“RUNNING ON EMPTY”: EXAMINING THE EFFECT OF PHYSICIAN STRESS, BURNOUT, AND EMPATHY ON PATIENT-CENTERED COMMUNICATION DURING THE LONG-CALL SHIFT

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ABSTRACT

Medical residency is characterized by sleep deprivation, stress, and heavy workload. The impact of these pressures on physician-patient communication has not been fully explored. The aim of the current study was to investigate how contextual demands, stress, and burnout impact empathy and provision of patient-centered communication among internal medicine residents in two hospitals. The long-call shift was studied, as it is known to be particularly taxing and is a primary feature of medical residency. Assessments were obtained both prior to and at the conclusion of residents' shifts. Cognitive complexity was examined as a potential mediator of the relationship between stress and burnout, and burnout and empathy. Results revealed that there was a significant decline in physician empathy from the beginning to the end of the long-call shift and that this decline in empathy predicted less patient-centered communication from physicians. Stress, burnout, and decline in empathy were all positively associated, indicating that resident physicians who were more stressed and burned out were at increased risk for declines in empathy over the course of their shift. Cognitive complexity was not found to be a significant mediator of any associations between study variables, though it was associated with several key variables in unexpected ways. These findings highlight the importance of identifying and addressing barriers to patient-centered communication, as a number of these barriers may be routinely present in the demanding environment of medical residency.

INTRODUCTION

Residency

Residency, the period of medical training and education following medical school, is a time of intense occupational stress. Traditionally, postgraduate medical training involves long hours, heavy caseload (number of patients), and sleep deprivation (Leung & Becker, 1992; Sutton, 2004). These conditions are often seen as a necessary feature of medical education programs, in place to ensure optimal learning opportunities and continuity of patient care; many in the medical profession also view these hardships as a rite of passage and initiation into the culture of medicine (Daugherty & Baldwin, 1996; Rosen, Bellini, & Shea, 2004). In 1984 the highly publicized case of Libby Zion, a young woman who died while under the care of fatigued resident physicians at a teaching hospital, began to attract public attention to the issue of working conditions among house staff (Gopal, Glasheen, Miysoshi, & Prochazka, 2005). In the years since the case, the duty hours and fatigue that characterize graduate medical education have remained controversial and have lead to a substantial body of research investigating effects including compromised resident well-being and performance and, consequently, adverse patient outcomes. (Rosen, Bellini, & Shea, 2004; Veasey, Rosen, Barzansky, Rosen, & Owens, 2002).

The Accreditation Council for Graduate Medical Education (ACGME) implemented duty hour limitations in July 2003 in response to growing evidence that sleep deprivation and fatigue were, in fact, detrimental to resident performance, and resident and patient well-being. Since the inception of duty hour limitations, the

following restrictions have been in place for all residency programs: duty hours are restricted to a maximum of 80 hours per week and 24 hours in a given shift, with 6 additional hours allowed for administrative tasks and educational opportunities; a 24-hour period off per week is required; house staff can be on-call no more than every third day averaged over four weeks; and house staff must receive 10 hours off after call (Philibert, 2005; Sutton, 2004). Previous to ACGME regulations, on-call shifts lasted 36 hours with house staff on-call as often as every other night, and house staff were commonly subject to 90-120 hour work-weeks (Arnetz, Akerstedt, & Anderzen, 1990; Bonsteel, 1997). However, some chronic and acute sleep deprivation along with substantial caseload is unavoidable for resident physicians, as hospitals must provide round-the-clock care with a limited number of staff (Buysse et al., 2003).

The debate over residency practices continues among health care professionals, health care advocates and researchers, and policy makers. Reviews of residency training routinely acknowledge the negative impact of postgraduate training conditions on quality of patient care (Asken & Raham, 1983; Samkoff & Jacques, 1991; Veasy et al., 2002). However, there remains a substantial need for further research in this area, as studies explicitly investigating this relationship are lacking. The aim of the present study is to better understand the process leading from demanding residency conditions to compromised patient care; specifically, this investigation tests the role of resident stress, burnout, and empathy in predicting patient-centered communication, a key component of quality care.

The importance of physician-patient communication

Physician-patient communication constitutes a unique type of interpersonal interaction for a number of reasons (Ong, Hayes, Hoos, & Lammes, 1995). Physician-patient interactions may concern issues that are matters of life-or-death importance, and are generally pursued out of necessity rather than enjoyment. The encounter may be emotion laden because patients often experience anxiety, fear, and uncertainty related to their illness or symptoms. Finally, though physician and patient possess dissimilar levels of knowledge and unequal power, cooperation is required for a successful exchange. The communication that occurs in the context of this complex relationship is of great significance. Physician-patient communication has been linked to patient compliance, likelihood of litigation, recovery, improved health, reduced symptomology, and more (Ong et. al; Van Dulmen & Bensing, 2002)

In particular, physician affective behavior, that conveys the emotion and tone of the interaction and locates the patient as a person rather than a case, has been found to influence satisfaction and likelihood of litigation (Buller & Buller, 1987; Bylund & Makoul, 2002). In a study by Hall, Horgan, Stein, and Roter (2002) liking on the part of the physician lead to greater patient and physician satisfaction with the appointment, increased positive affect for the patient, more positive patient ratings of physician communication during the appointment, and improved patient health. Furthermore, liking on the part of the patient was predictive of greater self-reported health, appointment satisfaction, more positive patient ratings of physician communication, and increased positive affect after the appointment.

The communication that occurs between physician and patient, however, is a complex phenomenon shaped by both parties. Street (2003b) describes the "communicative ontology of medical encounters", explaining that, "the medical consultation is a dynamic, creative, and socially constructed event" in which the principal activity is talk between physician and patient (p. 65). In examining the physician-patient interaction, one of the unique contributions of communication scholars is their orientation toward identifying the ways in which various attitudes or internal states are revealed or translated in the encounter through the communication that occurs.

The physician-patient relationship is constructed via communication between its two interactants; for this reason, the significance of messages exchanged between physician and patient must not be underestimated. Residents report that the stressors they are subject to during residency lead to reduced attention, empathy, concern, and sensitivity, and increased irritability, abruptness, and tendency to objectify patients (Asken & Raham, 1983; Daugherty & Baldwin, 1996; Papp et al., 2004; Ratanawongsa et al., 2006; Walterstein, Rosner, & Wallace, 1989; Veasy et al., 2002). These emotions and behaviors are clearly not optimal in the context of the physician-patient interaction, and potentially communicate a powerful (negative) message to patients as they are enacted. Considering the impact of physician-patient communication on patient physical and emotional outcomes, the effect of feelings and actions reported by residents should be a subject of concern.

Influences on Physician-Patient Communication

Williams, Savage, and Linzer (2006) suggest a general physician-patient cycle model in which the health care environment, coupled with patient demands, leads to varying levels of physician stress and satisfaction which in turn affect physician mental health and the quality of the medical encounter. Williams et al. cite the work of Lazarus and Folkman (1984), explaining that the relationship between stress and outcome is mediated by appraisal and coping. Accordingly, physicians' recognition of and reaction to stress will undoubtedly affect the manner in which their mental and emotional states impact their interactions with patients (Williams et al.). The quality of the medical encounter promotes either satisfied or unsatisfied patients; unsatisfied patients become more demanding and feed back into physician stress and satisfaction, helping to perpetuate the cycle. Williams et al. place great importance on the communication that occurs in the physician-patient interaction, as this is the point at which mental states manifest themselves and become observable in behavioral terms.

Street (2003b), addressing the lack of attention to contextual variables as they influence the medical encounter, offers an "ecological perspective" for research involving physician-patient interaction in an attempt to identify fundamental processes in the physician-patient interaction and pinpoint where understanding is lacking. Street's model positions the interpersonal context of the medical encounter within larger organizational, political-legal, media, and cultural contexts. He argues that though these larger contexts will influence the encounter, the verbal and nonverbal behaviors enacted ultimately depend on various "predisposing influences" (e.g. communication style, linguistic

capability, perception of self) and "cognitive-affective influences" (e.g. affective states, perception of other and relationship with other, goals, and communication strategies). In addition to calling for increased attention to contextual factors that affect physician-patient interaction, Street points out that social scientists studying this phenomenon should put more effort into investigating how cognitive-affective processes impact the physician-patient interaction; furthermore, he asserts, "it is through the cognitive-affective influences that broader contextual influences will often emerge" (p. 80).

Rising to Street's call, the purpose of this study is to investigate how various occupational stressors in residency lead to states (stress) and attitudes (burnout) that may affect the physician-patient encounter (patient-centered communication) through lowered levels of empathy, and to examine a possible individual-difference variable (cognitive complexity) as a potential moderator of this relationship. Figure 1 presents a visual depiction of the proposed theoretical model and relationships between study variables. Using the framework of Street's (2003b) ecological model of communication in medical encounters, the organizational context of postgraduate medical training (in particular, the demands of residency) will be examined as it relates to various "predisposing" and "cognitive-affective" influences on the verbal and nonverbal behaviors of the resident physicians in their interactions with patients. Specifically, the sleep deprivation and workload characteristic of residency lead to burnout and reductions in empathy which, consistent with Street's model, are cognitive-affective influences concerning an interactant's, "goals, perceptions of partner, perception of relationship, communicative strategies [and] emotional state" (p. 65). Cognitive complexity, the postulated moderator

in the present study, fits Street's description of a predisposing influence on the behavior enacted; cognitive complexity is an appropriate instance of such an influence in that it concerns concept of self and other, linguistic resources, and communication style. Furthermore, one very specific and particularly challenging "organizational context"—night-call—will be examined for its potential to impact the physician-patient encounter.

LITERATURE REVIEW, RESEARCH QUESTIONS, AND HYPOTHESES

Contextual Demands

Sources of Stress

The most widely identified stressor in residency training is the long-call shift and the resulting sleep deprivation it creates (Asken & Raham, 1983). The taxing nature of being on "long-call" (overnight call) is widely recognized—one basic premise in duty hour reform efforts is that reducing the frequency of night call will reduce stress and fatigue among residents, improving patient outcomes (Sawyer, Tribble, Newberg, Pruett, & Minasi, 1999). Sawyer et al. found that resident call frequency was clearly associated with higher levels of stress, with the residents on call every other night reporting significantly greater stress than the residents on call every fourth night. Schwartz, Black, Goldstein, Jozefowicz, and Emmings (1987) found that call frequency and lack of sleep were predictive of elevated stress levels, and residents self-identified frequent night call, lack of sleep (caused primarily by night call), and heavy patient load to be among their chief sources of distress. These findings regarding the strain of sleep deprivation, night or long-call specifically, and case (patient) load have been echoed in many studies (Ford & Wentz, 1986; Rose, Manser, & Ware, 2008; Small, 1981; Walerstein, Rosner, & Wallace, 1989).

Studies of resident sleep deprivation have found average hours slept on call to range from 1.6 to 3.7 (Bartel, Offermeier, Smith, & Becker, 2004; Richardson et al., 1996; Samkoff & Jacques, 1991). Four or less hours of sleep is the accepted criterion for

significant sleep deprivation and established consequent adverse effects (Wilkinson, 1990).

In a study by Firth-Cozens and Greenhalgh (1997), 82% of residents reported that stress had negatively affected the care they provided to their patients; half of the effects on care concerned lowered standards of care and 40% of the effects involved the expression of irritability or anger. In identifying the reasons for these errors, 57% of residents reported tiredness and 47% of residents reported being overworked. In a study of residents and burnout by Shanafelt, Bradley, Wipf, and Back (2002), residents experiencing burnout were significantly more likely to identify inadequate sleep and shifts over 24 hours (long call shifts) as major stressors. Furthermore, when surveyed, residents in the study most often identified workload as their primary stress. Gopal, Glasheen, Miyoshi, and Prochazka (2005) conducted a longitudinal study of residents and found that work-hour restrictions led to decreases in emotional exhaustion and depersonalization, illustrating the role of shift conditions in influencing the incidence of burnout.

It has become clear that physicians perceive sleep deprivation and workload to impact the quality of their interactions with patients; most notable are the self-reported consequent declines in physician patience, compassion and attention, and increases in experienced and expressed negative affect (Asken & Raham, 1983; Leung & Becker, 1992; Papp et al., 2004; Ratanawongsa et al.; 2006; Samkoff & Jacques, 1991). Based on physician reports such as the ones discussed, it has been argued that the interactions between stressed physicians and their patients is sub-optimal. Stewart (1995) found that

stressed physicians spend less time providing and explaining information to patients, and use less humor in the medical encounter. Additionally, in reflecting on self-reported resident behavior toward patients, Howard, Gaba, Resekind, & Zarcone (2002) comment that fatigue is obviously unlikely to "result in the most sensitive, compassionate, and effective interactions between doctors and their patients" (p. 1024).

Williams et al. (2006) point out, however, that this compromised communication that occurs between stressed, burned out, or less empathetic physicians and their patients has not been studied. Williams et al. argue that, "The research on physician-patient communication is well-developed and links specific physician behaviors to patient outcomes. However, researchers have explored few antecedents to these physician behaviors." The authors urge those examining the medical encounter to "investigate physician attitudes and how they manifest themselves in the patient encounter" (p. 136).

In understanding the process that leads from resident stress (caused in large part by sleep deprivation and workload) to compromised physician-patient interactions, the role of burnout and empathy are key issues to consider. It appears that sleep deprivation and workload are contributing factors to burnout and declines in empathy, as will be discussed. If stressful residency conditions do lead to compromised patient care, it could be in large part that they exacerbate burnout and facilitate declines in empathy, negative affective states which manifest themselves in the context of the physician-patient interaction.

Cognitive-Affective Influences

Burnout

According to Maslach and Jackson (1981), burnout is the consequence of prolonged occupational stress, particularly in the realm of human service work, in which the focus of the worker-client interaction is on helping with a client's physical, psychological, or social problem. The client may experience emotions such as pain, frustration, embarrassment, or fear, making for a potentially challenging situation that is not always easy to remedy. Interactions such as these can be draining for the human service professional, and may lead to emotional exhaustion over time. Emotional exhaustion is, in fact, a hallmark of burnout, as is patient depersonalization, and reduced sense of personal accomplishment (Maslach & Jackson, 1981). Emotional exhaustion is the feeling of one's emotional resources being depleted; patient depersonalization is a negative attitude towards patients which can be characterized by callousness, detachment, and even belief that the patients have brought suffering upon themselves; reduced sense of personal accomplishment is a negative attitude toward oneself involving dissatisfaction with one's work performance or outcomes (Maslach & Jackson; Miller, Stiff, & Ellis, 1988). It is a widely held assumption that the presence of these negative affective states reduces the quality of care provided to clients or patients (Miller et al., 1995); burnout is focused on attitudes about oneself and the individual one cares for, after all. The link between attitude and behavior has long been an assumed one in burnout research. Perhaps the taken-for-granted relationship between burnout and client/patient treatment is due to the fact that "it is now generally recognized that attitudes are relevant for understanding

and predicting social behavior" (Ajzen, 2001, p. 48), though factors that moderate the relationship between attitudes, intentions, and behavior remain under continued investigation.

Research has shown burnout rates among physicians to range on average from 25-60% (Shanafelt, Bradley, Wipf, & Back, 2002). Burnout rates are attributed in large part to sleep deprivation and overwork, two conditions residents are regularly subject to in standard residency training (Daugherty & Baldwin, 1996; Rosen, Bellini, & Shea, 2004). In the study of residents and burnout by Shanafelt et al. (2002), residents experiencing burnout were significantly more likely to identify inadequate sleep and shifts over 24 hours (long call shifts) as major stressors. Furthermore, when surveyed, residents in the study most often identified workload as their primary stress. Workload and sleep deprivation or fatigue have been labeled significant contributing factors to burnout in the majority of studies on burnout among residents (Gopal et al.; Shanafelt et al.; Thomas, 2004).

Shanafelt et al. (2002) conducted the first known study to examine the effect of burnout on patient care, exploring the relationship between resident burnout and self-reported patient care in an internal medicine program. Shanafelt et al. found that 76% of their resident sample met the criteria for burnout—these residents were two to three times more likely to report possessing sub-optimal attitudes and engaging in sub-optimal practices with their patients at least on a weekly or monthly basis. Sub-optimal attitudes were represented by items such as "I paid little attention to the social or personal impact of an illness on a patient" (the most frequent attitude held by burned-out residents, with

approximately 85% reporting doing this on a regular basis), and sub-optimal practices included items such as, “I ordered restraints or medication for an agitated patient without evaluating him or her” and “I did not fully discuss treatment options or answer a patient’s questions.”

Burned-out residents most frequently reported that an “essential” coping technique was a “survival attitude” to manage stress, whereas other residents most frequently used talking to significant others, family members, and fellow residents as an tool to manage stress. Aside from Shanafelt et al.’s work, a surprising lack of data exists on the concrete communicative behaviors demonstrated by workers suffering from burnout. In the current study, the contributing role of burnout in provision of patient-centered communication will be assessed.

Reduced Empathy

According to Yarnold, Bryant, Nightengale, and Martin (1996), empathy is characterized by feelings of compassion, attempts to see the perspective of another, and concern about the problems that another is facing. Empathy is not only a key component in interpersonal relationships and communication competence—it is considered a necessary quality of a health care professional (Hojat, 2007).

Morton et al. (2000) conducted a longitudinal study of medical students and clinical skill and found that medical students’ empathy was positively associated with the satisfaction ratings of their patients. According to Hemmerdinger, Stoddart, and Lilford (2007) empathy is recognized as desirable in a physician to extent that a small number of medical schools in the UK evaluate applicants, in part, based on their scores on the

Medical Schools admissions Test (MSAT), which contains a component designed specifically to measure empathy, and there exists pressure to identify an empathy measure that could be widely used in the medical school selection process.

Unfortunately, studies have shown that empathy is subject to declines over the course of residency, an erosion that is suspected to be caused by work conditions, sleep deprivation and caseload in particular (Bellini & Shea, 2005; Shanafelt et al., 2005). Bellini and Shea (2005), in their three-year longitudinal study of internal medicine residents, found that empathy, specifically empathetic concern and perspective taking as assessed by the Interpersonal Reactivity Index (IRI), declined significantly in the first year and remained low through the duration of residency. Bellini and Shea found accompanying mood disturbance among the residents, and pointed out that the long hours, sleep deprivation, and heavy workload typical of residency made these findings understandable. Shanafelt et al. (2005) explicitly assessed the relationship between well-being and empathy among internal medicine residents and found there to be a significant positive relationship; unfortunately, as has been discussed, it is known that resident well-being and empathy suffers over the course of residency (Buysse et al., 2003; Bellini & Shea; Papp et al., 2004; Wallerstein, Rosner, & Wallace, 1989).

According to Bylund and Makoul (2002), lower levels (lack) of physician empathy in the medical encounter are associated with lower levels of patient satisfaction and higher likelihood of litigation. In the medical encounter, deficient empathy is observable via such behaviors as physician avoidance of psychosocial topics, absence of

demonstrated concern for the patient's problems, and want of nonverbal positive affect on the part of the physician (Bylund & Makoul).

It is important to note that studies of physician empathy, thus far, have concentrated on this individual difference as a "trait" rather than a "state." According to Nezlek, Feist, Wilson, and Plesko (2001) in their study of day-to-day variations in empathy, "…more contemporary approaches to the study of individual differences have emphasized the need to think of constructs simultaneously as traits *and* states…" (p. 402). Measures designed to assess physician trait empathy include such scales as the Interpersonal Reactivity Index and the Jefferson Scale of Physician Empathy. These scales are administered periodically to physicians to capture changes in empathy over a course of months or years (Bellini, Baime, & Shea, 2002; Bellini & Shea, 2005; Mangione et al., 2002; West et al., 2006).

In a study by Yarnold et al. (1996) the authors noted that when assessing physician empathy via the IRI, empathetic concern (one subscale of the measure) was the least stable over time, indicating that it had state-like characteristics that made it sensitive to environmental factors. State empathy, which can fluctuate from hour to hour, is a response to a particular situation, event, or context. The implication when studying state empathy is that, "regardless of one's developmental level of empathy, empathetic experience varies by situation. The perspective allows for studying the effects of situational factors and intra-individual differences in empathy, as well as promoting empathetic training or learning" (Duan & Hill, 1996, p. 262). Nezleck et al. (2001) found that that individuals with higher trait (dispositional) levels of empathy are likely to

exhibit overall greater levels of state empathy, but that trait empathy has no significant effect on fluctuations of state empathy resulting from daily events or mood. The present study aimed to assess the degree to which resident physicians experience a fluctuation of state empathy over the course of their long-call shift, known for its stressful, tedious, and demanding nature. Because state empathy is a contextual response, it could very well be impacted by the conditions of a long-call shift. For example, Lingenfelser et al. (1994) assessed resident neuropsychological function prior to and immediately after night call and found declines in memory, attention, and occupational motivation (assessed using the question, "Would you enter the medical profession a second time?"). These declines were found over the course of a single night on-call. One aim of the current study aims is to investigate whether levels of state empathy decline over the course of a single night-call shift. Furthermore, the ability of contextual variables to predict changes in empathy were examined.

The Role of Empathy in Burnout

Researchers have argued that empathy protects human service workers in that it facilitates more satisfying communication interactions, lessening the chances of burnout development, and that it lessens the propensity of a worker to depersonalize his or her clients (Miller, Birkholt, Scott, & Stage, 1995; Miller, Stiff, & Ellis, 1988). In fact, Miller et al. (1995) offer an Empathetic Communication Model of Burnout, in which empathy leads to effective communication with clients/patients, preventing the development of burnout. Several studies involving residents have found burnout to be accompanied by lower levels of empathy (Rosen, Gimotty, Shea, & Bellini, 2006; West et al. 2006). Day

and Chambers (1991) found scores on the empathetic concern and perspective-taking subscales of the Interpersonal Reactivity Index (a classic empathy measure) to be negatively associated with the depersonalization and reduced sense of personal accomplishment subscales of Maslach's Burnout Inventory (MBI).

One dimension of burnout in particular, however, depersonalization, could arguably be a manifestation of lack of empathy, or a contributor to lack of empathy just as well as it could be a product of it. Efforts to identify the nature of the empathy-burnout relationship have yielded mixed results. Wiliams (1989), in a study of empathy and burnout among nurses, asserts that the relationship between the two constructs is problematic, in that the role of empathy in creating or preventing burnout is contested, and that empathy and burnout may, in fact, be assessing the same phenomenon: "if this is the case, and empathy and burnout represent opposite poles of the same underlying construct, then measures of burnout and empathy may be redundant" (p. 170). In her study, Williams found empathy to be predictive of burnout, a relationship that contradicts Miller's assumptions. Similarly, in his study of counselors, Gross (1994) found empathetic concern to be predictive of depersonalization but also positively associated with personal accomplishment. As the cumulative results of studies have shown, the relationship between the two cognitive-affective influences of burnout and empathy remain unclear despite continuing investigations. The current study examines the nature of the relationship between burnout and empathy; specifically, this study conceptualizes empathy as being *impacted by*, rather than an antecedent to, burnout (see Figure 1).

Miller, Stiff, & Hartman-Ellis (1988), in exploring in the role of communication in burnout, primarily concentrate on the caregiver-patient interaction as an antecedent to burnout. That is, particular types of communication with patients will either make caregivers more or less susceptible to the experience of burnout. What is lacking is any explicit examination of the type of caregiver-patient communication that is enacted when burnout is present. This study proposes that burned out caregivers will be less likely to engage in patient-centered communication, specifically.

Interpersonal Context

Patient-Centered Care

Unfortunately, the attitudes and behaviors associated with the stress, burnout (especially depersonalization), and reduced empathy experienced by residents would seem to impede sensitive or "patient-centered" care, achieved through patient-centered communication. In the past several decades, though its conceptualization and implementation is still being refined, patient-centered care has become a widely advocated approach to caring for patients. In fact, according to Zandbelt, Smets, Oort, Godfried, and Haes (2007), "A patient-centered approach is advocated universally in modern medical education" (p. 330). Patient-centered care is characterized by an effort to recognize patients' perspectives, taking into consideration their beliefs, needs, and preferences (Street, 2003a). Epstein et al. (2005) set forth the communicative principles of patient-centered care that include "eliciting and understanding the patient's perspective," "understanding the patient within his or her unique psychosocial context,"

"shared understanding of problem and treatment…concordant with the patient values," and involving patients to their preferred extent (p. 1517).

Patient-centered care has been offered by health advocates and researchers as an optimal model for provider-patient interactions and has been found in several studies to be associated with patient satisfaction and medical adherence (Mead & Bower, 2000; Swenson et al., 2004). In their observational study of health care providers across seven United States cities, Wissow et al. (1998) found a patient-centered style to be associated with more patient talk, and higher ratings of partnership and provider informativeness. Providers' patient-centeredness is also associated with patient-reported improved mental health status, fewer referrals and diagnostic tests, and reduction of concern and discomfort (Stewart et al., 2000). Lastly, according to Wanzer, Booth-Butterfield, and Gruber (2004) patient-centered behaviors are positively associated with patient satisfaction with care provided and with practitioner communication.

The fact that instruments to assess patient-centered care/communication are still being refined and tend to encompass a wide variety of behaviors has potentially contributed to mixed results in studies; that is, there exist studies that do not fully demonstrate the effect of patient-centered physician behavior on patient outcomes (Mead & Bower, 2000, 2002; Michie, Miles, & Weinman, 2003). The preliminary evidence, however, is encouraging and has lead to continued support and enthusiasm for the implementation of patient-centered care. To aid in the development of this mode of physician-patient interaction, identifying factors that facilitate and *impede* the provision

of patient-centered care is of great importance if this approach is to be effectively implemented.

Mead and Bower (2000) present a model of patient-centeredness which represents this model of care as being affected by "professional contexts" (e.g. professional norms, performance incentives), "doctor factors" (e.g. attitudes, values, knowledge of patient), "shapers" (e.g. medical training and experience), "consultation-level influences" (e.g. time limitations and workload pressure), and "patient factors" (e.g. attitudes and expectations, nature of illness), all of which influence the likelihood of patient-centeredness in the medical encounter (p. 1104). Aita, McIlvain, Backer, McVea, and Crabtree (2005) also emphasize that a variety of contextual and systemic factors can affect the provision of patient-centered care, as can limited resources. In their model of patient-centered interaction, practice culture, patient characteristics, community culture, and physician characteristics are identified as key factors that influence the physician-patient encounter. Importantly, they point out that physicians who subscribe to a patient-centered philosophy may find it challenging to act in a way that is consistent with their beliefs in the face of organizational and situational factors (e.g. understaffing, time constraints). Aita et al. (2005) state, "In practice, strategies to reconcile differences between patient-centered values and practice demands include making explicit one's commitment to a patient-centered philosophy of care. In some cases, physicians overcame an organizational milieu at odds with their philosophy of medicine by finding ways to work within it" (p. 303). The authors' findings illuminate the importance of studying the provision of patient-centered care in a context "beyond the examination

room" to include more institutionally and environmentally embedded influences, many of which are deterrents to the practice of patient-centered care. In a call to action, the authors stress that only by clearly identifying the forces which hinder the provision of patient-centered care can the issue be tackled and subsequently conquered. Certainly features of residency that create particular sub-optimal mental and emotional states represent such "forces," by way of the physician behaviors they engender.

Predisposing Influence

Cognitive complexity

One factor, or predisposing influence, that may play a large role in provision of patient-centered care is cognitive complexity. Cognitive complexity may potentially offer resistance to declines in patient care in the face of stressful conditions, as it exerts a mitigating force on the affective states of physicians and, thus, the interpersonal context of the physician-patient interaction. "Cognitive complexity" is a term used to describe a stable individual difference in social and cognitive processing ability that is linked to communication competence (Burleson & Waltman, 1988; O'Keefe & Sypher, 1981). Personal constructs are mental templates or cognitive dimensions used to make sense of one's self, others, the world, and events in it. An individual is cognitively complex to the degree that he or she possesses differentiated (numerous), articulated (well-developed), and integrated (organized) constructs (Burleson, 2006; Burleson & Caplan, 1998). Cognitive complexity can be domain-specific; that is, an individual can have a sophisticated set of constructs in the area of mechanics, for example, but have under-developed constructs for people. Constructs relating to people are referred to as

"interpersonal constructs", and high complexity in this realm has been the main focus of research on cognitive complexity (Burleson; Burleson & Caplan). Thus, when used henceforth, the term cognitive complexity will refer to interpersonal cognitive complexity, specifically.

Cognitive complexity influences a wide variety of processes, but most clearly affects social perception, message production, and message reception (Burleson, 2006). This present study is focused on the role of cognitive complexity in social perception; social perception "refers to the process through which we make sense of the human or social world, including our experiences of ourselves, other people, social relationships, and social institutions" (Burleson, p. 109). Social perception is key to communication processes because the ways in which people communicate or interpret the communication of others are based on their perceptions. Several key social perception processes include: "affect recognition, causal attribution, nonverbal decoding, impression formation, information integration, social evaluation, and social perspective taking" (Burleson, p. 109). Individuals with different levels of cognitive complexity will engage in differential perception processes. For example, an individual high in cognitive complexity would be less likely to make attribution errors due to his or her more sophisticated social perception. Additionally, an individual with high cognitive complexity would be more able to take the perspective of another, even when that person comes from a different viewpoint.

Cognitive complexity and the ability to produce person-centered messages has been addressed in health care contexts to some extent. Kline and Ceropski (1984) found

medical students with high cognitive complexity to provide more person-centered messages in encounters with new patients. In another study by Gillotti (2000) on medical students delivering a “bad news” prognosis, medical students with higher cognitive complexity provided more person-centered communication than their peers. Tripodi and Bieri (1964), used information theory to investigate whether cognitive complexity affected clinical judgments. They deduced from these early findings that, “judges high in complexity are more able to discriminate ambiguous information than judges low in cognitive complexity” (p. 134). These results were recognized to be consistent with findings that those high in cognitive complexity are able to more easily incorporate contradictory information (Tripodi & Bieri).

A study by Spengler and Strohmer (1994) found that psychologists with high cognitive complexity were more likely to detect and diagnose mental disorders in developmentally challenged adults than psychologists with low cognitive complexity. This indicates an ability to see patients as multidimensional rather than relying on one characteristic. In this same vein, Walker and Spengler (1995) examined how physician cognitive complexity moderated the degree to which stereotypes interfered with diagnosis and treatment of AIDS patients. Findings showed that cognitive complexity moderated the degree of treatment, overshadowing bias, in which the presence of one condition (i.e. AIDS) impedes recognition of another condition (i.e., depression). Walker and Spengler suggest that physicians high in cognitive complexity may be less likely to rely on biases, judgment shortcuts, and stereotypes. This enhanced and more sophisticated social perception evident in the previous studies discussed is consistent with one of the primary

features of cognitive complexity—the ability to think about persons and situations in abstract and complex ways (Burleson & Caplan, 1998).

Though the connection has been drawn between person-centered messages and patient-centered messages, "patient-centered" has been used in a manner which simply substitutes "person" for the more specific term "patient" in medical contexts. No discussion has explored cognitive complexity and person-centeredness in relation to the current understanding of patient-centered care as "patient-centered care" has been more recently conceptualized.

Resident cognitive complexity

Stress. In their model of stress and coping, Lazarus and Folkman (1987) explain that one's primary appraisal of environmental conditions—either as threatening (harmful) or challenging (conferring possible benefit or mastery)—will determine the degree of stress experienced and the mode of coping employed. The accumulation of repeatedly appraising a stressor as threatening, or continually utilizing particular mal-adaptive coping techniques (e.g., avoidance-based techniques) is what leads to long-term effects of compromised mental and physical health (Folkman, Lazarus, Dunkel-Schetter, et al., 1986; Folkman, Lazarus, Gruen, et al., 1986). Cognitive complexity serves as one individual level variable that could enable residents to appraise conditions as challenging rather than simply threatening, thereby lessening stress and burnout and facilitating more productive coping behaviors.

Individuals high in cognitive complexity have been found to have "greater tolerance for ambiguity" indicating less discomfort with, and ability to integrate,

contradictory stimuli (Burleson, 2006). This tolerance for ambiguity may allow for more complex evaluations of environmental demands (i.e. residency conditions) in a way that enables residents to appraise the conditions as possibly threatening, but also challenging and beneficial. For example, postgraduate training conditions *are* thought by many in the medical profession to be necessary in ensuring continuity of patient care and learning opportunities (Daugherty & Baldwin, 1996; Rosen, Bellini, & Shea, 2004). Should residents evaluate their taxing work conditions as offering some benefit, their appraisals will result in lower levels of perceived stress. Though it is not within the aims of the current study to identify the nature of resident appraisals, resident self-reports of stress will be obtained; the association between experienced stress and cognitive complexity can, thus, be examined to explore the relationship between the two variables.

In addition to perceiving and processing the conditions of residency in a more nuanced manner, conceptualizing themselves in multiple ways could also be of potential benefit for residents. Linville (1985) investigated the role of self-complexity in buffering individuals from the effects of negative life events. What Linville found is that the more differentiated and abstract self-constructs persons had about themselves, the more resistant they were to upset when confronted with manipulated failures on “intelligence” tasks in the laboratory. Linville dubbed this phenomenon the “spill-over model”, that is, an individual possessing simple (few and overlapping) ideas about his or her identity will be susceptible to failures in one self domain spilling over into the other self domains, affecting thought and feelings about a greater portion of the self. Residents who have a “simple” self may be more likely to let stress and fatigue-related negative affect spill over

into their ideas about their capability as a physician. Residents with high self-complexity, however, might recognize that they are both physicians and non-invincible humans, thus susceptible to the effects of overwork and fatigue despite their best efforts to put forth a superior performance. These individuals might be more able to understand their compromised mood and exhaustion as being reflective of harsh residency conditions rather than as a sign of weakness or failure. These individuals might then be less likely to experience stress or reduced sense of personal accomplishment (a hallmark symptom of burnout).

Burnout. Thomas (2004) offers that "residents' perceptions of and reactions to the stress produced by work characteristics may vary, predisposing them differentially to burnout" (p. 2885). Some stress in residency is inevitable; the present study theorizes that cognitive complexity will moderate the relationship between stress and burnout. There is evidence that individuals high in cognitive complexity will have greater coping resources at their disposal—one such resources seems to be an ability to procure social support.

In her study of nurses Willihnganz (1987) found that those high in cognitive complexity rated peers as more supportive, indicating that cognitively complex individuals are able to draw out support from others more effectively when then need it. A number of studies have investigated potential buffering effect of social support as it pertains to burnout. In their study of nursing home aides and nurses, Miller, Zook, and Ellis (1989) found co-worker support to be negatively associated with levels of emotional exhaustion and patient depersonalization. Ellis and Miller (1994) studied hospital nurses and found that perceived levels of emotional, instrumental, and informational support

were associated with lower levels of burnout. Specifically, both emotional support and informational support were associated with lower incidence of emotional exhaustion, depersonalization, and reduced sense of personal accomplishment; instrumental support was associated with lower levels of emotional exhaustion and depersonalization.

Additionally, perspective-taking ability (greater among those who are more cognitively complex) would be expected to have a negative association with burnout. Burnout is in large part characterized by depersonalization, the impersonal treatment of a patient as a case rather than an individual. Studies like that of Walker and Spengler (1995) and Spengler and Strohmer (1994), mentioned earlier, illustrate that cognitively complex health care providers seem to have the tendency to view their patients as having multiple identities and needs; this tendency would hypothetically make physicians more resistant to the depersonalization central to the experience of burnout.

Empathy. Cognitive complexity is hypothesized in the present study to have both direct effects on empathy and to moderate the relationship between burnout and empathy (see Figure 1). Those high in cognitive complexity will theoretically be more empathetic overall, enabling them to provide patient-centered communication. Zimmerman et al. (2005) found that nursing home staff who possessed highly "person-centered" attitudes (reflecting higher levels of cognitive complexity) reported greater job satisfaction and provided higher quality care to patients. Cognitive complexity is positively associated with perspective or role taking (Burleson & Waltman, 1988), an inherent component of empathy. Individuals with higher cognitive complexity are, thus, expected to exhibit higher baseline levels of empathy. Residents have been shown to experience significant

declines in empathy over the course of residency (Bellini & Shea, 2005); if a resident has an initially high level of empathy, he or she might still hypothetically remain more empathetic than another resident who was less empathetic and experienced the same decline.

Additionally, cognitive complexity may protect residents from declines in empathy in the face of stress and burnout by facilitating more sophisticated attributions of patients and the self. For example, residents high in cognitive complexity will be more apt to recognize their fatigue and irritability as a reaction to sleep deprivation. This understanding and self-attribution would hypothetically prevent the resident from suffering a decline in empathy toward patients, as opposed to a resident low in cognitive complexity who attributes their negative affect to patients and consequently experiences a reduction in empathy.

Research Questions and Hypotheses

Overview

The current investigation sought to quantitatively evaluate a potential decline in empathy over the course of the 30-hour long-call shift. Assuming a decline in empathetic states, the study sought to determine whether contextual factors such as sleep deprivation, case load, case difficulty, or team supportiveness was related to this change. Furthermore, the contribution of stress and burnout to change in empathy was examined, as was the contribution of change in empathy to provision of patient-centered care. Lastly, cognitive complexity was examined as a correlate of stress and burnout, and was examined as a potential moderator of the relationships between stress and burnout, and burnout and

change in empathy (see Figure 1). The following research questions and hypotheses are generated by the proposed model:

H1: Post-call empathy will be lower than pre-call empathy.

RQ1: Will contextual factors (i.e., caseload, case difficulty, sleep, and team supportiveness) affect changes in empathy from pre-call to post-call?

H2: Cognitive complexity will be negatively related to stress.

H3: Stress will be positively associated with burnout.

H4: Cognitive complexity will be negatively related to burnout.

H5: The relationship between stress and burnout will be weaker when cognitive complexity is high than when cognitive complexity is low.

H6: Burnout will be positively associated with decline in empathy (from pre-call to post-call).

H7: The relationship between burnout and decline in empathy will be weaker when cognitive complexity is high than when cognitive complexity is low.

H8: Decline in empathy will be negatively associated with patient-centered communication.

METHODS

Participants

The sample consisted of resident physicians in an internal medicine residency program based out of Tucson Medical Center (TMC). Residents rotate between TMC, University Medical Center (UMC), and the Veteran's Administration (VA). Study sites included TMC and UMC; the VA was not included due to government regulations and prohibitions. Per IRB specifications, written site approval was secured from both TMC and UMC. A total of 93 residents participated, 35 from TMC and 57 from UMC. Because UMC is a larger facility, medical teams there feature one or two more residents than the teams at TMC, leading to more participants being obtained from UMC. Age of the participants ranged from 25-40 (M = 29.6, SD = 3.19) with 62 men and 30 women.

Procedure

Recruiting took place via the resident list-serve and appearances by the principal investigator at grand round meetings at which all residents are present. The location of the data collection was in the resident community break rooms. Survey measures were administered to residents immediately before (T1) and after (T2) their long-call shift, which ranges on average from 24-30 hours. Residents were compensated for their participation with a $10.00 gift card of their choice (for Starbucks, gas, or the movie theater) after their T1 assessments were completed, and a $10.00 gift card of their choice after their T2 assessments were completed.

Measures

Contextual factors (i.e., sleep, caseload, case difficulty, and team supportiveness) were assessed at both T1 and T2. Acute sleep deprivation was assessed by asking residents how many hours of sleep they had gotten in the last 24 hours, a common measure used in sleep deprivation studies. Workload or "caseload" was assessed with the question, "Approximately how many patients did you provide care for over the course of your last shift (including cross-cover, codes, etc.)?" Difficulty of cases was assessed by asking residents to indicate overall how difficult the shift was in terms of challenging cases, on a 7-point Likert-type scale, 1 = Not at all difficult, 7 = Extremely difficult. Support received from co-workers was assessed by asking resident to indicate overall how supportive the members of their team were during their last shift on a 7-point Likert-type scale, 1 = Not at all supportive, 7 = Extremely supportive.

Stress was measured at T1 using Cohen, Kamarack, and Mermelstein's (1983) Perceived Stress Scale, a 10-item instrument designed to assess subjective perceptions of stress. Questions concern the degree, on a five point scale from 0 = Never, to 4 = Very often, to which subjects believe their lives to be unmanageable, unpredictable, and overwhelming (e.g. "How often have you felt difficulties were piling up so high that you could not overcome them?"). The internal consistency reliability of this scale was $\alpha = .82$.

Cognitive complexity was measured at T1 by asking residents to complete Crockett's (1965) Role Category Questionnaire (RCQ) in which they are asked to describe two-well known peers, one liked and one disliked. Consistent with RCQ protocol, residents were asked specifically to, "Describe each peer in as much detail as

possible, focusing on the peer's habits, beliefs, mannerisms, ways of treating others, traits, and personality characteristics" (Burleson & Caplan, 1998). Responses were scored by two trained coders according to procedures set forth by Burleson and Waltman (1988), and inter-coder reliability was $r = .91$.

Burnout was assessed at T1 via administration of Maslach's Burnout Inventory (MBI), a 22-item scale composed of three subscales containing statements about feelings and attitudes and rated on frequency, 1 = a few times a year or less to 6 = every day, with a box to check for "never" (Maslach & Jackson, 1981). Maslach and Jackson's scale is the most frequently used burnout assessment in research on medical professionals (Thomas, 2004). The MBI's 5-item depersonalization scale contains such items as, "I feel I treat some patients as if they were impersonal 'objects'" and "I've become more callous toward people since I took this job." The 9-item emotional exhaustion scale consists of statements such as "I feel emotionally drained from my work" and "I feel like I'm at the end of my rope." Finally, the 8-item personal accomplishment subscale consists of statements such as, "I deal very effectively with the problems of my patients" and "I feel I'm positively influencing people's lives through my work." When calculating a participant's overall MBI score, responses to personal accomplishment items must be reverse-scored, as high numbers indicate low levels of burnout; in the other two subscales (depersonalization and emotional exhaustion), high numbers indicate high levels of burnout. Reverse-scoring personal accomplishment items transforms the subscale to make it consistent with depersonalization and emotional exhaustion, enabling the calculation of a sum burnout score. In other words, total MBI for each subject was

calculated by summing empathy subscale score, depersonalization subscale score, and reverse-scored items personal accomplishment subscale score. Overall internal consistency reliability of the MBI was $\alpha = .89$ and reliabilities of the various subscales were $\alpha = 0.75$, $\alpha = .90$, and $\alpha = .76$ for depersonalization, emotional exhaustion, and personal accomplishment, respectively.

State Empathy was assessed at T1 and T2 using an adaption of Tsang and Stanford's (2007) state empathy scale. Their 8-item scale features statements regarding emotions toward a particular person; because patients were the target individuals in this case, residents are asked about their emotions "toward [their] patients." Residents were asked to indicate their answers on a 7-point Likert-type scale, 1 = Strongly disagree, 7 = Strongly agree. The adapted scale includes such statements as, "I feel empathetic toward my patients" and "I feel compassionate toward my patients." Adjectives similar to the ones in Tsang and Stanford's scale have been successfully used to measure state empathy in other studies (Batson, Lishner, Cook & Sawyer, 2005; McCullough et al., 1998, 2003; Tsang & Stanford, 2007). Internal consistency reliability for the state empathy scale in the present investigation was $\alpha = 0.89$ at T1 and $\alpha = .93$ at T2.

Patient-centered communication was assessed at T2 using an adaptation of Wanzer, Booth-Butterfield, and Gruber's (2004) 13-item scale of patient-centered communication. The scale was converted from the patient to the physician perspective, asking residents to report the frequency with which they use particular patient-centered behaviors on a 5-point scale ranging from 1 = Never to 5 = Very often. The scale includes 2 items about introductions (e.g. "I introduced myself to new patients"); 4 items

concerning nonverbal immediacy behaviors (e.g. “I looked at patients while talking to them”), 1 item about use of humor (“If it was appropriate to do so, I used humor when communicating with patients); 1 item concerning clarity (“I communicated in a clear and direct manner when talking to patients”); 1 item assessing listening (“I listened intently to patients during my conversations with them”); and 4 items about empathy (e.g. “I asked patients to express any concerns they might have”). The original scale has been used successfully with good reliability in several studies (Wanzer et al., 2004; Wanzer, Wojtaszczyk, & Kelly, 2009). Internal consistency reliability for patient-centered communication was $\alpha = 0.84$.

RESULTS

Table 1 presents means, standard deviations, and ranges for all major study variables. A chi-square independent-samples t-test was performed to examine potential sex differences in scores on study measures. Result showed there to be no statistically significant differences between male and female resident physicians on any study variables. Therefore, sex was not considered for any further analyses.

The first hypothesis was that over the course of the long-call shift, resident empathy would decline. That is, it was postulated that there would be a reduction in empathy from pre-call to post-call. A paired-sample t-test was used to determine whether there was a significant difference between pre and post-call mean empathy scores. A significant difference was found between pre (M = 41.44, SD = 7.18) and post-call (M = 38.16, SD = 8.16) empathy scores, t (86) = 4.60, $p < .001$, $r^2 = .20$, supporting the first hypothesis that empathy would decline during the long-call shift. Empathy decline was calculated by subtracting post-call (end of shift) empathy from pre-call (beginning of shift) empathy. A high empathy decline score indicates that there was a large drop in resident empathy from the beginning to end of a resident's long-call shift.

Research question one asked whether contextual factors—caseload, case difficulty, hours of sleep, or team supportiveness—affected decline in empathy from pre-call to post-call. Contextual variables reported at T2 concerning the shift in question (the long-call shift) were used in this analysis, as opposed to contextual variables from the last shift (which were reported at T1). Multiple regression analysis was used to assess the ability of long-call (T2) caseload, case difficulty, hours of sleep, or team supportiveness

to predict decline in empathy. These four contextual independent variables were entered in one block with decline in empathy as the dependent variable. Regression analysis indicated that T2 sleep, caseload, case difficulty, and team supportiveness did not collectively predict significant variance in decline in empathy, $R = .17$, $R^2 = .03$, F (4,79) = .56, $p = .690$. Neither sleep (β = -.03, $t = -.27$, $p = .791$), caseload (β = .10, $t = .79$, $p = .432$), case difficulty (β = .10, $t = .89$, $p = .378$), nor team supportiveness (β = .01, $t = .08$, $p = .94$) at T2 was a significant predictor of decline in empathy. Correlation analyses showed that T2 sleep was associated with T2 caseload, r (87) = -.37, $p = .001$, and T2 difficulty of cases, r (89) = -.22, $p = .041$, meaning that larger caseloads and more difficult cases had a bivariate association with less sleep. No other contextual variables were related one another. Importantly, neither T2 sleep, r (85) = -.08, $p = .468$, caseload, r (84) = .13, $p = .250$, case difficulty, r (86) = .10, $p = .361$, nor team supportiveness, r (86) = -.02, $p = .850$, were significantly associated with decline in empathy. Sleep at T2 was associated with pre-call empathy, r (86) = -.25, $p = .02$, indicating that those who started their shift with more empathy ended up getting less sleep over the course of the shift. Additionally, T2 team supportiveness and burnout were negatively associated, r (86) = -.22, $p = .047$, indicating that residents who perceived their team to be supportive were less likely to be burned out. These correlations can be observed in Table 2.

The second hypothesis predicted that cognitive complexity would be negatively associated with stress. A bivariate regression analysis was used to test this prediction. Results indicated that cognitive complexity was a marginally significant predictor of stress, β = .21, t (84) = 1.98, $p = .051$, $R^2 = .05$. (Regression coefficients can be observed

in Table 3.) However, this finding was not in the hypothesized direction; that is, cognitive complexity was hypothesized to facilitate enhanced coping and, thus, be associated with lower levels of stress. The current finding indicates that within the sample, higher levels of cognitive complexity are associated with *higher* levels of stress, counter to what was predicted by hypothesis two.

Hypothesis three predicted that stress would be positively associated with burnout, and Hypothesis four predicted that cognitive complexity would be negatively associated with burnout. Approximately 60% of resident physicians in the study suffered from burnout. According to Maslach, Jackson, and Leiter (1996), scoring 27 and above on the emotional exhaustion subscale or 10 and above on the depersonalization scale of the MBI indicates the presence of moderate to severe burnout; this established criteria was utilized to diagnose burnout among study participants. The bivariate correlation between stress and burnout, r (81) = .63, p = .000, was significant and supported hypothesis three. The bivariate correlation between cognitive complexity and burnout, r (85) = .23, p = .032, was also significant, but not in the hypothesized direction. The analysis indicated that cognitive complexity was positively associated with burnout, meaning that higher cognitive complexity was predictive of *higher* burnout levels, leaving hypothesis four unsupported.

The unexpected finding that cognitive complexity was positively associated with burnout was further explored by examining the relationship between cognitive complexity to each of the subscales of the burnout measure—emotional exhaustion, depersonalization, and personal accomplishment. Cognitive complexity was found to be

significantly correlated with depersonalization, r (86) = .27, p = .010, but not emotional exhaustion r (89) = .16, p = .143, or personal accomplishment r (86) = -.07, p = .513. This finding regarding the positive association between depersonalization and cognitive complexity is opposite to the predicted direction, given that cognitive complexity is thought to be characterized by the ability to recognize persons' individuality.

The effects of stress and cognitive complexity on burnout (addressing Hypotheses three and four) were examined together by way of multiple regression analyses in which stress and cognitive complexity were entered together in a single block as Ivs, and burnout was entered as the DV. Results indicated that cognitive complexity and stress collectively predicted significant variance in burnout R = .64, R^2 = .40, F (2,80) = 27.14, p < .001. Individually, stress was a significant predictor of burnout, β = .62, t = 6.99, p < .001 (see Table 3), supporting Hypothesis three; however, cognitive complexity did not uniquely predict burnout, β = .07, t = .81, p = .419, failing to support Hypothesis four. The degree of shared variance between stress and cognitive complexity, β = .21, t (84) = 1.98, p = .051, R^2 = .05, likely contributed to the inability of cognitive complexity to predict burnout when the effect of stress is controlled for.

Hypothesis five predicted that cognitive complexity would moderate the relationship between stress and burnout so that the association between stress and burnout would be weaker when cognitive complexity was high than when it was low. A two-step multiple regression was performed to determine the moderating effect of cognitive complexity. Tests of interactions were performed in accordance with the procedure specified by Aiken and West (1991). This entails (1) creating centered versions of each

independent variable, (2) creating an interaction term that is the product of those two centered variables, and (3) testing the significance of the interaction term in a hierarchical multiple regression in which the independent variables (main effects) are entered simultaneously on the first step, followed by the interaction term on the second step. Results indicated that cognitive complexity did not significantly moderate the relationship between stress and burnout, $\beta = -.09$, $t = -.99$, $p = .326$. Hypothesis five thus went unsupported.

Hypothesis six predicted that burnout would be positively associated with decline in empathy. The bivariate correlation between burnout and decline in empathy, $r\ (82) = .28$, $p = .009$, is significant and supports Hypothesis six. To explore this finding, an examination of the associations between individual components of burnout and decline in empathy was undertaken. A multiple regression was used to determine the extent to which emotional exhaustion, depersonalization, and personal accomplishment uniquely predict decline in empathy. Regression analysis indicated that emotional exhaustion, depersonalization, and personal accomplishment collectively predicted significant variance in declines in empathy, $R = .31$, $R^2 = .10$, $F\ (3,80) = 2.84$, $p = .043$. Individually, depersonalization was a significant predictor of decline in empathy ($\beta = .26$, $t = 1.67$, $p = .099$), but emotional exhaustion ($\beta = .01$, $t = .05$, $p = .958$) and personal accomplishment ($\beta = -.10$, $t = -.88$, $p = .382$) were not.

A multiple regression was conducted to examine the earlier relationship between burnout (the summed measure) and decline in empathy proposed in Hypothesis six, this time with previous independent variables—stress and cognitive complexity—controlled

for. In step one, stress and cognitive complexity were entered as independent variables with decline in empathy as the dependent variable. In step two, burnout was entered as an independent variable. Results indicate that the path coefficient of burnout to empathy, β = .27, t = 1.90, p = .061 (see Table 3), only *approaches* levels of significance when all other independent variables are controlled for. The failure of burnout to significantly predict declines in empathy when controlling for the influence of stress (and cognitive complexity) is likely due to the large amount of shared variance between stress and burnout, r (81) = .63 , r^2= .40 $p < .001$. Therefore, at the bivariate level, hypothesis 6 is supported, but the more stringent test controlling for stress and cognitive complexity does not support Hypothesis 6.

Hypothesis seven predicted that cognitive complexity would moderate the relationship between burnout and decline in empathy so that the association between burnout and decline in empathy would be weaker as cognitive complexity increases. A two-step multiple regression was performed to determine the moderating effect of cognitive complexity, using the procedure specified by Aiken and West (1991). Results indicated that cognitive complexity failed to significantly moderate the effect of burnout on decline in empathy, β = -.17, t = -1.48, p = .143. Hypothesis seven was, thus, unsupported.

Hypothesis eight postulated that decline in empathy would be negatively associated with patient-centered communication. That is, the greater the decline in empathy, the less patient-centered communication will occur. The bivariate correlation between declines in empathy and patient-centered communication, r (83) = -.35, p = .001,

was significant and in the predicted direction, supporting hypothesis eight. A more stringent test of this hypothesis was undertaken with a multiple regression analysis in which the association between decline in empathy and patient-centered communication was examined, this time controlling for all causally prior independent variables (i.e., stress, cognitive complexity, and burnout). In step one, stress, cognitive complexity, and burnout were entered as independent variables with patient-centered communication as the dependent variable. In step two, decline in empathy was entered as an independent variable, with patient-centered communication as the dependent variable. Results indicate that decline in empathy significantly (negatively) predicts patient-centered communication, $\beta = -.27$, $t = -2.67$, $p = .009$ (see Table 3), even when all other independent variables are controlled for. Therefore, tests of both correlation and multiple regression support Hypothesis eight.

DISCUSSION

Overview of findings

The aim of this study was to investigate how internal states and external stressors can impact resident physician's provision of patient-centered communication, particularly in the context of the notoriously grueling residency long-call shift. Internal medicine residents at two teaching hospitals were surveyed on-site using self-report paper and pencil measures immediately before and after their long-call shift. Results showed that residents experienced a significant decline in empathy from the start to the end of the shift, which was not associated with acute sleep deprivation (hours of sleep during the shift), caseload, case difficulty, or team supportiveness. However, resident psychological states and attitudes were found to have a notable effect on declines in empathy. Reported stress was positively associated with levels of burnout, which was in turn was positively associated with declines in empathy. Declines in empathy strongly predicted less physician use of patient-centered communication. The postulated moderator in the study, cognitive complexity, was found to be positively associated with reported stress and depersonalization, these relationships being in the opposite direction of what was hypothesized. Cognitive complexity did not significantly moderate the relationship between stress and burnout or burnout and declines in empathy, leaving hypotheses of moderation unsupported.

Review of background

The grueling work schedule that characterizes medical residency has received attention in the past several decades for being potentially harmful to both resident

physicians and the patients they care for. In response to mounting evidence that long shifts and little time off leads to poor resident well-being and compromised patient safety, the ACGME established duty hours restrictions in 2003. One of the ACGME's restrictions includes limiting long-call shifts to 30 hours. Unfortunately, the length of this shift, which residents work as frequently as every third night, remains rather daunting. As researchers, policy makers, program directors, and the public continue to place heavy emphasis on quality of patient care, factors that negatively impact patient care must be acknowledged and addressed.

In the majority of studies of physician empathy, physicians are not in their work environment (e.g., they receive a questionnaire at their home) when they are asked to provide empathy measure self-reports, and assessments made in the clinical encounter are primarily done by observers (Pederson, 2009). This study is unique in that it obtains self-reports from physicians while they are in the midst of their routine at the hospital, in a break room location that they normally pass through regardless of survey administration.

This study is also unlike others before it in several other aspects. Though the decline of empathy in residency has been documented, it has been done so over the course of residency training in yearly or quarterly increments (Bellini et al., 2002; Bellini & Shea, 2005; Mangione et al., 2002; Rosen et al., 2006; West et al., 2006); the present study is the first to examine the decline of empathy over the course of the long-call shift (or any shift for that matter). Additionally, no other study has attempted to assess the relationship between empathy and patient-centered communication in quantitative terms. This investigation is also the first to assess the relationship of cognitive complexity to

empathy, cognitive complexity to burnout, and/or cognitive complexity to patient-centered communication.

Decline in empathy

The current investigation was predicated on the hypothesis that resident empathy would decline in the course of a single long-call shift. This assumption was supported empirically, as empathy levels dropped significantly from pre-call to post-call with a medium-large effect size of $r = .44$. This investigation of resident physician empathy is unique in that it investigates acute (state) declines in empathy in the course of a shift as opposed to over the course of several months or years (trait empathy). It is well known that empathy erodes during residency training (Bellini & Shea, 2005; Shanafelt et al., 2005), but treating this cognitive-affective influence at both a trait and state level allows for detection of more immediate day-to-day fluctuations. The detected decline in state empathy was unrelated to the acute contextual factors of hours of sleep, case load, case difficulty, and team supportiveness. This finding may be explained by the fact that some contextual factors contribute to negative psychological states over time—the effect of demanding and tedious work conditions is cumulative and leads to stress, burnout, and reduced empathy. This cumulative effect of residency work conditions is well recognized in the literature (Ford & Wentz, 1986; Rose, Manser, & Ware, 2008; Small, 1981; Walerstein, Rosner, & Wallace, 1989). However, the decline of empathy in a single shift can potentially be attributed to a number of factors.

Shanafelt et al. (2005) found a significant positive association between resident physician well-being (physical and mental health) and their tendency to engage in

perspective-taking, a key cognitive component of empathy. In their longitudinal study of young physicians, Bellini, Baime, and Shea (2009) found a significant negative association between interns' (first-year residents') levels of empathy and negative mood states. As internship progressed, interns became progressively more angry and depressed and less empathetic toward patients. The authors expressed concern about the effect of poor physician emotional health on patient care. Even in the course of a single long-call shift, Rose, Manser, and Ware (2008) found substantial mood disturbance. Assessed over the course of a work week, resident physicians experienced the highest levels of fatigue, confusion, tension, anger, and depression towards the end of their long-call shift compared to any other time. Lingenfelser et al. (1994) also found a significant increase in negative affect from the beginning to the end of residents' long call shift. The emotional distress experienced by resident physicians during long-call could most certainly contribute to declines in empathy—Nezlek et al. (2001) found state empathy to fluctuate with the event of negative or positive experiences.

In studies of physician empathy, subjects repeatedly report too little sleep, too little time, and too many patients as factors that diminish their empathetic capacity (Higginson, 2009; Hojat et al., 2009; Shanafelt et al., 2002). The erosion of empathy is never attributed to any one factor, but rather to a constellation of factors: time pressures, dearth of positive role models, negative experiences, information overload, competition, lack of discussion about observed suffering and death, technological dependency, cynicism, and more (Crandal & Marion, 2009; Hojat et al. 2009; Larson & Yao, 2009).

The act of empathizing with patients, in itself, can be stressful and draining (Cutler et al., 2008; Larson & Yao, 2010). In an attempt to understand physician empathy at any distinct point in time (as opposed to more globally), Larson and Yao (2005) dissect the psychological process of physician empathy in the physician-patient encounter via their Process Model of Clinical Empathy. They represent empathy as taking place in the "moment" or in the particular interaction transpiring. The authors identify numerous antecedents to the empathetic process including physician, patient, and situational characteristics of the physician-patient interaction. The immediate empathetic process is composed of a combination of involuntary reactions (e.g., mirroring), simple cognitions (e.g., conditioning), and advanced cognitions (e.g., perspective-taking). Intermediate outcomes include a variety of intrapersonal processes (perceptual and affective experiences) and interpersonal processes (social behaviors). Social behaviors involve verbal and non-verbal communication between physician and patient. In the present study, patient-centered communication was the "interpersonal outcome" of interest when examining resident empathy. In the process model, end-product outcomes for the physician and patient might include fulfillment/burnout or satisfaction/dissatisfaction, respectively. Of note, throughout the process model are opportunities for reciprocal effects and feedback loops, as seen with other transactional models of physician-patient interaction such as Williams, Savage, and Linzer's (2006) cycle model.

Larson and Yao approach physician empathy for patients as "emotional labor," or the activity of "regulating experienced and displayed emotions to present a professionally desired image during interpersonal interactions at work" (p. 1103). Empathy involves

both attempts to interpret and understand the emotions and experiences of another, and to display one's own emotions in an appropriately responsive manner. The authors explain that because the experience of empathy involves both psychological and behavioral management, it is a demand on the physician's mental and emotional resources.

At the beginning of residents' long-call shift when they are "fresh" or "running on a full tank" physically and emotionally, they have resources available and it is reasonable that empathy levels would be higher at that point than at the end of their shift. For, as the 30-hour shift wears on, the experience of empathy may be a task which requires too much time and energy when a physician is functioning on little to no sleep and responsible for the care of 50 patients in a single shift. The decline of empathy experienced by residents over the course of their shift could reasonably be an effort to conserve mental and physical resources which are in high demand as exhausted and stressed young physicians make life-or-death diagnostic and treatment decisions; prove themselves to senior colleagues in a high-pressure environment; learn and be tested on procedures and medical knowledge; and juggle high volume patient management and paperwork. As Larson and Yao (2005) explain, "The cognitive and emotional effort involved in empathy strain the already overextended psychological resource physicians have" (p. 1104).

Studies in neurophysiology add interesting support to this idea of strain diminishing empathetic capacity—fear, pressure, and distress have been shown to significantly depress the activity between neurons responsible for the experience of empathy (Gallese, 2003). These neurons are referred to as "mirror neurons" and are responsible for various emotional or behavioral responses. The particular neurons fire

spontaneously in response to perceived stimuli and create in the observer the internal experience of empathy (Decety & Jackson, 2006; Kaplan & Iacoboni, 2006). This neurophysiological reaction is addressed by Larson and Yao (2005) as the part of the first step of the empathetic process. Consistent with Larson and Yao's framing of mirroring as primary, other scientists recognize the mirror neurons and their ability to generate "interstimulation" as necessary to empathetic perception (Decety & Jackson; Gallese; Hojat, 2007).

Some residents experienced a more pronounced decline in empathy than others. Larson and Yao (2005), in their Process Model of Clinical Empathy, outline various individual and situational antecedent factors that make the experience and demonstration of empathy more or less likely. One individual-level factor that the authors identify is dispositional empathy—some individuals are more empathetic by nature than others, affecting their tendency to react empathetically in a variety of situations and with a variety of patients.

Dispositional empathy's influence on the experience of empathy in a given situation is echoed by the research of Nezlek and collegues (2001). In their study of day-to-day variation of empathy they found that the level of empathy experienced at any one particular point in time (state empathy) was a function of both trait (dispositional) empathy and proximal events. However, in their statistical model of empathy, day-to-day fluctuations represented 54% of variance, highlighting the heavy influence of context on experiences of empathy. Nezlek et al. found that empathy was strongly correlated with positive social events (positive interactions), and that this association was independent of

trait empathy. This finding means that, conversely, lack of rewarding interactions was significantly associated with lower levels of empathy among participants. It could be, then, that in the present study residents' lowered empathy toward the end of the shift reflects a lack of positive interactions. Undoubtedly, however, causality cannot be determined in the relationship between positive social events and empathy—empathy or lack thereof will influence the outcome of an interaction, but the outcome of an interaction can equally impact an individual's level of empathy. This reciprocal process is echoed in a number of models of physician-patient interaction (Larson & Yao, 2005; Williams, Savage, & Linzer, 2006).

Beyond considering the immediate factors that may influence the decline of empathy in the course of a shift, pre-existing psychological states and dispositions seem to impact empathy decline. In the present study, cognitive complexity, stress, and burnout were examined for their effect on empathy.

Influence of cognitive complexity on stress, burnout, and empathy

This study examined the ability of cognitive complexity to moderate the relationship between stress and burnout, and burnout and declines in empathy. It was originally hypothesized that cognitive complexity did not moderate either of these relationships. Cognitive complexity was also unrelated to declines in empathy. Cognitive complexity has been shown to be predictive of perspective-taking, social perception, and affect recognition (Burleson, 2006), making its lack of association with empathy rather unexpected.

Cognitive complexity was, however, positively associated with stress, a finding that was in the opposite direction hypothesized. The surprising positive association between cognitive complexity and stress calls for further investigation. Existing research establishes a positive association between cognitive complexity, enhanced coping with life events, and accrual of social support (Linville, 1985; Willihnganz, 1987). Enhanced coping and social support are resources that have been shown to protect individuals from stress; it is thus surprising that cognitive complexity is *positively* associated with stress among resident physicians in this study. Cognitive complexity among resident physicians (or any physicians, for that matter) is not well studied—more research is needed to understand how this individual-level difference operates in this particular population and occupational context.

A study by Burleson and Denton (1997) may offer insight into why individuals with higher cognitive complexity would report greater levels of stress during a time (residency) when they are under substantial pressure and strain. Burleson and Denton investigated the influence of various factors in marital satisfaction, but their findings reflect a phenomenon that could very well be occurring in the present study.

Burleson and Denton (1997) found that in non-distressed marriages, perceptual accuracy, "the ability to correctly infer a spouse's intentions," was positively associated with marital satisfaction, but that in distressed marriages the relationship between the two variables was negative. The authors explain that this relationship between perceptual accuracy and marital satisfaction in distressed marriages is quite understandable, as partners in distressed marriages were found to have significantly more negative intentions

towards one another than those in non-distressed marriages. In non-distressed marriages, spouses seemed to like their partners more when they had the ability to pick up on positive intentions; in distressed marriages, however, spouses liked each other more when they were *less able* to detect one another's negative intentions. Along these same lines, in non-distressed marriages men's cognitive complexity predicted liking for their partner; in distressed marriages, the relationship between these two variables was negative. Burleson and Denton reflect that their results seem to indicate perceptual skills may increase an individual's satisfaction if the perceived stimulus is positive, but that "ignorance is bliss when the news supplied by perceptual skills tends to be unpleasant" (p. 898).

Residency is considered by many to be the most stressful time in a physician's career (Hillhouse, Adler, & Walters, 2000; Leung & Becker, 1992; Sutton, 2004). The intense pressure and grueling schedules that young physicians are subject to compromise their well-being in a myriad of ways. In a study on the effects of residency, Papp et al. (2004) used both qualitative and quantitative methods to assess residents' perceptions of the impact of residency on their lives. A total of 149 residents were interviewed in 22 focus groups for the qualitative portion of Papp et al.'s study, and certain effects of residency were repeatedly voiced in virtually every group. First, residents said that their ability to learn and perform well at work was compromised by chronic sleep deprivation and fatigue—this effect of residency was the focus of the current study and has been discussed at length. Additionally, residents in the study described how residency had hurt their personal lives in several ways—they don't see their partners, family, and friends as often as they'd like; their exercise and eating habits have suffered; they have very little

leisure time; they can't date and if they are married their relationship with their spouse suffers; and residents with children feel like absentee or sub-par parents. Other sources of stress in residency include difficult attending physicians (the supervising physicians that residents work under); competition among residents; too much "scut work" (low-level work purposely given by superiors to reinforce hierarchy); lacking professional support; heavy work loads and under-staffing (Rose, Manser, & Ware, 2008; Schwartz et al., 1987). Resident physicians who are more cognitively complex are arguably more likely to perceive the extent of residency's challenges and negative consequences on themselves and those around them; this could be one explanation for the positive relationship between cognitive complexity and stress in the present study. As Burleson and Denton reflected, when perception leads to recognition of undesirable events, emotions, or realities, perhaps "ignorance is bliss."

Cognitive complexity was also found to be positively associated with burnout, a finding in the opposite direction of what was hypothesized. Upon further investigation, the association between cognitive complexity and burnout was explained by its significant positive correlation with the depersonalization subscale. Cognitive complexity was not significantly correlated with the other two burnout subscales, personal accomplishment or emotional exhaustion. This positive relationship between cognitive complexity and depersonalization is perhaps the study's most unexpected finding. It was hypothesized that cognitive complexity would be negatively associated with burnout, in particular, because this cognitive predisposition was assumed to ensure the recognition of the patient as an individual and thus protect from the experience of depersonalization. A

primary feature of cognitive complexity is the ability to recognize persons as unique from one another.

There are several possible explanations for this finding. Being that cognitively complex individuals are thought to be more in-tuned to the experiences and needs of others, perhaps this sensitivity forces cognitively complex physicians to depersonalize their patients more than other physicians as a protective mechanism to cope with heavy caseload, difficult cases, and limited time for each patient. Alternatively, it may be that cognitively complex individuals do not depersonalize their patients more, but that they more readily *recognize* and self-report the depersonalization that is prompted by contextual pressures and medical socialization. In fact, the recognition of patient depersonalization could be one factor feeding into higher levels of stress reported by more cognitively complex residents.

The existing assumption is that cognitive complexity facilitates beneficial physician-patient interaction; however, this has been studied thus far among medical students talking to new patients and with medical students who are asked to deliver a bad prognosis in an artificial setting (Kline & Ceropski,1984; Gillotti, 1996). These studies are not generalizable to physician-patient interactions in residency and beyond, necessitating investigations of resident and more seasoned physicians in their natural occupational environment and with actual patients with whom they have more than one communication exchange. More generally, the effects of cognitive complexity have primarily been studied in the context of romance and friendship (for examples, see Burleson & Denton, 1992; Burleson & Samter, 1990; Samter, 2002). Cognitive

complexity is individual-level difference that has the potential to function in a myriad of ways in different situations (distressing circumstances vs. non-distressing circumstances, personal versus work relationships, etc.). It seems as if there is much work to be done in understanding how this construct operates in the physician-patient relationship; the unexpected findings from the present study illustrate that fact. Many of the assumptions surrounding cognitive complexity may not hold true when tested in contexts heretofore unexplored. Lastly, cognitive complexity is a cognitive rather than affective variable, enabling a theoretically greater *capacity* for empathy, but not necessarily leading to the actual experience of empathy. The role of cognition as a precursor to empathetic experience is addressed in the aforementioned Process Model of Empathetic Communication (Larson & Yao, 2005). Larson and Yao's model recognizes cognition as a prerequisite to empathy; however, the next step required in the path to felt and expressed empathy is the intrapersonal process of perceptual and affective experience. In line with the premises of the Process Model, cognitive complexity, independently, would not guarantee the manifestation or communicative enactment of empathy.

Association between stress and burnout

The significant positive association between stress and burnout is consistent with the established knowledge that burnout is a response to extended occupational stress (Maslach & Jackson, 1981). Burnout was positively associated with declines in empathy over the course of the shift; depersonalization, out of the three burnout sub-scales, was significantly associated with empathy decline. This relationship mirrors a finding by Shanafelt, Bradley, Wipf, and Back (2002) in their study of burnout among residents, in

which they found depersonalization to be the element of burnout most predictive of sub-optimal patient practices.

Hillhouse, Adler, and Walters (2000) proposed a model of stress, burnout, and outcomes among resident physicians and tested the model using a longitudinal design. They found that as hypothesized in their model, higher levels of stress did lead to greater burnout, which then lead to negative mood states and lower clinical competence ratings. This study was unique in that the assessments made at multiple points in time allowed for demonstration of causality. Though the design of the current investigation does not afford such claims of causality, burnout is universally understood to result from prolonged occupational stress (Daugherty & Baldwin, 1996; Maslach & Jackson, 1981; Miller et al. 1988; Miller et al., 2005).

Association between burnout and declines in empathy

The bivariate relationship between burnout and declines in empathy was positive and significant—the more burned-out a resident was, the more likely he or she was to experience a large decline in empathy from pre to post-call. Upon isolating the effects of burnout subscales on decline in empathy, depersonalization was found to be the primary source of the relationship. Though the three burnout elements collectively predicted declines in empathy, depersonalization was the only on to do so individually. It thus appears that depersonalization is the aspect of burnout that most directly impacts residents' empathy toward patients, echoing the findings of several of other investigations. Day and Chambers (1991) found a significant negative association between MBI depersonalization scores and empathetic concern scores on the IRI.

Additionally, Shanafelt et al. (2002) found depersonalization scores to be the aspect of burnout that most significantly predicted resident physician self-reports of engaging in sub-optimal patient care practices.

Notably, however, the relationship between burnout and decline in empathy is rendered only marginally significant in multiple regression analyses that control for the effect of stress. Burnout is a reaction to occupational stress; thus, there is great shared variance between stress and burnout. It is not surprising, then, that partialing stress out of the equation would reduce the degree of association between burnout and decline in empathy.

This is the first investigation that examines the effect of physician burnout on *state* empathy, specifically. Previous studies have positioned trait empathy as a precursor to burnout, asserting that greater empathy leads to more satisfying provider-patient interactions, preventing the development of burnout (Miller, Birkholt, Scott, & Stage, 1995; Miller, Stiff, & Ellis, 1988). To recognize that burnout may affect empathy is not to discount that empathy may affect burnout. As Williams et al. (2006) explain in their physician-patient cycle model, physicians' mental and emotional states impact their interactions with patients, helping produce a satisfying or unsatisfying interaction, which then feeds back into the mental or emotional state, perpetuating the cycle. It could be that burnout and low empathy feed into one another in complex ways; various conceptualizations of the burnout-empathy relationship only provide us with greater potential understanding of the phenomenon. Ultimately, longitudinal data (beyond one

long-call shift) will be needed if any causality in the burnout-empathy relationship is to be established.

Decline in empathy and patient-centered communication

Declines in empathy (from pre-call to post-call) were strongly associated with less patient-centered behavior on the part of resident physicians. Patient-centered communication is characterized by attempts to understand and work within patients' preferences, values, and expectations, while building rapport and recognizing and addressing patients' feelings and concerns (Epstein et al., 2005). The patient-centered communication measure in the present study, adapted from Wanzer, Booth-Butterfield, and Gruber (2004) features items identifying concrete verbal and non-verbal patient-centered behaviors such as listening intently when a patient talks and inviting discussion of patient concerns. The more dramatic the decrease in empathy over the course of the shift, the fewer patient-centered behaviors were reported. Considering that the vast majority of residents did experience a decline in empathy over the course of the shift, this becomes problematic in light of the impact that the negative affective state has on interactions with patients. Empathy is conceptualized as a fundamental element of patient-centered care. Stress and burnout leading to declines in empathy and patient-care speak to concerns expressed by Aita, McIlvain, Backer, McVea, and Crabtree (2005). Aita et al. assert that even though physicians may subscribe to a patient-centered philosophy, powerful contextual and environmental factors serve as a barrier to patient-centered communication.

Shanafelt et al. (2002) found that 85% of burned-out residents reported that on a regular basis they paid scant attention to the psychosocial implications of an illness for a patient. This particular omission of quality care was the most frequently reported among respondents with significant levels of burnout; coincidentally, attention to psychosocial implications of a patient's disease is a major hallmark of patient-centered care. One of the chief aims of this study was to learn more about the type of communication that results from various physician mental states and attitudes, in order better understand how internal factors can shape the physician-patient interaction in tangible terms. Various authorities in physician-patient communication have called upon researchers to engage in such efforts (Street, 2003b; Williams et al., 2006).

A notable contribution of the present study is the suggestion of a possible mechanism through which burnout leads to sub-optimal patient care; burnout appears to make residents more susceptible to declines in empathy, and this reduced empathy leads to lack of patient-centered communication. Physician empathy has been shown to result in higher patient satisfaction (Bylund & Makoul, 2002; Morton, 2000); perhaps patients are more satisfied because empathetic physicians engage in more patient-centered communication. Patient-centered communication encompasses the key components of empathy: recognition, appreciation for, and discussion of patients' feelings and concerns (Bylund & Makoul, 2002; Street, 2003a). In fact, patient-centered communication might be thought of as the communicative or behavioral component of empathy. That is, the internal experience of empathy seems to manifest itself through this particular type of patient-centered interaction; in the present study, declines in empathy lead to lower levels

of patient-centered communication, illustrating a necessary relationship between the two variables.

Limitations and Future Directions

Limitations

There are several limitations of the current study. First, through face-to-face interaction with and disclosures from the study participants, it became apparent that roughly ¼ of the resident physicians spoke English as their second language. Prior to applying to any residency program in the United States, foreign medical students must first pass the Test of English as a Foreign Language (TOEFL) to demonstrate their proficiency in English. However, though all resident physicians in the study are necessarily proficient in English, there may have been some terms on the survey that were unfamiliar to non-native speakers. Residents' limited English vocabulary should not have affected their written RCQ scores, however, as a number of studies have found RCQ scores to be unrelated to vocabulary or verbal fluency (O'Keefe & Sypher, 1981). Secondly, the current study relied on use of physician self-reports in assessing patient-centered communication practices. As with any self-report data, the accuracy of the reports can be assumed to be imperfect, as self-reports are subjective rather than objective. However, self-report remains a common and popular data-collection method in the social sciences and offers insight into the phenomenon being studied.

Though surveys were filled out in a fairly expeditious manner, there was significant variation in responses on all measures, indicating that self-reports were at the very least somewhat reflective of the residents completing them. Physicians in a hospital

environment are accustomed to filling out important paperwork throughout their shift, and have ample practice focusing their attention on the task at hand despite various internal and external distractions. However, in recognition of the fatigue incurred from a 30 hour shift with potentially no sleep, the post-call survey was intentionally quite brief to keep the attention of respondents. The cognitive complexity short-essay portion of the survey (the Role Category Questionnaire or "RCQ") was administered pre-call. O'Keefe, Shepherd, and Streeter (1982) found in an early examination of the RCQ that timed and untimed versions of the measure were highly correlated ($r = .84$, df = 40, $p < .001$). In other words, untimed administrations of the questionnaire that allowed participants to take however little or much time they wanted yielded scores very similar to those obtained from administrations where participants wrote for a total of ten minutes. Furthermore, respondents' cognitive complexity scores are primarily meaningful when analyzed relative to other respondents' scores.

Future directions

Future studies should expand this topic of inquiry by utilizing patient and observer reports of patient-centered communication in addition to physician self-report data. When measuring patient-centered communication behaviors, patient, physician, and observer reports of the same interaction are not often highly correlated (Epstein et al., 2005). Observers can report on patients' expressed needs and feelings, but patients' unexpressed needs, both informational and emotional, play a large part in their perceptions of the physician-patient encounter, a potential explanation for discrepancies between observer, patient, and physician reports (Bell, Kravitz, Thom, et al., 2001;

Epstein et al., 1998). Physician self-assessments may be subject to social desirability bias, overestimation of abilities and skill, or even (conversely) overly critical judgment in the case of residents who feel that quality of patient care suffers when physicians are stressed and fatigued (Mead & Bower, 2000; Ong et al., 1995; West et al., 2006). Obtaining physician, observer, and patient reports of patient-centered communication in a particular interaction or interactions would be ideal in determining the extent to which this type of communication is being utilized (or not).

Additionally, the finding that burnout levels significantly predispose residents to declines in empathy over the course of a shift should be probed. Up to this point, researchers have focused primarily on empathy levels as an antecedent to or buffer from the experience of burnout (Gross, 1994; Miller et al., 1995), or have treated empathy decline as occurring alongside burnout without making assertions about the exact nature of the relationship between the two variables (Bellini & Shea, 2005; Rosen et al., 2006; Shanafelt et al., 2005). The temporal relationship of burnout and empathy has been deemed unclear, and the two constructs have been recognized as being potentially entangled (Williams, 1989). It is unknown whether less empathy leads to burnout, if lower empathy is simply a manifestation of burnout, or if burnout leads to decreased levels of empathy, as the current study suggests. The two psychological states likely feed into one another, as various mental states and experiences can. Several models of physician-patient interaction highlight feedback-loops between affect and behavior (Larson & Yao, 2005; Williams et al., 2006); it is likely that the relationship between empathy and burnout feature such feedback loops. To disentangle the complex temporal

association between burnout and empathy; techniques such as path modeling, a time series study, or multi-wave longitudinal study with path modeling might be used. It is key to recognize that burnout seems to be both associated with a more long-term decline of dispositional empathy, but that as the present study illustrates, it can also make residents more susceptible to short-term declines in state empathy. The precise mechanism through which burnout makes residents vulnerable to declines in empathy should be explored further.

Application

In applying the findings from this study, the challenges are two-fold. First, because stress and burnout contribute to declines in empathy and thus less patient-centered communication, steps must be taken to reduce the overall stress and burnout levels of resident physicians. It has been known for some time that stress and burnout are wide-spread in residency training, and efforts are on-going to address this. The ACGME regulations implemented in 2003 were once such effort to improve residents' physical and mental well-being. Unfortunately, it remains unseen as to whether or not the duty hour restrictions have made any difference, with studies thus far yielding conflicting results. Landrigan et al. (2008) found that under the new duty hour standards, there was no change in total weekly work and sleep hours but that with the new schedule, burnout rates in one sample dropped from 75.4% to 57%. On the other hand, in a study by Mathis, Diers, Hornung, Ho, and Rouan (2006) on the effects of duty hour reform, resident fatigue was no different despite the new schedule (burnout rates were not assessed). Lack of enforcement of duty hour restrictions is a problem in some residency programs—in a

study of 1653 surgical residents, 87% of the sample reported working more than 80 hours a week and 45% of the sample reported working more than 100 hours a week even after the regulations were implemented (Niederee, Knudtson, Byrnes, Helmer, & Smith, 2003). Gelfand et al. (2004) studied surgery residents' work hours and burnout scores 1 week prior to and 6 months following the implementation of duty hour reform regulations and found that despite a decrease in work hours, average burnout scores remained the same and depersonalization scores actually rose from 56% to 70%. As duty hour regulation appears not to have uniformly reduced stress and burnout in residency programs, additional interventions are necessary.

McCue and Sachs (1991) administered stress management workshops to 43 residents and found that 6 weeks later emotional exhaustion scores had declined; however, rates of depersonalization and reduced sense of personal accomplishment increased just as they did in the control group who received no treatment. Ospina-Kammerer and Figley (2003) offered seminars on stress reduction techniques to 23 residents and found that average total burnout scores decreased. Unfortunately, sample size in both of these studies was small and the study designs did not feature random assignment to conditions. A study by Shapiro et al. (2005) found that health care professionals experienced reductions in stress and burnout as a result of participation in mindfulness meditation (focusing on being "present and attentive"), but the study had too small of a sample size for sufficient power. A larger and more intensive 8-week intervention by Krasner et al. (2009) involved 70 internal medicine physicians and a combination of didactic sessions on control and meaning in the physician-patient

interaction, mindfulness meditation, and writing and sharing narratives. Participants were assessed at multiple points in time; notably, 3 months after the intervention was completed, burnout (emotional exhaustion, reduced sense of personal accomplishment, and depersonalization), stress, empathy, and belief in the importance of patient-centered care all remained improved compared to baseline levels. The authors admit that it is unknown whether the benefits obtained from the intervention impacted actual clinical behavior. However, attitudes offer substantial predictive ability when it comes to behavior (Ajzen, 2001), and it can be seem in the present study how an empathic orientation toward patients is significantly associated with provision of patient-centered care.

In addition to bolstering psychological states that make physicians more capable of quality patient care (less stress, lower burnout, greater empathy, greater appreciation of patients psychosocial needs), it is key to strengthen actual behavioral skills such as empathetic or patient-centered communication. Though understanding the patient's perspective is a prerequisite for quality patient-centered communication, most scholars agree that psychological empathy is primarily effective via the types of communication it produces (Bylund & Makoul, 2002; Feighny et al., 1998). That is, it is not only physicians' internal experience of empathy toward his or her patient, but the outward expression of empathy through empathetic communication that leads to satisfying physician-patient encounters. In fact some argue that clinical empathy is simply incomplete unless it involves an "action" component and moves beyond psychological to behavioral engagement (Garden, 2008). Fortunately, research indicates that both the

experience *and* expression of empathy can be taught. In addition to the interventions aimed at improving empathic ability, which have been discussed, there have been limited but promising interventions involving observable communication skill.

Unfortunately, the majority of physicians fail to perceptibly convey empathy to their patients and miss the vast majority of patient-created opportunities for empathetic responses, failing to react to 62-79% of patients' emotional cues (Easter & Beach, 2004; Levinson, Gorawara-Bhat, & Lamb, 2000). In response to this problem, Bonvicini et al. (2009) implemented a communication training program and assessed, among other things, the effect of the training on physicians' verbal expressions of empathy. The program was 18 hours long, broken into three sessions that consisted of didactic learning, role-play, video review, and experiential learning. One-on-one coaching followed each session and participants were asked to practice learned techniques with their patients. Physician-patient visits had been audio taped prior to the intervention and were audio taped 6 months afterward for comparison. Results showed a 50.75% increase in empathetic responses and an increase of 37.49% in global empathy scores among physicians who received the training. The success of this training emphasizes the need to instruct physicians how, in concrete terms, to communicate in ways that convey empathy to their patients. Though a physician may possess the emotional capacity for empathy, without the communication skills to communicate such feelings, the patient is left unaware of the physicians' care and concern.

Just as the internal experience of empathy falls short if unexpressed, expression of empathy without feelings of empathy is incomplete. When a physician performs

empathetic behaviors without feelings of empathy, Larson and Yao (2005) refer to this as “surface acting”; “deep acting” is when physicians actively attempts to understand and relate to patients, in which case empathetic expressions will come more naturally. The authors point out, however, that surface acting can actually build relationships and lead to outcomes with patients that begin to change the way physician feel about patients. That is, empathetic displays *can* over time become genuine reflections of a created internal empathetic experience.

CONCLUSION

The delivery of patient-centered care is affected by a number of contextual factors present in the environment, the physician, and the interaction itself (Mead & Bower, 2000). As evidenced by this study and others before it, the stress and burnout experienced by residents not only impairs their well-being, but the well-being of their patients. Results from the current study make clear that residents' negative psychological states contribute to an erosion of empathy over the course of the long call shift that impairs their ability to engage in patient-centered communication. As young physicians set about the task of serving and healing others, they struggle to maintain their own emotional and physical well-being in the grueling and high pressure environment of residency.

If policy-makers, researchers, program administrators, and patients are to continue advocating patient-centered care as the optimal model of physician-patient interaction, it should be recognized that this demand flies in the face of less-than-optimal conditions. There is no easy solution to ensuring quality care and between the reality of individual and organizational imperfection, flawless care will rarely, if ever, be achieved. Aita et al. (2005) assert that it is only by identifying the barriers to patient-centered care that these obstacles may be overcome. The obstacles in question may never be overcome, but it is the responsibility of all who care about physicians and the patients they serve to try to make it *better*.

APPENDIX A

Survey 1

1. Years of Age ___

2. Sex: □ Male □ Female

3. Are you in a committed romantic/marital relationship? □ Yes □ No

4. Do you have children? □ Yes □ No

5. Year of Residency: □ Transitional □ First □ Second □ Third

6. How many hours have you slept in the last 24 hours? ____

7. Approximately how many patients did you provide care for over the course of your last shift (including cross-cover, codes, etc.)? ____

8. Overall, how difficult was your last shift in terms of challenging cases?

Not at all difficult Extremely difficult

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1 2 3 4 5 6 7

9. Overall, how supportive were the members of your team were during your last shift?

Not at all supportive Extremely supportive

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1 2 3 4 5 6 7

APPENDIX A- *Continued*

Below, you will be asked to describe <u>two</u> <u>different</u> peers. Please visualize actual people that you know for this task. Describe each peer as completely as you can. Focus on personal characteristics rather than physical traits. Think about the peer's habits, beliefs, mannerisms, traits, and ways of treating others.

1. Describe a peer you know well and **like**.

2. Describe a peer you know well and **dislike**.

APPENDIX A - *Continued*

IN THE LAST 2 WEEKS:

1. **How often have you been upset because of something that happened unexpectedly?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

2. **How often have you felt that you were unable to control the important things in your life?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

3. **How often have you felt nervous and "stressed"?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

4. **How often have you felt confident about your ability to handle your personal problems?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

5. **How often have you felt that things were going your way?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

6. **How often have you found that you could not cope with all the things you had to do?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

7. **How often have you been able to control irritations in your life?**

0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very often

APPENDIX A - *Continued*

8. How often have you felt that you were on top of things?

0	1	2	3	4
Never	Almost never	Sometimes	Fairly often	Very often

9. How often have you been angered because of things that happened that were outside your control?

0	1	2	3	4
Never	Almost never	Sometimes	Fairly often	Very often

10. How often have you felt difficulties were piling up so high that you could not overcome them?

0	1	2	3	4
Never	Almost never	Sometimes	Fairly often	Very often

Please indicate on a 7-point scale the extent to which you feel the following emotions toward your patients.

1. I feel sympathetic toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

3. I feel empathetic toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

3. I feel concerned about my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

APPENDIX A - *Continued*

4. I feel moved by my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

5. I feel compassionate toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

6. I feel warm toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

7. I feel softhearted toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

8. I feel tender toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

Please indicate the frequency with which you experience the following:

1. I feel emotionally drained from my work. □ Never

1 A few times a year	2 Monthly	3 A few times a month	4 Every week	5 A few times a week	6 Every day

APPENDIX A - *Continued*

2. I can easily understand how my patients feel about things. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

3. I feel I treat some patients as if they were impersonal 'objects.' □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

4. I feel used up at the end of the workday. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

5. I deal very effectively with the problems of my patients. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

6. I've become more callous toward people since I took this job. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

7. I feel fatigued when I get up in the morning and have to face another day on the job. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

APPENDIX A - *Continued*

8. I feel I'm positively influencing other people's lives through my work. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

9. I worry that this job is hardening me emotionally. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

10. Working with people all day is really a strain for me. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

11. I feel very energetic. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

12. I don't really care what happens to some patients. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

13. I feel burned out from my work. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

14. I can easily create a relaxed atmosphere with my patients. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

APPENDIX A - *Continued*

15. I feel patients blame me for some of their problems. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

16. I feel frustrated by my job. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

17. I feel exhilarated after working closely with my patients. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

18. I feel I'm working too hard on my job. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

19. I have accomplished many worthwhile things in this job. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

20. Working with people directly puts too much stress on me. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

21. In my work, I deal with emotional problems very calmly. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

APPENDIX A - *Continued*

22. I feel like I'm at the end of my rope. □ Never

1	2	3	4	5	6
A few times a year	Monthly	A few times a month	Every week	A few times a week	Every day

Please return to fill out Part II (a shorter survey) after you have completed your shift. Thank you!

APPENDIX B

Survey 2

1. How many hours have you slept in the last 24 hours? ____

2. Approximately how many patients did you provide care for over the course of this last shift (including cross-cover, codes, etc.)? ____

3. Overall, how difficult was this last shift in terms of challenging cases?

Not at all difficult Extremely difficult

---

1 2 3 4 5 6 7

4. Overall, how supportive were the members of your team were during this last shift?

Not at all supportive Extremely supportive

---

1 2 3 4 5 6 7

Please indicate on a 7-point scale the extent to which you feel the following emotions toward your patients.

1. I feel sympathetic toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

4. I feel empathetic toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

3. I feel concerned about my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

APPENDIX B - *Continued*

4. I feel moved by my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

5. I feel compassionate toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

6. I feel warm toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

7. I feel softhearted toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

8. I feel tender toward my patients.

Strongly Disagree Strongly Agree

---

1 2 3 4 5 6 7

Please circle the answer that best describes your interactions with patients from approximately 12:00 A.M. through the end of this past shift.

1. I introduced myself to new patients.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

2. When I approached new patients, I provided my title and position to them.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

APPENDIX B - *Continued*

3. I used gestures to engage patients when communicating with them.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

4. If it was appropriate to do so, I used humor when communicating with patients.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

5. I looked at patients while talking to them.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

6. I had a tense body posture while talking to patients.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

7. I smiled at patients as I approached them.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

8. I listened intently to patients during my conversations with them.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

9. I communicated in a clear and direct manner when talking with patients.

1	2	3	4	5
Never	Rarely	Occasionally	Often	Very often

APPENDIX B – *Continued*

10. Patients seemed to feel comfortable expressing any worries or concerns to me.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

11. When patients stated worries or concerns they had, I directed the conversation away from their statements.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

12. If patients expressed emotions such as anxiety or fear, I invited discussion of these concerns.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

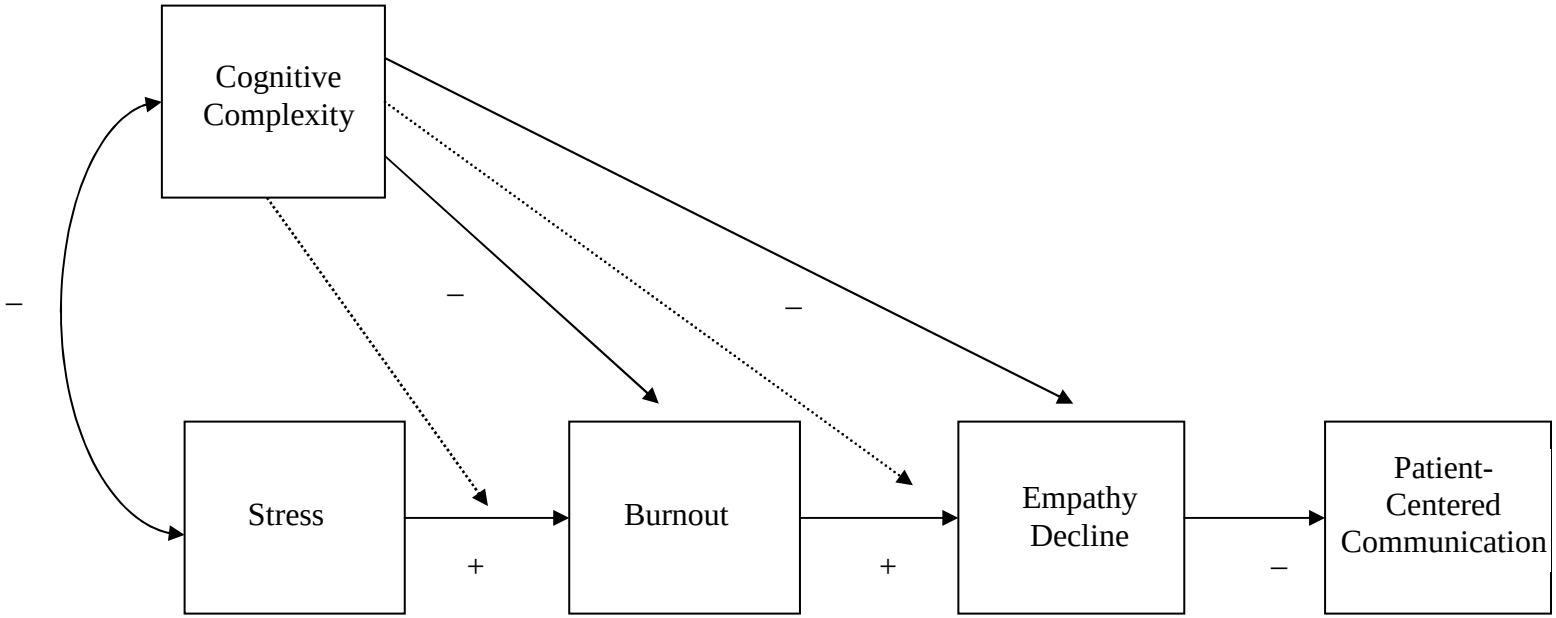
13. I asked patients to express any concerns they might have.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very often

Thank you very much for your participation!

Figure 1.

Hypothesized relationships between study variables



— indicates hypothesized direct effect

····· indicates hypothesized moderation effect

Table 1.
Descriptive Statistics for Study Variables

Variable	Mean	Standard Deviation	Range	
			Potential	Actual
Pre-call:				
Hours of sleep	7.20	1.68	.00-24.0	.50-11.0
Number of patients	13.59	11.17	.00-∞	1.0-60.0
Shift difficulty	3.82	1.53	1.0-7.0	1.0-7.0
Team support	5.94	1.05	1.0-7.0	2.0-7.0
Empathy	41.45	7.14	8.0-56.0	20.0-56.0
Stable Variables:				
Perceived stress	16.20	4.56	.00-40.0	6.0-27.0
Burnout total	47.54	18.51	.00-132.0	6.0-85.0
Emotional exhaustion subscale	24.96	11.38	.00-54.0	2.0-49.0
Depersonalization subscale	11.03	6.07	.00-30.0	1.0-24.0
Personal Accomplishment subscale	36.74	5.95	.00-48.0	22.0-48.0
Cognitive complexity	13.30	7.87	.00-∞	.00-41.0
Post-call:				
Hours of sleep	2.19	1.54	.00-24.0	.00-6.0
Number of patients	21.12	11.15	.00-∞	2.0-50.0
Shift difficulty	4.30	1.47	1.0-7.0	1.0-7.0
Team support	6.04	.10	1.0-7.0	2.0-7.0
Empathy	38.41	8.15	20.0-56.0	19.0-56.0
Change (decline) in empathy*	3.28	6.64	-36.0-36.0	-16.0-29.0
Patient-centered communication	54.11	6.09	13.0-65.0	40.0-65.0

Note. N = 87-92, * negative values for decline in empathy indicate *increase* of empathy from pre to post-call.

Table 2.
Correlations for variables under investigation

	1	2	3	4	5	6	7	8	9
1. Cognitive complexity	--								
2. Burnout	.23*	--							
3. Stress	.21$_a$	.63***	--						
4. Emotional exhaustion	.16	.90***	.59***	--					
5. Personal accomplishment	-.07	-.55***	-.31**	-.21 $_a$	--				
6. Depersonalization	.27**	.86***	.46***	.71***	-.33**	--			
7. Empathy-pre	-.12	-.29**	.06	-.18	.34***	-.29**	--		
8. Empathy-post	-.20$_a$	-.48***	-.09	-.32**	.46***	-.49***	.63***	--	
9. Empathy decline	.14	.28**	.21 $_a$	.21 $_a$	-.18	.30**	.31**	-.55***	--
10. Patient-centered communication	-.07	-.52***	-.20	-.38***	.36***	-.51***	.28**	-.35***	-.35***
11. Hours of sleep$_b$	.12	.07	-.16	-.03	-.18	.12	-.25*	-.15	-.08
12. Caseload$_b$	.04	-.07	.02	-.05	.11	-.17	.17	.05	.13
13. Case difficulty$_b$	-.13	.07	.07	.09	-.05	.02	.18	.07	.10
14. Team support$_b$	.00	-.22*	-.08	-.13	.14	-.19	-.03	.01	-.02

Note: * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. $_a$ p = .05-06. $_b$ indicates during the long-call shift. Correlations based on N = 83 - 90.

Table 2- Continued
Correlations for variables under investigation

	10	11	12	13	14
1. Cognitive complexity					
2. Burnout					
3. Stress					
4. Emotional Exhaustion					
5. Personal Accomplishment					
6. Depersonalization					
7. Empathy-pre					
8. Empathy-post					
9. Empathy decline					
10. Patient-centered Communication	--				
11. Hours of sleep$_b$	-.09	--			
12. Caseload$_b$	.02	-.37***	--		
13. Case difficulty$_b$	-.18	-.22*	.19	--	
14. Team support$_b$	.16	-.17	-.06	-.12	--

Note: * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. $_a$ p = .05-06. $_b$ indicates during the long-call shift. Correlations based on N = 83 - 90.

Table 3.
Regression Analyses

	Dependent Variable					
	Burnout		Empathy Change		Patient-Centered Communication	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.40***		.06		.06	
Cognitive Complexity		.07		.11		.03
Stress		.62***		.03		.14
Step 2			.04 [a]		.22***	
Burnout				.27 [a]		-.53***
Step 3					.06**	
Empathy Change						-.27**
Total R^2	.40***		.10*		.34***	

Note. ***p < .001, **p < .01, * p < .05, [a] p = .06

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