance to physical symptoms, as well (Ghorbani, Cunningham, & Watson, 2010). Other independent variables (attitudes of continuity toward menopause, health perceptions of resilience, anxiety, and menopausal transition stage) are predicted to have independent and direct relationships with HF severity, as depicted in Figure 4.1.

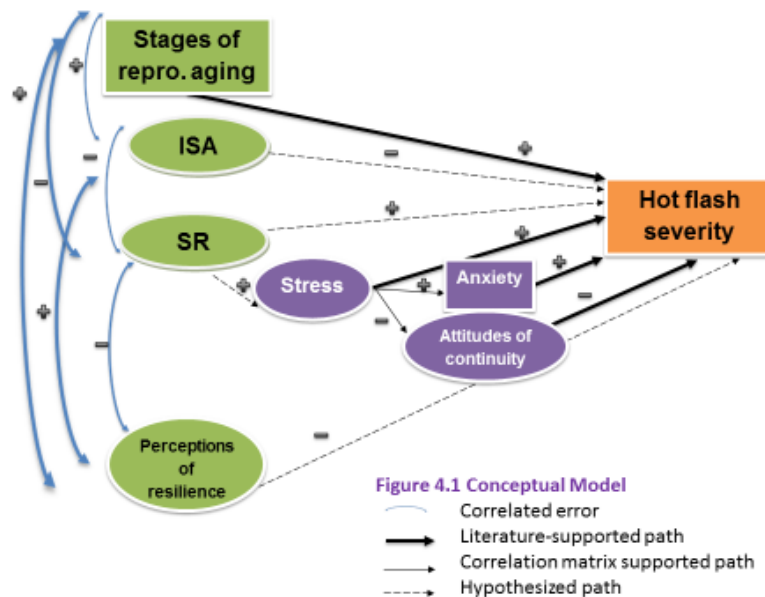


Figure 4.1. Factors hypothesized to influence hot flash severity during the late reproductive stage, menopausal transition, and early post-menopause.

Methods

Sample

Participants were drawn from the Seattle Midlife Women's Health Study (SMWHS), a longitudinal study of women experiencing the menopausal transition. This study has been described in detail elsewhere (Mitchell & Woods, 2011). Women entered the study between 1990 and 1992. Those eligible for the parent study included females ages 35-55 with at least one ovary who had had a period within the previous 12 months, were not pregnant or lactating, and were able to speak and read English. After an initial in-person interview (n=508) with a registered nurse trained to interview, participants began providing annual data in the form of a health diary, questionnaire, and menstrual calendar (n=390).

Eligible participants for this study (n=219) were those who completed an annual health report and monthly health diaries in 1997. Women were either in the late reproductive stage, early or late menopausal transition (MT) stages, or within 5 years of the final menstrual period (FMP) during the course of the study. Women not eligible for this study included those who had a prior hysterectomy, or received chemotherapy or radiation therapy.

The women who were eligible for inclusion had a mean age of 41 years (SD=4.27) years at the beginning of the study, a mean of 16 years of education (SD=2.764), and a median family income of \$37,400 (SD \$14,400). Most of the eligible participants were currently employed (87%), most were parents (69%), 72% were married or partnered, 21% were divorced or widowed, and 7% had never been partnered or married. Eligible women described their ethnicity at the start of the study as 6.5% African American, 8.6% Asian American, 83.6% Caucasian and 1.3% as Hispanic or other. Refer to Table 4.1 for a comparison of women eligible for this study and those determined ineligible. As demonstrated in Table 4.1, all women considered for this study are of similar age. Women included in analyses had slightly more education, a higher

annual income, and were more likely to be white than those who were not eligible for these analyses. The groups were similar with respect to employment and marital status.

Measures

The concepts included in this study are internal states awareness (ISA), self-reflectiveness (SR), perceived stress, anxiety, attitudes of continuity toward menopause, health perceptions of resilience, menopausal transition stage, and hot flash severity.

ISA and SR were assessed by subscales of the Self-Conscious Scale (SCS) (Fenigstein et al., 1975). The SCS was initially designed with three subscales: private self-consciousness, public self-consciousness, and social anxiety. Subsequent researchers identified two subscales to comprise private self-consciousness: internal state awareness (ISA) and self-reflectiveness (SR). The ISA subscale measures the concept of balanced self-awareness, intellectual self-attentiveness, or reflection, and the SR subscale measures the concept of neurotic self-examination or rumination (Trapnell & Campbell, 1999). The SCS possesses adequate internal consistency and test-retest reliability (Fenigstein et al., 1975). Participants completed the SCS, rating each of 23 items from 0 (extremely uncharacteristic) to 4 (extremely characteristic).

Internal state awareness was assessed using the ISA subscale of the SCS, which is composed of four items (e.g., “I’m generally attentive to my inner feelings”). This is used as a latent variable in the structural equation model (SEM) and as a summed index for bivariate correlations, listed in Table 4.2.

Self-reflectiveness was assessed using the SR subscale of the SCS subscale, which is composed of six items (e.g., “I sometimes have the feeling that I’m off somewhere watching myself”). This is used as a latent variable in the SEM and as a summed index for bivariate correlations, listed in Table 4.2.

Anxiety was assessed with a single question from the annual health report (“Think back over the past two days and rate overall how severe was each symptom listed below – anxiety”) and was rated on a scale of 0 to 4 (0 not present, 1 minimal, 2 mild, 3 moderate, 4 extreme).

Perceived stress was assessed with four questions from the annual health report: “During the past month, how much stress, if any, was created by the following areas of your life: job/student, your physical health, family stress, personal stress?” Participants answered from 1 to 4 (none, a little, moderate, a lot). This is used as a latent variable in the SEM and as a summed index for bivariate correlations, listed in Table 4.2.

Attitudes toward menopause were assessed using the Attitudes Toward Menopause (ATM) Extent of Continuity subscale, developed by Neugarten and colleagues (Neugarten, Wood, Kraines, & Loomis, 1963). Three items from the “extent of continuity” subscale were rated from 1 to 4. This subscale was selected as it was in keeping with Hunter’s cognitive model of beliefs regarding control/coping. The ATM subscale items relate to neutrality about the MT (e.g., “Going through the menopause really does not change a woman in any important way”). This is used as a latent variable in the SEM and as a summed index for bivariate correlations, listed in Table 4.2.

Health perceptions were measured using four items that comprise the resistance/susceptibility subscale of the Health Perceptions Questionnaire (HPQ). The items were rated from 1 (definitely false) to 5 (definitely true) (Ware, 1976). This is used as a latent variable in the SEM and as a summed index for bivariate correlations, listed in Table 4.2.

Stages of reproductive aging were used to classify women not taking any type of estrogen or progesterone. Using menstrual calendar data, women were determined to be in the late reproductive, early MT, late MT, or early post-menopause (EPM) stage. Classification is based on staging criteria developed by Mitchell, Woods, and Mariella (Mitchell, Woods, & Mariella, 2000), and validated by the ReSTAGE collaboration (Harlow et al., 2006). Stages include late reproductive (shorter cycles begin with subtle changes in menstrual cycle length),

early transition (increased variability in menstrual cycle length with persistent difference of 7+ days in length of consecutive cycles), late transition (occurrence of amenorrhea of 60 days or longer and menstrual cycles are characterized by increased variability in cycle length, extreme fluctuations in hormonal levels, and increased prevalence of anovulation) and early post-menopause (first 6 years since the final menstrual period). Symptoms are often the most frequent, severe and/or bothersome in the Late Transition (LT) and EPM stages (Duffy, Iversen, Aucott, & Hannaford, 2013; Duffy, Iversen, & Hannaford, 2012; Smith-DiJulio, Percival, Woods, Tao, & Mitchell, 2007).

HF severity was assessed using a single item from the annual health report: “If you had hot flashes or sweats at all in the past three months, how severe were they?” HF severity was scored from 1 to 4 (minimal, mild, moderate, severe).

Statistical Analysis

Descriptive statistics and bivariate correlations for variables in the analysis are shown in Table 4.2. Stata/SE was used for these analyses (v.14, StataCorp LP, College Station, TX). A structural equation model was built with Stata/SE to test the causal model for HF severity. The model related the dependent variable of HF severity with seven independent variables (ISA, SR, anxiety, stress, attitudes of continuity toward menopause, health perceptions of resilience, and MT stage). A multivariate structural model that simultaneously included all dependent and independent variables was built to test direct effects of ISA, SR, attitudes of continuity toward menopause, health perceptions of resilience, anxiety, and MT stage on HF severity, and mediated effects of perceived stress on relationships between SR and HF severity and relationships between ISA and HF severity (Figure 4.1). The structural model’s quality of fit was given by chi-square statistics and fit indices. We were guided by the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA), as

well as modification indices. We followed the conventional guideline of requiring at least two of the following fit indices to fall in the desired range: CFI \geq .90; RMSEA \leq .05; or TLI \geq .90 (Hooper, Coughlan, & Mullen, 2008).

Models were run with maximum likelihood missing values (MLMV) estimator to estimate models with missing data. MLMV was indicated as the data were missing at random (MAR). MLMV is advised over multiple imputation to deal with missing data because it is simpler to implement and gives a deterministic result (Allison, 2003).

Results

Data were drawn from the Seattle Midlife Women's Health Study (SMWHS), a longitudinal study of midlife women. The dataset has been described in detail elsewhere (Woods & Mitchell, 2011). Inclusion criteria included data from women who completed an annual health report at baseline and 2000. Comparing eligible women (N = 219) and ineligible women (N=276), the two groups were of similar age, employment & marital status. Eligible women had more education, higher income and were more likely to be white. Eligible women had a mean age of 41 years (SD=4.27), 16 years of education (SD=2.764), and median family income of \$37,400 (SD \$14,400); 87% were currently employed, 69% were parents, and 72% were married or partnered (72%). The eligible participants reported the following ethnicities: 6.5% African American, 8.6% Asian American, 83.6% Caucasian, and 1.3% Hispanic or other. Menstrual calendars were kept by women and data were used to establish stages of reproductive aging for each woman at each year. Sixty-seven percent of eligible women could be classified into stages of reproductive aging while 8% could not be classified due to them providing inadequate data, taking hormone therapy of some form (24%), undergoing chemotherapy, radiation, or having had a hysterectomy without hormone replacement therapy (1%).

As shown in Table 4.2, bivariate correlations of significance were observed between HF severity and MT stage ($r = .26, p < .01$); HF severity and ISA ($r = .20, p < .05$); SR and ISA ($r = .52, p < .001$); SR and stress ($r = .26, p < .01$); perceived stress and anxiety ($r = .42, p < .001$); perceived stress and ATM ($r = -.27, p < .01$); and Attitudes Toward Menopause (ATM) and Health Perceptions (HP) ($r = .22, p < .05$). The covariance between ISA and SR is significant, suggesting that they together are dimensions of a higher order construct. ISA and SR initially were initially classified as one subscale, private self-consciousness, when the scale was initially developed.

Factor loadings and standardized error were calculated for each of the items that comprise latent variables. The factor loadings are grouped according to latent variable - ISA, SR, perceived stress, attitudes toward menopause, and health perceptions - and are listed in Table 4.3.

A multivariate model with seven independent variables and the dependent variable of HF severity was built and evaluated using Stata 14. Figure 4.2 illustrates the significant and non-significant paths in the structural model relating ISA, SR, perceived stress, anxiety, attitudes of continuity toward menopause, health perceptions of resilience, and menopausal transition stages with HF severity. The model displayed poor fit indices when initially tested. The sample without missing data was $N=115$ (106 observations with missing data excluded). Fit indices included: $X^2(239)=347.21; p < 0.001$; RMSEA=0.06; CFI =.83; and TLI=0.81. The model was then run using MLMV. This resulted in improved fit indices ($X^2(239) = 326.10 p > 0.001$; RMSEA = 0.04; CFI = 0.92; TLI = 0.91). Significant pathways were found including stages of reproductive aging predicting HF severity ($\beta = .20 p < .01$), SR predicting stress ($\beta = .51 p < .001$), stress predicting anxiety ($\beta = .63, p < .001$), and stress predicting attitudes ($\beta = -.30 p < .001$). Covariance between ISA and SR was significant ($\beta = .62 p < .001$).

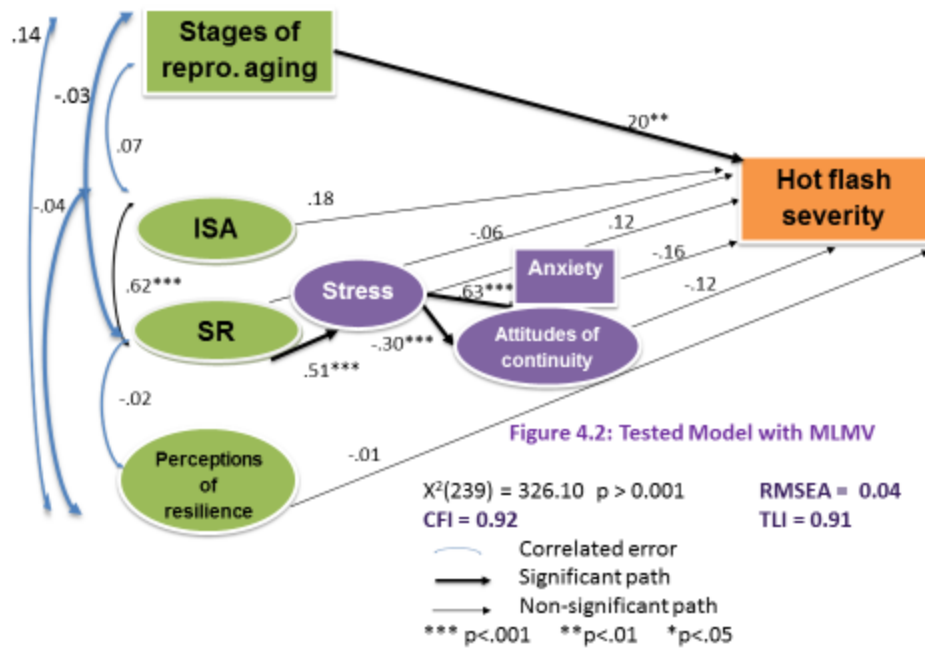


Figure 4.2

Model run with MLMV, standardized B.

Pathways with a value of $p \leq .15$ were trimmed as depicted in Figure 4.3. The model was run again and fit indices were good ($\chi^2(242) = 326.53$ $p > 0.001$; $RMSEA = 0.04$; $CFI = 0.92$; $TLI = 0.91$). The pathway between ISA and HF severity was significant ($\beta = .17$ $p < .05$), and attitudes predicted HF severity ($\beta = -.15$ $p < .05$) in addition to previously identified relationships: stages of reproductive aging predicting HF severity ($\beta = .20$ $p < .01$); SR predicting stress ($\beta = .51$ $p < .001$); stress predicting anxiety ($\beta = .63$, $p < .001$); and stress predicting attitudes ($\beta = -.30$ $p < .001$). Covariance between ISA and SR was significant ($\beta = .62$ $p < .001$).

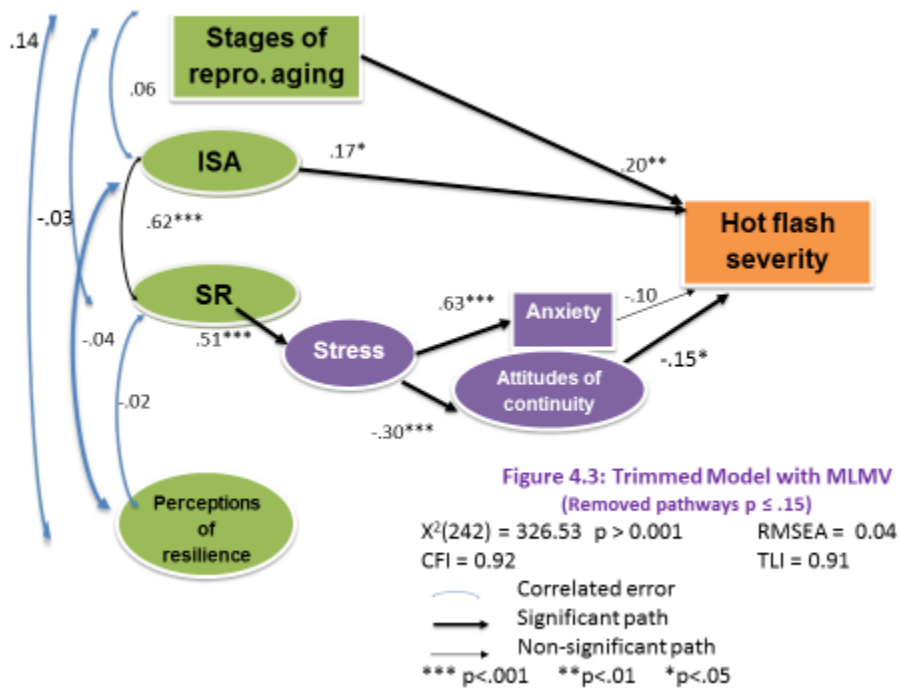


Figure 4.3

Trimmed model, standardized B.

Discussion

Our findings confirm previously established relationships between HF severity and MT stages. Women are more likely to experience increased HF severity in the late menopausal transition and early post-menopause (Freeman et al., 2007; Mitchell & Woods, 2015). ISA predicted HF severity in the trimmed MLMV model. Of interest is the positive relationship between the two variables. We predicted ISA and HF severity to be negatively related to one another – as a woman reported higher levels of ISA, she would report lower levels of HF severity. That is in keeping with the literature on decreased HF bother or severity in response to mindfulness or self-awareness enhancing interventions such as MBSR, CBT and yoga (Ayers et al., 2012; Booth-LaForce et al., 2007; J.

Carmody, Crawford, & Churchill, 2006). Instead, our findings indicate that, as a woman in this sample reported high ISA scores, she was more likely to report high scores of HF severity. It is plausible that as a woman becomes more self-aware (as indicated by higher scores of ISA), she is more “in tune” with her body, and perceives HF sensations as more severe.

In addition, SR predicted stress. SR, or rumination, is very similar to somatization – both indicate an individual worrying about symptoms in the colloquial use of the word “hypochondriac.” It is conceivable that as an individual is ruminating more about her/his symptoms, that s/he may perceive more stress. Variables taking social context into account may have helped illuminate this relationship – whether a woman is experiencing symptom interference with work or relationships, for example, might provide nuanced details about SR and perceived stress. Perhaps a woman whose HF severity interferes with work would display increased SR and worry about her symptoms, and become more “stressed out.” This would have to be tested. Likewise, analyzing for covariates such as work and parenting (studying women of the “sandwich generation”) could illuminate nuances of this finding. In Hunter and Chilcot’s (2013) cognitive model of hot flashes and night sweats, somatization and perceived stress were independent of one another, and both had independent and significant relationships with beliefs. Our findings add further information about these concepts and may shed light on how perceived stress may mediate the relationship between rumination, worsening attitudes toward menopause, and anxiety.

Perceived stress predicted anxiety, replicating findings from the Penn Ovarian Aging Study in which perceived stress predicted irritability, mood swings, and anxiety

(Freeman, Sammel, Lin, Gracia, & Kapoor, 2008). Perceived stress also predicted attitudes of continuity toward menopause. All together, these findings present a pathway of increased SR predicting increased levels of perceived stress, which in turn predicts worsening attitudes and increased anxiety.

In this model, ISA and SR are significantly related to one another, suggesting they are members of a higher-order construct ($B = 0.62$, $p < .001$). These are evaluated by indicators from the SCS, specifically the ISA (balanced self-awareness) and SR (rumination) subscales. These two subscales initially comprised one scale, the private self-consciousness scale (Fenigstein et al., 1975). Subsequent confirmatory factor analysis established the ISA and SR subscales (Burnkrant & Page, 1984); however, there has been much controversy about the precision of the SCS over the decades (Burnkrant & Page, 1984; Cramer, 2000; Watson et al., 1996).

There are several study limitations to consider. We were unable to classify some women's stages as late reproductive, early transition, late transition or early post-menopause, due to an absence of menstrual calendar data, or women taking estrogen or progesterone and subsequently having unclear menstrual patterns.

Additional difficulty in ascertaining significant predictive relationships in this model may be due to the dependent variable, HF severity, being skewed. This may have prevented us from discovering other predictive relationships that would help elucidate more of the nuances of symptom evaluation. This is an inherent limitation of the sample being an observational, community-based sample, and not clinic- or intervention-focused. Another challenge related to this sample is that the data analyzed include observations from 1997, which was fairly early in this longitudinal study

spanning over 23 years. Few women were in the late transition or early post-menopause stage when these data were collected, which is when HF severity tends to be higher. For that reason, the HF severity scores are skewed, with few women experiencing increased levels of HF severity.

In conclusion, the present study revealed relationships of interest between ISA and HF severity and between SR, stress, attitudes of continuity toward menopause, and anxiety. These relationships merit further study both with empirical testing of existing data and designing and testing interventions targeted at psychological aspects of symptom evaluation. For example, examining longitudinal change over time as women progress through the menopausal transition would be of interest, in order to see if there are stage-specific changes in ISA, perceived stress, attitudes of continuity toward menopause, anxiety, and SR. Research is merited to target perceived stress, anxiety, and attitudes of continuity toward menopause. Possible outcomes to study are quality of life and symptom interference with work and relationships. Certainly, as still more women from the baby boom generation enter into menopause, with a great deal of those women in “sandwich roles” between work and multiple family obligations, safe and effective interventions to improve health and decrease symptom severity, bother, and problem would be most welcome. Perceived stress, anxiety, and attitudes of continuity toward menopause are plausible targets for intervention design and testing.

Table 4.1

Sample Characteristics of Eligible and Ineligible Women for Inclusion

	Eligible women (n=232)	Ineligible women (n= 276)	
Characteristics	Mean (SD)	Mean (SD)	P ^a
Age, y	41.42 (4.27)	41.97 (4.86)	0.18
Years of education	15.95 (2.76)	15.40 (3.04)	0.04
Family income, \$ 1997	37,400 (14,400)	34,700 (15,800)	0.05
Characteristics	n(%)	n(%)	P ^b
Currently employed			0.61
Yes	202 (87.1)	236 (85.5)	
No	30 (12.9)	40 (14.5)	
Race/ethnicity			<0.001
African American	15 (6.5)	43 (15.6)	
Asian/Pacific Islander	20 (8.6)	23 (8.3)	
White	194 (83.6)	197 (71.4)	
Other (Hispanic, mixed)	3 (1.3)	13 (4.7)	
Marital status			0.25
Married/partnered	166 (71.6)	182 (65.9)	
Divorced/widowed/ not partnered	49 (21.1)	76 (27.6)	
Never married/ Partnered	17 (7.3)	18 (6.5)	
^a Independent t test.			
^b χ ² test.			

Table 4.2

Descriptive Statistics and Correlations among All Variables

Variable	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
1.HF	0.41	0.49	1.00							
2.MT Stage	2.83	0.91	0.26**	1.00						
3. ISA	14.20	3.16	0.20*	0.07	1.00					
4. SR		5.21								
	13.80		-0.00	-0.02	0.52***	1.00				
5. Stress										
	8.82	2.15	-0.01	-0.10	0.13	0.26**	1.00			
6. Anxiety										
	0.93	0.84	0.02	-0.05	0.14	0.27**	0.42***	1.00		
7. ATM	7.51	2.50	-0.06	0.13	0.01	-0.01	-0.27**	-0.16	1.00	
8. HP	14.90	2.95	-0.07	0.15	-0.01	0.08	-0.17	-0.01	0.22*	1.00

Note: $p < .001$ ***, $p < .01$ **, $p < .05$ *

HF = Hot flash

MT = Stage Menopausal transition stage

ISA = Internal state awareness

SR = Self-reflectiveness

ATM = Attitudes toward menopause

HP = Health perceptions

Table 4.3

Items and Standardized CFA Loadings

	Standardized loading	SE
Internal State Awareness		
13 I'm generally attentive to my inner feelings.	.61	.11
20 I'm alert to changes in my mood.	.39	.11
22 I'm aware of the way my mind works when I work through a problem.	.44	.10
Self-reflectiveness		
1 I'm always trying to figure myself out.	.66	.07
5 I reflect about myself a lot.	.83	.06
7 I'm often the subject of my own fantasies.	.21	.10
15 I'm constantly examining my motives.	.63	.07
18 I sometimes have the feeling that I'm off somewhere watching myself.	.38	.09
Perceived stress		
Physical stress last month	.39	.11
Job stress last month	.28	.12
Family stress last month	.32	.13

Personal stress last month	.55	.12
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Attitudes Toward Menopause (ATM) extent of continuity subscale

7 Going through the menopause really does not change a	.73	.06
--	-----	-----

woman in any important way.

8 A woman's body may change in menopause, but otherwise	.90	.04
---	-----	-----

she doesn't change much.

9 The only difference between a woman who has not been	.75	.05
--	-----	-----

through the menopause and one who has is that one

menstruates and the other doesn't.

Health Perceptions (HP) resistance/susceptibility subscale items

3 I seem to get sick a little easier than other people.	.68	.06
---	-----	-----

7 Most people get sick a little easier than I do.	.64	.07
---	-----	-----

15 My body seems to resist illness very well.	.84	.05
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29 When there is something going around I usually catch it.	.72	.06
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Notes to Chapter IV

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