

INVESTIGATING PATIENT AND PROVIDER INFLUENCES ON THE ASSESSMENT
AND TREATMENT OF PAIN: A NOVEL VIRTUAL PATIENT TECHNOLOGY
APPLICATION

By

ADAM T. HIRSH

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2008

© 2008 Adam T. Hirsh

ACKNOWLEDGMENTS

I thank Michael Robinson for his exceptional mentorship throughout my graduate education. He has provided the perfect combination of freedom and structure for my development as a scientist. I also thank my dissertation committee – Roger Fillingim, Steven George, and William Perlstein – for their time and energy. They have each served as models of academic excellence. Special thanks are extended to Shankar Manamalkav for his expert technical assistance, and to my colleagues in the Center for Pain Research and Behavioral Health for their friendship and support. I thank the NIH and my Program Director, Linda Porter, for funding this work and my graduate education. Thanks are also extended to the University of Florida and Department of Clinical and Health Psychology for providing a first-rate training environment. I thank my family for their support throughout this and previous endeavors. Finally, I thank my wife Sarah, without whom none of this would be possible.

TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS	3
LIST OF TABLES	6
ABSTRACT	7
CHAPTER	
1 INTRODUCTION	9
Pain Assessment	10
Influence of Sex	11
Influence of Age	13
Influence of Race/Ethnicity	15
Pain Treatment	17
Influence of Sex	18
Influence of Age	20
Influence of Race/Ethnicity	22
Limitations of the Assessment and Treatment Literature	25
Facial Expression of Pain	26
Lens Model Design	30
Rationale	31
2 METHODS	33
Participants	33
Measures	34
Demographics Questionnaire	34
Gender Role Expectations of Pain	34
Lens Model Design	35
Profiles	36
Judgments	37
Procedure	38
Hypotheses	39
Pain Assessment	39
Treatment with Non-opioid Medication	40
Treatment with Opioid Medication	40
Recommendations for Change in Medications	41
Healthcare Provider Characteristics	42
Statistical Analyses	42
Idiographic	42
Nomothetic	42

3	RESULTS	44
	Participants	44
	Pain Assessment Policies.....	44
	Pain Intensity	45
	Pain Unpleasantness	46
	Mood Assessment Policies	47
	Positive Mood.....	47
	Negative Mood	47
	Treatment Decision Policies	48
	Non-opioid Medication	48
	Opioid Medication.....	49
	Recommendation Policies	49
	Change in Non-opioid Medication	49
	Change in Opioid Medication	50
	Number of Significant Cues	51
	Significance of Contextual Cues	51
	Number and Significance of Overall Policies	53
	Within-cue Comparisons	54
	Pain Assessment	54
	Mood Assessment.....	56
	Treatment Decisions.....	57
	Recommendations	58
	Self-reported Cue Utilization.....	58
	Knowledge of Study Hypotheses and Cue Utilization	59
	Exploratory Group Analyses	60
	Participant Characteristics and Overall Decision Policies	60
	Participant education and overall decision policies	60
	Participant professional experience and overall decision policies	61
	Participant Characteristics and Cue Utilization.....	61
	Participant sex and cue utilization.....	62
	Participant education and cue utilization.....	62
	Participant professional experience and cue utilization	64
4	DISCUSSION	65
	APPENDIX RESULTS OF IDIOGRAPHIC REGRESSION ANALYSES.....	86
	LIST OF REFERENCES	102
	BIOGRAPHICAL SKETCH	115

LIST OF TABLES

<u>Table</u>	<u>page</u>
3-1 Demographic and background characteristics of participants	45
3-2 Number of significant cues at each policy	52
3-3 Variance in decision policies explained by contextual cues	53
3-4 Descriptive data on overall policy capturing	54
3-5 Means and standard deviations for ratings within cue	55
3-6 Number of participants with significant overall policies	60
3-7 Participant use of demographic and pain expression cues	63
A-1 Policies toward pain intensity assessment	86
A-2 Policies toward pain unpleasantness assessment	88
A-3 Policies toward positive mood assessment	90
A-4 Policies toward negative mood assessment	92
A-5 Policies toward non-opioid treatment	94
A-6 Policies toward opioid treatment	96
A-7 Policies toward change in non-opioid treatment	98
A-8 Policies toward change in opioid treatment	100

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

INVESTIGATING PATIENT AND PROVIDER INFLUENCES ON THE ASSESSMENT
AND TREATMENT OF PAIN: A NOVEL VIRTUAL PATIENT TECHNOLOGY
APPLICATION

By

Adam T. Hirsh

August 2008

Chair: Michael E. Robinson

Major: Psychology

Pain is a misunderstood and mistreated symptom of acute and chronic illness. Patient demographic characteristics and nonverbal communication displays have been found to influence the assessment and treatment of pain. Numerous methodological limitations of these previous investigations constrain the research questions that could be addressed and the conclusions that have been yielded. The current analogue study employed an innovative research design and novel virtual patient technology to investigate clinical decision making for pain assessment and treatment. Fifty-four currently practicing nurses participated in this study delivered via the Internet. Thirty-two vignettes of virtual patients were presented; each vignette contained a video clip of the patient and clinical summary information describing a post-surgical context. Nurses were asked to make decisions in the following domains: 1) pain intensity and unpleasantness assessment; 2) positive and negative mood assessment; 3) non-opioid and opioid medication treatment; and 4) recommendation for a change in non-opioid and opioid medication. The patient demographic cues of sex, race, and age, as well as facial expression of pain, were systematically manipulated across vignettes and hypothesized to influence assessment and treatment ratings. Idiographic and nomothetic statistical analyses were conducted to test these hypotheses. Results

indicated that at the idiographic level, patient demographic and pain expression cues accounted for significant, unique variance in assessment and treatment policies among many nurse participants. In several instances, the direction of the demographic cue effects was unexpected and counter to *a priori* hypotheses. Patient pain expression was the most prominent cue throughout these policy domains. Within-cue differences emerged in the aggregate; the size and consistency of these differences varied across policy domains. Exploratory analyses were suggestive of the role of provider education, professional experience, and practice setting on pain-related decisions. The current investigation demonstrates the application of novel virtual patient technology to the study of pain-related decision-making. These data indicate that patient demographic characteristics and facial expressions of pain often play a significant role in the assessment and treatment of acute post-surgical pain. Implications of the present findings are discussed in the context of the extant literature. Methodological considerations and future research directions are also discussed.

CHAPTER 1 INTRODUCTION

Despite recent increases of pain management content in the literature (Ferrell et al., 1993), the development of specific pain curricula for several pain-related health disciplines (International Association for the Study of Pain [IASP], 1993, 1997), and the availability of clinical practice guidelines (World Health Organization [WHO], 1986; American Pain Society [APS], 1992; Acute Pain Management Guideline Panel, 1992), pain remains a misunderstood and mistreated symptom of acute and chronic illness. Previous research has estimated that more than 80% of pain sufferers receive insufficient pain relief, largely due to excessively conservative pharmacologic treatment (WHO, 1986). Because pharmacotherapy with analgesic medications is one of the primary foundations of pain management, overly conservative approaches may deny adequate pain relief to increasing numbers of patients.

Poor pain management due to insufficient administration of analgesic medications is likely the result of several interacting factors (Portenoy, 1996). Many of these factors are the product of inadequate knowledge and inappropriate attitudes on the part of health care providers about pain in general, and pain assessment and treatment in particular. In compensating for knowledge deficits concerning pain assessment and pharmacologic pain management, providers may wittingly or unwittingly permit their own biases to exert undue influence over clinical decision-making. Consequently, less knowledgeable providers may mismanage pain and, thus, needlessly prolong the suffering of patients through the implementation of unsystematic clinical decision policies. Thorough investigations of those factors that influence the clinical decisions of providers regarding pain assessment and the administration of analgesic medications is, therefore, necessary to improve the care of patients in pain.

Pain Assessment

An individual's assessment of the pain experience of another person is likely based on many factors. In the clinical context, medical and disease related variables of the observed patient are of clear importance. Additionally, characteristics of the observer, such as his/her beliefs regarding appropriate pain behaviors and stereotypical social and gender roles, as well as his/her acuity in observing overt behaviors, are hypothesized to have a large impact on the assessment of pain in others. In addition, qualities of the person who is being observed, such as sex, age, and ethnicity, must also be considered (Teske, Daut, & Cleeland, 1983). The observer's perception of the pain experience of another, then, most likely results from an interaction between characteristics of the observer and the person that individual is observing.

In the clinical literature, there has been a considerable amount of attention paid to nurses' estimation of patients' pain. Much of this literature has focused on pain assessment accuracy, with mixed results. A frequently cited study by Zalon (1993) found that nurses' visual analogue scale (VAS) pain ratings were significantly, yet modestly, correlated with the pain ratings of postoperative abdominal surgery patients. Interestingly, these nurses over-estimated mild pain and under-estimated more severe pain. Patients' pain was the only significant factor – accounting for approximately 9% of the variance in nurses' assessments – that was related to the accuracy of nurses' pain assessments. These findings parallel those of other studies, revealing small but significant correlations between nurses' pain assessments and patients' self reports, and the tendency for nurses' to misestimate patients' pain (Choiniere, Melzack, Girard, Rondequ, & Paquin, 1990). Similarly, Salmon and Manyande (1996) found that nurses frequently underestimate patients' need for analgesia and their ability to cope with pain. Others, however, have found little to no agreement between the pain ratings of nurses and patients, presumably because these nurses relied exclusively on observed behavior (Thomas, Robinson, Champion,

McKell, & Pell, 1998). This body of literature suggests that health care providers often make inaccurate judgments regarding the level of patients' pain. The concerning implication is that these misestimates influence the decisions that providers make regarding medication administration for pain.

Influence of Sex

As noted above, sex of both the observer and observed, in addition to the observer's beliefs about sex and gender, may influence the pain assessment process. There has been a recent increased interest in sex and gender differences in pain. Research has shown that there is a discrepancy between the relatively small sex differences in clinical pain report and the moderate-to-large differences in experimental pain report. Robinson and colleagues developed the Gender Role Expectations of Pain (GREP) questionnaire to explore the hypothesis that the differences in experimental pain are an artifact of the laboratory setting where gender roles are activated. Their research has shown that males and females report significant differences in their pain expectations for self and others (Robinson et al., 2001). Importantly, these expectations are associated with experimental pain responding, and have been shown to explain more variance in pain reports than sex (Wise, Price, Myers, Heft, & Robinson, 2002). Subsequent research focused on the assessment of pain in others. Specifically, this research was conducted to determine if males and females perceive pain and pain-related emotions in others differently based on the sex of the individual (Robinson & Wise, 2003). This study involved participants viewing videotaped recordings of others undergoing a cold pressor task, after which they provided ratings of perceived pain experience of the videotaped participant. Results indicated that (1) viewers rated male videos as having less pain than female videos; (2) for both male and female videos, female viewers rated observed pain intensity higher than did male viewers; (3) both male and female video participants' pain was underestimated, but males' pain was

underestimated more than females' pain; (4) expectations of gender-related endurance of pain significantly predicted rating of both male and female videos; (5) when endurance expectations were controlled, sex of the viewer no longer significantly predicted observed pain ratings.

The data from these studies suggest that not only do gender stereotypes influence one's own pain ratings and pain behavior, but they also influence one's perceptions of the pain experience of others. This research was conducted in the laboratory and investigated experimental pain. As such, these findings cannot directly address the clinically relevant issues of whether gender role expectations influence pain assessment and decisions about treatment and prescription practices for pain in the medical setting. These findings do, however, underscore the need for such research, which has heretofore not been conducted. The few investigations that have been conducted on the influence of patient sex on clinical pain assessments are mixed. In an early study of cancer patients, a greater patient-provider discrepancy about the perceived severity of the patient's pain was found for females (Cleeland et al., 1994). A later study of 281 minority cancer patients found no sex differences in the proportion of males and females whose pain was underestimated by their physicians (Cleeland, Gonin, Baez, Loehrer, & Pandya, 1997). In this study, underestimation was high for both male and female patients (66% and 72%, respectively). In a more recent study of minority cancer patients, Anderson and colleagues (2000) did find evidence of a sex disparity in pain assessment. Consistent with results from Cleeland et al. (1994), they found that physicians underestimated the pain severity of 79% of female patients compared with 59% of male patients.

The important contribution of these investigations to the pain assessment literature notwithstanding, the generalizability of their findings may be constrained for several reasons. First, all were investigations of cancer patients. The implications and appraisals of cancer-related

pain may be very different from non-malignant pain conditions, given that cancer is a life-threatening illness. This may impact on both the patient and provider assessment of pain. Second, the racial/ethnic status of the patients in these studies may have confounded the results. Both the Cleeland et al. (1997) and Anderson et al. (2000) studies included only patients of racial/ethnic minority status; the Cleeland et al. (1994) study did not report the racial/ethnic characteristics of their sample. Given that minority individuals are at increased risk of having their pain under-assessed and under-treated (see below), this fact may complicate interpretations of these investigations. For example, the null finding of the Cleeland et al. (1997) study may be due to the overwhelming ubiquity of pain underestimation in these minority patients, which may have obscured any sex difference in pain assessment. Finally, the vast majority of providers in these studies were Caucasian male physicians. Since patient-provider demographic congruence may influence the medical encounter (Anderson et al., 2003), and the number of providers from diverse racial/ethnic and sex backgrounds is increasing (American Medical Association [AMA], 2005; Girard, 2003), future investigations that include a diverse range of providers are certainly warranted.

Influence of Age

The experience of pain is common in older populations, with prevalence estimates ranging from 45-80% depending on the residential status of the sample (Fries, Simon, Morris, Flodstrom, & Bookstein, 2001; Herr, 2002; Mobily, Herr, Clark, & Wallace, 1994; Teno, Weitzen, Wetle, & Mor, 2001; Weiner, Peterson, & Keefe, 1999; Werner, Cohen-Mansfield, Watson, & Pasis, 1998). Despite these estimates, pain assessment in the elderly is poor relative to younger populations (Ferrell, 1996; Gloth, 2000; Horgas & Elliott, 2004). The assessment of pain in older populations is complicated by several factors. Older adults may hold the belief that pain is a normal and expected part of aging and, thus, fail to adequately communicate their pain

experience to others (Ferrell, 1995). Indeed, older adults tend to under-report pain relative to younger populations (Bellville, Forrest, Miller, & Brown, 1971; Oberle, Paul, Wry, & Grace, 1990). Since self-report is the gold standard of clinical pain assessment, this tendency increases the likelihood of a sub-optimal outcome of the pain assessment process in the elderly patient. The self-report of pain is further complicated in older adults by the paucity of adequately standardized assessment instruments for this population. The psychometric properties of instruments that have been thoroughly standardized in younger patients [e.g., VASs, McGill Pain Questionnaire (MPQ; Melzack, 1975)] are often compromised when employed in the elderly (Gagliese, 2001).

Higher rates of medical comorbidities in the elderly may also impact on the assessment of pain in these patients, as such comorbidities may compete for the attention of healthcare providers (Nishikawa & Ferrell, 1993). Among the possible comorbidities, dementia is of particular importance. Not only does dementia have the likelihood of competing for the attention of providers, but, perhaps more importantly, it introduces a level of complexity to the pain assessment process that is unmatched by other conditions. As the severity of dementia increases, the level of self-awareness and ability to communicate decreases (White & Cummings, 1997). The pain assessment process is consequently compromised. Evidence for this is found in the substantial literature documenting the substandard assessment of pain in elderly patients with cognitive dysfunction (Cohen-Mansfield & Lipson, 2002a, 2002b; Cook, Niven, & Downs, 1999; Kaasalainen et al., 1998; Ferrell, 1995; Sengstaken & King, 1993).

A final complication of the assessment of pain in older adults concerns the attitudes and beliefs of providers. Research suggests that providers may be overly cautious in considering the pharmacologic management of pain in general (Portenoy, 1996), and this approach may be

heightened in the elderly (Aubrun, 2005). This cautiousness is likely to impact the pain assessment process, since this process is undertaken for the primary purpose of informing treatment decisions. Providers may also hold beliefs similar to the elderly themselves concerning the normative experience of pain in this population and/or the decreased pain sensitivity of older adults (Sarkisian, Hays, Berry, & Mangione, 2001). These beliefs may, in turn, inappropriately influence the pain assessment of such patients.

It is unlikely that the factors noted above operate in isolation. Rather, they are likely to interact with each other and other variables to influence the assessment of pain in elderly patients. Although the extent of this interaction has not been entirely elucidated, it is clear that elderly individuals are at increased risk of sub-optimal pain assessment and, consequently, pain management. As such, continued work in this area appears warranted.

Influence of Race/Ethnicity

There has been a recent surge of investigations on race/ethnic differences in pain experience. In the experimental context, African-Americans and Hispanics reliably demonstrate lower pain tolerance and higher pain unpleasantness than Whites across a range of pain stimuli (Campbell, Edwards, & Fillingim, 2005; Edwards & Fillingim, 1999; Walsh, Schoenfeld, Ramamurth, & Hoffman, 1989). Race/ethnic differences in pain perception have also been reported for several chronic pain conditions, including AIDS (Breitbart et al., 1996); glaucoma (Sherwood et al., 1998); migraine (Stewart, Lipton, & Liberman, 1996); arthritis (Creamer, Lethbridge-Cejku, & Hochberg, 1999); postoperative pain (Faucett, Gordon, & Levine, 1994); and myofascial pain (Nelson, Novy, Averill, & Berry, 1996). There is also an expanding literature concerning race/ethnic disparities in the treatment of pain, which is reviewed below. Differences in the pain assessment process have been investigated as one possible explanation for these treatment disparities. The results of these studies are mixed. On the one hand,

race/ethnic differences have been reported in the ability of health care providers to accurately interpret patient pain. For example, results of a large multi-center study indicated that minority cancer patients were more likely to have the severity of their pain underestimated by their physicians than White patients (Cleeland et al., 1997). Sheiner and colleagues (1999) found that although Jewish and Bedouin parturients gave similar self-reports of pain, the medical staff – consisting entirely of Jewish providers – perceived Bedouin women as experiencing less pain than Jewish women. Although their study included only minority patients with cancer and, thus, did not allow for comparisons to Caucasian patients, Anderson and colleagues (2000) found that physicians underestimated the pain severity of 74% and 64% of African-American and Hispanic patients, respectively. In addition to being at increased risk of having their pain misestimated, there is evidence that minority patients may also be less likely to have their pain documented altogether (Bernabei et al., 1998).

A number of possible explanations for these disparities exist. Race/ethnic differences in language and communication, socioeconomic status, access to healthcare, symptom manifestation, and patient preference may all play a role in this context. Provider bias must also be considered. It is important to note, however, that such disparities in pain assessment are not always found. For example, Todd, Lee, and Hoffman (1994) investigated the concordance between patient and provider pain assessments in the Emergency Department. Caucasian and Hispanic patients presenting with isolated extremity fracture were included in this study. Although physician estimates of pain were lower than patient reports, there was no difference in physician estimates of pain between the groups. Furthermore, in contrast to the finding noted above that minority patients may be less likely to have their pain recorded (Bernabei et al., 1998), Todd, Deaton, D’Adamo, and Goe (2000) found no difference in the frequency of pain

documentation between Caucasian and African-American patients presenting to the Emergency Department.

An important ambiguity of many of these studies is whether the difference – if one is found – in provider estimation of patient pain is the result of factors within the medical staff who rated the pain (e.g., knowledge deficits, bias), or factors related to the patient groups (e.g., communication, SES). Future investigations are needed to elucidate these issues. Such investigations have the potential of improving the pain assessment process and, consequently, treatment of all patients in pain.

Pain Treatment

Optimal treatment of pain is an important goal of healthcare. Complications of unrelieved pain are widespread and varied. Physical, functional, and psychologic conditions are associated with and exacerbated by pain. These include depression, sleep disturbance, and functional impairment (Ferrell, 1995; Herr & Mobily, 1991; Lavsky-Shulan et al., 1985; Parmalee, Katz, & Lawton, 1991; Williamson & Schulz, 1992). There is also evidence of increased morbidity and mortality secondary to poor pain control (Cousins, 1991). Despite recent increases of pain management content in the literature (Ferrell, McGuire, & Donovan, 1993), the development of specific pain curricula for several pain-related health disciplines (IASP, 1993, 1997), and the availability of clinical practice guidelines (WHO, 1986; APS, 1992; Acute Pain Management Guideline Panel, 1992), pain remains a misunderstood and mistreated symptom of acute and chronic illness. Approximately 23 million Americans experience post-operative pain each year, and as many as 75% do not achieve adequate pain control despite the availability of effective treatments (Cousins, 1994). In terms of chronic pain, the difficulties of managing this condition are axiomatic. Of the many possible contributing factors that may account for the overwhelming

evidence of poor pain management practice, patient demographic characteristics have been the target of recent empirical focus.

Influence of Sex

The accumulation of evidence from both the laboratory (e.g., the influence of gender role stereotypes on pain assessments) and the clinical setting (e.g., the inaccuracy of health care providers' pain assessments of patients) suggests that an individual's sex may influence the assessment of pain in others and, thus, may elicit differential treatment practices from health care providers. Research investigating clinicians' beliefs regarding sex differences in pain perception is equivocal. Some studies indicate that many health care providers believe differences in pain perception between males and females do exist (McCaffrey & Ferrell, 1992), while others reveal no such belief among providers (Holm, Cohen, Dudas, Medema, & Allen, 1989).

In terms of actual pain management practice, the literature is similarly conflictual. Results of many investigations indicate that females are at increased risk of having their pain under-treated relative to males. Retrospective studies have demonstrated a tendency for males to receive a higher frequency of narcotic analgesics (Calderone, 1990) and larger initial doses of pain medication (McDonald, 1994) post surgery. This sex disparity in post-operative pain management has also been found in pediatric and elderly samples. In one study, men and boys were prescribed significantly more narcotic medication following cardiothoracic surgery than similar females (Beyer, DeGood, Ashley, & Russell, 1983). Faherty and Grier (1984) reported that medical providers prescribed significantly less pain medication for adult females of all age groups, including the elderly, following abdominal surgery compared to males. Female cancer patients with pain have also been found to be under-medicated relative to males (Cleeland et al., 1994). In more experimental designs, research employing identical vignettes, save the sex of the

patient, has shown that nurses choose less analgesic medications to be administered to females than males (Cohen, 1980; McDonald & Bridge, 1991).

Evidence that patient sex does not influence pain management practices has also been reported. Bartfield and colleagues (1997) conducted a prospective study on adult patients with acute low back pain presenting to the Emergency Department. Patient sex did not emerge as a significant predictor of analgesic administration in this sample. Similar findings were reported by Turk and Okifuji (1997) in a heterogeneous sample of chronic pain patients. A later study by Turk and Okifuji also found no significant sex differences in current use of analgesics or past treatment in a large sample of chronic pain and cancer-related pain patients (Turk & Okifuji, 1999). Campbell (2002) employed a vignette design to the study of nurses' decision-making regarding pain management practices. Results of this study indicated that the vast majority of nurses' were not predisposed to administer less opioid medication to hypothetical female post-surgical patients. Also noteworthy is the fact that the earliest investigations of sex differences in pain management practice found that males, not females, were at increased risk of receiving sub-optimal analgesic care (Bond & Pilowsky, 1966; Pilowsky & Bond, 1969), perhaps due to a culturally sanctioned belief that males should be more tolerant of pain than females (Bond, 1971).

These disparate findings question the reliability of sex as an influence on the prescription of pain medication. Furthermore, as Robinson and Wise (2003) note, any conclusions that are drawn from this body of research should be tentative due to methodological issues. Two additional issues of concern with the entirety of the clinical literature that cannot be overstated are (1) the absence of any significant manipulation of the independent variables in an ecologically valid manner, and (2) the noted lack of variability in the sex of the assessor (e.g.,

medical provider). Clearly, then, additional research is needed to clarify the issue of sex and pharmacologic pain management.

Influence of Age

As noted above, elderly individuals manifest high rates of both acute (e.g., post-surgical) and chronic (e.g., arthritis) pain conditions. Although there appears to be some evidence of age-related changes in pain perception, such as declines in endogenous analgesic systems (Edwards, Fillingim, & Ness, 2003) and altered transmission along A-delta and C nerve fibers (Chakour, Gibson, Bradbeer, & Helme, 1996; Helme & Gibson, 1997), the effects of these changes on the experience of pain remain unclear. Results of laboratory-based studies comparing pain threshold and tolerance across age groups are mixed. This has led some to question the clinical significance of age-related changes in pain perception (Ferrell, 2003; Harkins, 1996).

Despite the aforementioned lack of empirical consistency, clinical practice guidelines for pain management assert that elderly patients are at risk of being under-treated for pain (Agency for Health Care Policy and Research [AHCPR], 1994). As previously noted, the consequences of uncontrolled pain are considerable. These consequences are heightened in the older adult population (American Geriatrics Society, 2002). The elderly undergo surgery four times more often than other age groups (Rooke, Reves, & Rosow, 2002), and greater than half report inadequate post-operative pain relief (Karani & Meier, 2004). Results of a study by Oberle and colleagues (1990) indicated that, compared to younger patients with similar reports of pain intensity, elderly patients received smaller amounts of analgesics following surgery. Results of a vignette study also indicated that at least some health care providers use age as a significant cue in the decision making process regarding use of pain medication, such that some nurses were predisposed to administer less medication to older patients (Campbell, 2002). These findings hold increased significance when considered in light of empirical evidence that older patients do

not self-administer fewer analgesics than other patient groups (Morgan & Puder, 1989; Owen, Szekeley, Plummer, Cushnie, & Mather, 1989); although, contradictory findings have been reported (Gagliese, Jackson, Ritvo, Wowk, & Katz, 2000; Gagliese & Katz, 2003). The literature concerning management of chronic pain in elderly individuals is relatively small. The use of opioid drugs for chronic, non-malignant pain is controversial in general, but they are likely underutilized in treatment of the elderly (Popp & Portenoy, 1996). The literature provides some support for this contention (AGS, 2002; Auret & Schug, 2005; Ferrell, Ferrell, & Rivera, 1995).

Several possible explanations for these results are available. Age-related physiologic changes in response to opioids (e.g., increased risk of organ toxicity, increased sensitivity to medication effects) may induce caution in health care providers in administering such medications to older individuals in pain. Although these changes certainly complicate the use of analgesics in these patients, the application of ageist stereotypes to the decision making process – which the literature suggests exists to some degree – is not supported. As reviewed earlier, pain assessment in elderly patients may be complicated by many factors (e.g., cognitive impairment, provider attitudes), which has clear implications for pain management. Not only can cognitive impairment negatively affect pain assessment but it can also be aggravated by both post-operative pain and the medications used to treat this pain (Montamat, Cusack, & Vestal, 1989; Moore & O’Keefe, 1999). Effects of these complications are seen in the research demonstrating that cognitive impairment strongly influences the amount of analgesic medication that medical providers administer to older patients following trauma or in the post-operative period (Foster, Pardiwala, & Calthorpe, 2000; Feldt, Ryden, & Miles, 1998; Morrison et al., 2003), as well as in the nursing home environment (Horgas & Tsai, 1998).

Influence of Race/Ethnicity

In contrast to the relatively small and inconsistent literature concerning race/ethnic influences on the pain assessment process, there is considerable empirical support for the assertion that race/ethnicity plays an important role in the treatment of acute and chronic pain. Race/ethnic disparities in pain management have been reported across a range of conditions. Racial/ethnic disparities in Emergency Department (ED) pain management have been reported in several studies. In a series of retrospective studies, Todd and colleagues (1993, 2000) found that Hispanic and African-American patients were more likely than Whites to receive no pain medication upon admission to the ED with isolated long bone fractures; these disparities were not due to ethnic differences in physician pain assessment (Todd et al., 1994). More recently, Tamayo-Sarver, Hinze, Cydulka, and Baker (2003b) found that African-American migraine and back pain ED patients were less likely to be prescribed opioids than similar White patients. Importantly, this disparity was greatest for conditions with fewer objective findings (e.g., migraine), which presumably permitted non-medical factors, such as race/ethnicity, to play a larger role in medical decision-making.

Management of post-operative and back pain also evinces racial/ethnic disparities. A retrospective analysis of post-surgical pain management practices indicated that White patients consistently received higher doses of analgesics than African-American and Hispanic patients; these differences persisted after controlling for relevant demographic and clinical variables (Ng, Dimsdale, Shragg, & Deutsch, 1996b). A follow-up investigation by these same researchers found that White patients were prescribed a larger amount of patient-controlled analgesia for post-operative pain than Hispanic patients, and African-American patients were prescribed a larger amount than Hispanic and Asian patients (Ng, Dimsdale, Rollnik, & Shapiro, 1996a). Again, these disparities remained significant after controlling for potential confounds.

Racial/ethnic disparities in the management of cancer and HIV/AIDS-related pain have also been documented. Cleeland and colleagues (1994), in a multicenter study, found that outpatients of cancer clinics that primarily serve ethnic and racial minorities were three times more likely to be undermedicated with analgesics than were patients in other settings. The percentage of patients indicating inadequate analgesia was significantly higher in community clinical oncology programs that treated predominantly African-American and Hispanic patients than in academic medical cancer centers and community-based hospitals and practices. Furthermore, African-American and Hispanic patients were more likely than non-minority patients to receive inadequate pain management in all settings. In a subsequent investigation, these researchers found that patients treated in settings that primarily serviced African-Americans, Hispanics, or both were more likely to receive inadequate analgesia than patients treated in non-minority community treatment settings (Cleeland et al., 1997). Bernabei and colleagues (1998) found that (1) elderly African-American and Hispanic cancer patients were less likely to have their pain recorded compared to Whites, and (2) minority nursing home cancer patients were more likely to have received no analgesia. Specifically, African-Americans had a 63% increased probability of having their pain untreated compared to White patients. Similar disparities were observed for other racial and ethnic groups, although small sample sizes precluded detailed analyses of these disparities. Similar results were reported by the Office of Minority Health; 62% of cancer patients at medical facilities serving primarily African-American patients and 82% of cancer patients at medical facilities serving primarily Hispanic patients were prescribed inadequate analgesic medication (Ross, 2000). Less dramatic but still noteworthy, Anderson and colleagues (2000) found that approximately one-third of African-American cancer patients received pain medications of insufficient strength to adequately manage their pain. In the

HIV/AIDS literature, differences in pain treatment have been found between members of racial minority groups and Whites, with minority patients receiving less adequate pain management (Sambamoorthi et al., 2000).

Although the evidence for racial/ethnic disparities in the treatment of pain appears overwhelming, contradictory findings have been reported. Karpman, Del Mar, & Bay (1996) attempted to replicate the findings of Todd et al. (1993) and determine the existence of a relationship between patient race/ethnicity and the amount of analgesia administered to reduce pain from a long bone fracture. In contrast to the earlier study by Todd et al. (1993), no differences between Hispanic and White patients were found in terms of pharmacologic pain management practice for fracture reduction. A more recent retrospective study also sought to investigate the influence of patient race/ethnicity on decision making for pain management following bone fracture (Fuentes, Kohn, & Neighbor, 2002). Consistent with Karpman and colleagues (1996), no differences in analgesic treatment practices for White, African-American, Hispanic, or Asian patients were noted. Bartfield and colleagues (1997) conducted a prospective study of adult patients treated for non-traumatic low back pain to determine the influence of physicians' impression of patients' race/ethnicity on analgesic prescription practices. Results indicated that only patient pain, not race/ethnicity, influenced analgesic administration. Two recent vignette studies also found that race/ethnicity of hypothetical patients did not influence analgesic practice among physicians and nurses (Campbell, 2002; Tamayo-Sarver et al., 2003a).

When considered in its entirety, the literature indicates that patient race/ethnicity is an important variable in the treatment of pain. Although not perfectly consistent, this literature demonstrates that African-Americans and Hispanics are more likely to be under-treated for pain than their White counterparts. Furthermore, such disparities were found in diverse medical

facilities and geographic locations. These disparities may result from many factors, including communication difficulties, differential expression and manifestation of pain, differential preferences and expectations for treatment, and frank provider racism. Continued effort to elucidate treatment disparities in pain management practices and the reasons behind them is needed to improve the treatment of pain in all people.

Limitations of the Assessment and Treatment Literature

Although the literature regarding the issues outlined above has expanded and improved in recent years, conspicuous limitations and gaps remain. A primary issue is methodological. The two principal approaches to studying pain assessment and treatment are the retrospective and vignette designs. Retrospective designs have generally taken the form of chart reviews in which patient medical records are reviewed to determine if patient demographic factors are related to medical assessment and/or treatment. These designs are fraught with problems that make it difficult to test hypotheses and draw firm conclusions. Specifically, they preclude any manipulation of the independent variables of interest (e.g., patient demographics) and limit the analysis of potential confounds. Additionally, pain report is often not documented in patient charts (Calderone, 1990; McDonald, 1994; Ng et al., 1996), placing further constraints on the applicability of retrospective designs to pain research in this context. A more methodologically sound approach is the vignette study. These designs typically involve the reading of a hypothetical patient's "file" by the medical provider, after which the provider answers a series of questions regarding the patient's pain level and the medication administration they (provider) would endorse. Although these designs permit greater control in the manipulation of variables, they suffer from low external validity and high task transparency/social desirability.

The lack of variability in the demographic characteristics of the health care provider is an additional limitation. As previously noted, the medical field has seen an expansion of both sex

and racial/ethnic diversity among providers (AMA, 2005; Girard, 2003); however, the vast majority of participants in research investigations to date have been Caucasian and of the stereotypic sex (i.e., male physicians and female nurses). Not only may patient-provider congruence on these characteristics influence the medical encounter (Anderson et al., 2003), but demographically diverse providers may approach clinical problems (e.g., pain) and their assessment and management in systematically different ways due to the influence of culturally-sanctioned attitudes and behaviors regarding health.

The literature to date, both in the laboratory and the medical setting, has soundly demonstrated the importance of investigating the factors that influence medical assessments and decisions, especially regarding patient pain and analgesic medication administration. However, a creative, more methodologically sound research design is now needed to probe those questions that remain unanswered and re-evaluate the conclusions that have been drawn thus far. The proposed study aims to take this next logical step in the literature regarding pain assessment and management by health care providers.

Facial Expression of Pain

Patient self-report is the gold standard of pain assessment and typically takes the form of a verbal response to a pain-related inquiry by the health care provider. Self-report of pain may also be obtained through response to items from a questionnaire and/or one of many rating scales (e.g., VAS, NRS). Nonverbal expressions of pain offer a promising adjunct to these self-report indices (Craig & Prkachin, 1983) and are likely to impact on the pain assessment and treatment process. In fact, observers generally assign greater weight to nonverbal expressions of pain than self-report (Craig, 1992; Poole & Craig, 1992). Among the many variants of nonverbal pain behaviors, facial expressions have been the subject of much empirical work. The foundation of this work is largely provided by Paul Ekman and his colleagues who have demonstrated the

existence of distinct facial expressions representing fundamental emotional states (Ekman, 1992). These states can be accurately detected by observers on the basis of specific facial cues (Ekman & Friesen 1969b; Ekman, Friesen, & Ellsworth, 1983). Kenneth Craig and his colleagues extended this line of research to the field of pain in the 1980s, which is not to say that facial expressions of pain were ignored until only recently. In fact, Darwin (1872/1965) commented on specific mouth and eye movements that he considered characteristic of the human expression of pain. Although these facial features did not hold up to later empirical scrutiny, the notion that the facial expression of pain could be quantified by analysis of specific movements of facial muscles portended a field of inquiry that did not come to fruition until a full century later.

This field of inquiry has been aided in large part by development of technologies capable of capturing specific morphological features of distinct facial expressions. The Facial Action Coding System (FACS; Ekman & Friesen, 1978) is the primary such technology. The FACS is an objective, anatomically-based system that permits a full description of the basic units of facial movement associated with private experience, including pain. Forty-four different action units (AUs) scored on a 5-point intensity scale have been identified, which represent the minimal units of facial activity that are anatomically separate and visually distinguishable. Core action units representing the facial expression of pain in adults are: brow lowered, cheek raised and lid tightened, nose wrinkled and upper lip raised, and eye closure (Craig, Prkachin, & Grunau, 1992; Prkachin, 1992b). Although the associated changes in facial musculature – for pain and other expressions – occur along continuous dimensions, these expressions are perceived in a categorical manner (Etcoff & Magee, 1992; Young et al., 1997). Importantly, the pain expression is relatively specific to pain, as it can be differentiated from other negative subjective states, such

as disgust, fear, anger and sadness (LeResche, 1982; LeResche & Dworkin, 1988; Hale & Hadjistavropoulos, 1997).

Following identification of the characteristic facial expression of pain, scientists turned to investigations of the developmental and cultural stability of this expression, as well as to investigations in diverse experimental and clinical contexts. A specific facial expression of pain appears to be present from an early age. Infants from 25 weeks gestation show a characteristic pain face (Craig, Whitfield, Grunau, Linton, & Hadjistavropoulos, 1993; Grunau & Craig, 1987; Lilley, Craig, & Grunau, 1996; Stevens, Johnston, & Horton, 1994). Strong consistencies in the morphology of facial expressions of pain have been observed from birth through old age; however it is important to note that these expressions are subject to environmental pressures, particularly those related to sociocultural norms and immediate context (Craig, 1980). In contrast to the sizeable literature on developmental aspects of the pain expression, little cross-cultural investigations have been conducted. This is a conspicuous gap in the literature given that pain behaviors may vary dramatically both between and within cultures (Goldberg & Remy-St. Louis, 1998). Cross-cultural studies of facial expression of emotions have been conducted (Ekman & Friesen, 1971; Ekman et al., 1987); however, the extent to which these studies generalize to pain is not clear. Unfortunately, this is a difficult area of inquiry due to methodological and interpretation constraints (Ekman, 1994; Fridlund, 1994; Haidt & Keltner, 1999; Russell, 1994, 1995), but one that is in need of development.

The facial expression of pain across different experimental pain stimuli (Prkachin, 1992b) and clinical pain conditions (Craig, Hyde, & Patrick, 1991; Hadjistavropoulos & Craig, 1994; LeResche, 1982; LeResche & Dworkin, 1988; Prkachin & Mercer, 1989) has been investigated and appears to be relatively constant. Furthermore, the magnitude of facial expression has been

shown to increase in relation to exacerbations of clinical pain intensity and to be related to several indices of clinical pain severity (Craig et al., 1991; Hadjistavropoulos, LaChapelle, Hadjistavropoulos, Green, & Asmundson, 2002; LeResche & Dworkin, 1988; Prkachin, Berzins, & Mercer, 1994; Prkachin & Mercer, 1989).

The complement to a distinctive facial expression of pain is the ability of others to detect it. As noted above, observers can reliably distinguish the facial expression of pain from that of other subjective states. Research indicates that the facial cues inherent in the expression of pain are used consistently by observers to judge pain in adults and children (Craig et al., 1991; Watt-Watson, Evernden, & Lawson, 1990); however, the accuracy of these judgments is inconsistent (see below). Facial expressions of pain make substantial contributions to observer ratings of others' pain (Ahles et al., 1990; Hale & Hadjistavropoulos, 1997), even when a contradictory verbal report of the absence of pain is presented (Poole & Craig, 1992). Caregivers of the profoundly cognitively impaired have been noted to rely heavily on facial expressions as an index of experienced pain (LaChapelle, Hadjistavropoulos, & Craig, 1999; van Dongen, Abu-Saad, & Hamers, 1999).

The overall literature concerning observer accuracy of pain estimation based on facial expressiveness is relatively small, particularly when health care providers' estimations are the target of investigation. Laypersons and providers are generally accurate in judging the presence or absence of pain based on facial expressions of the observed person (Breau et al., 2001; Goodenough et al., 1997; Lilley et al., 1996; Lindh, Wiklund, Sandman, & Hakansson, 1997; Prkachin et al., 1994). However, when judgments involve pain severity and not merely the presence or absence of pain, concordance between observer and observed pain ratings decreases. For example, Prkachin and colleagues (1994) videotaped the faces of patients experiencing

shoulder pain and found that untrained observers of these tapes underestimated patients' pain by as much as 80%. In a more recent study, Prkachin, Solomon, Hwang, and Mercer (2001) investigated the influence of pain familiarity on accuracy of pain judgments. Three groups of participants (laypersons with a family history of pain conditions, laypersons with no family history of pain conditions, and health care providers) viewed videotapes of patients undergoing a painful medical procedure, after which they provided pain assessments of these patients. Patients' pain was underestimated by each group of participants, but to varying degrees. Participants with a family history of pain attributed greater pain to the patients than did those with no such history. Furthermore, health care providers (physical and occupational therapists) attributed the least amount of pain to patients. These data suggest that personal and professional experience with pain may influence the assessment of pain in others. In a study by Goodenough and colleagues (1997), pediatric nurses indicated that they relied heavily on facial cues when making global estimates of pain. However, results revealed a significant discrepancy between children's self-report of pain (visual analogue toy) and the nurses' judgment, such that nurses' ratings of patient pain were consistently lower than the patients' ratings. Although this literature is small, it is generally consistent with research reviewed earlier in which provider underestimation of patient pain appears to be the rule rather than the exception.

Lens Model Design

As noted above, methodological shortcomings are characteristic of the extant literature concerning pain assessment and treatment. The proposed study will attempt to address these shortcomings by employing a lens model design. The lens model is an analogue method for capturing how individuals use information in their environment to form judgments. It is both a theoretical model of how individuals use information to make judgments, and an experimental paradigm for studying judgment processes and outcomes (Beal, Gillis, & Stewart, 1978). The

lens model was originally formulated by Egon Brunswick in the 1950s and later refined by Kenneth Hammond within his Social Judgment Theory (Cooksey, 1996).

Inherent in the lens model approach is the assumption that judgment processes are contextually determined. That is, an individual's judgment is determined based on his/her attention to and weighting of the information (cues) available in the immediate environment. In lens model applications, individuals are presented a series of profiles containing cues that may be used to form a judgment. The profiles depict cases or situational contexts for the individual to process, and each contains a unique combination of cues. The outcome of the judgment process for each profile is obtained using a quantifiable response mode, such as NRSs or VASs. Policy capturing occurs at the idiographic level utilizing multiple regression procedures. A linear equation is produced that optimally weights each cue in terms of its predictive contribution to the judgments. Once an individual's judgment policy has been captured, a coefficient of multiple determination (R^2) can be generated, which represents the proportion of the variance in judgments accounted for by the linear model of the individual. This model also permits data aggregation for group analyses.

Rationale

As reviewed above, there are varying degrees of evidence that an individual's demographic characteristics – namely, sex, age, and race – influence observers' assessment and treatment (in the case of medical providers) of pain. The vignette- and retrospective-based methodologies most frequently employed in such investigations impose constraints on the research questions that could be addressed and the conclusions that have been yielded. An innovative research design that capitalizes on the advantages of these methodologies while limiting their disadvantages may further our understanding of these complex issues. Further, a more detailed analysis of the clinical decision making process itself than has heretofore been conducted would

be a positive direction for this line of research. Such an analysis would extend past the practice of mere examination of the end result – i.e., the decision product – and instead permit investigation of the process that precedes the result. Only through analysis of the process can we begin to understand where biases and knowledge deficits infiltrate clinical decision-making. Investigations of this type have the potential to inform future intervention efforts aimed at rectifying such problems. In addition, to date, little work has examined the interaction of the characteristics of both the observer and the observed in this context. This is largely due to the difficulty in securing participants of sufficient variability to conduct adequately powered analyses. Thus, investigations like the current one that particularly target providers of variable personal and professional characteristics are needed.

CHAPTER 2 METHODS

Participants

All participants were at least 18 years of age and a licensed practicing Registered Nurse (RN). Students and those with advanced nursing degrees were included if they met the aforementioned criteria. Recruitment of participants occurred at the local and national level. Local recruitment strategies included presentations at class lectures, advertisements displayed in local hospitals and clinics, and presentations at local and state association meetings. National recruitment occurred via nursing mailing lists and email listservs, and through attendance at national meetings. It was expected that this approach would maximize the demographic and clinical diversity of practicing professionals. Continuing education credits for the debriefing portion of this study or financial compensation served as incentives for participation.

The current study was powered for the idiographic analyses of the lens model approach. Task sensitivity, the principal concern of lens model designs, is primarily a function of the ratio of profiles to cues. The smallest recommended profile-to-cue ratio is 5:1, but a 10:1 ratio may be preferred given logistical feasibility (Cooksey, 1996). Idiographic power of this study was maximized by employing a ratio that exceeded the acceptable 5:1 ratio. The 10:1 ratio would likely have imposed undue burden on study participants through the creation of a large number of profiles and, thus, was not adopted. This study investigated 4 contextual cues (age, race, sex, and pain expression) and used a total of 32 profiles, which is a profile-to-cue ratio of 8:1. This ratio permitted each possible cue combination to be presented twice, which further enhanced statistical power. It was expected that this ratio would ensure adequately powered nomothetic analyses when the idiographic data were aggregated. Lens model designs that employ a sufficient profile-to-cue ratio have enhanced power at the nomothetic level due to greater reliability of each

individual's data as a result of multiple observations. Thus, policy-capturing investigations like the current study can achieve adequate power with a smaller sample size than traditional research designs (Cooksey, 1996). Given the methodological uniqueness of the proposed study, it was difficult to conduct a precise traditional power analysis at the nomothetic level. However, based on a modified power analysis using *Power Analysis and Sample Size (PASS)* software, the results of a previous study (Campbell, 2002) that most closely resembles the current one, and the literature reviewed above, a total of 50 participants were planned for recruitment.

Measures

Demographics Questionnaire

A demographics questionnaire elicited information pertaining to participant sex, age, race/ethnicity, years of professional nursing experience, and past practice settings and clinical specialties.

Gender Role Expectations of Pain

The GREP (Robinson et al., 2001) is comprised of 12 visual analog scales (VAS) that assess an individual's view of the typical man and woman with respect to pain sensitivity, pain endurance, and willingness to report pain. It also assesses the individual's personal attribution of his or her pain sensitivity, pain endurance, and willingness to report pain relative to the typical man and woman. Psychometric properties of the GREP are sound. The factor structure is consistent with the theoretical formulation of the scales and accounts for 76% of the variance in scores. The GREP has good test-retest reliability with individual item correlations ranging from .53 to .93. High correlations (-.71 to -.81) between individual items reflecting the opposite gender role (i.e., typical male endurance of pain correlated with typical female endurance) demonstrates internal consistency. Finally, sex differences in the endorsement of items on the GREP are large, with the largest differences (46% of variance) shown for "willingness to report

pain” items. These differences provide evidence for the construct validity of the measure (Robinson et al., 2001). The GREP has also been demonstrated to be a significant predictor of experimental pain ratings in undergraduate men and women, accounting for a significant proportion of the sex differences in pain report (Wise et al., 2002). Consistent with previous research (Robinson and Wise, 2003), two theoretically important items from the GREP were included in the subsequent analyses to determine if gender stereotypes about “endurance of pain” and “willingness to report pain” influence clinical decisions regarding pain assessment and management practices.

Lens Model Design

The current study employed a lens model design, an analogue method for capturing how individuals use information in their environment to form judgments. The lens model serves as a theoretical model of how individuals use information to make judgments, and as an experimental paradigm for studying judgment processes and outcomes (Beal et al., 1978). The lens model approach is based on the assumption that the immediate environmental context – i.e., the cues available to the individual’s perceptual faculties – influences an individual’s judgment process. Empirical applications of this approach typically consist of a series of cue-containing profiles presented to a study participant, about which the participant forms a judgment. This judgment is recorded via a quantifiable response mode, such as a VAS.

In the current study, the outcome of the judgment process was each participant’s assessment ratings of pain and mood, as well as his/her decisions regarding pain management practices. The contextual cues of interest that vary systematically across clinical profiles are patient age, sex, race, and expression of pain.

Profiles

Each profile consists of a vignette and video clip. The vignettes contain patient clinical information indicating the status of the patient, pain complaint (duration and location), and prescription medication orders. The majority of the patient clinical information is included only to enhance task familiarity and ecological validity; this information has minimal variability and is within normal limits. The remaining information is used to provide the participants with the context in which they are to make assessment and treatment decisions.

The video clips were generated with *People Putty* software by Haptik Incorporated. *People Putty* is a technology that permits the user to develop virtual characters with a variety of features. Standard characters are available for use; however, users may also upload digital picture files of actual people and program these files into the existing software. Various demographic features (e.g., sex, age, and race) can be manipulated to create a diverse array of characters. A particularly innovative and desirable feature of this technology is the ability to manipulate the facial expressions of characters. Users can manipulate specific facial features in order to achieve a desired expression. The specific features of an empirically-validated pain expression – brow lowered, cheek raised and lid tightened, nose wrinkled and upper lip raised, and eye closure – can be altered to represent varying degrees of pain expressivity. Furthermore, these expressions can then be held constant and applied to other characters of different characteristics. For example, the characteristic features of a “high” pain face can be equally applied to both a young, African-American male and elderly, Caucasian female. This feature of *People Putty* permits a level of experimental control that is lacking in retrospective-based research, and permits a level of ecological validity that is lacking in vignette-based research. In this manner, the current design sought to maximize the advantages of these approaches while minimizing their disadvantages. The control afforded by the virtual patient technology is also

greater than that available through the use of actual persons who have been attempted to be equated on demographic characteristics and trained in the display of facial expressions of pain. Another important advantage over the use of trained actors is that the virtual patient technology eliminates from the development of the stimuli the very biases this study is intending to investigate.

Profiles were presented randomly to control for order effects. Each profile contains four cues: sex (male, female), age (young adult, old adult), race (Caucasian, African-American), and pain expression (low, high). The cues of patient sex, age, and race were available to participants from the video clips. Pain intensity level was represented by the facial expressions of the characters. As noted above, these facial expressions were generated through manipulation of the specific features characteristic of the pain face. The FACS was used to direct the creation of these expressions. A total of 16 unique scenarios were created representing all possible cue combinations. In the current study, in order to achieve maximal task sensitivity, each participant viewed each possible cue combination twice, for a total of 32 profiles.

Judgments

Four assessment ratings were obtained for each profile presented. Participants rated each virtual patient's level of pain intensity and pain unpleasantness, as well as their level of positive and negative mood. Pain assessment ratings were recorded on separate VASs with endpoints at *no pain sensation* and *most intense pain sensation imaginable* for pain intensity, and *not at all unpleasant* and *most unpleasant imaginable* for pain unpleasantness. Mood assessment ratings were recorded on VASs with endpoints at *neutral* and *most positive imaginable* for positive mood, and *neutral* and *most negative imaginable* for negative mood. Four treatment ratings were also obtained for each profile: (1) likelihood of administering a non-opioid analgesic within prescribed dosage, (2) likelihood of administering an opioid analgesic within prescribed dosage,

(3) likelihood of recommending a change in non-opioid analgesia to achieve better pain control, and (4) likelihood of recommending a change in opioid analgesia to achieve better pain control. Separate VASs were used for each rating, with endpoints at *not at all likely* and *complete certainty*. The VASs for assessment and treatment ratings consist of computerized horizontal lines anchored by their corresponding endpoint descriptors. Participants used a “slider” to indicate the point that best represents their assessment and treatment ratings. The distance from the left-most endpoint to the point indicated by the participant represents their ratings.

Procedure

A WEB-based delivery model was used for the current study. Each participant was asked to read an informed consent that included a description of the study, time required to complete the study, and compensation for their time if they decided to participate. Participants provided electronic consent if they agreed to participate. After providing consent, participants completed the demographics questionnaire. The order of the GREP and patient profile administration was counterbalanced and followed the completion of the demographics questionnaire. The following procedure was used for all administrations of the patient profiles: (1) participants read the clinical information and view the video simultaneously; (2) participants complete questions that ask them to provide pain and mood ratings using electronic VASs, and rate the likelihood of carrying out pain management practices. Prior to the patient profile portion of the study, participants read an “instructions” document that informed them about how to approach the task and how to use the electronic VASs to give pain, mood, and treatment ratings. Participants are instructed to fully complete the questions for each profile and are not permitted to return to previously completed profiles. To maximize compliance with instructions and provide answers to frequently posed questions, a help menu was provided and accessible at all times.

Following completion of the study, participants were administered a short task-validity questionnaire that asked them to guess at the purpose(s) and/or hypothesis(es) of the study. They were also asked about what information they used when making their assessment and treatment ratings. Participants were then fully debriefed regarding the variables of interest and the study hypotheses. A brief educational tutorial regarding pain practice with sex, age, and ethnically diverse patients was then provided, after which participants completed a short test of their knowledge in this area. All data were collected and stored in an electronic database. The time necessary to complete the study varied between approximately 60 and 90 minutes, and was primarily a function of individual participant's computer specifications.

Hypotheses

Pain Assessment

1A. There is a discrepancy between the experimental and clinical literature concerning the effect of patient sex on pain assessment. The Robinson and Wise (2003) hypothesis that gender role stereotypes will result in observers rating males' pain lower will be supported in the current study by pain assessment ratings for male virtual patients being reliably lower than those for female virtual patients. Conversely, the clinical pain literature indicates that females are at increased risk of having their pain under-assessed. This may be due to provider beliefs about sex differences in pain perception, the fact that the appraisal of pain may be more difficult for patients who are not of the same sex (primarily male providers were included in these investigations), and/or some other as-yet undetermined reason. Support for these results will be seen in the current study by pain assessment ratings for female virtual patients being reliably lower than those for male virtual patients.

1B. Elderly patients will be judged to have lower pain intensity and unpleasantness than young patients.

1C. African-American patients will be judged to have lower pain intensity and unpleasantness than Caucasian patients.

1D. Patients demonstrating a low facial expression of pain will be judged to have lower pain intensity and unpleasantness than patients demonstrating a high facial expression of pain.

Treatment with Non-opioid Medication

2A. Patient sex cues will predict likelihood of administering non-opioid medication. Specifically, providers will be less likely to utilize this treatment modality with female patients relative to male patients.

2B. Patient age cues will predict likelihood of administering non-opioid medication. Specifically, providers will be less likely to utilize this treatment modality with elderly patients relative to younger patients.

2C. Patient race cues will predict likelihood of administering non-opioid medication. Specifically, providers will be less likely to utilize this treatment modality with African-American patients relative to Caucasian patients.

2D. Patient pain expression cues will predict likelihood of administering non-opioid medication. Specifically, providers will be less likely to utilize this treatment modality with patients demonstrating a low facial expression of pain relative to patients demonstrating a high facial expression of pain.

Treatment with Opioid Medication

3A. Patient sex cues will predict likelihood of administering opioid medication. Specifically, providers will be less likely to utilize this treatment modality with female patients relative to male patients.

3B. Patient age cues will predict likelihood of administering opioid medication.

Specifically, providers will be less likely to utilize this treatment modality with elderly patients relative to younger patients.

3C. Patient race cues will predict likelihood of administering opioid medication.

Specifically, providers will be less likely to utilize this treatment modality with African-American patients relative to Caucasian patients.

3D. Patient pain expression cues will predict likelihood of administering opioid medication. Specifically, providers will be less likely to utilize this treatment modality with patients demonstrating a low facial expression of pain relative to patients demonstrating a high facial expression of pain.

Recommendations for Change in Medications

4A. Patient sex cues will predict likelihood of recommending a change in both non-opioid and opioid medications. Specifically, providers will be less likely to make recommendations on behalf of female patients relative to male patients.

4B. Patient age cues will predict likelihood of recommending a change in both non-opioid and opioid medications. Specifically, providers will be less likely to make recommendations on behalf of elderly patients relative to younger patients.

4C. Patient ethnicity cues will predict likelihood of recommending a change in both non-opioid and opioid medications. Specifically, providers will be less likely to make recommendations on behalf of African-American patients relative to Caucasian patients.

4D. Patient pain expression cues will predict likelihood of recommending a change in both non-opioid and opioid medications. Specifically, providers will be less likely to make recommendations on behalf of patients demonstrating a low facial expression of pain relative to patients demonstrating a high facial expression of pain.

Healthcare Provider Characteristics

There are few empirical investigations of the influence of healthcare provider characteristics on pain assessment and pain management practices. There has also been a lack of theoretical attention to these issues. Consequently, specific, empirically and/or theoretically informed hypotheses concerning the influence of provider characteristics on pain assessment and treatment are not proposed. To the extent that variability in the characteristics of providers who participate in the current study permits, exploratory analyses will be conducted.

Statistical Analyses

Descriptive statistics were conducted to summarize the demographic and background characteristics of the sample.

Idiographic

Simultaneous multiple regression equations were generated for each individual to capture his/her decision making policies. Virtual patient age, race, sex, and pain expression served as independent variables in each model. Pain and mood assessment ratings, medication-based treatment ratings, and change-related recommendation ratings were dependent variables in their respective models. The standardized regression coefficients in each equation represent the weight of each cue in the formation of the assessment and treatment judgments. This weight represents the unique contribution and relative importance of each cue in the participant's clinical decision. The coefficient of multiple determination (R^2) represents the amount of variance in assessment and treatment decision policies accounted for by the predictor variables, or the overall function of the cues in each individual's policy.

Nomothetic

Following idiographic analyses for all participants, descriptive statistics were conducted to determine: 1) the total number of cues that were significantly weighted at each decision policy;

2) the amount of variance accounted for by each cue in the separate decision policies; 3) the number of significant overall decision policies; and 4) the average coefficient of determination for each decision policy. Paired samples t-tests compared ratings within cue for the entire sample. Finally, Chi-square tests and Analysis of Variance (ANOVA) were conducted to explore whether participant demographic and professional background characteristics were related to overall pain assessment and treatment policies and contextual cue utilization.

CHAPTER 3 RESULTS

Participants

Fifty-four nurses participated in this study. Consistent with national data, the vast majority of nurses were female (83%) and self-reported Caucasian (93%). The average age of the sample was approximately 42 years ($SD = 11.90$). A wide range of geographical locations was represented, with Florida ($n = 23$) being the modal state of residence. Twenty-two participants held an Associate Degree in nursing, whereas 17 matriculated at the Bachelor level and 15 at the graduate level. At the time of their participation, approximately 72% were not currently enrolled in an academic program. Of the 15 nurses who were currently students, the majority ($n = 11$) was pursuing graduate degrees. Examination of self-reported professional background data indicated that the average years of nursing experience was approximately 14 ($SD = 10.52$). The three most frequently endorsed current practice areas were critical care ($n = 22$), primary care ($n = 16$), and oncology ($n = 14$). With one exception, all nurses reported experience working in a hospital setting. Detailed demographic and background information is provided in Table 3-1.

Pain Assessment Policies

Patient sex, race, age, and pain expression were hypothesized to be significant, independent factors in nurses' assessments of pain intensity and unpleasantness. Specifically, it was expected that, relative to their within-cue counterparts, lower pain intensity and unpleasantness ratings would be assigned to patients who were African-American, older, and displaying high levels of pain expressivity. Competing hypotheses were articulated regarding the influence of patient sex on pain assessment ratings.

Table 3-1. Demographic and background characteristics of participants

	<i>N</i>	% of total	Mean (<i>SD</i>)	Range
Sex				
Female	45	83.3		
Male	9	16.7		
Age (years)			42.02 (11.90)	22 – 66
Race				
Caucasian	50	92.6		
African-American	2	3.7		
Asian	1	1.9		
Other	1	1.9		
Nursing education				
Associate's degree	22	40.7		
Bachelor's degree	17	31.5		
Graduate degree	15	27.8		
Current educational status				
Not enrolled	39	72.2		
Enrolled	15	27.8		
Nursing experience (years)			14.06 (10.52)	0 – 37
Practice area				
Critical Care	9	16.7		
Emergency	7	13.0		
Oncology	7	13.0		
Medical-Surgical	6	11.1		
Internal Medicine	4	7.4		
Pediatrics	4	7.4		
Primary Care	3	5.6		
Obstetrics	2	3.7		
Psychiatry	2	3.7		
Hospice	1	1.9		
Other	9	16.7		
Practice setting*				
Hospital	53	98.1		
Outpatient facility	16	29.6		
Nursing home	8	14.8		
Hospice	5	9.3		

*Categories are not mutually exclusive.

Pain Intensity

Results indicated that 34 nurses had significant ($p < .05$) policies for pain intensity assessment; 5 had policies that approached significance ($p < .1$). Thirteen of these 39 nurses used sex as a prominent ($p < .1$) cue in their policy. Ten gave higher pain intensity ratings for females; the reverse was true for 3 nurses. Race was a prominent cue in the policies of 8 of these 39

nurses, with 7 more likely to judge higher pain intensity in African-American virtual patients and 1 more likely to judge higher pain intensity in Caucasians. Thirteen nurses used age as a prominent cue in their pain intensity assessment policies. Twelve were more likely to judge older virtual patients as experiencing greater pain intensity, whereas the converse was true for 1 nurse. Finally, with the exception of 1, pain expression was a prominent cue for all nurses, such that virtual patients displaying high levels of pain expression were judged to be experiencing greater levels of pain by the participants. Results of idiographic regression analyses for pain intensity assessments are presented in Table A-1.

Pain Unpleasantness

Similar results were obtained for pain unpleasantness ratings, such that 35 nurses had significant ($p < .05$) policies, and 2 had policies that approached significance ($p < .1$). Examination of the contribution of the specific contextual cues indicated that sex, race, age, and pain expression were prominent cues in the policies of 13, 8, 13, and 36 of these nurses, respectively. Eleven of the nurses with a significant sex cue were more inclined to make higher ratings for female patients; the converse was true for 2 nurses. African-American virtual patients were assessed to be experiencing more pain unpleasantness by 7 nurses, whereas 1 nurse judged Caucasian patients to be experiencing more pain. Relative to younger patients, older patients were judged to be experiencing more pain unpleasantness by 12 nurses; the opposite was true for 1 nurse. Finally, every nurse with a prominent pain expression cue judged those with high expressivity to be experiencing greater pain unpleasantness than those with low expressivity. Results of idiographic regression analyses for pain unpleasantness assessments are presented in Table A-2.

Mood Assessment Policies

Positive Mood

Twenty-three nurses had significant ($p < .05$) policies for positive mood assessment; 2 had policies that approached significance ($p < .1$). The 3 nurses in whom sex played a prominent role in their positive mood policies each judged male patients to be experiencing greater positive mood relative to female patients. Six nurses used race as a prominent cue; 4 were more likely to judge Caucasian patients as having greater positive mood, whereas 2 indicated this for African-Americans. Thirteen had policies in which age was a prominent cue. Of these 13 nurses, 12 assessed younger virtual patients to be experiencing greater positive mood relative to older patients. Conversely, 1 nurse assessed older patients to be experiencing greater positive mood. Twenty-four nurses used pain expression as a prominent cue; all were more likely to assign greater ratings to patients with low expressivity. Results of idiographic regression analyses for positive mood assessments are presented in Table A-3.

Negative Mood

Thirty-five nurses had significant ($p < .05$) policies for negative mood assessment; 3 had policies that approached significance ($p < .1$). Regarding sex, 12 nurses had policies in which this cue was prominent. Ten nurses judged female patients to be experiencing greater negative mood compared to males, whereas the converse was true for 2 nurses. Of the 8 nurses who used race as a significant cue, 6 assigned greater negative mood ratings for African-American patients. The remaining 2 gave greater ratings for Caucasian patients. All 13 nurses with policies in which age was a prominent cue assessed greater negative mood in older virtual patients relative to younger patients. Finally, all 34 nurses who used pain expression as a prominent cue assigned greater negative mood ratings to those with high expressivity. Results of idiographic regression analyses for negative mood assessments are presented in Table A-4.

Treatment Decision Policies

The patient cues of sex, race, age, and pain expression were each hypothesized to play a significant, unique role in policies regarding administration of non-opioid and opioid medications. Specifically, a greater likelihood of medication administration (both non-opioid and opioid) was expected for patients who were male, Caucasian, younger, and displaying high pain expressivity.

Non-opioid Medication

Twelve nurses had significant ($p < .05$) policies for non-opioid treatment; 3 had policies that approached significance ($p < .1$). Sex played a prominent role for 2 nurses out of the 15 with significant overall non-opioid policies. Both of these nurses gave higher ratings to female patients and, thus, were more likely to engage in this treatment practice with them compared to male patients. Three nurses used patient race as a prominent cue. African-American patients were more likely to be administered a non-opioid medication by 2 nurses. One nurse was more likely to engage in this practice with Caucasian patients. Age was a prominent cue in the policies of 6 of these nurses. Four were more likely to administer non-opioid medication to younger patients; 2 were more likely to engage in this treatment practice for older patients. Lastly, pain expression was a prominent cue in the policies of 13 nurses, with low expressive virtual patients being more likely to receive non-opioid medication by 7 nurses and high expressive patients more likely to receive this treatment by 6 nurses. Additional, unplanned analyses were conducted in response to the disparate directional effect of the pain expression cue between non-opioid and opioid treatment domains. As noted below, every nurse who significantly weighted patient pain expression when making opioid treatment ratings used this cue in a similar manner; high expression patients received higher ratings than low expression patients. Since the direction of this effect was approximately equal for non-opioid decisions, follow-up analyses tested whether

opioid ratings differed between these two non-opioid groups (i.e., those who used pain expression in a positive vs. negative way). Results indicated that the two non-opioid groups did not provide significantly different ratings for high and low expression patients in regards to opioid treatment [$F(1,11) = .39, p > .05$]. Idiographic regression results for non-opioid treatment policies are presented in Table A-5.

Opioid Medication

Twenty-three nurses had significant ($p < .05$) policies for opioid treatment; 4 had policies that approached significance ($p < .1$). Sex was a prominent cue in the opioid treatment policies of 7 nurses. Of these, 6 were more likely to engage in this treatment with female patients; 1 was more likely to do so with male patients. All 5 nurses with a prominent race cue were more likely to administer opioid treatment to African-American patients. Of the 9 who used age as a prominent cue, 8 were more likely to engage in this treatment with older versus younger patients. The converse was true for 1 nurse. All of the 25 nurses with a prominent pain expressivity cue were more likely to administer opioid medication to highly expressive patients. Idiographic regression results for opioid treatment policies are presented in Table A-6.

Recommendation Policies

All four patient cues were hypothesized to exert a significant, independent influence on policies regarding recommendations for a change in non-opioid and opioid medication. Specifically, for both classes of medication, it was expected that nurses would be less likely to make such recommendations for patients who were female, African-American, older, and displaying high levels of pain expressivity.

Change in Non-opioid Medication

Fifteen nurses had significant ($p < .05$) policies for recommending a change in non-opioid treatment; 3 had policies that approached significance ($p < .1$). Of these 18, sex was a prominent

cue for 3, race was a prominent cue for 7, age was a prominent cue for 3, and pain expression was a prominent cue for 16. Two nurses were more likely to make recommendations on behalf of female patients; 1 nurse was more likely to do so on behalf of male patients. Four nurses were more likely to recommend a change for African-American patients. A recommendation was more likely for Caucasian patients in 3 nurses. Two nurses were more likely to recommend a change for younger patients than older, whereas the converse was true for 1 nurse. Finally, patients with a high level of pain expressivity were more likely to have recommendations made on their behalf by 13 of the nurses. Three nurses were more likely to recommend a change for patients with low pain expressions. Table A-7 presents the results of idiographic regression analyses for policies regarding recommendations of change in non-opioid medication.

Change in Opioid Medication

Sixteen nurses had significant ($p < .05$) policies for recommending a change in non-opioid treatment; 6 had policies that approached significance ($p < .1$). Sex was a prominent cue in the policies of 3 of these 22. Change recommendations were more likely for female patients among 2 nurses; the converse was true for 1 nurse. All of the 4 that used race as a prominent cue were more likely to make recommendations for African-American patients relative to Caucasian. Seven nurses had policies in which age was a prominent cue. Five nurses were more likely to recommend a change for older patients. Two were more likely to make a recommendation on behalf of younger patients. Regarding pain expression, all of the 20 nurses with a prominent expression cue were more likely to recommend a change in opioid treatment for patients displaying a high pain expression compared to those displaying a low pain expression. Table A-8 presents the results of idiographic regression analyses for policies regarding recommendations of change in opioid medication.

Number of Significant Cues

Descriptive and frequency data were generated for the total number of cues that were significantly weighted at each decision policy (Table 3-2). Participants with invariant policies were excluded from these analyses. On average, a greater number of cues were used for pain and mood assessment policies (pain intensity: $M = 1.51$, $SD = 1.01$; pain unpleasantness: $M = 1.45$, $SD = 1.01$; positive mood: $M = 1.27$, $SD = .88$; negative mood: $M = 1.36$, $SD = 1.00$). Decision policies about non-opioid treatment had the least number of significant cues (non-opioid treatment: $M = .66$, $SD = .80$; non-opioid recommendation: $M = .76$, $SD = .89$). Results of frequency analyses indicated that, for pain and mood assessments, the majority of participants significantly weighted one or two cues in their policies. For decisions (treatment and change) regarding non-opioid medication, at least half of participants did not have a significant cue in their policies, and over 75% used 1 or fewer cues. Approximately 70% of nurses had an opioid treatment policy with 1 or 2 significant cues, whereas the majority of nurses significantly weighted 1 or fewer cues in their decisions about recommending a change in opioid medication.

Significance of Contextual Cues

In order to quantify the amount of variance accounted for by each cue in the various decision policies, individual standardized regression coefficients for each cue within each policy across nurse were squared. Results of these calculations indicated that sex, race, age, and expression cues accounted for as much as 13%, 15%, 26% and 77%, respectively, of the variance in policies for pain intensity assessments and 14%, 13%, 28%, and 79%, respectively, of the variance in policies for pain unpleasantness assessments. In regards to mood assessments, these cues accounted for as much as 15%, 15%, 22%, and 62%, respectively, of the variance in positive mood policies and 20%, 14%, 27%, and 81%, respectively, of the variance in negative mood policies. Examination of the regression coefficients for medication-related treatment

Table 3-2. Number of significant cues at each policy

Decision policy	<i>N</i>	Mean	<i>SD</i>	Min	Max	Number of significant cues				
						0 <i>N</i> (%)	1 <i>N</i> (%)	2 <i>N</i> (%)	3 <i>N</i> (%)	4 <i>N</i> (%)
Pain intensity assessment	53	1.51	1.01	0	4	8(15.1)	21(39.6)	14(26.4)	9(17.0)	1(1.9)
Pain unpleasantness assessment	53	1.45	1.01	0	4	9(17.0)	21(39.6)	14(26.4)	8(15.1)	1(1.9)
Positive mood assessment	49	1.27	.88	0	3	9(18.4)	23(46.9)	12(24.5)	5(10.2)	0(0)
Negative mood assessment	53	1.36	1.00	0	4	10(18.9)	22(41.5)	15(28.3)	4(7.5)	2(3.8)
Non-opioid treatment	50	.66	.80	0	2	27(54.0)	13(26.0)	10(20.0)	0(0.0)	0(0)
Opioid treatment	51	1.16	.86	0	3	12(23.5)	22(43.1)	14(27.5)	3(5.9)	0(0)
Recommendation: non-opioid	50	.76	.89	0	3	25(50.0)	14(28.0)	9(18.0)	2(4.0)	0(0)
Recommendation: opioid	52	.96	.82	0	3	16(30.8)	24(46.2)	10(19.2)	2(3.8)	0(0)

policies revealed that sex, race, age, and expression cues accounted for a maximum of 21%, 30%, 26%, and 38%, respectively, of the variance in non-opioid decisions and 17%, 22%, 14%, and 85%, respectively, of the variance in opioid decisions. Finally, similar calculations were made for the two recommendation policies. Results indicated that up to 25%, 13%, 22%, and 34% of the variance in recommendations for a change in non-opioid treatment and 14%, 15%, 17%, and 68% of the variance in recommendations for a change in opioid treatment were accounted for by the patient cues of sex, race, age, and expression, respectively. Table 3-3 contains detailed results of these calculations.

Table 3-3. Variance in decision policies explained by contextual cues

Decision policy	Sex	Race	Age	Pain expression
	Mean (<i>SD</i>) Range			
Pain intensity assessment	.03(.04) .00-.13	.03(.04) .00-.15	.04(.05) .00-.26	.29(.22) .00-.77
Pain unpleasantness assessment	.04(.04) .00-.14	.03(.03) .00-.13	.05(.06) .00-.28	.30(.23) .00-.79
Positive mood assessment	.03(.04) .00-.15	.03(.04) .00-.15	.06(.06) .00-.22	.17(.16) .00-.62
Negative mood assessment	.04(.05) .00-.20	.03(.05) .00-.14	.04(.05) .00-.27	.26(.22) .00-.81
Non-opioid treatment	.03(.04) .00-.21	.04(.05) .00-.30	.04(.05) .00-.26	.10(.11) .00-.38
Opioid treatment	.04(.04) .00-.17	.04(.05) .00-.22	.04(.04) .00-.14	.23(.23) .00-.85
Recommendation: non-opioid	.03(.05) .00-.25	.04(.03) .00-.13	.04(.05) .00-.22	.12(.15) .00-.34
Recommendation: opioid	.03(.03) .00-.14	.03(.04) .00-.15	.03(.04) .00-.17	.17(.19) .00-.68

Note: Values represent squared standardized regression coefficients.

Number and Significance of Overall Policies

Descriptive and frequency data were generated for the entire sample at the level of overall policy (R^2). Out of eight total assessment and treatment decisions, participants had an average of 3.56 ($SD = 2.77$; Range: 0-8) significant ($p < .1$) decision policies. The modal number of significant policies was 1 ($n = 10$), with the next most frequent being 8 ($n = 8$), 3 ($n = 7$), 4

($n = 7$), and 0 ($n = 7$) significant policies. Six participants had 2 significant policies across the study; 5 nurses had 7 significant policies, with the remaining nurses having 6 ($n = 2$) and 5 ($n = 2$) significant policies. These data indicate the presence of variability across the assessment and treatment ratings in terms of which participants had significant overall decision policies.

Descriptive data were generated for the individual decision policies across participants. As can be seen in Table 3-4, there is wide variability in overall R^2 s, both within and between policies. On average, a greater amount of total variance was accounted for in pain assessment policies (pain intensity: $M = .40$; pain unpleasantness: $M = .41$) than policies pertaining to treatment and recommendation decisions. The least amount of variance ($M = .21$) was accounted for in decisions about non-opioid treatment.

Table 3-4. Descriptive data on overall policy capturing

Decision policy	Mean	<i>SD</i>	Min	Max
Pain intensity assessment	.40	.22	.02	.82
Pain unpleasantness assessment	.41	.24	.03	.84
Positive mood assessment	.29	.17	.02	.70
Negative mood assessment	.37	.22	.01	.83
Non-opioid treatment	.21	.12	.05	.51
Opioid treatment	.34	.22	.03	.86
Recommendation: non-opioid	.23	.16	.01	.62
Recommendation: opioid	.26	.19	.00	.73

Note: Values represent coefficients of determination (R^2).

Within-cue Comparisons

For each nurse, average assessment and treatment ratings were calculated across virtual patients at each level of cue (Table 3-5). Paired samples t-tests were then used to compare ratings within cue for the entire sample.

Pain Assessment

For pain intensity and unpleasantness ratings, significant differences were present within each cue. Nurses assessed female patients to be experiencing greater pain intensity [$t(46) = -3.83$, $p < .001$, $d = .76$] and unpleasantness [$t(46) = -4.22$, $p < .001$, $d = .90$] than male patients.

Table 3-5. Means and standard deviations for ratings within cue

	Sex		Age		Race		Expression	
	Male	Female	Young	Old	Caucasian	African-American	Low	High
Pain intensity assessment	41.95 (20.97)	45.01 (20.48)	41.20 (20.37)	45.76 (21.15)	41.68 (21.19)	45.29 (20.23)	34.44 (22.56)	52.54 (20.81)
Pain unpleasantness assessment	43.05 (21.41)	46.74 (20.23)	42.39 (20.58)	47.40 (21.15)	43.39 (21.34)	46.40 (20.29)	35.33 (23.25)	54.47 (20.92)
Positive mood assessment	14.37 (12.96)	13.44 (11.47)	15.88 (13.12)	11.93 (11.54)	14.16 (12.62)	13.66 (11.93)	18.33 (15.39)	9.47 (10.80)
Negative mood assessment	38.02 (22.00)	41.74 (20.64)	37.45 (21.18)	42.32 (21.28)	38.85 (21.26)	40.92 (21.31)	30.61 (23.22)	49.18 (21.56)
Non-opioid treatment	61.04 (34.62)	61.89 (34.05)	61.91 (33.52)	61.01 (35.30)	61.70 (34.43)	61.22 (34.24)	62.28 (33.44)	60.62 (36.43)
Opioid treatment	55.40 (30.44)	59.09 (28.58)	55.11 (29.74)	59.38 (29.32)	55.50 (30.40)	58.98 (28.72)	47.68 (34.71)	66.82 (26.99)
Recommendation: non-opioid	39.60 (32.62)	41.75 (32.12)	40.15 (32.19)	41.19 (32.61)	40.93 (33.19)	40.41 (31.57)	38.39 (32.09)	42.94 (33.78)
Recommendation: opioid	37.43 (30.59)	39.93 (30.73)	37.54 (29.98)	39.83 (31.43)	37.11 (30.66)	40.25 (30.64)	32.49 (32.02)	44.89 (30.67)

Note: Rating scale is 0–100.

Greater pain intensity [$t(46) = -4.06, p < .001, d = .93$] and unpleasantness [$t(46) = -3.54, p < .01, d = .74$] ratings were assigned to African-American versus Caucasian patients. Older patients were judged to be experiencing greater pain intensity [$t(46) = -4.34, p < .001, d = 1.05$] and unpleasantness [$t(46) = -4.87, p < .001, d = 1.10$] than younger patients. Finally, patients with high expressivity were judged to be experiencing greater pain intensity [$t(46) = -8.21, p < .001, d = 1.83$] and unpleasantness [$t(46) = -7.88, p < .001, d = 2.94$] than those with low pain expressivity. Follow-up analyses were conducted to test the *a priori* hypothesis that gender-role expectations about pain would influence participants' assessment ratings. Since within-cue sex differences emerged for both pain intensity and unpleasantness ratings, follow-up analyses were conducted separately for these decision domains. Correlation analyses indicated that the GREP factor of "willingness to report pain" was significantly associated with average pain intensity assessment ratings for both male ($r = .31, p < .05$) and female ($r = .30, p < .05$) virtual patients. This factor was also significantly associated with average pain unpleasantness ratings for female patients ($r = .27, p < .05$); results approached significance ($r = .27, p = .052$) for male patients. The GREP factor of "stereotypic endurance" for pain was not significantly associated with average pain intensity or unpleasantness ratings for either male or female patients; however, the magnitude of these relationships (coefficient range: $-.18$ to $-.23$) was sufficient as to warrant follow-up analyses. Analysis of Covariance (ANCOVA) results indicated that the significant within-cue sex differences persisted [pain intensity: $F(1,51) = 10.73, p < .01$; pain unpleasantness: $F(1,51) = 13.24, p < .01$] even after controlling for the GREP factors of "willingness to report pain" and "stereotypic endurance" for pain.

Mood Assessment

Significant differences in averaged positive mood assessment ratings emerged within age and expression cues, with younger [$t(46) = 4.44, p < .001, d = .96$] and low expression [$t(46) =$

4.90, $p < .001$, $d = 1.16$] patients receiving higher ratings than those who were older and displaying high pain expression. No differences in positive mood ratings were evident between races or sexes. Turning to assessment of negative mood, nurses rated female virtual patients as having greater negative mood than male patients [$t(46) = -3.38$, $p < .01$, $d = .71$]; older patients as having greater negative mood than younger patients [$t(46) = -4.73$, $p < .001$, $d = 1.08$]; and high expression patients as having greater negative mood than low expression patients [$t(46) = -7.96$, $p < .001$, $d = 1.69$]. A trend was also observed for African-American patients to receive higher negative mood ratings than Caucasian patients [$t(46) = -1.85$, $p < .07$, $d = .42$].

Treatment Decisions

There were no significant differences within cue for non-opioid treatment decisions. Opioid treatment decisions were more likely to be endorsed for patients who were female [$t(46) = -2.75$, $p < .01$, $d = .70$], African-American [$t(46) = -2.39$, $p < .05$, $d = .59$], older [$t(46) = -3.26$, $p < .01$, $d = .77$], and displaying high expressivity [$t(46) = -6.25$, $p < .001$, $d = 1.38$]. Follow-up analyses were conducted to test the *a priori* hypothesis that gender-role expectations about pain would influence participants' treatment decisions. These analyses were confined to ratings for opioid treatment, since sex differences only emerged for this treatment domain. Correlation analyses indicated no significant association between the GREP factor of "willingness to report pain" and average opioid treatment ratings for male ($r = .14$, $p > .05$) and female ($r = .15$, $p > .05$) virtual patients. Similarly, no significant association emerged between the GREP factor of "stereotypic endurance" for pain and average opioid treatment ratings for male ($r = .03$, $p > .05$) and female ($r = .08$, $p > .05$) patients. Due to these non-significant findings, no further analyses were conducted to control for the effects of gender-role expectations about pain.

Recommendations

No significant differences emerged within race and age cues for decisions regarding recommendations for a change in non-opioid medication. Differences were evident, however, for sex and pain expression cues. Nurses were more likely to make change recommendations on behalf of female [$t(46) = -1.98, p = .05, d = .42$] patients and those displaying high levels of pain expression [$t(46) = -2.40, p < .05, d = .46$]. Examination of the average ratings for opioid-related change recommendations indicated that such decisions were significantly more likely to be made for virtual patients who were African-American [$t(46) = -2.79, p < .01, d = .68$], female [$t(46) = -2.29, p < .05, d = .52$], and displaying high expressivity [$t(46) = -5.57, p < .001, d = 1.20$]. Additionally, a trend was observed wherein older patients were more likely to have such recommendations made on their behalf relative to younger patients [$t(46) = -1.66, p = .10, d = .43$].

Self-reported Cue Utilization

At the conclusion of the study, participants were asked to reflect back on their experiences during the clinical scenario portion. Specifically, they were asked what information they used when formulating their assessment and treatment ratings for the virtual patients. Responses were provided in an open-ended format. Several themes (not mutually-exclusive) were identified upon inspection of these responses. Thirty-three nurses indicated that they used the facial expressions of the virtual patients when making ratings. Vital sign information ($n = 28$) and patient movement ($n = 10$) were the next most frequently endorsed themes. Eight nurses stated that they incorporated text-based information about the general clinical scenario, and 7 stated that they used text-based pain-specific information from the clinical scenario to inform their decisions. Five nurses reported using general non-verbal information, but did not specify further. Finally, 3

nurses indicated that they relied on their clinical experience to make assessment and treatment decisions regarding the virtual patients.

Knowledge of Study Hypotheses and Cue Utilization

Because task transparency and socially desirable responding are highly relevant issues with analogue designs, at the conclusion of the study, participants were asked to guess at the hypotheses of interest. Responses to this open-ended inquiry were examined for indication that a given nurse was aware of any of the hypotheses concerning patient cues of sex, race, and age. Targeted analyses were then conducted to determine the influence of such awareness on assessment and treatment ratings. Due to the high volume of analyses that could be conducted, and the consequent inflation of Type I error absent specific hypotheses, analyses were confined to pain intensity assessment and opioid treatment ratings. These domains were chosen because they were of most interest and relevance to clinical practice. Of the 46 nurses who responded to the query, 11 did not give any indication that they were aware of the hypotheses of interest. The remaining 35 gave some indication – a liberal criterion was used in judging these responses – of knowledge of the pertinent hypotheses. It should be noted that few of these nurses indicated awareness of all the study hypotheses. Results of Chi-square analyses comparing these groups in their cue utilization indicated no differences in the directional weighting of patient demographic (sex: $\chi^2(2) = 1.14, p > .05$; race: $\chi^2(2) = .51, p > .05$; age: $\chi^2(1) = 1.40, p > .05$) or facial expression ($\chi^2(1) = .48, p > .05$) cues for pain intensity policies. Similarly, no group differences were found in weightings of demographic (sex: $\chi^2(2) = .73, p > .05$; race: $\chi^2(2) = .95, p > .05$; age: $\chi^2(1) = 3.08, p > .05$) or facial expression ($\chi^2(1) = 1.72, p > .05$) cues for opioid treatment policies.

Exploratory Group Analyses

The following exploratory analyses were conducted to determine whether putatively relevant participant characteristics were related to overall pain assessment and treatment decision policies and contextual cue utilization. Given that no specific hypotheses were articulated concerning these relationships, the results presented below should be interpreted with caution.

Participant Characteristics and Overall Decision Policies

Participants were grouped according to the significance of their overall policies. At each of the eight assessment and treatment decisions, nurses who had a policy that was significant ($p < .05$) or approached significance ($p < .1$) comprised one group; those with non-significant ($p > .1$) policies were included in a separate group. Nurses with invariant ratings were excluded. Table 3-6 presents the number of participants in each group. Group comparisons were then conducted to test for differences in pertinent participant demographic and professional variables.

Table 3-6. Number of participants with significant overall policies

Policy	Significant	Not significant	Invariant
Pain intensity assessment	39	14	1
Pain unpleasantness assessment	37	16	1
Positive mood assessment	25	25	4
Negative mood assessment	38	15	1
Non-opioid treatment	15	35	4
Opioid treatment	27	25	2
Recommendation: non-opioid	18	32	4
Recommendation: opioid	22	30	2

Participant Education and Overall Decision Policies

Chi-square analyses were employed to test for differences in nursing degree status and overall policy significance. Results indicated no significant differences ($p > .05$) between nurses who were trained at the Associate, Bachelor, and Master level in terms of their overall policy significance across the 8 ratings.

Participant Professional Experience and Overall Decision Policies

Comparisons between participants with significant and non-significant overall policies indicated group differences in years of professional experience for policies involving opioid treatment [$F(1,50) = 5.83, p < .05, \eta_p^2 = .10$] and recommendation for change in opioid medication [$F(1,50) = 4.55, p < .05, \eta_p^2 = .08$]. Examination of group means revealed that nurses with a significant opioid treatment policy had fewer years of professional experience ($M = 11.07$) than those with a non-significant opioid policy ($M = 17.84$). Similarly, nurses with a significant policy for recommendation of a change in opioid medication ($M = 10.27$) had fewer years of professional experience than those with a non-significant policy ($M = 16.40$) in this domain. No other significant differences in professional experience emerged at the level of overall policy.

Participant Characteristics and Cue Utilization

A similar grouping scheme as that used for overall policy was employed at the cue level. However, due to the large number of analyses required to make group comparisons across each of the four cues at each of the eight decision policies – in addition to the absence of specific hypotheses concerning such comparisons – an additional grouping method was applied. The virtual patient cues of age, race, and sex were combined to comprise a “demographics” cue; the pain expression cue was unchanged. Nurses were then grouped according to whether they used a demographics cue in their various decision policies. At each decision policy, nurses who had at least one demographic cue coefficient (age, race, sex) that was significant or approached significance were grouped together. In the following analyses, these nurses were compared to those who did not use patient demographic cues in their judgment policies. A similar process was employed at the level of pain expression cue: nurses with a significant pain expression cue were compared to those with a non-significant pain expression cue. Participants with invariant

responding were excluded from group analyses. Table 3-7 contains the distribution of nurses across the various groups.

Participant Sex and Cue Utilization

Previous research suggests that the sex of the observer may interact with the sex of the individual being observed to influence pain-related ratings (Robinson & Wise, 2003). Thus, comparisons were made to determine the presence of sex differences in the utilization of virtual patient sex cue, as well as averaged ratings of pain assessment and pharmacologic treatment. Results of chi-square analyses indicated that male and female nurses did not differentially weight patient sex in their decision policies about pain intensity assessment ($\chi^2(2) = .92, p > .05$), pain unpleasantness assessment ($\chi^2(2) = 3.47, p > .05$), non-opioid treatment ($\chi^2(2) = .40, p > .05$), or opioid treatment ($\chi^2(2) = .67, p > .05$). ANOVA results were also non-significant; in the aggregate, male and female nurses did not provide different pain intensity [$F(1,52) = 1.20, p > .05, \eta_p^2 = .02$] or unpleasantness [$F(1,52) = 1.67, p > .05, \eta_p^2 = .03$] assessment ratings, nor non-opioid [$F(1,52) = 1.52, p > .05, \eta_p^2 = .03$] or opioid [$F(1,52) = .40, p > .05, \eta_p^2 = .01$] treatment ratings for male and female virtual patients. When considered with the findings above in the *Within-Cue Comparisons* section, these results suggest that although assessment and treatment ratings differ based on the sex of the patient, these “biases” are equivalently shared by male and female nurses.

Participant Education and Cue Utilization

Comparisons in cue utilization were made across degree status (Associate, Bachelor, and Master) to determine if educational achievement interacted with use of contextual demographic and pain expression information. Significant differences were found in pain cue utilization for judgments about pain intensity ($\chi^2(2) = 6.51, p < .05$). Ninety-three percent (14/15) and 82%

Table 3-7. Participant use of demographic and pain expression cues

Policy	Demographic cues			Pain expression cue		
	Significant	Not significant	Invariant	Significant	Not significant	Invariant
Pain intensity assessment	27	26	1	41	12	1
Pain unpleasantness assessment	29	24	1	40	13	1
Positive mood assessment	25	24	5	32	17	5
Negative mood assessment	26	27	1	37	16	1
Non-opioid treatment	15	35	4	19	31	4
Opioid treatment	27	24	3	28	23	3
Recommendation: non-opioid	16	34	4	19	31	4
Recommendation: opioid	20	32	2	25	27	2

Note: Values represent number of participants in each category.

(18/22) of nurses with a Master's and Associate's Degree, respectively, had a significant regression coefficient for pain expression, whereas only 56% (9/16) of those with a Bachelor's Degree significantly weighted pain expression in their policies for pain intensity assessment. Similar results were obtained for pain unpleasantness assessment ($\chi^2(2) = 5.82, p = .055$), such that 93% of Master's-trained, 77% of Associate's-trained, and 56% of Bachelor's-trained nurses had a significant pain unpleasantness policy in which the pain expression cue played a prominent role. All other degree-based comparisons regarding utilization of demographic and pain expression cues were non-significant ($p > .05$).

Participant Professional Experience and Cue Utilization

Results of ANOVAs comparing nurses who did and did not have significant demographic cue coefficients indicated no differences in years of professional experience between these two groups. When similar comparisons were made regarding pain expression cue utilization, two significant differences emerged. In the context of opioid treatment policies, nurses with a significant pain expression cue ($M = 10.54$ years) had less professional experience [$F(1,49) = 7.93, p < .01, \eta_p^2 = .14$] than nurses with a non-significant pain expression cue ($M = 18.30$ years). A similar result was found for opioid-related recommendation policies, such that participants who used pain expression as a significant cue ($M = 10.76$) had less professional experience [$F(1,50) = 4.24, p < .05, \eta_p^2 = .08$] than those who did not ($M = 16.63$). No significant differences in professional experience emerged for the other decision policies.

CHAPTER 4 DISCUSSION

Issues related to the assessment and treatment of pain have received increased theoretical and empirical attention over the past several years. Taken in its entirety, this body of work indicates that clinical pain is frequently inadequately assessed and under-treated (e.g., Cousins, 1994; Manyande, 1996; Thomas et al., 1998; WHO, 1986). Patient characteristics – in particular, sex, race/ethnicity, and age – have been identified as a potential source of these deficiencies (e.g., Anderson et al., 2000; Cleeland et al., 1994; Horgas & Elliott, 2004; McDonald, 1994; Ng et al., 1996b; Oberle et al., 1990; Robinson & Wise, 2003). Unfortunately, methodological limitations of previous investigations in this field place considerable constraints on the conclusions that may be drawn from them. The current study sought to address several of these limitations through implementation of an innovative research design and methodology. Additionally, this investigation was structured to provide a more detailed analysis of the clinical decision making process in order to better characterize the extent to which patient characteristics influence provider decision-making about pain. Overall, results indicated that the virtual patient technology and lens model methodology were successful in capturing and detailing the pain-related decision policies of nurse participants. Although replication of this success is certainly needed, the current investigation illustrates an alternative and promising approach by which to continue the study of medical decision-making.

Results of idiographic analyses of pain assessment ratings indicated that approximately 70% of nurses had significant decision policies in this domain. Stated differently, the contextual information provided in the clinical scenarios was sufficiently weighted by the majority of nurses to result in a reliable decision product. It would appear, then, that despite the constraints on cue number that lens model designs impose (see discussion below), highly relevant information was

provided for clinical decisions about pain assessment. Although negative mood assessments were similarly reliable, ratings of positive mood were less consistent. This is to be expected given the clinical context. Assessment of negative mood in a patient – apparently even a virtual one – experiencing acute, post-operative pain should be less subject to error than assessment of positive mood in that same patient, given that negative mood is more consistent with the experience of pain (Robinson & Riley, 1998) and likely to be more frequently encountered by healthcare professionals.

Analyses of pain treatment policies indicated that almost twice as many nurses had significant opioid than non-opioid policies. For these particular healthcare providers, the information contained in the clinical scenarios was apparently more serviceable for decisions about the use of opioid medications than non-opioid medications. It is also possible that these results are due to nurses' greater familiarity with opioid medications in an acute pain context and/or the relative paucity of guidelines specific to non-opioid medications. In the final decision domain – recommendation for a change in medication – a significant non-opioid recommendation policy was found in one-third of nurses, whereas 41% had a significant overall opioid policy. These data suggest that when compared with other decision domains, particularly the assessment policies, decisions about medication recommendations were less influenced by the contextual cues available to study participants. This is not surprising when one considers that the other decision domains were likely to be perceived as more precise relative to this domain (see below). If so, the decision policies of individual nurses would be expected to be less consistent, resulting in fewer significant overall policies. There is also likely to be considerable differences among nurses in terms of their comfort in making medication-related recommendations. These differences may be a product of the considerable variability in the

medical cultures within which individual nurses practice (Casanova et al., 2007; Irvine et al., 2000; Pollard, 2003).

The consistency of assessment policies – pain and mood – relative to both medication and recommendation treatment domains also suggests that fewer additional cues are needed by nurses when making decisions about the experience of pain and mood in their patients. This is supported by the finding that the greatest number of available cues were used for pain and mood assessment policies. In contrast, the contextual cues contained in the clinical scenarios were not sufficient, and may not have even been necessary, to produce a reliable decision product in a large number of nurses in this study, particularly in the non-opioid treatment and both recommendation domains. Future research is needed to further identify those cues that are particularly germane to these treatment decisions.

A major innovation of the current methodology lies in its ability to capture the decision-making process as well. Analyses at this level indicated that patient demographic cues played a significant role in many nurses' assessments of pain intensity and unpleasantness. The vast majority of those who used sex as a significant cue tended to assign higher pain ratings to female patients. In addition to its statistical significance, this cue accounted for a rather substantial amount (up to 14%) of the total variance in the pain assessment decision policies of some nurses. When ratings were averaged across participants for more traditional nomothetic analyses, female videos received significantly higher ratings than male videos, even after controlling for stereotypic beliefs about gender and pain.

These results are interesting when considered in light of the literature that indicates females are at greater risk of having their pain under-assessed in the clinical context (Anderson et al., 2000; Cleeland et al., 1994), whereas in the experimental setting, females are judged to be

experiencing greater pain than males (Robinson & Wise, 2003). The current study differs in many respects from these previous investigations. An atypical and innovative hybrid design was employed in that participants made assessment ratings of a clinical nature in an experimental context. Differences in study participants are also noteworthy. This study was largely comprised of female nurses, whereas the aforementioned clinical investigations consisted mainly of male physicians; participants in the Robinson and Wise study were primarily college undergraduates with a roughly equal proportion of males and females. In the current study, no differences were found between male and female nurses' utilization of patient sex cue, or in their averaged ratings for male and female videos. Although lack of statistical power should be considered given the small proportion of male nurses, the corresponding effect sizes were small, suggesting that any differences that do exist are likely to be of little consequence. These across-study differences make a clean synthesis of this literature difficult. Although the current results are supportive of the hypothesis that, relative to males, females are viewed by others as having greater pain, future investigations are needed to further elucidate the role of patient and provider sex in decision-making about pain assessment. Greater variability in provider sex and professional role are particularly critical.

The virtual patient race cue also emerged as a prominent contributor to many nurses' pain assessment policies. Most nurses who significantly weighted patient race assigned higher pain ratings to African-American patients, and the magnitude of this cue's effect was similar to that of patient sex. At the nomothetic level, African-American patients received significantly higher ratings of pain intensity and unpleasantness than their Caucasian counterparts. These findings were surprising and counter to *a priori* hypotheses. The relevant literature on this topic is small and mixed, with some evidence that African-American patients are at greater risk of having their

pain underestimated relative to Caucasians (Cleeland et al., 1997) and some reports of no racial/ethnic differences in pain assessment (Todd et al., 2000). To the author's knowledge, this is the first study to find that African-American patients received *higher* pain ratings than Caucasians. The same unique characteristics of the current study noted above also hold relevance here in terms of understanding these disparate findings. Methodological differences between the studies that have been conducted on this topic are significant and, when taken together with their small overall number, place considerable constraints on the drawing of overarching conclusions.

It is, at present, unclear why patients of different racial/ethnic backgrounds were judged to be experiencing different levels of pain in the current study despite the fact that contextual information – particularly pain expression – was standardized across patient. Perhaps study participants were sensitive to scientific and media reports of racial/ethnic disparities in medical care and took particular caution not to underestimate – relative to Caucasian patients – the pain experience of African-American virtual patients. Perhaps female nurses are less likely to hold and/or act on biases concerning minority populations. The development of multicultural competence is a recurrent theme in the nursing literature and highly emphasized among nursing education programs (Fitzpatrick, 2007; Hughes, & Hood, 2007; Lipson, & DeSantis, 2007; Robinson, 2000; Underwood, 2006). It is certainly possible that the effects of such attention in the nursing field were transferred to pain assessment ratings in the current study. It is also difficult to ascertain the meaning of these racial/ethnic differences in pain assessment ratings. In judging African-American virtual patients as having greater pain relative to Caucasian patients, did nurses discount the pain experience of Caucasian patients? Did they view African-Americans as being less able to tolerate similar pain experiences? These are intriguing questions that could not be addressed by the current study. Regardless, that significant differences in pain assessment

at both the idiographic and nomothetic levels emerged is cause for concern and continued research.

The final patient demographic cue – age – also played a significant role in the pain assessment of many nurses. In fact, almost one-quarter of nurses weighted age in their assessment decisions, with all but one of these providing higher pain ratings for elderly patients. The greatest amount of variance in these decision policies accounted for by age (over 25%) even exceeded that of patient sex and race. Averaged ratings across study participants also showed that older videos received significantly higher ratings than younger videos. The literature documenting the under-assessment of pain in older individuals is robust (Cohen-Mansfield & Lipson, 2002a, 2002b; Cook et al., 1999; Ferrell, 1995; Ferrell, 1996; Gloth, 2000; Horgas & Elliott, 2004; Kaasalainen et al., 1998; Sengstaken & King, 1993); thus the current results were not expected. However, much of this literature has focused on the comorbid medical conditions – particularly dementia – that are more prevalent in older populations and likely to complicate the assessment of pain in these patients. The current clinical scenario was standardized, such that older and younger patients presented with equivalent conditions. That older patients were judged to be experiencing greater pain than younger patients is, therefore, particularly intriguing. As discussed above in the findings regarding race, the precise implications of these results are not clear. Was the pain experience of older patients over-estimated? Or was the pain experience of younger patients under-estimated? Without patient self-report information – which, for obvious reasons, was not possible in this study – these questions remain unanswered. They do, however, provide direction for future research efforts in this domain. The inclusion of relevant comorbid conditions as an additional cue in future investigations would also likely prove fruitful in further elucidating the role of patient age in the assessment of pain.

The pain expression cue emerged as a highly important contributor to assessment ratings; approximately 70% of study participants reliably used this cue when making decisions about pain intensity and unpleasantness. All of these nurses judged patients displaying high levels of pain expression to be experiencing greater levels of pain. Further, up to 79% of the variance in these ratings were accounted for by patient expression. Consistent with these findings, results of nomothetic analyses indicated large differences in average pain intensity and unpleasantness ratings of high vs. low pain expression videos. The methodological implications of these results are encouraging. Although the facial manipulations of virtual patients were guided by the FACS and, thus, were expected to closely approximate the empirically-validated pain expression (Craig et al., 1992; Prkachin, 1992b), the current findings regarding participant use of this cue provide further validation of the manipulation. As a clinical matter, it is reassuring that pain expression was the most salient cue in pain assessment policies. This finding is consistent with previous work highlighting the considerable influence of nonverbal expressions on observers' ratings of pain in others (Ahles et al., 1990; Hale & Hadjistavropoulos, 1997). In fact, observers have been found to rely more on such nonverbal expressions than even self-report (Craig, 1992; Poole & Craig, 1992). Replication of these findings with virtual patient methodology would be an interesting future endeavor.

Turning to policies regarding the treatment of pain, when these ratings were submitted to idiographic analyses virtual patient sex played a relatively minor role in decisions about non-opioid treatment, with only two nurses significantly weighting this cue. Opioid-related decisions, on the other hand, were more frequently influenced by patient sex. With one exception, when patient sex served as a significant cue, female patients received higher ratings and, thus, were more likely to be administered medication for pain. Although fewer nurses reliably used this cue

for treatment decisions, the policies of those that did were even more affected by sex than in the assessment domain. At the nomothetic level, sex differences were found only for opioid decisions, with females, again, more likely to receive such treatment.

That patient sex had an influence on the pain-related treatment decisions for many nurses was not surprising. It was surprising, however, and counter to study hypotheses, that when sex was a significant cue female patients were more likely to receive pain medication than males. There is substantial evidence that females receive sub-optimal pharmacologic management of their pain relative to males (Beyer et al., 1983; Calderone, 1990; Cleeland et al., 1994; Cohen, 1980; Faherty & Grier, 1984; McDonald, 1994; McDonald & Bridge, 1991). It is important to note, however, that sex differences are not always found (Bartfield et al., 1997; Turk & Okifuji, 1997, 1999). Differences have even been found in the reverse direction, with early studies indicating that females were the recipients of more aggressive treatment (Bond & Pilowsky, 1966; Pilowsky & Bond, 1969). The current results are consistent with this early literature. Bond (1971) interpreted his findings in the context of a culturally-sanctioned belief system wherein males are expected to be more tolerant of pain than females. Although intuitive, this conclusion was speculative absent any additional, supportive data. The inclusion of a measure of gender-role stereotypic beliefs about pain in the current study provided an opportunity to directly test this hypothesis. Results indicated no significant relationship between these beliefs and treatment ratings. Thus, it would appear that, as measured by the GREP, providers' pain-related stereotypic beliefs do not explain the sex difference in their treatment of pain. What, then, is driving these results? Potential explanations lie in the sex and role of the provider. As noted above, previous investigations have largely included male physicians. The fact that the current study enrolled only nurses, most of whom were female, could explain the disparate findings. Although the

current study attempted to address the provider sex issue through targeted recruitment, this effort was likely not successful in securing enough male nurses for adequately powered sex-based comparisons in treatment policies. In regards to provider role, it is also possible that treatment-related sex differences are more likely to manifest in the context of medication prescription and administration – primarily a physician activity – and are less prominent in clinical activity that consists solely of medication administration, an activity that is largely the purview of nurses. This hypothesis is speculative but, if true, could explain the discrepancy between the current results and those of other recent investigations.

Patient race was significantly weighted by 6% and 9% of nurses, respectively, in their non-opioid and opioid treatment decisions. With one exception in each domain, nurses were more likely to engage in these treatment practices with African-American patients than Caucasian patients. Despite their small number, the nurses who significantly weighted race in their policies did so to a larger degree than in the assessment domain. In the aggregate, a medium-sized difference was found, such that African-American patients received significantly higher opioid treatment ratings than Caucasians. No race differences were found in averaged non-opioid ratings. As in the pain assessment domain, these results are in conflict with the relatively large and consistent literature demonstrating that minority individuals' pain is under-treated relative to individuals of the dominant racial/ethnic background (Anderson et al., 2000; Bernabei et al., 1998; Cleeland et al., 1994; Cleeland et al., 1997; Ng et al., 1996a; Ng et al., 1996b; Ross, 2000; Sambamoorthi et al., 2000; Tamayo-Sarver et al., 2003b; Todd et al., 1993, 2000). Several explanations have been articulated to account for these findings. In addition to frank racism on the part of providers, a widely held explanation is that patient race serves as a proxy for the true operating variables that drive these treatment differences. These include factors such as

differential communication, SES, and access to healthcare. Aside from the cues of interest that were systematically manipulated across virtual patients, all other factors in the current clinical scenarios were held constant. The findings that African-American patients did not receive sub-optimal treatment compared to Caucasian patients – and, in fact, were the recipients of *more* aggressive pharmacologic care in many instances – are more in line with a “race-as-proxy” explanation than one based on provider racism. Future investigations that include cues such as patient SES are needed to better address these important issues.

The speculative hypotheses articulated above concerning provider sex and role may also be extended here. In fact, there is evidence that females harbor less racial/ethnic biases than males (Bier, 1990; Johnson, & Marini, 1998; Qualls, Cox, & Schehr, 1992; Schuman, Steeh, & Bobo, 1997; Wuensch, Campbell, Kesler, & Moore, 2002). The findings observed in the present study could, thus, be attributable in part to the overwhelming majority of female participants. It will be interesting to revisit this issue in the future when a sufficient number of male providers have been enrolled. An additional factor that may bear on the differences between the current results and those of previous studies concerns the manner in which treatment decisions were operationalized. The current study examined nurses’ *likelihood* of administering a given medication, whereas previous studies have largely focused on the *amount* of medication administered. This seemingly subtle difference could, in fact, be quite important. Future studies would need to include both *likelihood* and *amount* ratings in regards to medication-related decisions to further clarify this issue.

The context in which the pain is occurring may also have implications for these differences. The post-surgical scenario employed in the present investigation is rather straightforward and, thus, may be less likely to elicit non-medical influences (e.g., racial biases)

on providers' treatment-related decisions than more ambiguous scenarios such as migraine or sickle cell crises (Tamayo-Sarver et al., 2003b). It is also possible that the type of methodology used to investigate these issues is of importance. Despite its novel innovations, the current study is still properly classified as a vignette-based approach. Two other recent vignette studies found that race of hypothetical patients did not influence analgesic practice among medical providers (Campbell, 2002; Tamayo-Sarver et al., 2003a). Perhaps these designs provide sufficient shelter from the time and financial pressures of real medical practice that may make biased decisions more likely. To address this hypothesis, future modifications to the current approach could include time constraints, such that assessment and treatment decisions must be made within a circumscribed period of time.

When patient age was analyzed at the individual level, it emerged as a significant cue in the non-opioid treatment policies of 11% of the study sample. Seventeen percent had opioid policies in which age played a significant role. The magnitude of these effects was roughly equivalent to pain assessment policies. The direction of the age effect was somewhat mixed for non-opioid decisions, the effect of which was seen when ratings were aggregated and no significant differences emerged between younger and older patients. More consistent results were found for opioid treatment; the majority of nurses were more likely to administer opioid medication to older patients relative to younger ones. This greater consistency was borne out at the group level, as a moderate-to-large age difference was found.

The relevant empirical literature is small and, thus, should be approached with caution. Nevertheless, in contrast to the current data, Oberle and colleagues (1990) found that post-surgical elderly patients received *less* medication for pain than their younger counterparts. In a vignette-based study, Campbell (2002) also found that hypothetical elderly patients were at

greater risk of being under-medicated for acute pain relative to younger ones. Returning to the current results, not only is it surprising that elderly patients often received higher treatment ratings, that this was particularly so – at least in terms of the directional consistency of the effect – for opioid medication is remarkable. It is well-documented that providers are increasingly reluctant to administer this class of medications, even in the most severe cases (Portenoy, 1996). Thus, it would be expected that age-related practice differences – elderly receiving more conservative treatment – as assessed in the current study would be more likely to manifest for decisions about opioids. Since, relative to their younger counterparts, older individuals are more likely to present with a larger array of comorbid medical conditions (Anderson, & Horvath, 2002; Hoffman, Rice, & Sung, 1996; Wolff, Starfield, & Anderson, 2002), the current findings may be a consequence of the standardization of clinical presentation across virtual patients. These results tentatively suggest that when older and younger patients present with similar conditions – both number and type – older patients, by and large, receive equivalent pain-related pharmacologic treatment and may even be the recipients of more aggressive treatment by some nurses.

The level of pain expression displayed by virtual patients significantly influenced treatment decisions regarding non-opioid and opioid medications in 24% and 46% of study participants, respectively. Interestingly, the direction of this effect was approximately equally split for non-opioid decisions and entirely consistent for opioid decisions, with high expression patients receiving higher ratings. As with pain assessment ratings, this cue had the largest absolute effect on nurses' overall policies in the treatment domain. When analyzed nomothetically, not surprisingly given the roughly equal split, no difference emerged in average non-opioid ratings between patients displaying low and high pain expressions. In contrast, a

large difference was found for opioid treatment ratings; high expression patients were more likely to be administered medication than low expression patients. The natural question that arises from these sets of findings is, relative to their directional counterparts, did those nurses who were less likely to administer *non-opioid* medication to high expression patients provide higher *opioid* medication ratings for these patients. Follow-up analyses indicated that this was not the case; there were no differences in opioid ratings – for high or low expression patients – between the two groups who used the pain expression cue in opposite directions for non-opioid treatment decisions. What then accounts for these individual differences in cue use? Unfortunately, that question must remain unanswered at present, but is an important consideration for future investigations.

The utilization of patient demographic cues in decision-making about pain assessment and treatment, even if found in only a small cluster of nurses, is highly significant when one considers several features of current nursing practice. The first concerns nurse-to-patient ratios. California is currently the only state to set a ratio limit for inpatient hospital units (Buchan, 2005). Medical/surgical units – the most relevant to the current discussion – are prohibited from exceeding a ratio of 1:5. If one adopts this as a conservative estimate of the average nurse-to-patient ratio across the country, then a given full-time nurse has the opportunity to assess and treat the pain of hundreds of patients each year and thousands of patients in a career. In this context, even a small propensity to utilize patient demographic characteristics in pain-related decision-making is of considerable importance. A second relevant feature of current nursing practice is related to training and modeling. The precepting of new nurses is a very important aspect of professional nursing practice (Alspach, 2000; Hardy, & Smith, 2001; Shamian, & Inhaber, 1985; Speers, Strzyzewski, & Ziolkowski, 2004). If, in this capacity, a veteran nurse

conveys the message – the self-reported cue utilization data from the current study suggest that this is likely to be an implicit process – that patient demographic characteristics are to be considered when making pain-related decisions, the consequences could be dramatic. Not only would the precepted nurses be more likely to engage in similar practices, but if they served as preceptors in the future, the transmission of such inappropriate clinical behavior is furthered still. Similar dissemination is likely to also occur outside of formal training in the form of modeling. Thus, any one nurse with a given propensity to weight patient demographic cues in the assessment and/or treatment of pain could have a far-reaching influence on clinical practice.

Policies regarding the likelihood of recommending a change in medication to obtain better pain control were also influenced to some degree by contextual cues. Patient sex played a relatively minor role in the decision-making process for most nurses; however, for the few that did use this cue in a reliable manner, the effect was quite substantial. When ratings were combined for group analyses, female patients received significantly higher ratings for both medication classes. Race was a somewhat larger factor in this context. At the idiographic level, the direction of effect was approximately equal for non-opioid medications, which manifested in a non-significant within-cue difference in aggregated ratings for African-American and Caucasian patients. In contrast, the results were entirely consistent for opioid recommendations. All 4 nurses with a significant race cue made higher likelihood ratings on behalf of African-American patients. Although these nurses represented less than 10% of the entire sample, their use of virtual patient race was enough to produce a significant and relatively substantial aggregate difference between ratings for African-Americans and Caucasians. Virtual patient age had a minor impact on non-opioid recommendation decisions but a somewhat larger one for opioid decisions. More nurses gave higher non-opioid recommendation ratings to younger

patients than older ones; however, the reverse was true for opioid medication. When these data were collapsed for group analyses, no age differences emerged for either medication. Finally, and consistent with previous results, virtual patient pain expression played a relatively large and consistent role in recommendation decisions. Most nurses who used this cue in a consistent and significant manner were more likely to make recommendations on behalf of patients displaying a high pain face. It is not surprising, then, that similar significant within-cue differences for pain expression emerged at the nomothetic level.

A precise elucidation of the above results is difficult at this time. Perhaps the most pressing interpretive challenge is that the intent of the ratings is not known. It is likely that while some nurses made ratings with the objective of recommending a change in medication *type*, others were pursuing a change in medication *dosage*; still others could have intended something different altogether. Without this level of informational detail, further interpretation of these data is exceedingly speculative and, thus, imprudent. Future studies could address these issues by having nurses indicate their intent and likelihood.

Although not a primary target of the current investigation, the impact of contextual cues on mood assessment ratings was also determined. Virtual patient sex emerged as a relatively insignificant cue in the assessment of positive mood but a more influential constituent of policies involving negative mood assessment. When virtual patient sex cue was weighted by participants, males tended to be viewed as experiencing a more favorable mood (less negative, more positive), whereas the opposite (more negative, less positive) was true for females. Research supports the existence of strong, sex-specific socialization pressures that bear on the judgment of another's emotional experience. For example, Gaelick, Bodenhausen, and Wyer (1985) found that expressions of happiness and anger by women were perceived as more and less intense,

respectively, than expressions of equivalent intensity displayed by men. Even young children are affected by these stereotypes (Haugh, Hoffman, & Cowan, 1980). An interesting reversal of the stereotype was reported by Hess, Adams, and Kleck (2004), in that women were rated as more angry and men as more happy. The current results are consistent with this study by Hess and colleagues, and although both of these findings could be spurious – merely the result of chance – they can also be meaningfully interpreted in the context of the Shifting Standards Model (Biernat, Manis, & Nelson 1991). Briefly, this model posits that subjective judgments of individuals from different social groups may fail to elicit the stereotyped expectations of judges, because they invite the use of different evaluative standards. As applied to the current study, males and females are generally expected to display more negatively and positively valenced emotions, respectively. Consequently, a given negative emotional expression – an expression of greater pain in the current study – is perceived as more negative when displayed by a female than a male. Conversely, a given positive emotion is rated as more positive when expressed by a male than a female. This interpretation is tentative but provides an intriguing basis for future investigations of the pain-mood nexus.

As with virtual patient sex, there was directional variability in individual nurses' use of the race cue. Nevertheless, more nurses were inclined to view African-Americans as experiencing less favorable mood than Caucasians. Cross-cultural recognition and categorization of emotional expressions has received considerable empirical attention (Dickey & Knowler, 1941; Ekman & Friesen, 1972; Fridlund, Ekman, & Oster, 1987; Izard, 1968; Matsumoto, 1987; Schimmack, 1996; Shioiri et al., 1999). However, this research has been overwhelmingly asymmetrical in its focus on the race/ethnicity of the observer to the conspicuous exclusion of the race/ethnicity of the observed individual. Given the lack of variability in the racial/ethnic background of

participants, the current study focused exclusively on the characteristics of the observed patient. Consequently, the voluminous literature on cross-cultural issues in the expression and perception of emotional states provides little interpretative guidance for the current results.

Of all the demographic variables, age demonstrated the largest and most consistent impact on mood assessments, with approximately one-quarter of participants using this cue in a significant manner. With one exception, these nurses rated younger patients as experiencing more favorable mood than their older counterparts; the directional consistency of this effect was borne out in group analyses of average ratings. A small literature exists on the perception of elderly individuals' emotional expressions. In contrast to the current findings, Borod and colleagues (2004) found no difference in intensity ratings of positive and negative emotions expressed by individuals of varying age groups. A similar finding was reported by Moreno, Borod, Welkowitz, & Alpert (1993) in which the age of the expressor did not influence the perceptual accuracy scores of raters. In contrast, Malatesta, Fiore, & Messina (1987) found that the emotional expressions of older subjects were not perceived with clarity. Although this study lacked an adequate, younger comparison group, it does suggest that older persons are at risk for misattribution of their emotional displays. Given the substantial differences in methodology and purpose, the relevance of this literature to the current study is unclear. Additional research is needed to clarify the effect of patient age – and other demographic characteristics for that matter – on providers' emotional assessment in a clinical pain context, a topic that has not received adequate attention to date.

The final cue of interest – pain expression – again emerged as a strong and consistent contributor to decision policies in the domain of mood. Forty-four percent and 63% of the sample manifested a significant pain expression policy in assessments of positive and negative

mood, respectively. All rated highly expressive patients as experiencing less favorable mood. These results are not surprising considering the overlap in core action units – namely AUs 4 and 7, which correspond to movements of the brow and eyes, respectively – of various negative emotional states (e.g., anger, fear, sadness) and pain. From a conceptual point of view, concomitant negative affect is expected with the experience of pain. Indeed, the IASP (1994) defines pain as "an unpleasant sensory and *emotional* experience associated with actual or potential tissue damage or described in terms of such damage" (italics added). Thus, even in the absence of “explicit” mood-related information, one would expect the assessment of mood – particularly negative mood – in a clinical pain context to be a relatively reliable process and amenable to statistical modeling.

An interesting issue that emerges from the discussions above concerns the integration of idiographic and nomothetic results. The vast majority of scientific investigations involving human participants are nomothetic; i.e., data is collected from individuals and aggregated for group analyses. The current study highlights a major limitation of a strictly nomothetic approach, namely, that it provides an incomplete perspective on the phenomenon of interest. To take an example from the current data, if one limited the analysis of patient race and opioid treatment decisions to solely a nomothetic approach, the conclusion would consist only of the following: African-American patients received significantly higher opioid treatment ratings than Caucasians, and this difference was of a medium-size effect. If, however, an idiographic perspective was added, the conclusion would be much different. Results of an idiographic analytic approach indicated that, far from being a ubiquitous phenomenon, such race-based differences in opioid treatment were only present in 9% of study participants. And of these 9%, one nurse’s use of the race cue even operated in the opposite direction. The implications of these

results are very different. A strictly nomothetic approach could possibly lead to calls for sweeping intervention efforts aimed at addressing this “problem” of differential pain treatment practices among racial groups. On the other hand, idiographic results suggest a more nuanced approach, one that involves the identification and targeting of those individuals who produced discrepant ratings across race. The current study was primarily focused on the contextual cues of interest and, consequently, did not secure sufficient variability in key provider characteristics to address the individual differences question. Nevertheless, results were suggestive of the influence of provider education and experience on pain-related decisions. Continued systematic efforts to include providers of diverse personal and professional characteristics are needed to further this next step in the literature, namely, the identification of which providers are most likely to weight patient demographic cues in their clinical decision-making about pain. The idiographic-nomothetic distinction highlighted in the current study also provides an alternative lens through which to view the existing literature in this field, as well as a unique methodological approach by which to continue this line of research.

A significant limitation of lens model designs is the necessity to restrict the number of contextual cues available to study participants. The purpose of this restriction is primarily two-fold. First, the cognitive capacity of human participants is limited; only 7 ± 2 independent pieces of information (i.e., cues) can be processed at any one time (Miller, 1956). Thus, Cooksey (1996) recommends that no greater than nine cues be included in a study. Inclusion of a greater number of cues increases the probability of inconsistent responding, inconsistent cue use, and/or ignoring of cues. A second reason for limiting the number of available cues has to do with the number of scenarios presented. As the number of cues increases, the number of scenarios needed also increases, but at an exponential rate. The mere addition of a few more cues in a given study

could easily increase the necessary number of clinical scenarios to a practically infeasible total. The consequence of such cue restriction is that many potentially important cues to the decision process of interest must be excluded from any one study. One way of determining the relevance of cues included in a particular study, and of the need in future work to incorporate additional cues, is to examine the coefficient of determination (R^2) for a given policy. In the current study, when averaged R^2 values were compared across decision domains, pain assessment policies emerged at the top. Further, the greatest proportion of study participants had a significant overall policy in the assessment domain. These results indicate that the available contextual cues were highly relevant to decisions about pain assessment. Conversely, additional cues are apparently needed to better capture the decision making process in the domains of non-opioid treatment and medication-related recommendations.

A shared feature of all empirical investigations is the presence of limitations. Although several limitations of the current study have been noted throughout the discussion, perhaps the most conspicuous limitations are related to its analogue nature. All analogue studies must strongly consider their representativeness of the topic of interest as it actually exists in the world. The current study attempted to mitigate this limitation, while still exerting rigorous experimental control, through the use of virtual patient technology. This innovation notwithstanding, study participants were still making clinical decisions about a hypothetical virtual patient in a contrived experimental setting delivered via computer. Furthermore, the videos captured only the head and face of virtual patients and contained no verbal component. To address this issue of representativeness, feedback was elicited from nurse participants concerning several features of the study. Over 70% indicated that the virtual patient facial expressions were realistic depictions of pain. Over 90% considered the clinical scenario to be reflective of a real post-operative

scenario. Over 80% of participants rated the patient information as similar to that encountered in a real clinical setting. Finally, over 70% stated that their decisions regarding the treatment of the virtual patients were similar to decisions they would make regarding a real patient. Although these responses suggest a high degree of representativeness, one must remain cautious when attempting to extend these findings to actual clinical practice. A second issue concerns the face validity of the investigation and consequent potential for participants to respond in a socially desirable manner. Although many nurses in the current study expressed at least partial awareness of the hypotheses of interest, they did not differentially weight patient demographic or facial expression cues relative to those who did not express such awareness. This lack of a difference may be due, in part, to the fact that all nurses in this study were unaware of their use of such cues. In fact, not one nurse indicated that s/he used a patient demographic cue for any of the decision domains.

In conclusion, the current study found that the patient demographic cues of sex, race, and age are significant contributors to the pain-related decision policies of many nurses. The level of pain expressed by the virtual patient was also found to be an important factor in this context. In addition, this study demonstrated the use of innovative novel virtual patient technology and lens model methodology in the investigation of these highly important issues. Continued research is needed to address the many questions raised herein, with the goal of improving the assessment and management of all patients suffering from pain.

APPENDIX
RESULTS OF IDIOGRAPHIC REGRESSION ANALYSES

Table A-1. Policies toward pain intensity assessment

Participant	Age	Race	Sex	Pain	R ²
1	-.013	.085	.366*	.411*	.310*
2	.189	.000	-.095	.452*	.249 [†]
3	.254	.295 [†]	-.268 [†]	.282 [†]	.303*
4	.174 [†]	.253*	-.016	.793**	.724**
5	.491**	.104	.097	.630**	.658**
6	-.084	.118	.196	.174	.089
7	.507**	.140	-.243*	.552**	.640**
8	.278 [†]	.155	.214	.545**	.444**
9	.173	.381*	.042	.485**	.412**
10	.070	.249	-.082	.436*	.264 [†]
11	-.126	.005	.170	.603**	.408**
12	-.065	.157	.166	.792**	.684**
13	-.098	.153	.153	.094	.065
14	.149	-.200	.353*	.472**	.409**
15	-.005	.099	-.049	.740**	.560**
16	.088	.059	.294	.059	.101
17	.221	.099	.173	.550**	.391**
18	-.121	-.178	.099	.335 [†]	.168
19	.198	.033	.160	.566**	.387**
20	-.010	.332 [†]	.033	.115	.125
21	-.066	.074	.249 [†]	.629**	.467**
22	.206	.077	-.060	.652**	.477**
23	.264**	.061	-.157	.809**	.753**
24	-.158	-.058	-.050	.605**	.397**
25	.244 [†]	-.201	.310*	.489**	.435**
26	.239	.274	.104	-.007	.143
27	.148 [†]	.167*	-.164 [†]	.859**	.815**
28	.318 [†]	.169	-.012	.186	.165
29	.392**	.058	.315*	.586**	.600**
30	.179	.140	.000	.420*	.228
31	.027	-.027	-.118	.027	.016
32	.204	-.058	.065	.660**	.485**
33	-.042	.363*	-.005	-.035	.134
34	-.079	-.280*	-.040	.700**	.576**
35	-.211	.105	.090	.105	.075
36	.280*	.040	.249 [†]	.633**	.543**
37	.029	.107	.257 [†]	.670**	.528**
38	.261 [†]	.289 [†]	.219	.476**	.425**
39	.080	-.080	-.064	.161	.043
40	.144	.313**	.049	.729**	.652**

Table A-1. Continued

Participant	Age	Race	Sex	Pain	R ²
41	-.169 [†]	-.003	.090	.877**	.805**
42	.256	.054	.112	.425*	.262 [†]
43	.309 [†]	.288 [†]	.116	-.133	.209
44	.172	.136	.335**	.733**	.697**
45	.044	.086	-.065	.467**	.232
46	.051	-.093	-.157	.469*	.262 [†]
47	.296*	-.070	.206 [†]	.706**	.633**
48	.153	.173	.009	.792**	.680**
49	.369**	.252 [†]	.098	.580**	.547**
50	.226	.011	-.138	.414*	.242 [†]
51	-----	-----	-----	-----	-----
52	.041	.209	-.116	-.058	.062
53	.107	.000	.064	.735**	.556**
54	-.056	.153	.237 [†]	.704**	.578**

**p<.01,*p<.05,[†]p<.10

Table A-2. Policies toward pain unpleasantness assessment

Participant	Age	Race	Sex	Pain	R ²
1	.038	.022	.347*	.503**	.376*
2	.256	-.147	.134	.378	.248 [†]
3	.204	.016	-.376*	.031	.184
4	.181 [†]	.186 [†]	-.081	.802**	.718**
5	.510**	.178 [†]	.216*	.649**	.760**
6	-.085	.061	.195	.159	.074
7	.529**	.145	-.266*	.523**	.645**
8	.182	.259 [†]	.213	.472**	.368*
9	.212	.323*	.199	.552**	.494**
10	.050	.192	.024	.537**	.328*
11	.032	-.104	.304*	.581**	.441**
12	-.119	.131	.190 [†]	.778**	.672**
13	.166	.103	.225	-.095	.098
14	.132	-.064	.343*	.464**	.354*
15	.201*	.000	.081	.886**	.832**
16	-.014	.072	.359*	-.101	.145
17	.121	-.093	.111	.753**	.602**
18	-.046	-.184	.064	.326 [†]	.146
19	.188	.033	.161	.571**	.388**
20	.043	.340 [†]	-.017	.157	.143
21	-.053	.233 [†]	.348*	.548**	.478**
22	.209	.064	-.055	.643**	.465**
23	.243*	.030	-.076	.848**	.785**
24	-.111	-.012	.009	.607**	.381**
25	.234	-.218	.329*	.484**	.445**
26	.178	.260	.082	-.034	.107
27	.201*	.106	-.191*	.831**	.779**
28	.294 [†]	.215	.115	.136	.165
29	.401**	.058	.330**	.586**	.617**
30	.180	.173	.025	.375*	.204
31	-.023	-.281	-.068	.144	.105
32	.201	-.044	.098	.638**	.459**
33	-.129	.354 [†]	-.008	-.051	.145
34	-.152	-.324*	-.031	.703**	.623**
35	-.132	.050	-.066	-.083	.031
36	.257 [†]	.013	.234 [†]	.659**	.555**
37	.089	.069	.146	.578**	.368*
38	.234	.219	.234	.537**	.446**
39	.286	-.051	-.139	.198	.143
40	.136	.321**	.037	.732**	.659**
41	-.191	.000	.124	.887**	.838**
42	.203	.046	.091	.475**	.277 [†]
43	.076	.181	-.133	-.181	.090

Table A-2. Continued

Participant	Age	Race	Sex	Pain	<i>R</i> ²
44	.143	.113	.303**	.767**	.713**
45	.050	.145	-.061	.457*	.236
46	.390*	.034	-.074	.441*	.359*
47	.292*	-.085	.204 [†]	.730**	.667**
48	.206 [†]	.201	-.001	.711**	.588**
49	.387**	.244 [†]	.120	.562**	.540**
50	.130	-.152	.152	.352*	.187
51	-----	-----	-----	-----	-----
52	.177	.157	-.218	.000	.104
53	.177	.032	.121	.720**	.566**
54	-.108	.134	.186	.762**	.644**

**p<.01,*p<.05,[†]p<.10

Table A-3. Policies toward positive mood assessment

Participant	Age	Race	Sex	Pain	R ²
1	-.341*	-.058	-.389*	-.427**	.453**
2	.035	.383*	-.104	-.087	.166
3	.180	-.012	-.156	.337 [†]	.171
4	-.189	-.316*	.032	-.516**	.403**
5	-.318*	-.318*	.053	-.371*	.344*
6	-----	-----	-----	-----	-----
7	-----	-----	-----	-----	-----
8	.042	.073	.237	.383*	.210*
9	.357*	.064	-.119	-.082	.153
10	-.101	-.316 [†]	.003	-.240	.168
11	-.234	-.002	-.191	-.055	.094
12	-.132	-.009	.044	-.731**	.554**
13	.274	-.017	.105	.021	.087
14	-.048	-.078	.385*	-.011	.156
15	-.400**	-.043	-.156	-.713**	.695**
16	-.072	-.217	-.362*	-.217	.230
17	-.210	.242	-.131	-.439**	.313*
18	-.205	.184	-.263	.130	.162
19	-.201	.285 [†]	-.169	-.487**	.387**
20	-.158	-.338 [†]	.197	-.069	.183
21	.073	-.081	-.245	-.549**	.373*
22	-.102	-.102	-.102	-.408*	.198
23	-.294*	-.173	.086	-.708**	.626**
24	-.248	-.149	-.133	-.514**	.366*
25	-.382*	.123	-.140	-.370*	.318*
26	-.181	.211	.215	.126	.139
27	-.443**	-.268 [†]	.011	-.313*	.366*
28	-.180	.180	.180	-.180	.129
29	-.300 [†]	-.050	-.383*	-.383*	.385**
30	-.107	.010	.193	-.193	.086
31	-----	-----	-----	-----	-----
32	-.144	.155	.122	-.580**	.396**
33	.082	.009	-.111	-.043	.021
34	-.223	.287	-.053	-.223	.185
35	-.122	-.049	.146	.122	.054
36	-.323*	-.218	-.152	-.491**	.416**
37	-----	-----	-----	-----	-----
38	.065	-.013	.079	-.425*	.192
39	.343*	.023	.080	-.377*	.267 [†]
40	-.051	-.024	.133	-.403*	.183
41	.049	.215 [†]	-.004	-.787**	.669**
42	-.185	-.042	.102	-.341 [†]	.163
43	.359*	.072	.049	-.113	.149

Table A-3. Continued

Participant	Age	Race	Sex	Pain	<i>R</i> ²
44	-.108	.149	.108	-.316 [†]	.146
45	-.181	.010	-.341*	-.366*	.283*
46	-.473**	-.108	.028	-.512**	.509**
47	-.350**	.091	-.141	-.662**	.590**
48	-.278 [†]	-.081	-.038	-.568**	.408**
49	-.454**	-.307*	-.043	-.392**	.456**
50	-.226	.111	-.116	-.368*	.213
51	-----	-----	-----	-----	-----
52	-.134	.370*	.195	.082	.200
53	-.240	-.110	-.240	-.386*	.277 [†]
54	.010	-.169	-.129	-.618**	.427**

**p<.01,*p<.05, [†]p<.10

Table A-4. Policies toward negative mood assessment

Participant	Age	Race	Sex	Pain	R ²
1	.131	-.235	.328*	.508**	.437**
2	-.020	-.526**	.245	.032	.338*
3	-.184	-.033	-.080	-.071	.046
4	.049	.272**	-.065	.819**	.751**
5	.521**	.201 [†]	.100	.632**	.722**
6	-.060	.018	-.025	.032	.006
7	.374**	.045	-.296*	.625**	.621**
8	.195	-.039	.000	.311 [†]	.136
9	.343*	.254 [†]	.299 [†]	.359*	.401**
10	.002	.190	-.144	.478**	.285*
11	-.022	-.009	.013	.737**	.543**
12	-.133	.241*	.148	.758**	.673**
13	.136	.009	-.032	.054	.023
14	.181	-.277 [†]	.443**	.082	.313*
15	.283**	-.054	-.001	.802**	.726**
16	.038	.038	.419*	-.063	.182
17	.266 [†]	-.056	.134	.545**	.389**
18	.077	-.166	.191	.444*	.267 [†]
19	.118	-.042	.216	.477**	.290*
20	.087	.380*	.000	.075	.158
21	-.042	.139	.412**	.550**	.494**
22	.146	.073	.000	.656**	.457**
23	.262*	.102	.080	.737**	.629**
24	-.120	-.075	-.014	.636**	.425**
25	.180	-.075	.122	.600**	.413**
26	.205	.255	.105	-.173	.148
27	.163 [†]	.186*	-.267**	.804**	.779**
28	.226	.233	.089	.192	.151
29	.366*	.095	.417	.219	.364*
30	.042	.228	.111	.377*	.208
31	.121	-.198	.179	.051	.089
32	.165	.012	.053	.628**	.424**
33	.117	-.011	-.117	.156	.052
34	-.188	-.156	-.007	.656**	.491**
35	-.396*	.044	.242	.000	.217
36	.308 [†]	-.007	.289 [†]	.365*	.312*
37	.033	.156	.325*	.644**	.547**
38	.225	.121	-.012	.422*	.244 [†]
39	-.120	.172	-.190	.310 [†]	.176
40	.130	.370**	-.003	.625**	.545**
41	-.029	.079	.096	.901**	.828**
42	.100	-.204	.194	.541**	.382**
43	-.013	.136	-.069	.019	.024

Table A-4. Continued

Participant	Age	Race	Sex	Pain	R^2
44	.171 [†]	-.014	.282**	.788**	.729**
45	.123	-.043	.305 [†]	.376*	.251 [†]
46	.408**	-.052	-.051	.609**	.543**
47	.336**	-.034	.138	.709**	.635**
48	.248 [†]	.047	.033	.603**	.429**
49	.096	.183	.057	.535**	.332*
50	.105	.156	-.228	.167	.115
51	-----	-----	-----	-----	-----
52	.169	.216	-.005	.084	.082
53	.147	.032	.015	.653**	.450**
54	-.145	.101	.261 [†]	.630**	.496**

**p<.01, *p<.05, [†]p<.10

Table A-5. Policies toward non-opioid treatment

Participant	Age	Race	Sex	Pain	R ²
1	-.151	.076	-.138	.087	.056
2	.040	.546**	.022	.262 [†]	.369*
3	-.180	-.180	.180	-.180	.129
4	.116	-.198	-.131	-.282	.150
5	.081	-.244	-.244	.081	.132
6	.180	-.180	.180	.180	.129
7	-----	-----	-----	-----	-----
8	-.037	.213	.120	.409*	.228
9	.200	-.035	.118	.259	.123
10	.106	.152	-.014	-.350 [†]	.157
11	.438*	-.045	-.135	.191	.248 [†]
12	-.029	-.001	.229	.550**	.355*
13	.273	-.020	.164	.076	.108
14	.184	.114	.461**	-.386*	.409**
15	.288 [†]	-.079	.068	.519**	.363*
16	.012	.229	.157	-.326 [†]	.184
17	-.171	-.284 [†]	-.124	-.316 [†]	.225
18	.136	.311 [†]	-.116	-.017	.129
19	-----	-----	-----	-----	-----
20	.020	.256	.256	.020	.132
21	.049	.117	.336*	.512**	.391**
22	-----	-----	-----	-----	-----
23	.010	-.070	-.142	.272	.099
24	-.039	-.015	-.042	.491**	.245 [†]
25	.173	-.191	-.180	.176	.130
26	.181	.181	.181	-.178	.130
27	.088	-.037	.209	-.571**	.379**
28	-.133	.035	.262	-.069	.092
29	.008	.259 [†]	.028	.540**	.359*
30	.127	-.017	.081	.168	.051
31	-.180	-.180	-.180	.180	.129
32	.229	.229	.115	.229	.171
33	-.093	-.219	-.205	.000	.099
34	.200	-.399*	-.105	.244	.270 [†]
35	-.180	.180	-.180	-.180	.129
36	-.511**	-.057	-.112	-.468**	.496**
37	-.244	-.081	-.081	-.081	.079
38	.000	.258	.000	-.258	.133
39	.239	-.278	-.017	-.231	.188
40	-.161	-.132	-.110	-.537**	.343*
41	-.074	-.247	.247	.247	.188
42	-.027	.184	.048	.233	.091
43	-.201	-.201	.033	.201	.122

Table A-5. Continued

Participant	Age	Race	Sex	Pain	<i>R</i> ²
44	-.128	.222	.222	-.128	.131
45	-.229	-.200	.135	-.232	.165
46	-.237	-.081	.133	-.352 [†]	.214
47	-.334*	.116	-.040	-.618**	.509**
48	-.348*	-.100	-.016	-.557**	.442**
49	-.391*	-.014	-.251	-.334*	.327*
50	.089	.164	-.202	-.089	.083
51	-.180	-.180	.180	.180	.129
52	.150	-.354*	-.150	-.107	.182
53	.269 [†]	.103	.024	.515**	.349*
54	-----	-----	-----	-----	-----

**p<.01, *p<.05, [†]p<.10

Table A-6. Policies toward opioid treatment

Participant	Age	Race	Sex	Pain	R ²
1	.052	.054	.365*	.171	.168
2	.199	.383*	.003	.199	.226
3	.180	.180	.180	-.180	.129
4	.067	.217*	-.004	.875**	.818**
5	.378*	.076	.098	.489**	.397**
6					
7	.201	-.402*	-.126	-.101	.228
8	-.019	.099	.370*	.540**	.439**
9	.264	.274	.155	.174	.199
10	-.040	.131	-.180	.454**	.257 [†]
11	.024	-.142	.086	.665**	.470**
12	-.002	.084	.219 [†]	.740**	.603**
13	.331 [†]	.085	.299 [†]	-.121	.221
14	.290 [†]	-.012	.343*	.367*	.337*
15	.117	-.016	.078	.776**	.622**
16	.008	-.040	.233	-.040	.057
17	.252 [†]	.200	.111	.611**	.489**
18	.040	-.181	.211	.346 [†]	.199
19	.199	-.094	.241	.455**	.314*
20	.008	.341 [†]	-.083	.000	.123
21	-.278*	.312*	.141	.626**	.587**
22					
23	.302**	-.077	.116	.776**	.713**
24	-.112	-.007	-.089	.464**	.235
25	.084	.119	.417*	.249	.257 [†]
26	.180	.180	.180	-.180	.129
27	.109	.134	-.181 [†]	.847**	.779**
28	.271	.072	-.151	.268	.173
29	.349**	.170	.329**	.611**	.632**
30	.089	.135	.061	-.020	.031
31					
32	.133	-.008	.003	.512**	.280 [†]
33	-.095	.469**	-.163	.060	.259 [†]
34	-.008	-.159	-.099	.750**	.598**
35	.107	-.322 [†]	-.107	-.107	.138
36	.154	-.144	.248	.532**	.389**
37	.177	-.183	-.183	.177	.129
38	.102	.397**	.151	.497**	.438**
39	.026	-.096	-.411*	.236	.235
40	.124	.333**	.131	.730**	.676**
41	-.106	-.025	.037	.920**	.860**
42	-.027	.168	.049	-.200	.071
43	-.251	.142	-.050	-.042	.088

Table A-6. Continued

Participant	Age	Race	Sex	Pain	R^2
44	-.151	-.151	.001	.189	.081
45	.031	.305 [†]	.209	.279	.216
46	.135	.144	-.050	.360 [†]	.180
47	.341**	-.086	.125	.717**	.653**
48	.182	.158	.006	.594**	.411**
49	.337*	.049	.141	.447**	.335*
50	.298	-.053	.165	-.074	.124
51	.180	.180	-.180	-.180	.129
52	.147	-.332 [†]	-.147	-.114	.166
53	.305*	-.065	.033	.656**	.528**
54	.002	.034	.297*	.625**	.480**

**p<.01, *p<.05, [†]p<.10

Table A-7. Policies toward change in non-opioid treatment

Participant	Age	Race	Sex	Pain	R ²
1	.090	-.114	.072	.094	.035
2	.194	.230	.035	.000	.092
3	.132	.019	-.345 [†]	.194	.174
4	.298	-.007	-.047	-.040	.093
5	.320 [†]	.110	.129	.320 [†]	.234
6	.019	.119	.119	.268	.100
7	.173	-.307 [†]	.040	-.360*	.256 [†]
8	-.097	.194	.252	.180	.143
9	-.464**	-.282 [†]	-.001	-.145	.316*
10	.008	.008	.133	-.174	.048
11	-.078	.287 [†]	-.088	.511**	.357*
12	.054	.081	.092	.774**	.618**
13	.341 [†]	.080	.211	-.011	.167
14	.156	-.164	.499**	-.110	.312*
15	.216	-.076	.234	.579**	.443**
16	.030	.030	.355*	-.315 [†]	.227
17	-----	-----	-----	-----	-----
18	-----	-----	-----	-----	-----
19	.211	-.063	.147	.523**	.344*
20	.180	.180	.180	.180	.129
21	-.141	.218 [†]	.374**	.609**	.578**
22	.279	.279	-.200	.153	.219
23	.216	-.027	-.084	.463**	.268 [†]
24	-.089	.092	-.064	.614**	.398**
25	.087	-.167	-.107	.167	.075
26	.286	.283	.095	-.157	.196
27	.042	.293 [†]	-.293 [†]	.484**	.407**
28	-.051	-.118	.185	-.138	.070
29	.291 [†]	-.243	.271	.018	.218
30	.040	.056	.032	-.040	.007
31	-.264	-.242	-.022	-.132	.146
32	.183	.183	-.176	.176	.129
33	-.086	-.121	-.159	.159	.072
34	-.111	-.144	.202	.573**	.403**
35	-----	-----	-----	-----	-----
36	-.409*	-.203	.041	-.098	.220
37	.180	.356**	.150	.651**	.604**
38	-.012	-.292	.226	.074	.142
39	.178	-.148	-.294	-.011	.140
40	-.180	-.180	-.180	.180	.129
41	-.184	-.300*	.074	.657**	.560**
42	.336*	.237	.013	.324 [†]	.274 [†]
43	-.248	.235	.172	-.146	.168

Table A-7. Continued

Participant	Age	Race	Sex	Pain	R^2
44	.177	-.149	-.012	.152	.077
45	-.167	-.237	.073	-.261	.157
46	-.109	.110	.031	-.270	.096
47	-.209	.195	-.086	-.540**	.381**
48	-.370*	-.108	.042	-.500**	.400**
49	-.280	-.280	-.038	-.082	.165
50	-.152	.281	.094	-.304 [†]	.203
51	-----	-----	-----	-----	-----
52	.190	.224	-.184	.034	.121
53	.115	-.187	.209	.587**	.436**
54	.257	-.244	.244	.068	.190

**p<.01,*p<.05,[†]p<.10

Table A-8. Policies toward change in opioid treatment

Participant	Age	Race	Sex	Pain	R ²
1	.127	.030	.372*	.260	.223
2	.204	.240	.027	.027	.101
3	.222	.146	-.089	.349*	.200
4	.057	.065	.057	.789**	.633**
5					
6	.051	.107	.006	.264	.084
7	.064	-.295	.013	-.218	.138
8	.083	.124	.185	.447*	.257 [†]
9	-.303 [†]	-.321 [†]	-.096	-.096	.213
10	.004	.162	-.131	.403*	.206
11	-.051	.182	.005	.466**	.253 [†]
12	-.043	.112	.288*	.703**	.592**
13	.218	.161	.100	.157	.108
14	.192	.304 [†]	.304 [†]	.155	.245 [†]
15	.049	-.049	-.008	.824**	.683**
16	-.063	.032	.317 [†]	-.016	.106
17	.180	-.180	.180	.180	.129
18					
19	.211	-.039	.135	.507**	.321*
20	-.034	.242	-.126	-.040	.077
21	-.346*	.277 [†]	.159	.255	.287*
22	-.027	.311 [†]	-.030	.252	.162
23	.281**	-.091	.091	.797**	.731**
24	-.038	-.134	-.128	.520**	.306*
25	-.068	.166	.296 [†]	.178	.151
26	.016	.016	.016	-.016	.001
27	.000	.216 [†]	-.304*	.716**	.652**
28	.065	-.015	.225	-.210	.099
29	.286 [†]	-.123	.253	.335*	.273 [†]
30	.109	.199	.032	.045	.055
31	-.206	-.186	.021	-.062	.081
32	.111	.095	.118	.195	.073
33	-.034	.393*	-.132	.247	.234
34	-.035	-.090	.152	.676**	.489**
35	.180	-.180	-.180	.180	.129
36	-.036	-.039	.175	.511**	.294*
37	.246 [†]	.293*	.170	.567**	.497**
38	.077	.109	.258	.413*	.255 [†]
39	.059	-.075	-.138	-.083	.035
40	-.122	.122	-.122	.320 [†]	.147
41	-.144	.047	-.005	.730**	.556**
42	.346*	.223	.002	.329*	.278 [†]
43	.173	.065	.108	.087	.054

Table A-8. Continued

Participant	Age	Race	Sex	Pain	R^2
44	.320 [†]	.000	.160	.320 [†]	.231
45	-.128	.151	.105	.206	.093
46	-.098	.306 [†]	-.219	.281	.241
47	.392**	-.073	.083	.652**	.592**
48	.154	.184	-.011	.563**	.374*
49	.122	.267	-.071	.361*	.222
50	.409*	-.027	.264	-.002	.237
51	-.180	.180	.180	-.180	.129
52	.091	.310 [†]	-.125	.100	.130
53	.090	.167	.070	.583**	.381**
54	-.261 [†]	.197	.146	.501**	.380**

**p<.01, *p<.05, [†]p<.10

LIST OF REFERENCES

- Acute Pain Management Guideline Panel. *Acute pain management: Operative or medical procedures and trauma. Clinical practice Guideline.* (1992). Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.
- Agency for Health Care Policy and Research. *Management of Cancer Pain.* (1994). Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.
- Ahles, T. A., Coombs, D. W., Jensen, L., Stukel, T., Maurer, L. H., & Keefe, F. J. (1990). Development of a behavioral observation technique for the assessment of pain behaviors in cancer patients. *Behavior Therapy, 21*, 449-460.
- Alspach, J. G. (2000). *From staff nurse to preceptor: A preceptor development program* (2nd ed.). Aliso Viejo, CA: American Association of Critical Care Nurses.
- American Geriatrics Society Panel on Persistent Pain in Older Persons. (2002). The management of persistent pain in older persons. *Journal of the American Geriatrics Society, 50*, 205-224.
- American Medical Association. (2005). *Physician characteristics and distribution in the U.S.* Chicago, IL: American Medical Association.
- American Pain Society. (1992). *Principles of analgesic use in the treatment of acute pain and chronic cancer pain* (3rd ed.). Skokie, IL: American Pain Society.
- Anderson, G., & Horvath, J. (2002). *Chronic conditions: Making the case for ongoing care.* Princeton, NJ: Robert Wood Johnson Foundation's Partnership for Solutions.
- Anderson, K. O., Mendoza, T. R., Valero, V., Richman, S. P., Russell, C., Hurley, J., et al. (2000). Minority cancer patients and their providers: pain management attitudes and practice. *Cancer, 88*, 1929-1938.
- Aubrun, F. (2005). Management of postoperative analgesia in elderly patients. *Regional Anesthesia and Pain Medicine, 30*, 363-379.
- Auret, K., & Schug, S. A. (2005). Underutilisation of opioids in elderly patients with chronic pain: Approaches to correcting the problem. *Drugs & Aging, 22*, 641-654.
- Bartfield, J. M., Salluzzo, R. F., Raccio-Robak, N., Funk, D. L., & Verdile, V. P. (1997). Physician and patient factors influencing the treatment of low back pain, *Pain, 73*, 209-211.
- Beal, D., Gillis, J. S., & Stewart, T. (1978). The lens model: Computational procedures and applications. *Perceptual & Motor Skills, 46*, 3-28.

- Bellville, J. W., Forrest, W. H., Miller, E., & Brown, B. W. (1971). Influence of age on pain relief from analgesics. *JAMA*, *217*, 1835-1841.
- Bernabei, R., Gambassi, G., Lapane, K., Landi, F., Gatsonis, C., Dunlop, R., et al. (1998). Management of Pain in Elderly Patients with Cancer. *JAMA*, *279*, 1877-1882.
- Beyer, J. E., DeGood, D. E., Ashley, L. C., & Russell, G. A. (1983). Patterns of postoperative analgesic use with adults and children following cardiac surgery. *Pain*, *17*, 71-81.
- Bier, M. (1990). *A comparison of the degree of racism, sexism, and homophobia between beginning and advanced psychology students*. Unpublished master's thesis, East Carolina University, Greenville, NC.
- Bond, M. R. (1971). Pain in hospital. *Lancet*, *1*, 37.
- Bond, M. R., & Pilowsky, I. (1966). Subjective assessment of pain and its relationship to the administration of analgesics in patients with advanced cancer. *Journal Psychosomatic Research*, *10*, 203-208.
- Borod, J. C., Yecker, S. A., Brickman, A. M., Moreno, C. R., Sliwinski, M., Foldi, N. S., Alpert, M., Welkowitz, J. (2004). Changes in posed facial expression of emotion across the adult life span. *Experimental Aging Research*, *30*, 305-331.
- Breau, L. M., McGrath, P. J., Craig, K. D., Santor, D., Cassidy, K-L., & Reid, G. J. (2001). Facial expression of children receiving immunizations: A principal components analysis of the child facial coding system. *Clinical Journal of Pain*, *17*, 178-186.
- Breitbart, W., McDonald, M. V., Rosenfeld, B., Passik, S. D., Hewitt, D., Thaler, H., et al. (1996). Pain in ambulatory AIDS patients. I. Pain characteristics and medical correlates. *Pain*, *68*, 315-321.
- Buchan, J. (2005) A certain ratio? The policy implications of minimum staffing ratios in nursing. *Journal of Health Services Research and Policy*, *10*, 239-247.
- Calderone, K. L. (1990). The influence of gender on the frequency of pain and sedative medication administration to postoperative patients. *Sex Roles*, *23*, 713-725.
- Campbell, L. C. (2002). Predispositions toward pharmacological pain management: A policy capturing study (Doctoral Dissertation, University of Florida, 2002). *Dissertation Abstracts International*, *63*, 4892.
- Campbell, C. M., Edwards, R. R., & Fillingim, R. B. (2005). Ethnic differences in responses to multiple experimental pain stimuli. *Pain*, *113*, 20-26.
- Casanova, J., Day, K., Dorpat, D., Hendricks, B., Theis, L., & Wiesman, S. (2007). Nurse-physician work relations and role expectations. *Journal of Nursing Administration*, *37*, 68-70.

- Chakour, M. C., Gibson, S. J., Bradbeer, M., & Helme, R. D. (1996). The effect of age on A-delta and C fibre thermal pain perception. *Pain, 64*, 143-152.
- Choiniere, M., Melzack, R., Girard, N., Rondequ, J., & Paquin, M. J. (1990). Comparisons between patients' and nurses' assessment of pain and medication efficacy in severe burn injuries. *Pain, 40*, 143-52.
- Cleeland, C. S., Gonin, R., Baez, L., Loehrer, P., & Pandya, K. J. (1997). Pain and treatment of pain in minority patients with cancer. *Annals of Internal Medicine, 127*, 813-816.
- Cleeland, C. S., Gonin, R., Hatfield, A. K., Edmonson, J. H., Blum, R. H., Stewart, J. A., et al. (1994). Pain and its treatment in outpatients with metastatic cancer. *NEJM, 330*, 592-596.
- Cohen, F. L. (1980). Postsurgical pain relief: Patients' status and nurses' medication choices. *Pain, 9*, 265-74.
- Cohen-Mansfield, J., & Lipson, S. L. (2002a). Pain in cognitively impaired nursing home residents: How well are physicians diagnosing it? *Journal of the American Geriatrics Society, 50*, 1039-1044.
- Cohen-Mansfield, J., & Lipson, S. (2002b). The underdetection of pain of dental etiology in persons with dementia. *American Journal of Alzheimer's Disease and Other Dementias, 17*, 249-253.
- Cook, A. K., Niven, C., & Downs, M. G. (1999). Assessing the pain of people with cognitive impairment. *International Journal of Geriatric Psychiatry, 14*, 421-425.
- Cooksey, R. W. (1996). *Judgment analysis: Theory, methods, and applications*. San Diego, CA: Academic Press.
- Cousins, M. J. (1991). Prevention of postoperative pain. In M. R. Bond, J. E. Charlton, & C. J. Woolf (Eds.), *Pain research and clinical management: Vol. 4. Proceedings of the 6th World Congress on Pain*. (pp. 41-50). New York, NY: Elsevier
- Cousins, M. (1994). Acute and postoperative pain. In P. Wall, & R. Melzack (Eds.), *Textbook of pain*. (pp. 357-385). Edinburgh, Scotland: Churchill Livingstone.
- Craig, K. D. (1980). Ontogenetic and cultural influences on the expression of pain in man. In H. W. Kosterlitz, & L. Y. Terenius (Eds.), *Pain and society*. (pp. 39-52). Weinheim: Verlag Chemie.
- Craig, K. D. (1992). The facial expression of pain: better than a thousand words? *APS Journal, 1*, 153-162.
- Craig, K. D., Hyde, S. A., & Patrick, C. J. (1991). Genuine, suppressed and faked facial behavior during exacerbation of chronic low back pain. *Pain, 46*, 161-171.

- Craig, K. D., & Prkachin, K. M. (1983). Nonverbal measures of pain. In R. Melzack (Ed.), *Pain measurement and assessment*. (pp. 173-179). New York: Raven Press.
- Craig, K. D., Prkachin, K. M., & Grunau, R. (1992). The facial expression of pain. In D. Turk, & R. Melzack (Eds.), *Handbook of pain assessment*. (pp. 257-276). New York: Guilford Press.
- Craig, K. D., Whitfield, M. F., Grunau, R. V. E., Linton, J., & Hadjistavropoulos, H. D. (1993). Pain in the preterm neonate: Behavioural and physiological indices. *Pain*, *52*, 287-299.
- Creamer, P., Lethbridge-Cejku, M., & Hochberg, M. C. (1999). Determinants of pain severity in knee osteoarthritis: Effect of demographic and psychosocial variables using 3 pain measures. *Journal of Rheumatology*, *26*, 1785-1792.
- Darwin, C. (1872/1965). *The expression of the emotions in man and animals*. Chicago: University of Chicago Press. (Original work published 1872)
- van Dongen, K. A. J., Abu-Saad, H. H., & Hamers, J. P. H. (1999). On the development of an observational scale to measure pain in nonverbal children with severe or profound cognitive impairment; collecting the indicators. *Proceedings of the 9th World Congress of Pain*. (p. 87). Seattle: IASP Press.
- Edwards, R. R., Fillingim, R. B., & Ness, T. J. (2003). Age-related differences in endogenous pain modulation: A comparison of diffuse noxious inhibitory controls in healthy older and younger adults. *Pain*, *101*, 155-165.
- Edwards, R. R., & Fillingim, R. B. (1999). Ethnic differences in thermal pain responses. *Psychosomatic Medicine*, *61*, 346-354.
- Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, *6*, 169-200.
- Ekman, P. (1994). Strong evidence for universals in facial expressions: A reply to Russell's mistaken critique. *Psychological Bulletin*, *113*, 268-287.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, *1*, 49-98.
- Ekman, P., & Friesen, W. V. (1978). *Manual for the facial action coding system*. Palo Alto, CA: Consulting Psychology Press.
- Ekman, P., & Friesen, W. V. (1971). Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology*, *17*, 124-129.
- Ekman, P., Friesen, W. V., & Ellsworth, P. (1983). What components of facial behavior are related to observers' judgments of emotion? In P. Ekman (Ed.), *Emotion in the human face*. (pp. 98-110). Cambridge, England: Cambridge University Press.

- Ekman, P., Friesen, W. V., O'Sullivan, M., Chan, A., Diacoyanni-Tarlatzis, I., Heider, K., et al. (1987). Universals and cultural differences in the judgments of facial expressions of emotion. *Journal of Personality and Social Psychology*, *53*, 712-717.
- Etcoff, N. L. & Magee, J. J. (1992). Categorical perception of facial expression. *Cognition*, *44*, 227-240.
- Faherty, B. S., & Grier, M. R. (1984). Analgesic medication for elderly people post-surgery. *Nursing Research*, *33*, 369-372.
- Faucett, J., Gordon, N., & Levine, J. (1994). Differences in postoperative pain severity among four ethnic groups. *Journal of Pain Symptom Management*, *9*, 383-389.
- Feldt, K. S., Ryden, M. B., & Miles, S. (1998). Treatment of pain in cognitively impaired compared with cognitively intact older patients with hip-fracture. *Journal of the American Geriatrics Society*, *46*, 1079-1085.
- Ferrell, B. A. (1995). Pain evaluation and management in the nursing home. *Annals of Internal Medicine*, *123*, 681-687.
- Ferrell, B. A. (1996). Overview of aging and pain. In B. R. Ferrell, & B. A. Ferrell (Eds.), *Pain in the elderly*. (pp. 1-10). Seattle, WA: IASP Press.
- Ferrell, B. A. (2003). Acute and chronic pain. In C. K. Cassel, R. M. Leipzig, H. J. Cohen, E. B. Larson, & D. E. Meier (Eds.), *Geriatric medicine: An evidence-based approach*. (pp. 323-342). New York, NY: Springer-Verlag.
- Ferrell, B. A., Ferrell, B. R., & Rivera, L. (1995). Pain in cognitively impaired nursing home patients. *Journal of Pain and Symptom Management*, *10*, 591-599.
- Ferrell, B. R., McGuire, D. B., & Donovan, M. I. (1993). Knowledge and beliefs regarding pain in a sample of nursing faculty. *Journal of Professional Nursing*, *9*, 79-88.
- Fitzpatrick, J. J. (2007). Cultural competence in nursing education revisited. *Nursing Education Perspectives*, *28*, 5.
- Foster, M. C., Pardiwala, A., & Calthorpe, D. (2000). Analgesia requirements following hip fracture in the cognitively impaired. *Injury*, *31*, 435-436.
- Fridlund, A. J. (1994). *Human facial expression: An evolutionary view*. San Diego, CA: Academic Press.
- Fries, B. E., Simon, S. E., Morris, J. N., Flodstrom, C., & Bookstein, F. L. (2001). Pain in U.S. nursing homes: Validating a pain scale for the Minimum Data Set. *The Gerontologist*, *41*, 173-179.
- Fuentes, E. F., Kohn, M. A., & Neighbor, M. L. (2002). Lack of association between patient ethnicity or race and fracture analgesia. *Academic Emergency Medicine*, *9*, 910-915.

- Gagliese, L. (2001). Assessment of pain in elderly people. In D. C. Turk, & R. Melzack (Eds.), *Handbook of pain assessment*. (pp. 119-133). New York, NY: Guilford Press.
- Gagliese, L., Jackson, M., Ritvo, P., Wowk, A., & Katz, J. (2000). Age is not an impediment to effective use of patient controlled analgesia by surgical patients. *Anesthesiology*, *93*, 601-610.
- Gagliese, L., & Katz, J. (2003). Age differences in postoperative pain are scale dependent: A comparison of measures of pain intensity and quality in younger and older surgical patients. *Pain*, *103*, 11-20.
- Girard, N. J. (2003). Men and nursing. *AORN Journal*, *77*, 728-730.
- Gloth, F. M. (2000). Geriatric pain. Factors that limit pain relief and increase complications. *Geriatrics*, *55*, 46-54.
- Goldberg, M. A., & Remy-St. Louis, G. R. (1998). Understanding and treating pain in ethnically diverse patients. *Journal of Clinical Psychology in Medical Settings*, *5*, 343-356.
- Goodenough, B., Addicoat, L., Champion, G. D., McInerney, M., Young, B., Juniper, K., et al. (1997). Pain in 4- to 6-year-old children receiving intramuscular immunization injections: A comparison of the Faces Pain Scale with other self-report and behavioral measures. *Clinical Journal of Pain*, *13*, 60-73.
- Grunau, R. V. E., & Craig, K. D. (1987). Pain expression in neonates: Facial action and cry. *Pain*, *28*, 395-410.
- Hadjistavropoulos, H. D., & Craig, K. D. (1994). Acute and chronic low back pain: cognitive, affective, and behavioral dimensions. *Journal of Consulting and Clinical Psychology*, *62*, 341-349.
- Hadjistavropoulos, T., LaChapelle, D. L., Hadjistavropoulos, H. D., Green, S., & Asmundson, G. J. G. (2002). Using facial expressions to assess musculoskeletal pain in older persons. *European Journal of Pain*, *6*, 179-187.
- Haidt, J., & Keltner, D. (1999). Culture and facial expression: Open-ended methods find more expressions and a gradient of recognition. *Cognition and Emotion*, *13*, 225-266.
- Hale, C., & Hadjistavropoulos, T. (1997). Emotional components of pain. *Pain Research and Management*, *2*, 217-225.
- Hardy, R., & Smith, R. (2001). Enhancing staff development with a structured preceptor program. *Journal of Nursing Care Quality*, *15*, 9-17.
- Harkins, S. W. (1996). Geriatric pain. Pain perceptions in the old. *Clinics in Geriatric Medicine*, *12*, 435-459.

- Helme, R. D., & Gibson, S. J. (1997). Pain in the elderly. In T. S. Jensen, J. A. Turner, & Z. Wiesenfeld-Hallin (Eds.), *Proceedings of the 8th World Congress on Pain: Progress in pain research and management*. (pp. 919-944). Seattle, WA: IASP Press.
- Herr K. (2002). Chronic pain: Challenges and assessment strategies. *Journal of Gerontological Nursing, 28*, 20-27.
- Herr, K. A., & Mobily, P. R. (1991). Complexities of pain assessment in the elderly. Clinical considerations. *Journal of Gerontological Nursing, 17*, 12-9.
- Hoffman, C., Rice, D., & Sung, H. Y. (1996). Persons with chronic conditions: Their prevalence and costs. *JAMA, 276*, 1473-1479.
- Holm, K., Cohen, F., Dudas, S., Medema, P., & Allen, B. (1989). Effect of personal pain experience on pain assessment. *Journal of Nursing Scholarship, 21*, 72-75.
- Horgas, A. L., & Elliott, A. F. (2004). Pain assessment and management in persons with dementia. *Nursing Clinics of North America, 39*, 593-606.
- Horgas, A. L., & Tsai, P. F. (1998). Analgesic drug prescription and use in cognitively impaired nursing home residents. *Nursing Research, 47*, 235-242.
- Hughes, K. H., & Hood, L. J. (2007). Teaching methods and an outcome tool for measuring cultural sensitivity in undergraduate nursing students. *Journal of Transcultural Nursing, 18*, 57-62.
- International Association for the Study of Pain. (1993). *Curriculum on pain for schools of nursing*. Seattle, WA: International Association for the Study of Pain.
- International Association for the Study of Pain. (1997). *Curriculum on pain for schools of nursing*. Seattle, WA: International Association for the Study of Pain.
- Irvine, D., Sidani, S., Porter, H., O'Brien-Passal, L., Simpson, B., McGillis Hall, L., Graydon, J., DiCenso, A., Redelmeir, D., & Nagel, L. (2000). Organizational factors influencing nurse practitioners' role implementation in acute care settings. *Canadian Journal of Nursing Leadership, 13*, 28-35.
- Johnson, M. K., & Marini, M. M. (1998). Bridging the racial divide in the United States: The effect of gender. *Social Psychology Quarterly, 61*, 247-258.
- Kaasalainen, S. J., Robinson, L. K., Hartley, T., Middleton, J., Knezacek, S., & Ife, C. (1998). The assessment of pain in the cognitively impaired elderly: A literature review. *Perspectives, 22*, 2-8.
- Karani, R., & Meier, D. E. (2004). Systemic pharmacologic postoperative pain management in the geriatric orthopaedic patient. *Clinical Orthopaedics and Related Research, 425*, 26-34.

- Karpman, R. R., Del Mar, N., & Bay, C. (1997). Analgesia for emergency centers' orthopaedic patients: Does an ethnic bias exist? *Clinical Orthopaedics and Related Research*, 334, 270-275.
- LaChapelle, D. L., Hadjistavropoulos, T., & Craig, K. D. (1999). Pain measurement in persons with intellectual disabilities. *Clinical Journal of Pain*, 15, 13-23.
- Lavsky-Shulan, M., Wallace, R. B., Kohout, F. J., Lemke, J. H., Morris, M. C., & Smith, I. M. (1985). Prevalence and functional correlates of low back pain in the elderly: the Iowa 65+ Rural Health Study. *Journal of the American Geriatrics Society*, 33, 23-28.
- LeResche, L. (1982). Facial expression in pain: a study of candid photographs. *Journal of Nonverbal Behavior*, 7, 46-56.
- LeResche, L., & Dworkin, S. F. (1988). Facial expression of pain and emotions in chronic TMD patients. *Pain*, 35, 71-78.
- Lilley, C. M., Craig, K. D., & Grunau, R. V. E. (1996). Rating the intensity of facial actions in infants and toddlers: Impact on effect size. *Abstracts of the 8th World Congress on Pain*. Seattle, WA: IASP Press.
- Lindh, V., Wiklund, U., Sandman, P. O., & Hakansson, S. (1997). Assessment of acute pain in preterm infants by evaluation of facial expression and frequency domain analysis of heart rate variability. *Early Human Development*, 48, 131-142.
- Lipson, J. G., & DeSantis, L. A. (2007). Current approaches to integrating elements of cultural competence in nursing education. *Journal of Transcultural Nursing*, 18, 10S-20S.
- Malatesta, C., Izard, C. E., Culver, C., & Nicolich, M. (1987). Emotion communication skills in young, middle-aged and older women. *Psychology and Aging*, 2, 193-203.
- McCaffery, M., & Ferrell, B. R. (1992). Does the gender gap affect your pain management decisions? *Nursing* 92, 22, 48-51.
- McDonald, D. D. (1994). Gender and ethnic stereotyping and analgesic administration. *Research in Nursing & Health*, 17, 5-49.
- McDonald, D. D., & Bridge, R. G. (1991). Gender stereotyping and nursing care. *Research in Nursing & Health*, 14, 373-378.
- Melzack, R. (1975). The McGill Pain Questionnaire: major properties and scoring methods. *Pain*, 1, 277-299.
- Merskey, H., & Bogduk, N. (1994). *Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms* (2nd ed.). (1994). Seattle, WA: International Association for the Study of Pain.

- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, *63*, 81-97.
- Mobily, P. R., Herr, K. A., Clark, M. K., & Wallace, R. B. (1994). An epidemiologic analysis of pain in the elderly: The Iowa 65+ Rural Health Study. *Journal of Aging and Health*, *6*, 139-154.
- Montamat, S. C., Cusack, B. J., & Vestal, R. E. (1989). Management of drug therapy in the elderly. *NEJM*, *321*, 303-309.
- Moore, A. R., & O'Keeffe, S. T. (1999). Drug-induced cognitive impairment in the elderly. *Drugs & Aging*, *15*, 15-28.
- Moreno, C., Borod, J., Welkowitz, J., & Alpert, M. (1993). The perception of facial emotion across the adult life span. *Developmental Neuropsychology*, *9*, 305-314.
- Morgan, J., & Puder, K. (1989). Postoperative analgesia: Variations in prescribed and administered opioid dosages. In C. S. Hill, & W. S. Fields (Eds.), *Advances in pain research and therapy*. (pp. 175-180). New York, NY: Raven.
- Morrison, R. S., Magaziner, J., Gilbert, M. Koval, K. J., McLaughlin, M. A., Orosz, G., et al. (2003). Relationship between pain and opioid analgesics on the development of delirium following hip fracture. *Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *58*, 76-81.
- Nelson, D. V., Novy, D. M., Averill, P. M., & Berry, L. A. (1996). Ethnic comparability of the MMPI in pain patients. *Journal of Clinical Psychology*, *52*, 485-497.
- Ng, B., Dimsdale, J. E., Rollnik, J. D., & Shapiro, H. (1996a). The effect of ethnicity on prescriptions for patient controlled analgesia for post-operative pain. *Pain*, *66*, 9-12.
- Ng, B., Dimsdale, J. E., Shragg, G. P., & Deutsch, R. (1996b). Ethnic Differences in Analgesic Consumption for Postoperative Pain. *Psychosomatic Medicine*, *58*, 125-29.
- Nishikawa, S. T., & Ferrell, B. A. (1993). Pain assessment in the elderly. *Clinical Geriatrics and Issues in Long Term Care*, *1*, 15-28.
- Oberle, K., Paul, P., Wry, J., & Grace, M. (1990). Pain, anxiety and analgesics: A comparative study of elderly and younger surgical patients. *Canadian Journal on Aging*, *9*, 13-22.
- Owen, H. Szekeley, J., Plummer, J., Cushnie, J., & Mather, L. (1989). Variations in patient controlled analgesia 2: Concurrent infusion. *Anesthesia*, *44*, 11-13.
- Parmelee, P. A., Katz, I. R., & Lawton, M. P. (1991). The relation of pain to depression among institutionalized aged. *Journal of Gerontology*, *46*, 15-21.
- Pilowsky, I., & Bond, M. R. (1969). Pain and its management in malignant disease. Elucidation of staff-patient transactions. *Psychosomatic Medicine*, *31*, 400-404.

- Pollard, K. (2003). Searching for autonomy. *Midwifery, 19*, 113-124.
- Poole, G. D., & Craig K. D. (1992). Judgments of genuine, suppressed and faked facial expressions of pain. *Journal of Personality and Social Psychology, 63*, 797-805.
- Popp, B., & Portenoy, R. K. (1996). Management of chronic pain in the elderly: Pharmacology of opioids and other analgesic drugs. In B. R. Ferrell, & B. A. Ferrell (Eds.), *Pain in the elderly*. (pp. 21-34). Seattle, WA: IASP Press.
- Portenoy, R. K. (1996). Opioid therapy for chronic nonmalignant pain: a review of the critical issues. *Journal of Pain and Symptom Management, 11*, 203-217.
- Prkachin, K. M. (1992). The consistency of facial expressions of pain: A comparison across modalities. *Pain, 51*, 297-306.
- Prkachin, K. M., Berzins, S. & Mercer, S. R. (1994) Encoding and decoding of pain expressions: A judgment study. *Pain, 58*, 253-259.
- Prkachin, K. M., & Mercer, S. R. (1989). Pain expression in patients with shoulder pathology: validity, properties and relationship to sickness impact. *Pain, 39*, 257-265.
- Prkachin, K. M., Solomon, P., Hwang, T., & Mercer, S. R. (2001). Does experience influence judgments of pain behavior? Evidence from relatives of pain patients and therapists. *Pain Research and Management, 6*, 105-112.
- Qualls, R. C., Cox, M. B., & Schehr, T. L. (1992). Racial attitudes on campus: Are there gender differences? *Journal of College Student Development, 33*, 524-530.
- Robinson, J. H. (2000). Increasing students' cultural sensitivity. A step toward greater diversity in nursing. *Nurse Education, 25*, 131-135.
- Robinson, M. E., & Wise, E. A. (2003). Gender bias in the observation of experimental pain. *Pain, 104*, 259-264.
- Robinson, M. E., Riley III, J. L., Myers, C. D., Papas, R. K., Wise, E. A., Waxenberg, L. B., et al. (2001). Gender role expectations of pain: Relationship to sex differences in pain. *The Journal of Pain, 2*, 251-257.
- Robinson, M. E., & Riley, J. L. (1998). Negative emotion in pain. In R. Gatchel, & D. Turk (Eds.), *Psychosocial factors in pain*. (pp. 74-88). New York: Guilford Press.
- Rooke, G. A., Reves, J. G., & Rosow, C. (2002). Anesthesiology and geriatric medicine (editorial). *Anesthesiology, 96*, 2-4.
- Ross, H. (2000). *Lifting the unequal burden of cancer on minorities and the underserved. Closing the gap*. Washington, DC: Office of Minority Health, U.S. Department of Health and Human Services.

- Russell, J. A. (1994). Is there universal recognition of emotion from facial expression? A review of cross-cultural studies. *Psychological Bulletin*, *115*, 102-141.
- Russell, J. A. (1995). Facial expressions of emotion: What lies beyond minimal universality? *Psychological Bulletin*, *118*, 379-391.
- Salmon, P., & Manyande, A. (1996). Good patients cope with their pain: postoperative analgesia and nurses' perceptions of their patients' pain. *Pain*, *68*, 63-68.
- Sambamoorthi, U., Walkup, J., McSpiritt, E., Warner, L., Castle, N., & Crystal, S. (2000). Racial differences in end-of-life care for patients with AIDS. *AIDS Public Policy Journal*, *15*, 136-148.
- Sarkisian, C. A., Hays, R. D., Berry, S. H., & Mangione, C. M. (2001). Expectations regarding aging among older adults and physicians who care for older adults. *Medical Care*, *39*, 1025-1036.
- Schuman, H., Steeh, C., & Bobo, L. (1997). *Racial attitudes in America: Trends and interpretations*. Cambridge, MA: Harvard Univ. Press.
- Sengstaken, E. A., & King, S. A. (1993). The problems of pain and its detection among geriatric nursing home residents. *Journal of the American Geriatrics Society*, *41*, 541-544.
- Shamian, J., & Inhaber, R. (1985). The concept and practice of preceptorship in contemporary nursing: A review of pertinent literature. *International Journal of Nursing Studies*, *22*, 79-85.
- Sheiner, E. K., Sheiner, E., Shoham-Vardi, I., Mazor, M., & Katz, M. (1999). Ethnic differences influence care giver's estimates of pain during labour. *Pain*, *81*, 299-305.
- Sherwood, M. B., Garcia-Siekavizza, A., Meltzer, M. I., Hebert, A., Burns, A. F., & McGorray, S. (1998). Glaucoma's impact on quality of life and its relation to clinical indicators. *Ophthalmology*, *105*, 561-566.
- Speers, A., Strzyzewski, N., & Ziolkowski, L. (2004). Preceptor preparation: An investment in the future. *Journal for Nurses in Staff Development*, *20*, 127-133
- Stevens, B. J., Johnston, C. C., & Horton, L. (1994). Factors that influence the behavioral pain responses of premature infants. *Pain*, *59*, 101-109.
- Stewart, W. F., Lipton, R. B., & Liberman, J. (1996). Variation in migraine prevalence by race. *Neurology*, *47*, 52-59.
- Tamayo-Sarver, J. H., Dawson, N. V., Hinze, S. W., Cydulka, R. K., Wigton, R. S., Albert, J. M., et al. (2003a). The effect of race/ethnicity and desirable social characteristics on physicians' decisions to prescribe opioid analgesics. *Academic Emergency Medicine*, *10*, 1239-1248.

- Tamayo-Sarver, J. H., Hinze, S. W., Cydulka, R. K., & Baker, D. W. (2003b). Racial and ethnic disparities in emergency department analgesic prescription. *American Journal of Public Health, 93*, 2067-2073.
- Teno, J. M., Weitzen, S., Wetle, T., & Mor, V. (2001). Persistent pain in nursing home residents. *JAMA, 285*, 2081.
- Teske, K., Daut, R. L., & Cleeland, C. S. (1983). Relationships between nurses' observations and patients' self-reports of pain. *Pain, 16*, 289-296.
- Thomas, T., Robinson, C., Champion, D., McKell, M., & Pell, M. (1998). Prediction and assessment of the severity of post-operative pain and of satisfaction with management. *Pain, 75*, 177-185.
- Todd, K. H., Deaton, C., D'Adamo, A. P., & Goe, L. (2000). Ethnicity and analgesic practice. *Annals of Emergency Medicine, 35*, 11-16.
- Todd, K. H., Lee, T., & Hoffman, J. R. (1994). The effect of ethnicity on physician estimates of pain severity in patients with isolated extremity trauma. *JAMA, 271*, 925-928.
- Todd, K. H., Samaroo, N., & Hoffman, J. R. (1993). Ethnicity as a risk factor for inadequate emergency department analgesia. *JAMA, 269*, 1537-1539.
- Turk, D. C., & Okifuji, A. (1997). What factors affect physicians' decisions to prescribe opioids for chronic noncancer pain patients? *Clinical Journal of Pain, 13*, 330-336.
- Turk, D. C., & Okifuji, A. (1999). Does sex make a difference in the prescription of treatments and the adaptation to chronic pain by cancer and non-cancer patients? *Pain, 82*, 139-148.
- Underwood, S. M. (2006). Culture, diversity, and health: responding to the queries of inquisitive minds. *Journal of Nursing Education, 45*, 281-286.
- Walsh, N., Schoenfeld, L., Ramamurth, S., & Hoffman, J. (1989). Normative model for the cold pressor test. *American Journal of Physical Medicine and Rehabilitation, 68*, 6-11.
- Watt-Watson, J. H., Evernden, C., & Lawson, C. (1990). Parents' perceptions of their child's acute pain experience. *Journal of Pediatric Nursing, 5*, 344-349.
- Weiner, D., Peterson, B., & Keefe, F. (1999). Chronic pain-associated behaviors in the nursing home: Resident versus caregiver perceptions. *Pain, 80*, 577-588.
- Werner, P., Cohen-Mansfield, J., Watson, V., & Pasis, S. (1998). Pain in participants of adult day care centers: Assessment by different raters. *Journal of Pain and Symptom Management, 15*, 8-17.
- White, K. E., & Cummings, J. E. (1997). Neuropsychiatric aspects of Alzheimer's disease and other dementing illnesses. In S. C. Yudofsky, & R. E. Hale (Eds.), *The American*

Psychiatric Press textbook of neuropsychiatry. (pp. 823-854). Washington, DC: American Psychiatric Press.

- Williamson, G. M., & Schulz, R. (1992). Pain, activity restriction, and symptoms of depression among community-residing elderly adults. *Journal of Gerontology, 47*, 367-372.
- Wise, E. A., Price, D. D., Myers, C. D., Heft, M. W., & Robinson, M. E. (2002). Gender role expectations of pain: Relationship to experimental pain perception. *Pain, 96*, 335-342.
- Wolff, J. L., Starfield, B., & Anderson, G. (2002). Prevalence, expenditures, and complications of multiple chronic conditions in elderly. *Archives of Internal Medicine, 162*, 2269-2276.
- World Health Organization. (1986). *Cancer Pain*. Geneva: World Health Organization.
- Wuensch, K. L., Campbell, M. W., Kesler, F. C., & Moore, C. H. (2002). Racial bias in decisions made by mock jurors evaluating a case of sexual harassment. *The Journal of Social Psychology, 142*, 587-600.
- Young, A. W., Rowland, D., Calder, A. J., Ectoff, N. L., Seth, A., & Perrett, D. I. (1997). Facial expression megamix: Tests of dimensional and category accounts of emotion recognition. *Cognition, 63*, 271-313.
- Zalon, M. L. (1993). Nurses' assessment of postoperative patients' pain. *Pain, 54*, 329-334.

BIOGRAPHICAL SKETCH

Adam T. Hirsh received his B.A. in psychology from the University of Central Florida in 2001. He subsequently enrolled in the doctoral program in Clinical and Health Psychology at the University of Florida. He was granted an M.S. in 2004, and following completion of a clinical internship at the VA Puget Sound Health Care System, Seattle, he will graduate with a Ph.D. in 2008. His clinical specialty is in behavioral medicine, and his research interests are in the area of pain.