Prescriber Perceptions While Managing Pain

By

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The following dissertation is dedicated to

my babies: Anne, Alistair, and Eamon.

You make me a better person.

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"Anytime you see a turtle up on top of a fence post, you know he had some help."
–Alex Haley

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Introduction: This study used Q Methodology to explore and describe prescriber perceptions while managing pain. Pain is a condition different from many other conditions. The patient's psychological and sociocultural context impact the pain experienced by different patients. From a quality of care perspective, it is important for prescribers who manage and treat pain to recognize these differences, so all aspects of pain are considered during treatment.

Objectives: Phase 1**:** Objective 1a explored a prescriber-level model of factors that influence decision-making in pain management. Objective 1b created a sample of items from Objective 1a to be sorted and ranked in Phase 2. Phase 2: Objective 2a used a by-person factor analysis to identified prescriber "types" based on their perceptions when managing pain. Objective 2b described the prescriber types through interpretation of the factors that emerge from Objective 2a.

Methods: Q Methodology is a mixed-methods approach to studying perceptions. Phase 1 of this study used semi-structured interviews to qualitatively explore Primary Care Prescriber perceptions of pain management to develop the Concourse of responses. Phase 2 began where Phase 1 ended. From the Concourse, the Q-set was developed, which forms the statements that were sorted and ranked by prescribers who completed the Q-sort. The Q-sort is a method of data collection that allowed by-person factor analysis, the hallmark of a Q Methodology study. The Q-sort was administered as part of a self-administered, paper-based questionnaire. By-person factor analysis identified prescriber types that emerged from the Q-sort data.

Results: In this study, three prescribers types were identified, based on their perceptions regarding pain management. Confident Clinicians focused on clinical characteristics of the

patient, developed a treatment plan based on those characteristics, and worked with the patient to determine the best treatment. This is similar to a traditional approach to medicine, adhering strongly the Biomedical Model. Sensitive Psychologists, while also considering clinical characteristics, focused more intently on patient psycho-behavioral characteristics. They were sensitive to the increased likelihood of abuse or addiction in patients with poor psychological status, and were concerned with causing abuse in these patients. The Seasoned Realists selected themes from each of the clinical, psychological and social aspects of the patient and considered the patients most holistically. They recognized that no matter their treatment of choice, the patient must be able to access the treatment.

Conclusions: The three prescriber types that emerged from the data share common perspectives of pain as they are all trained in the allopathic tradition. However, certain perceptions distinguished the Sensitive Psychologists and the Seasoned Realists from the Confident Clinicians. These distinguishing perceptions are what can be used to differentiate prescribers by their perceptions.

The main limitations of this study are the lack of generalizability and a reliance on self-report. As an exploratory study, these limitations were acceptable. Other methods, such as secret shopper or vignette studies, can address the reliance on self-report and expand on the prescriber behavior aspects of this study. Future studies can incorporate additional practice settings and expand upon the prescriber model identified in this study.

This study contributes a novel way of identifying prescribers by their perceptions of pain management. In identifying prescribers by perceptions, it becomes possible to associate outcomes, such as patient pain scores or impact of pain on daily activities, with prescriber perceptions. It also becomes possible to use prescriber perceptions as outcomes themselves, for example, to evaluate interventions aimed at changing prescriber

perceptions. At the organization level, quality improvement efforts and implementation of organizational policies or protocols can be aided by a better understanding of the population of prescribers practicing in a specific organization.

I. INTRODUCTION

A. BACKGROUND

Chronic pain affects more Americans than diabetes, coronary heart disease, stroke, and cancer combined. [2] According to the National Center for Health Statistics survey, over 55% of the adult population in the US reported pain within the past three months. Commonly reported pain conditions include low back pain, headache or migraine pain, neck pain, and facial ache or pain.[68] In 2010, pain-related diagnoses account for almost 40 million outpatient office visits nationally, with Primary Care Providers (PCPs) conducting approximately 50% of these visits.[58] Studies show when pain is mismanaged it can lead to poor quality of life, decreased function, chronic pain, or opioid abuse and/or addiction.[45; 61]

Pain is a condition that differs from most other conditions in the sense that it is a subjective experience, making treatment decisions difficult for prescribers. Prescribers who acknowledge the impact of psychosocial status on pain are thought to make better treatment decisions, leading to improved patient outcomes and quality of pain management.[29]

Previous studies have documented differences in prescribing behavior based on patient demographics,[32] particularly gender.[26; 31; 46] Studies have also documented “worsening” trends in prescribing over the past decade. These trends have favored increased use of opioid pain medications and decreased use of non-opioid pain medications.[58] Studies repeatedly showed that regardless of the amount of information provided to prescribers, they did not change pain management behaviors.[18; 44; 107]

One study investigated prescriber perceptions on opioid prescribing,[69] with a focus on prescriber beliefs. This study indicated that strongly held beliefs about opioids

predicted their willingness to prescribe or not prescribe opioids for non-malignant pain. No previously published study has investigated prescriber perceptions with regard to patient psychosocial status.

Before it is possible to address whether prescriber perceptions of patient psychosocial status actually do make “better” treatment decisions and see improved outcomes in their pain patients, we must establish a way to measure perceptions of prescribers when managing pain.

This study uses a novel method of scientific inquiry to study the perceptions of PCPs while managing pain. Q Methodology is a mixed-methods approach to studying perception. The perceptions of interest in this study are the perceptions held by Primary Care Prescribers (PCPs) of patient psychosocial attributes as they relate to pain management. Once able to identify prescribers based on the perceptions they hold about patient psychosocial attributes, we will be able to study if these perceptions predict prescribing behavior.

This study has two aims and is conducted in two phases; the first phase addressing Aim 1, and the second phase addressing Aim 2. The first aim of this study is to qualitatively explore what influences prescriber decision-making in pain management. The objectives of Aim 1 are to: 1a) investigate a prescriber-level model of what influences decision-making and 1b) identify themes for use in the second aim.

The second aim of this study is to quantitatively identify “prescriber types” based on what influences their decision-making in pain management. These prescriber types will be quantitatively identified using by-person factor analysis, the hallmark of a Q Methodological study. The factors that emerge from the factor analysis will be interpreted using an abductive, qualitative approach. The objectives of Aim 2 are to: 2a) demonstrate the use of Q Methodology to identify “prescribers types” and 2b) describe

the prescribers types identified. Additionally, a product of this study is a reproducible tool that can be used in future studies to categorize prescribers based on their "prescriber type" in future studies.

B. MIXED-METHODS DATA COLLECTION

In the first phase of this study, qualitative, semi-structured interviews are used to investigate prescriber perceptions. Investigating prescriber perceptions of patient psychosocial attributes establishes whether prescribers are aware of the impact of psychosocial attributes on the pain experience. In doing so, a prescriber-level model of decision-making in pain management emerges. A prescriber-level model is not well-defined currently, and will further guide research in the this and future studies.

The second use of the qualitatively generated data is to develop a tool that can be used to quantitatively, yet holistically, identify prescribers according to their perceptions. To study prescriber perceptions holistically, Q Methodology utilizes a Q-Sort exercise. In the Q-sort, prescribers sort and rank statements about their decisions according to the level of agreement between each statement and a researcher-identified prompt. An example of a prompt is: "What do you consider the most important when managing pain?" The benefit of the Q-Sort lies in the ability to identify the relative importance of factors influencing behavior, retaining the depth and richness of the interviews conducted in the qualitative data collection.

Data collected from the Q-Sort are then quantitatively analyzed using by-person factor analysis; the factors identified in the factor analysis generate prescriber "types" or trajectories of thought that characterize individual prescribers. The ability to identify prescribers by their perceptions allows behavior modification; while perceptions may be difficult to alter, they are modifiable, unlike typically identified demographic factors that

influence behavior.

Finally, the Q-Sort is a quantitative tool that can be replicated for use in future studies, allowing researchers to characterize the prescribers in their study sample. Characterizing prescribers in a study can help to stratify results or test hypotheses in outcomes research.

C. DISSERTATION OVERVIEW

This chapter introduced the problem addressed in this dissertation. Pain is a problem for both society and prescribers helping patients manage their pain. Patient psychosocial attributes affect the patient experience of pain, yet how prescribers perceive these psychosocial attributes has not been studied previously. The chapters that follow are: the Literature Review, Methods, Influences on Decision-Making, Identifying Prescriber Types, and, finally, Discussion and Conclusions.

The Literature Review includes a review of clinical decision-making both globally and specific to pain management. Included in this review are two frameworks that define the organization of concepts in this study. In the first framework, decision-making is conceptualized as a process; alternatives models conceptualize decision-making qualitatively. This framework summarizes the problem and the context in which pain management is studied.

In the second framework, pain is conceptualized at the patient-level. This framework for conceptualizing a patient's pain experience provides a foundation for what prescribers should think about when managing pain. A discrepancy exists between the framework used to conceptualize pain: it is a patient-level model whereas prescribers are the subject of study. This discrepancy, however, provides justification for using Q Methodology to study prescribers. Unlike other models that have been used to study

prescriber perceptions, Q Methodology allows exploration of a prescriber-level model of pain management.

A review of Q Methodology that describes the general procedures of a Q Methodological study is included. The review specifically describes how other researchers have used Q Methodology to address questions and study populations similar to those presented in this dissertation.

The Methodology presents the recruitment, data collection, and analytical methods used in this study. This study is a mixed-methods study, completed in two phases. The first phase is qualitative in nature and involves interviewing Primary Care Prescribers (PCPs); interview questions are based on the responses to a pre-interview questionnaire. Analysis of the qualitative data primarily addresses the breadth of responses in order to develop the statements used in the subsequent, quantitative phase of the study. The second phase of the study involves a survey, which includes the Q-Sort exercise and a small number of demographic questions to help further characterize respondents. Analysis of this phase uses by-person factor analysis, a method congruent with Q Methodology.

The results of the qualitative and quantitative phases of this study are reported in two separate chapters. The qualitative results are presented in the fourth chapter, titled "Influences on Decision-Making." The qualitative results focus on themes identified in interviews conducted with PCPs who work in Internal Medicine and Family Medicine settings. The quantitative results are presented in the fifth chapter, titled "Describing Prescriber Types." The quantitative results focus on the solutions of the by-person factor analysis, which identify factors that describe prescriber perceptions in pain management.

The Discussion follows the chapter describing prescriber types. First the findings of the study will be reviewed. Next, the findings of the study will be discussed with

respect to the role of demographic data, how they apply to the Biopsychosocial Model of Pain, and placed in the context of previously published studies.

Finally, the Conclusions presents how well Q Methodology was able to meet the aims of this study and the lessons while conducting this study. Every study has limitations, which are presented here. Implications for future research conclude this study.

II. LITERATURE REVIEW

The overarching goal of this study is to describe and measure prescriber perceptions related to pain management. To achieve this, this study will 1) qualitatively explore what influences prescriber decision-making in pain management, and 2) quantitatively identify “prescriber types” based on what influences their decision-making in pain management.

This literature review summarizes what is known about clinical decision-making, provides a conceptual framework for studying prescriber decision-making in pain management, and propose a method for achieving the goals of this study. A brief history of the concept of decision-making is provided to show how understanding of decision-making has evolved over time, and give perspective to the purpose of this study.

The first major section of the literature review establishes what is known about decision-making as it applies to medical decisions of all types—not just in pain management. The piece-meal nature of the literature on prescriber decision-making in pain management acknowledges and builds upon the work of previous research from a broad collection of disciplines. These disciplines include psychology[63; 100]—the study of decision-making, clinical psychology[40] — the integration of psychology and the study of pain, and health services research – the study of clinician practices.[38] The previous research focuses on 1) prescriber decision-making, both in a broad context and specific to pain management, and 2) pain and how it affects a patient, presented in the context of the Biopsychosocial Model of Pain.

Prescriber decision-making has been conceptualized by several researchers, each with his or her own strength or focus. The literature review will describe, compare and contrast previously published prescriber decision-making models.

Separate from the conceptual framework, a review of cognition is included as a

subsection of prescriber decision-making. Cognition plays a large role in prescriber decision-making, as it contributes to the variability of behavioral outcomes.[19; 27; 35; 41] As a content area, cognition is a vast literature; however, this literature review will examine the areas of cognition that are salient to prescriber decision-making.

Decision-making specific to pain places additional demands on the prescriber given that pain is a unique type of condition. As such, a review of the literature specific to prescriber decision-making in pain management will conclude this section. Pain is similar to psychiatric conditions, in which few physiologic markers or measures can be used to identify the cause or extent of illness. In pain conditions, physical symptoms poorly correlate with the patient's report of pain. Similarly, there are few objective measures or markers of pain available to aid prescribers in assessing pain.

Following a review of clinical decision-making, the conceptual framework used to frame the research questions and decisions in this study is provided. This conceptual framework, the Biopsychosocial Model of Pain, is useful for understanding pain and how it affects a patient. In particular, it establishes the importance of the psychosocial attributes of a patient who is in pain. The psychosocial attributes of a patient affect both the pain experience and potential improvement or resolution of symptoms. This framework has evolved over the past 40 years, and will continue to evolve as more research becomes available. A review of the literature used to create the conceptual framework is included in this section. A critique of the framework follows, and identifies short-comings related to studying prescriber decision-making in pain management. The critique sets the stage for the methodology used to achieve the goals of this study.

Following explanation of the conceptual framework, an introduction to the methodology serves as the final section of the literature review. A method known as Q Methodology was used to achieve the goals of this study. Recall that the goals of this study are to explore a prescriber-level model of decision-making and to identify "types"

of prescribers based on their “pain management style.” While Q Methodology is relatively novel to health services research, it has been used in a variety of areas and applications. Rationale, including a critique of alternate methodologies, for using Q Methodology is provided. The section concludes with published examples using Q Methodology to study prescribers.

A. CLINICAL DECISION-MAKING

Prescriber decision-making in pain management plays a central role in this study. It is a complex topic that encompasses many aspects of health services research—from individual patient and provider psychology to the patient-provider interaction to environmental and situational contexts. This complexity makes clinical decision-making a difficult topic to study comprehensively. However, in laying a firm foundation of the current knowledge surrounding clinical decision-making, both generally and specifically in pain management, we will be able to focus on where knowledge gaps or research gaps exist.

This section on prescriber decision-making begins with the evolution of conceptualizations of decision-making that lead to the perspective taken in this study. Next, the conceptual framework for this study and its alternatives are introduced to establish the focus of this study.

Following the conceptual framework is a review of the cognitive functions that contribute to variation in decision-making. Cognition is defined as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses[76] Cognition is central to decision-making. Two important concepts within cognition are: 1) uncertainty and 2) heuristics and their related biases. Therefore, the Literature Review will present a summary of how uncertainty and relevant heuristics and biases affect prescriber decision-making. Prescriber decision-making does not occur in a

controlled laboratory environment, but in the real world where one cannot control all functions other than the experimental variables in question.

This section on clinical decision-making concludes with considerations important and specific to clinical decision-making in pain management. As described earlier, pain is unique to health conditions because objective measures of pain are lacking, and because the subjective experience of pain varies by patient, even when physical symptoms are similar. Assessment of the condition is the first step in making a clinical decision-making. Given the subjectivity of pain, assessment of a patient by a prescriber is difficult, which makes subsequent decisions, notably treatment decisions, difficult as well.

1. Evolution of decision-making models

The history of research about decision-making can be summed up by the three terms used to characterize the different models used to study decision-making. *Normative* models use a standard that defines the best or optimal way of processing information in order to achieve an intended goal. *Descriptive* models are theories that describe how people process information. *Prescriptive* models describe how people should process information. More recently, a fourth model described as *naturalistic* has emphasized how prescribers process information in the context in which they would naturally make a given decision.[38]

The earliest studies on decision-making were performed by economists. Bernoulli postulated Utility Theory, which studied the proportion (or disproportion) of usefulness to the monetary value of the prize. Accordingly, decision-making was most closely associated with economists and was used to characterize buyers and sellers in the market. These theories were normative in nature, assuming that people act rationally, calculating probabilities of the outcome and the utility of a behavior.[38]

Psychologists began studying decision-making using descriptive models in the mid-twentieth century. The sentinel study for psychologists in this field is von Neumann and Morganstern's 1947 classic *Theory of Games and Economic Behavior*.[103] In this study, the authors posit that decisions are made based on the expected value of outcomes. In the 1970s, Tversky and Kahneman proposed that people do not always behave rationally, and instead use heuristics, the practice of simplifying or processing information, to make decisions.[100] Heuristics have been called cognitive "shortcuts" or "data reduction techniques."[38] These shortcuts lead to biases that may have consequences unknown to the decision-maker. The majority of these early psychology studies were descriptive, establishing how people made decisions.[38]

More recently, psychologists have taken a naturalistic approach, studying how people think in their natural environment. The naturalistic approach stems from the recognition that experimental psychology studies performed in a laboratory do not generally account for environmental demands such as time pressure, stress and organizational constraints.[38] Naturalistic decision making can be summarized by five important characteristics: 1) it focuses on proficient decision-makers who are experienced in their domains; 2) it operates on the premise that proficient decision-makers match decisions with the situation; 3) it assumes information is context specific; 4) it describes the cognitive processes of the decision-maker; and 5) it aims at developing a prescriptive model for decision-making, meaning that the description of cognitive processes are used to develop prescriptions for how performance in a similar situation can be improved.[38]

This study approaches decision-making from a naturalistic perspective, asking prescribers what influences their treatment decisions in certain circumstances. The method used in this study was chosen because it allows holistic analysis of many factors at the same time, rather than single factors individually.[104]

2. Conceptual framework for clinical decision-making

Clinical decision-making is a complex process that requires an understanding of several areas of the literature. While this review is not intended to be exhaustive of the literature, it is meant to frame the problem of study in this dissertation (Figure 1.1). To understand the outcome of interest the treatment decision, it is necessary first to understand the anatomy of a treatment decision. This results from the prescriber assimilating information received from the patient, identifying possible options, evaluating the options in the context of the patient. The process of decision-making will be more thoroughly explained in the next section.

It is equally important to understand that treatment decisions are not made in a vacuum, but are influenced by both prescriber- (meso) and patient-level (micro) factors. This study focuses on prescriber perceptions, which are the filter through which both the problem and patient-level factors are viewed (Figure 1.1). The following sections of this literature review expand on prescriber- and patient-level factors that influence treatment decision-making in pain management. Prescriber-level factors focus on cognitive influences on decision-making, while patient-level factors describe pain and the patient experience of pain.

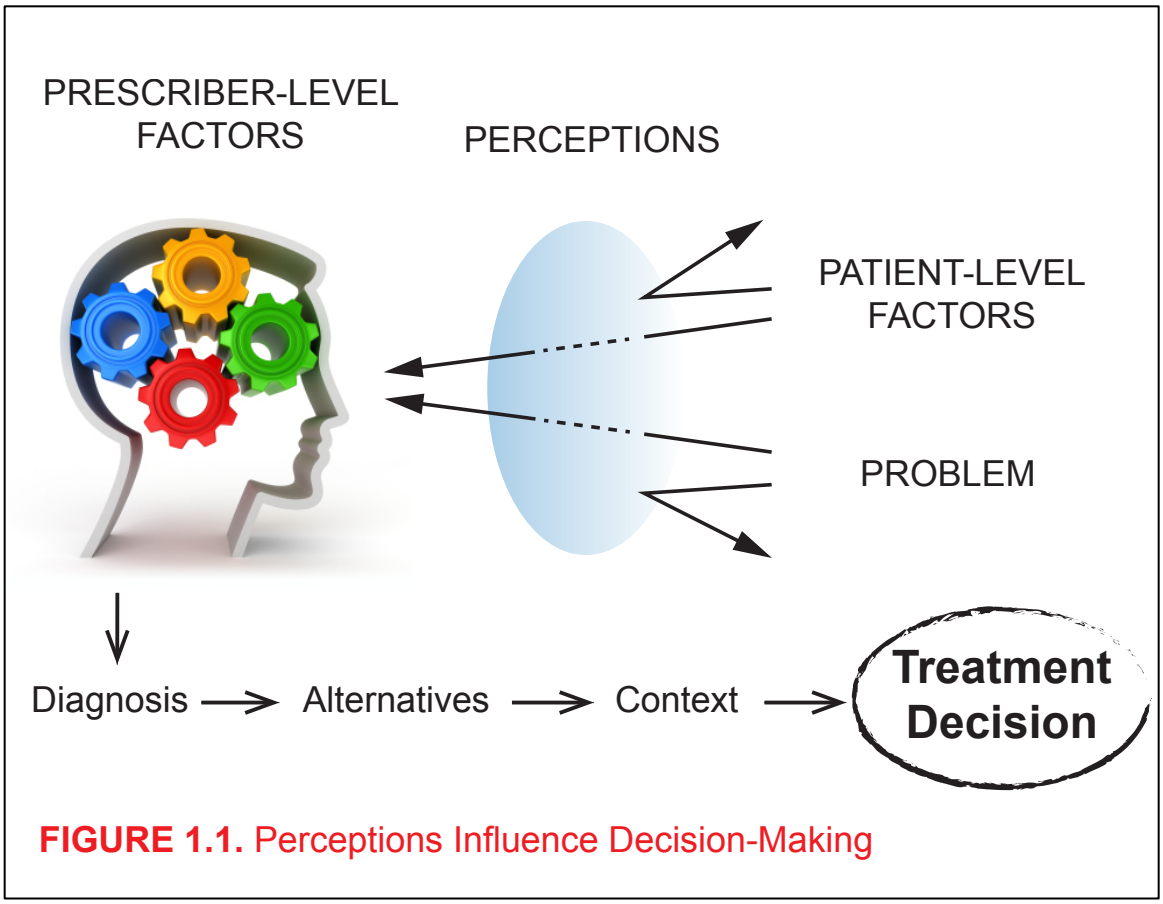

FIGURE 1.1. Perceptions Influence Decision-Making

a. Decision-Making

To understand decision-making, it is important to understand the difference between a decision and decision-making. A decision can be defined as "a choice in a course of action among a set of options with the intent of achieving a goal"[8]. Decision-*making*, in general, has been described in a process-oriented approach (Figure 1.2). The components of the process of decision-making has been conceptualized as a) information search; b) problem recognition; c) option generation; d) evaluating options and making a choice; e) translating the choice into behavior; and f) post-decision evaluation.[38] Although the model described by Galanter does not include a follow-up decision, it is implied, and included in this framework for completeness.

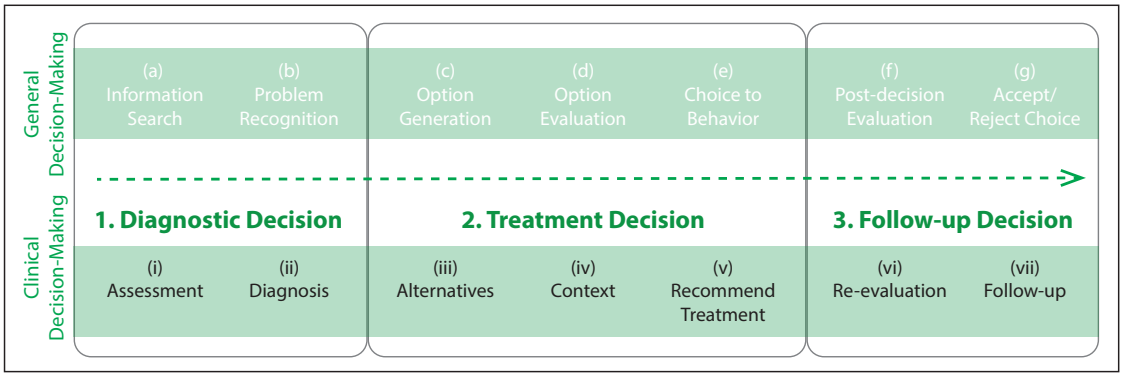

Figure 1.2. Decision-Making Conceptual Framework

When put in the context of clinical decision-making, the decisions that prescribers regularly face parallel general decision-making. The components of clinical decision-making are conceptualized as three separate decisions (Figure 1.2): 1) diagnostic decisions, i.e., determination of what medical condition is to be treated, 2) treatment decisions, i.e., determination of what treatment to use for the medical condition, and 3) follow-up, i.e., determination of whether the treatment is working as it should, or if another treatment should be considered. As depicted in Figure 1.2, the actions taken by the prescriber can be categorized as requiring cognitive processing ((i) assessment, (iii) alternatives, (iv) context, and (vi) re-evaluation), and decision-oriented ((ii) diagnosis, (v) treatment recommendation, and (vi) follow-up decision).

It should be noted that this is an iterative process. Early decisions influence later decisions, and later decisions in turn influence subsequent decisions. For example, a diagnostic decision obviously influences the treatment decision, as one cannot make a treatment decision without a diagnosis. Whether the diagnosis is correct is a separate issue from whether the treatment decision for the determined diagnosis. When the patient returns for follow-up, the prescriber may choose to continue with the same treatment recommendation. Alternatively, the prescriber may question the intial

diagnostic decision, and change the treatment recommendation based on the follow-up evaluation.

This study focuses on treatment decisions and the related cognitive processing required in making a treatment decision. Diagnostic decisions will be discussed only as much as they pertain to treatment decisions. Similarly, because follow-up evaluation and resultant decisions have little influence on initial treatment decisions that are the focus of this study, they will not be discussed.

b. Alternative Models of Treatment Decision

Two alternative models are helpful for explaining decision-making from a qualitative perspective, as opposed to the process-orientation described above. These models are important because they establish that prescribers utilize vast amounts of information to make prescribing decisions. These models are complementary to the Decision-Making Conceptual Framework (Figure 1.2) described above. They can be overlaid at the decision-nodes to clarify what information is being processed to come to a decision. The first is known as the Causistic (or Case-based) Clinical Reasoning Model [96] and the other is called the Physician Resource Demand Model.[57]

Tonelli's Casuistic Clinical Reasoning Model approaches prescriber decision-making from a knowledge availability perspective.[96] This model is worth noting because it incorporates the different types of knowledge that prescribers use to make a decision. The exact influence each type of knowledge has on a decision varies by situation. The factors that influence pain treatment decisions are described in greater detail in the section on clinical decision-making in pain.

In Tonelli's model,[96] two types of knowledge are used to fill in gaps left by information gleaned from the patient regarding his/her specific biomedical need to make a decision regarding treatment. The two types of knowledge are 1) evidence from

epidemiologic studies and/or clinical trials and 2) clinical knowledge from experience treating patients. These two types of knowledge complement each other. Epidemiologic studies and clinical trials provide population-based probabilities of disease or treatment success. On the other hand, clinical knowledge provides real-world application of the knowledge gained in a controlled environment, such as a clinical trial. In the Casuistic Model, the prescriber is weighing these bits of information and coming to a most-plausible conclusion and subsequent decision for each individual patient.[96] This conceptualization underscores how prescribers must make assumptions about each patient, and make cognitive leaps in order to come to a treatment decision.

Tonelli's model is important because it recognizes the difficulty prescribers have of applying population-level data to individual patients. It underscores the important role that prescribers play in the delivery of health care. Most quality markers and indicators apply population-based markers to individual patient and prescribers; similarly, quality is measured using populations of patients.[21] Prescribers may feel some tension when treating patients, balancing individual need with population-based probabilities.[60] As discussed in later sections of this literature review, the complexity of prescribing is multiplied when considering the nuances of pain and pain treatment. While some conditions are associated with a clear treatment in order to obtain a desired outcome, this is not the case with pain and pain management.

Similar to Tonelli, Long recognizes the synthesis of decisions is made only after careful consideration of a myriad of needs in the Physician Resources Demand Model.[57] These needs are categorized by Long as clinical, patient, organizational, and environmental. This model is worth noting because it addresses variation in decision-making and proposes and categorizes the knowledge and information used in prescriber decision-making into themes. The Physician Resource Demand Model has been suggested for quality improvement initiatives.

Long analyzed variance in prescribing and separated variance into induced and innate variation.[57] Similar to Tonelli, Long proposed that prescribers 1) consider the clinical needs of the patient, and 2) make decisions that incorporate the constraints of the patient, organization and environment. Together, these made up the *induced variation*. Long proposed the remaining variation is due to prescriber variation, or *innate variation*. Long notes that increased uncertainty leads to increased variation; in situations where there is little uncertainty, variation in prescribing practice will ideally be reduced.[57]

With the many and diverse considerations affecting prescribers when making prescribing decisions, it is easy to imagine many of these considerations are judged/assessed in the prescriber's subconscious. This study investigates treatment decisions by varying the alternatives and context of problems presented to study participants. Participants are also asked to describe how they apply epidemiologic or guideline-based knowledged to individual patients (concepts borrowed from Tonelli). Finally, factors from the multi-level structure of needs and resources modeled by Long are also worked into problems to be addressed by study participants.

c. Cognition in clinical decision-making

In addition to the process of decision-making and the various considerations used to make decisions, cognition inherently plays an important role in decision-making. Cognition is defined as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.[72]

Although cognition is not specific to decision-making, it is necessary to understand how it interfaces with decision-making, specifically in pain management. For this reason, this section summarizes uncertainty and heuristics and biases relevant to pain management decision-making.

In normative models, rationality is assumed. Pathologic physiology forms arguments of causality, while a clear and convincing mechanism of action increases the acceptance and adoption of treatments.[96] Logic is the reason decisions are made. However, descriptive models indicate that decisions do not always follow logic. Rather they often follow heuristics, the process of simplifying information in order to make a perform a desired task.[100] It is helpful, therefore, to review the heuristics specific to treatment decision-making. Related to heuristics is the concept of uncertainty. In situations of greater uncertainty, heuristics are relied on to a greater extent than in situations of lesser uncertainty.[38] The following section discusses cognition in relation to uncertainty before turning to heuristics and biases activated in treatment decision-making.

i. Uncertainty

Despite the gains in knowledge through scientific investigation and clinical trials, uncertainty in medical care remains a problem that plagues prescribers to this day. Uncertainty has been described with regards to 1) the frequency (or probability) of an events, 2) the likelihood that an assessment is accurate and believable, and 3) ambiguity that results when one treatment option is not clearly superior to others—a term known as entropy.[16; 24]

Treatment decision-making is simple when treatment effects are dramatic or immediately recognizable. In contrast, decision-making is difficult when no treatment option stands out above the others. As indicated in the definition of a decision provided in the introduction to decision-making, a decision is made with an intended goal in mind. When all desired outcomes are unknown or unquantifiable, decision-makers may be unable to act.[63] Nonetheless, prescribers may choose to act, even under uncertain circumstances.

Uncertainty is a common problem in diagnosing and assessing pain. There are issues implicit to patients, prescribers, and in the interaction between the two.

ii. Heuristics and biases employed in treatment decisions

In cases of uncertainty (and sometimes when decisions are quite obvious), heuristics are often employed. Heuristics are strategies used to simplify a judgment or make a final decision. In general the medical community has negatively associated heuristics with medical decisions.[105] From a rational perspective (as is the common assumption in medicine), using less information or relying on past experience to make a decision is wasteful of information and perhaps negligent.

Wegwarth argues that heuristics, particularly in the case of uncertainty, are necessary to make any decision. Without heuristics, prescribers would be unable to process all the information needed to make a decision when all outcomes seem equally good or bad. The use of heuristics implies an established norm. When there is deviation from that norm, the result is called bias.[105]

Among the many heuristics and related biases that have been studied, prescribers exhibit three biases in treatment decision-making: 1) Regret/Outcome bias,[11] 2) Framing bias,[11] and 3) Number of Alternatives bias.[11; 25; 79]

Regret or Outcome bias is a bias towards action. In the current context, it suggests that a prescriber would rather act than find out later that treatment options existed and they took no action. One potential result of this is making decisions without sufficient information, which can lead to unnecessary, ineffective, or otherwise inappropriate interventions and/or costs.

Framing bias refers to the presentation of an idea or concept. For example, the perceptions of a condition change when it is presented, positively (e.g., survival) or negatively (e.g., mortality). Similarly, studies have show that when a probability is

presented to prescribers, they are more likely to choose an intervention when it is presented positively, as opposed to a negatively presented version of the same probability[76]. Again, one potential result of this bias is that unnecessary action is taken. It should be noted that all individuals, including patients, are subject to this same bias, and even in cases where prescribers engage patients, the same conclusion may be made when framed positively versus negatively.

The Number of Alternatives bias refers to the rational assumption that a choice should remain the same regardless of the number of alternatives presented. For example, if choice A is the best choice, it should be chosen even when choice C is dropped. However, in studies that span 20 years, prescribers consistently behave differently when given a different number of alternatives. Two responses have been noted. Redelmeier found that when two prescribing options were given, prescribers were less likely to choose either option, compared with when just one option was presented.[79] When two options were presented, prescribers were more likely to refer the patient to a specialist. When three prescribing options were given, the “standard care” option was chosen more often than when only two options were given.[25]

Heuristics have recently been acknowledged as playing a positive role in treatment decision-making.[105] They are credited with providing prescribers the ability to use parsimonious data to make accurate decisions in patient care. The result is a robustness of decision-making, which allows the correct decision to be made in a variety of situations.

In contrast, decisions made without the use of heuristics and use all available information can become cognitively cumbersome and overwhelm the decision-maker. For example, two decision tools to determine the appropriateness of macrolide antibiotics for Community-Acquired Pneumonia (CAP) were developed and tested.[33] One test, based on logistic regression, used a scoring system to ascertain the likelihood

of the CAP contagion to be *M. penumoniae*. The alternate tool was a fast and frugal decision tree that had only two criteria regarding the patient's age and duration of fever. Both tools performed similarly, with 75% and 72% of high-risk cases correctly identified.

To summarize, the role of cognition in prescriber decision-making is played out in the use of heuristics and biases, particularly when uncertainty is present in any part of the decision-making process. Prescribers may or may not be aware of how heuristics and biases have affected their decision-making, or that heuristics and biases were ever employed during the decision-making process. Direct questioning of heuristics and biases may yield false results for two reasons: 1) the prescriber is unaware and 2) social desirability introduces bias during data collection. In recognizing this, it becomes clear that, when studying prescriber decision-making, the method of study allows exploration of concepts taken for granted by the prescriber. Before getting into the method used to study prescriber decision-making, I will first go through the many factors that influence prescriber decision-making that have been presented in the literature.

B. PRESCRIBER DECISION MAKING IN PAIN MANAGEMENT

Prescriber decision-making in pain is particularly difficult. Pain is a symptom, and not all pain is associated with a physical pathology.[98] Recall from the Decision Making Conceptual Framework (Figure 1.2) that clinicians must first assess and diagnose the condition as presented by the patient. Only after thorough assessment can treatment recommendations be made. The importance of assessment in clinical decision-making cannot be highlighted enough. The following is a review of what makes assessment in pain management so difficult, and how it affects the subsequent decisions prescribers make.

1. Assessment of pain

Patient assessment is the first step in prescriber decision-making (Figure 1.2), and influences treatment decisions. The following section briefly describes the relationship between pain and patient assessment.

When assessing patients in pain, prescribers are faced with the difficulty of assessing a subjective condition and relying on patient self-report, currently considered the gold standard in pain management. The patient-provider interaction is therefore crucial in properly assessing a patient in pain. Importantly, the prescriber is relying on the patient to give an accurate and truthful representation of his or her pain symptoms. Although this seems a reasonable assumption, studies have shown there are difficulties on the parts of the prescriber, the patient, and in the interaction between the two. Patients can exhibit stoicism or catastrophize their pain.[40] Studies show poor agreement between patient-reported and prescriber-assessed pain severity.[34] Prescribers expect that patients are truthful, despite the possibility of patient reluctance to tell the truth. When there is suspicion or distrust, a cycle of poor communication results, making accurate assessment of pain symptoms impossible.[84]

Despite the difficulty in assessment, prescribers have continually sought to accurately assess pain objectively. Given the sociocultural filters used by each patient to perceive pain this task is described as difficult at best.[92]

In the absence of an accurate assessment, prescribers tend to discount pain symptoms and/or order further diagnostic testing. Neither of these behaviors directly leads to effective management of pain.[92] Discounting pain symptoms results in under-treatment of pain. Ordering diagnostic tests delays treatment while waiting for test results. Given the poor correlation between physiologic symptoms and pain experience, it is possible that diagnostic testing provides no further value in making a treatment decision.

Putting together what we know about assessment, uncertainty, heuristics and decision-making, we begin to understand why quality pain management is so difficult to provide to patients in pain. The literature review thus far establishes important and relevant considerations in prescriber decision-making, both in general and specifically in the context of pain management.

The next section presents the conceptual framework for the current research study, which lays the foundation for why many research decisions were made. This conceptual framework serves as the understanding of pain and how pain affects the patient. In this study, patients in pain are presented to prescribers. The prescribers' perceptions of the best way to manage the patient's pain are then described and analyzed. In presenting a framework of patients and pain, a foundation is laid for how the patient is presented to the prescribers. This conceptualization of the patient is important to understanding the range of patient characteristics the prescribers in this study are drawing from.

2. The Biopsychosocial Model of Pain

This study employs a conceptual framework specific to pain, the Biopsychosocial Model of Pain. Previously published studies have used other theoretical models and conceptual frameworks to study prescriber decision-making. These models include the Social Cognitive Theory,[42] the Health Belief Model,[15; 49; 81] and Theory of Reasoned Action/Theory of Planned Behavior.[37; 95] These models are all patient-level models, the same short-coming as the Biopsychosocial Model of Pain, yet are not specific to pain.

The Biopsychosocial Model of Pain[39] has been used in Clinical Psychology to study patients and their response to pain. This model evolved from the Biopsychosocial Model, introduced by Engel in 1977.[28] Though this model was first conceptualized over

40 years ago and developed thoroughly over the past 20 years, the Biomedical Model of Pain continues to be the model used for treating pain.[88]

The Biopsychosocial Model of Pain serves as a valuable framework for understanding and conceptualizing a patient's experience with pain and for discussing with prescribers. Notably, the Biopsychosocial Model of Pain provides guidance and describes the psychosocial attributes of a patient in pain, rather than relying solely on constructs of the Biomedical Model. There is overlap between the Biopsychosocial Model of Pain and the Biomedical Model. The Biopsychosocial Model of Pain builds upon the Biomedical Model, acknowledging the importance of physiological pain and function. The Biopsychosocial Model of Pain contributes to the understanding of pain by acknowledging that patients experience pain differently; the experience of pain is largely mediated by psychosocial attributes of the patient.[39]

Central to this study is the patient's experience of pain and how it determines the patient's pain management needs. As described previously, prescribers must be able to fully and accurately assess a patient in order to prescribe a medication or treatment regimen. For patients in pain, this is particularly difficult due to the complexity of the psychosocial components of pain.[84] For prescribers to offer the best care, it is important for them to understand the psychosocial components of pain and the specific needs of an individual patient.

a. The Conceptual Framework

The psychosocial needs of a patient with pain has been conceptualized in the Biopsychosocial Model of Pain (Figure 1.3), adapted from the model proposed by Gatchel.[39] This model builds upon the Biomedical Model and recognizes that pain encompasses both disease and illness. Although the Biomedical Model is complex, the model described by Gatchel is even more complex. It is presented in a simplified form in

Figure 1.3 with the peripheral processes identified as the Hypothalamic-Pituitary-Adrenal (HPA) Axis and a list of social factors identified as the subjective experience of pain. This was done to ease reading, as the details of the HPA Axis are not relevant to this study, and there are no defined relationships between the list of social factors.

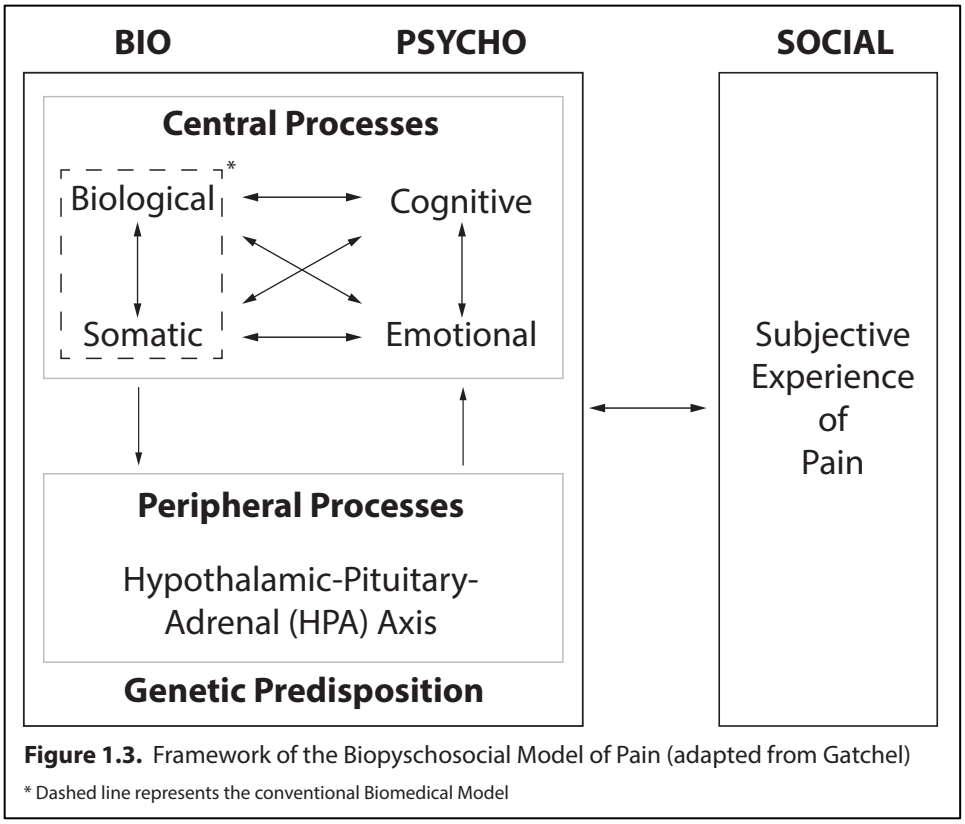

Figure 1.3. Framework of the Biopyschosocial Model of Pain (adapted from Gatchel)

* Dashed line represents the conventional Biomedical Model

Of course biologic components, common in both the Biomedical Model and the Biopsychosocial Model of Pain, are important in any medical condition. In fact, they form the first part of the framework (Figure 1.3), and are contained within the dashed lines under “Bio.” The remainder of the model captures the psychosocial components of the Biopsychosocial Model and the relationships between the biological and psychosocial components. These components and their relationships are described below.

The distinction between disease and illness should not be overlooked. Disease is the physical manifestation of injury; in contrast, illness is the “complex interaction of

biological, psychological and social factors."[40] This is similar to the distinction between nociception and pain. Nociception is the stimulation of pain receptors that transmit information about potential tissue damage to the brain. On the other hand, pain is the "transduction, transmission and modulation of sensory information… that may be filtered through an individual's genetic composition, prior learning history, current psychological status and sociocultural influences."[40]

i. Biologic Components

In medical education, mnemonics are commonly used to help medical students learn assessment of symptoms. PQRST is the common mnemonic used for assessing pain symptoms. "P" refers to provocation and palliation, meaning what aggravates and relieves the pain symptoms. "Q" refers to the quality and quantity of pain. Words used to describe pain include sharp, dull, stabbing, throbbing, and burning. "R" refers to region and radiation, and answers the questions "Where is the pain located?" and "Where does it travel to (if it does travel)?" "S" refers to severity, and is commonly measured using a pain scale. For adults, a pain scale of 0 to 10 is used, with 0 being no pain, and 10 being the most severe pain imaginable. The pain scale is used to assess maximum and minimum pain scores, and helps to identify what causes those scores to change. "T" refers to the timing of pain symptoms—when did the pain start, how long does it last, and how frequent is it felt? This also includes the time of day symptoms are present and if the onset of pain is gradual or sudden.[83]

These symptoms describe what is understood to be the Biomedical Model as it relates to pain. They are not thoroughly elaborated on in the Biopsychosocial Model, as an assumption is made about the biomedical components. These symptoms describe and characterize biological and somatic pain. Biological pain is understood to be the physiologic interaction of neurotransmitters on pain receptors at the molecular level.

Somatic pain is the physical pain resulting from injury to the body.[28]

In the Biopsychosocial Model of Pain, Gatchel adds another biologic component to the Biomedical Model , the Hypothalamic-Pituitary-Adrenal (HPA) Axis. Prolonged periods of unmanaged pain results in HPA Axis dysfunction and elevated levels of cortisol, a hormone that initiates the body's response to stress and fosters the development of chronic pain.[67]

Psychological stress secondary to somatic pain can also elevate cortisol levels, furthering the development of chronic pain. Figure 1.3 illustrates this relationship in the square labeled "Bio Psycho" at the top. The psychological components are represented by the cognitive and emotional components under "Psycho," and are further described below. Recognizing these dynamics is important to the treatment of pain, as removing the painful stimulus is one way of minimizing HPA Axis dysfunction. As described above, however, the cognitive and emotional implications of pain have strong influences on a patient's pain experience. With this understanding, reducing stress and improving coping strategies are other ways of minimizing pain [64-66; 87]

ii. Psychological Components

Somatic pain and biologic symptoms make up one aspect of pain. Consciousness is necessary for experiencing pain; therefore an individual's psychological state plays an important role in a patient's experience of pain. Figure 1.4 illustrates the complex relationship between pain and the psychological components of pain, which are conceptualized as personality, cognition, and emotion, and act as latent variables (Figure 1.4).[40] These three components make up the "Psycho" portion of the Biopsychosocial Model of Pain (Figure 1.3). They are discussed as three separate items for simplicity, but it should be noted that they are closely intertwined and work together to influence a subjective pain response. Likewise, Figure 1.4 is a simplification of the

relationships between the three psychological components, which are too complex to illustrate in a figure.

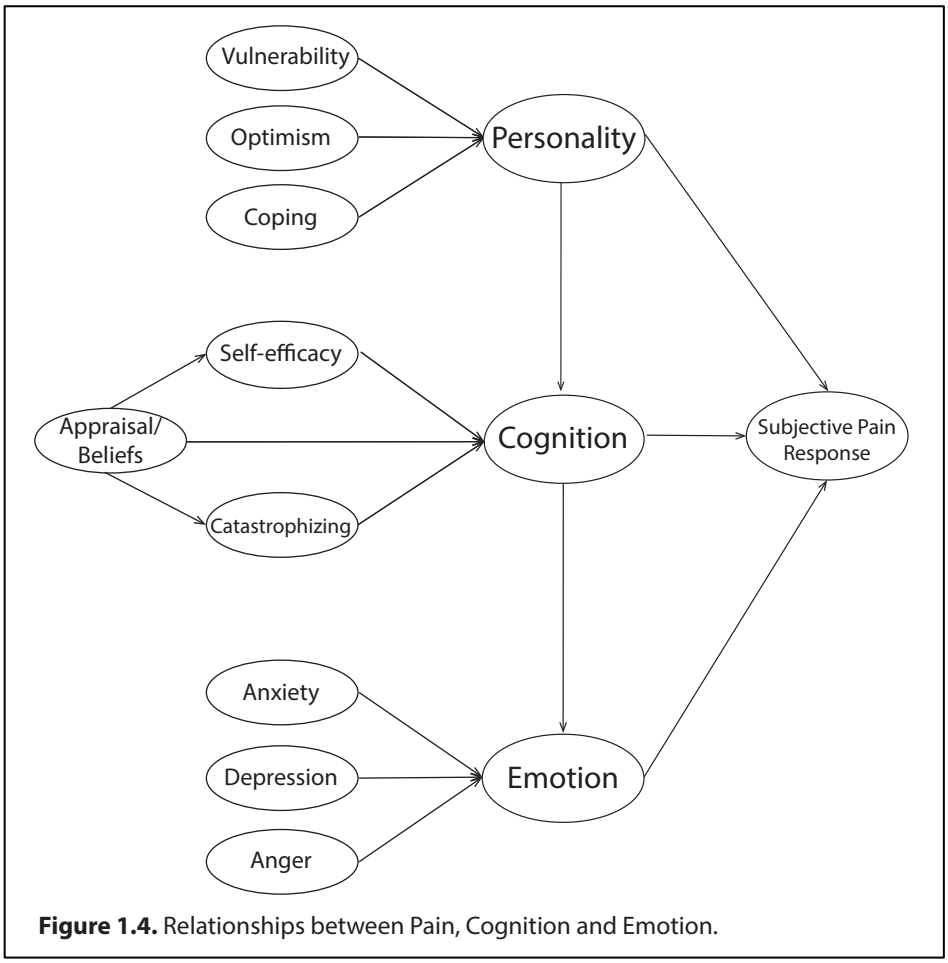

Figure 1.4. Relationships between Pain, Cognition and Emotion.

In Figure 1.4, “Subjective Pain Response” represents behavioral outcomes, both positive and negative, associated with pain. Positive examples of these outcomes are compliance with treatment and positive reframing of the situation.[40] Negative examples of these outcomes are avoidance and heightened vigilance of pain sensation.[40]

The relationships between pain and emotion are well described and conceptualized in the literature(Figure 1.4). Emotional distress can 1) cause pain,[30; 98] 2) mediate pain,[22; 74] and 3) result from pain.[4; 5] Emotions as they relate to pain most thoroughly described in the literature are anxiety,[55; 102] depression,[6; 59; 82]

and anger.[17; 70; 85]

Patients describe anxiety in pain in three general ways. Anxiety results as a fear for their future and the meaning of their symptoms.[106] Anxiety may also result from others' disbelief of their symptoms.[40] Lastly, the anticipation of pain during certain activities can lead to anxiety while doing these activities, which leads to avoidance and possibly increases disability.[10; 39; 76] For some, the anticipation of pain caused more anxiety than the actual pain itself.[55; 102] Fear is a common emotion felt as a result of the anxiety caused by pain.

Approximately 40%-50% of chronic pain patients suffer from depression.[7; 23; 80] The relationship between pain and depression that is most often considered is that pain causes depression.[6] However, it should be noted that some researchers have shown that depression can cause pain[59], and that pain and depression exist in a mutually reinforcing relationship.[82] Cognition also plays a role in the relationship between pain and emotion. A patient's beliefs about their control over pain and their ability to function through pain affects depression symptoms.[82; 97] That is, positive beliefs reduce the risk of depression.

Anger is the third well-studied emotion of pain. Anger has been conceptualized as 1) the outward expression of anger towards others, 2) the internalization of anger towards one's self, and 3) anger resulting from intractable symptoms, untreated pain, and symptoms of unknown etiology. As anger can be socially undesirable, some patients may be less willing than others to express anger.[36]

Cognitive factors related to a subjective pain response are beliefs,[50; 99] appraisal, catastrophizing, and self-efficacy. Beliefs are the assumptions held by an individual about the pain that shape interpretation and appraisal of pain.[40] Pain appraisal is defined as the meaning ascribed to pain by an individual.[89]. Primary appraisal refers to the significance of pain: how threatening, benign, or irrelevant is the

pain to the individual? Secondary appraisal refers to the control the individual feels they have over the pain. Beliefs and appraisal are strong determinants of adjustment to pain.[51]

Catastrophizing is described in terms of a set of maladaptive beliefs that result in "exaggerated negative orientation toward actual or anticipated pain experiences."[40] The role of catastrophizing in pain management is important to recognize. Patients catastrophizing their pain symptoms report increased pain, exhibit increased illness behavior (e.g., staying in bed, calling in to work sick), and increased physical and psychological dysfunction.[40] Catastrophizing has even been shown to predict chronic pain in general populations[86; 90] and intense pain and slower recover after surgical procedures.[43; 53; 75]

Perceived control over pain is related to self-efficacy. Perceived control is defined as the belief that one can exert influence on the duration, frequency, intensity or unpleasantness of pain.[40] Researchers have shown that instead of trying to gain control over pain itself, patients can be directed to try to gain control over the effects of pain on their lives.[93] Self-efficacy is the belief that one can successfully perform a task or produce a desirable outcome.[40] Improved self-efficacy has been shown to result in improvements in pain, functional status, and psychological adjustment.[52; 62]

Personality is conceptualized as vulnerability, optimism, and hope. Vulnerability relates to a patient's sensitivity to negative affect (emotions such as fear and anxiety) or illness.[40] An example of sensitivity to negative affect is the feeling of heart palpitations or feeling faint, which are signs of anxiety. A person with high sensitivity feels these sensations more readily than an individual with low sensitivity. An example of illness sensitivity is the concern a patient feels about being injured further. Illness sensitivity was a stronger predictor of medical fears than anxiety sensitivity.[94] Optimism and hope are positive personality traits that have been shown to mitigate pain.[40] Positive

personality traits have not been studied as extensively as vulnerability, but patients who exhibit these positive personality traits have fared better with regards to their pain outcomes than patients more negatively inclined.[40]

Two examples of how these factors are intertwined demonstrate the relationships between these psychological factors. In the first example, increased vulnerability has been linked to catastrophizing, which increases fear and anxiety. As described, fear and anxiety have negative effects on pain response. In the second example, optimism improves appraisal of pain, which increases control of pain effects, and therefore improves yields an improved pain response.

As described and illustrated in Figures 1.3 and 1.4, psychological components of pain interact complexly with the patient's pain response. According to the Biopsychosocial Model of Pain, addressing the psychological needs of a patient also reduces the pain experienced by the patient.[40] With this understanding, assessment of patient psychological status is important to the treatment and management of pain. In this study, we investigate the extent to which prescribers recognize and respond to psychological and social factors that influence pain.

iii. Social Components

The social components of the Biopsychosocial Model of Pain encompass the myriad social factors that may influence individual behavior (Figure 1.3). They range from activities of daily living to interpersonal relationships to work history to social expectations and cultural factors. They have also been described as the "sociocultural context" from which the patient's pain perception and response to illness is understood.[39]

Concrete examples of social factors that influence the pain experience exist. However, the relationships between these factors and patient behavior are unclear. For

example, individuals who experience pain can become caring and sympathetic towards other family members when they were previously critical and demanding.[54; 73] While this phenomenon has been observed, the mechanisms through which pain mediates this behavior are currently unknown.

Although the pain experience has been shown to influence the social behavior of an individual, the converse is also true. Social interaction has been shown to influence an individual's pain experience. This phenomenon is exemplified in strong social networks influencing pain behaviors. Individuals who reported poor social networks exhibited more or greater pain behaviors, such as staying in bed and emotional distress, as a result of pain. On the other hand, individuals with strong social supports returned to work sooner, showed less reliance on medication, and increased their activity levels more quickly than those with poorer social networks.[48]

It should be noted that the social components of the Biopsychosocial Model of Pain are not as well defined, described, and characterized as the psychological components. The relationship between social and psychological components requires further elucidation. While additional research about the social components is needed, their importance should not be overlooked as they certainly influence an individual's pain experience. When considering the quality of pain management delivered to patients in pain, the exact mechanisms through which social factors influence pain behavior are interesting, but this isnot necessary to understand in order to improve pain management. Recognizing them is an important first step however. In this study, we investigate the extent to which prescribers consider social factors in addition to the psychological factors known to influence pain.

b. A Critique of the Biopsychosocial Model of Pain

As depicted in the Biopsychosocial Model of Pain, psychological and social

factors can influence the way a patient experiences pain. For this reason, it is a useful model for discussing a patient's pain experience with prescribers. The Biomedical Model (Figure 1.2, within the dashed square) is a more commonly used model, as it reflects the generally accepted model in medicine that focuses on biological explanations of disease. The Biomedical Model overlooks the psychological and social components that influence pain, and also the important role that chronicity plays in a patient's pain experience. When prescribers adhere to a Biomedical Model when managing pain, they discount the subjective nature of pain. In doing so, they discount much of what the literature has shown to determine which treatments and interventions will be most suitable for an individual patient.

A fair critique of the Biopsychosocial Model of Pain recognizes that it is a patient-level model. The strength of the model is that it fully captures the psychological components that influence pain at the patient-level. However, even at the patient-level, the Biopsychosocial Model of Pain only briefly describes the social components that influence pain, and the components are not well conceptualized. Further research is necessary to fully describe the relationships between social and psychological factors, and to clarify to what extent social factors influence the patient's pain experience.

Evidence shows prescriber decision-making is influenced by both patient- and prescriber-level factors.[92] In a model similar to the Biopsychosocial Model of Pain, Tait identifies four types of patient-level factors that influence prescriber decision-making. In addition to the three types of factors identified in the Biopsychosocial Model, Tait identified situational features, such as pending litigation with an employer, that influence prescribers while managing pain.

Prescriber-level factors supplement patient-level factors that influence prescriber decision-making. [92] describes three prescriber-level factors that are most relevant to prescriber decision-making: affect, experience, and empathy. Affect refers to the way in

which prescribers perceive a patient. Patients who were perceived negatively by prescribers were assigned lower pain scores, compared with patients who were perceived positively by prescribers. Increased experience with treating pain also resulted in prescribers assigning lower pain scores to patients in pain compared with lay people judging the same patient's pain symptoms.[92] Empathy refers to the ability of the prescriber to "step into the patient's shoes"[92], and is linked to the prescriber's ability to accurately assess the subjective pain of another person. Only one study explores the role of empathy in pain management, and it does not address treatment decisions.[91] It showed that surgeons who empathized more with patients were less likely to blame a patient for failed surgical procedures. Additional research is needed to assess the role of empathy in treatment decisions and prescribing behavior. Challenges arise for time-pressured prescribers who report difficulty expressing empathy with their patients.[92]

Because prescriber decision-making is influenced by both patient- and prescriber-level factors, it is not possible to accurately study prescribers using just the Biopsychosocial Model of Pain. Nonetheless, it serves as a good starting point for discussion, and provides important considerations to study of prescribers managing pain. To fully describe and characterize prescriber perceptions in pain management though, a new prescriber-level model must be generated.

C. Q METHODOLOGY

In this study, we explore a new prescriber-level model that incorporates both the patient-level factors described in the Biopsychosocial Model of Pain and the multi-level nature of prescriber decision-making described by Tait. This will be done using a method known as Q Methodology because this method allows exploration from the prescriber's point-of-view. Although this method has not been used extensively in pain management, it is used in a wide variety of areas and applications, and offers benefits over traditional,

purely qualitative or quantitative approaches to the same problem.

1. Rationale for using Q Methodology

The Aims of this study are to 1) explore a prescriber-level model of what influences decision-making when managing pain and 2) identify and describe prescriber types, based on what influences the prescriber's decisions when managing pain. To date, there has been little research on prescribers and pain management using the Biopsychosocial Model of Pain regarding how prescribers are or are not attentive to components of the Biopsychosocial Model of Pain when managing pain. Prescriber-level models still need to be generated for a full conceptualization of whether and how prescribers understand the needs of a patient.

This study uses Q Methodology, a mixed-methodology that employs both qualitative and quantitative methods, to study prescribers while managing pain. Q Methodology provides an avenue for exploring prescriber-level conceptualization of patient-level factors while generating testable hypotheses for future studies. In addition, a resulting product of Q Methodology is a tool that is easily reproducible and easy to administer relative to traditional qualitative interviews.[12]

The strengths of a purely qualitative study are that results of the study retain contextual richness absent from most quantitative studies. However, one short-coming a qualitative analysis is that hypotheses that are difficult to test quantitatively.[104]

The strengths of a purely quantitative study are the relative reproducibility of data collection, and the precision with which results are presented. However, purely quantitative studies lose much of the richness of individual subjective perceptions through data reduction techniques that minimize the importance of the individual, and generalize to the population level.[3; 20; 104]

The benefit of using Q Methodology over traditional purely qualitative or quantitative methods is that it allows descriptions of individual perceptions that influence behavior. The use of qualitative methods in Q Methodology retains the contextual richness lacking in a purely quantitative study. Related to context, data are gathered and analyzed holistically. The findings thus show relative, rather than absolute, importance to each individual.[3; 20; 104]

Researchers have used a variety of methods to study prescriber decision-making, including Recognition-primed Decision-Making,[19] Image Theory,[29] and Task Analysis.[13] Although these are all naturalistic methods of studying decision-making, they attempt to answer different research questions related to decision-making, and were not suitable methods for the current study.

Recognition-Primed Decision-Making is to identify differences between experienced and novice-decision-makers about decisions made in their profession. There is an underlying assumption that experienced decision-makers are able to conclude a best decision more quickly than novice decision-makers. The reason for this is that experienced decision-makers have made similar decisions and have already sorted through possible outcomes; novices will need to imagine the outcomes and then choose.[19] Image Theory posits that decisions are made in two-phases. In the first phase, decision-makers narrow a researcher-identified set of alternatives to the decision-maker's own set of values or goals. Incompatible alternatives are thrown out, and decisions are made from the remaining compatible alternatives.[29] Task Analysis investigates the process by which a decision is made. This method attempts to break a task into manual and cognitive functions needed to perform the task. In clinical decision-making, it has been used to study how PCPs structure an office visit and to describe the cognitive functions employed by physicians when using an electronic medical record.[76]

The current study explores prescriber perceptions of when managing pain. None of the models or theories described above incorporates this exploration into their methodology. They also attempt to describe decision-making, which does not address subconscious considerations that are unknown to the study subject.

2. Explanation of Q Methodology

Q Methodology is a two-step, mixed methodology that pairs qualitative data collection and quantitative data analysis. To understand Q Methodology, is it helpful to begin with the original goal of the method and the implications for research design, to work toward a current understanding of the method.

Q Methodology was developed by Stephenson in 1935. Stephenson recognized that factor analysis as was commonly accepted then and now identifies factors that group *variables* at the population level, rather than factors grouping *individuals*.[104] In response, Stephenson developed Q Methodology, which runs *by-person* factor analysis, rather than *by-variable* factor analysis. Figure 1.5 illustrates the conceptual differences between traditional R Methodology (named for Pearson's *r* correlation) and Q Methodology. As captured in Figure 1.5, R Methodology correlates measures of individual tests, while Q Methodology inverts the correlation matrices and correlates measures of individual people.

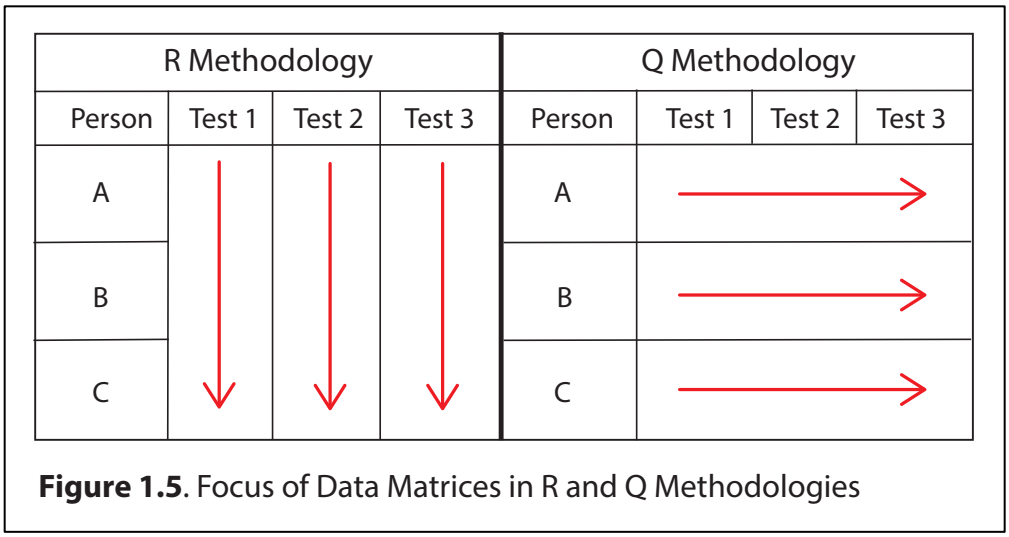

Figure 1.5. Focus of Data Matrices in R and Q Methodologies

As Stephenson developed his method, he came to recognize two important implications for research design. In calculating any correlation, the measures must all be the same unit. In R Methodology, correlations of height must be calculated using all inches or centimeters. If units are not the same, the correlations have no meaning. In Q Methodology, this requirement also holds. However, because correlations are calculated by-individual in Q Methodology, all the units of measure for each individual must be the same; but, measures between individuals can be different. This observation led to the development of the Q-Sort, an exercise in which respondents sort a series of statements or images that represent all possible responses to a given prompt, thus giving equal units to all measures presented to an individual participant. For this study, we refer to the representative responses as statements, as that is the form that is used in this study.

Q-Sort statements can be generated using any method of qualitative data collection. This allows a full representation of the possible responses from the perspective of the study subject. In this study, the qualitative generation of the Q-Sort statements allows exploration of prescriber-level perceptions and attitudes towards patient-level factors identified in the Biopsychosocial Model of Pain. This necessarily fills a gap in the knowledge of prescriber-level factors that influence behavior.

As previously mentioned, the measures *between* individuals do not necessarily have to be the same in Q Methodology. Thus, the meaning of each statement can vary from prescriber to prescriber, and this is acceptable to the methodology. In fact, it is considered a strength of the methodology, as it allows organic, person-specific interpretation of the statements, which preserves the individual context and experiences each individual brings to the research. In contrast, measures used in most traditional methods of scale development are averaged across a population and standardized for comparison across measures. Thus, individual differences, along with the context and richness that comes along with subjective responses, are lost.

3. Examples and Applications of Q Methodology in the Literature

This review of the use of Q Methodology in the literature focuses on studies of prescriber perceptions and how the results have been applied to policy making/formulation. It should be noted, however, that Q Methodology has been used and applied in many other disciplines and interventions.

These studies exemplify the use of Q Methodology in health care, and illustrate how Q Methodology can be used to study prescriber perceptions. Prasad explains how Q Methodology can be used to develop a tool to measure prescriber perceptions. Valenta[101] and Shabila[88] used the findings from their studies to inform policy- and decision-making at both organization- and national-levels. It is clear from these examples that Q Methodology is both appropriate and powerful in exploring prescriber opinions, and that the findings of the study have real-world application and utility. These capabilities accurately reflect the goals of the current study, and support the use of Q Methodology to explore prescriber perceptions and attitudes of patient psychosocial attributes when managing pain.

a. Q Methodology to Develop a Tool to Measure Prescriber Attitudes towards HIV patients

Most similar to the current study is the Prasad study, which used Q Methodology to develop a tool for assessing prescriber attitudes of patients with HIV/AIDS. The tool that was developed was the Q-Sort, as was administered in the described study. That Q-Sort was not later translated into a traditional scale or survey that measures constructs individually.[77] Although it is possible to translate a Q-Sort into a traditional survey, it is not necessary.

Prasad's rationale for using Q Methodology lay in the strengths of the administration of the tool: a Q-Sort (and its related brief survey) is more easily administered and analyzed. Prasad argues that although Likert or Likert-type scales are useful in measuring what they measure, their length and response burden are so great that it is unreasonable to expect an average, uncommitted prescriber to respond with the necessary attention and thoughtfulness to items in the scales. Similarly, scales based on semantic differential are complicated to score, and limit their usefulness.[77] Additionally, Prasad argued that in the Q-Sort, prescribers are forced to consider their attitudes carefully because the statements are all sorted at the same time.

Another strength of the Q-Sort identified by Prasad was its ability to detect short-term changes in prescriber attitudes. This characteristic makes it suitable for use in evaluating the effects of interventions aimed at changing prescriber attitudes towards HIV/AIDS patients.[77] This provides another reason for using Q Methodology in the current study: the resulting tool can be used to measure perceptions of prescribers both before and after an intervention that is aimed at expanding the considerations that prescribers use when developing treatment recommendations in pain management.

b. Q Methodology to Study Prescriber Perceptions of Medical Technology

Valenta used Q Methodology to study physician and medical student perceptions of medical technology and the resistance to adoption of Electronic Medical Records (EMRs) in a hospital setting.[101] The benefit of using Q Methodology over then-current surveys was in how results of the study could be presented to health care managers. In previous surveys, results were reported as one composite average. According to the managers, this was not helpful in planning and implementing EMRs for several reasons. Concerns raised by individual physicians were lost in the composite. Also, concerns could appear in varying combinations among individuals; this was lost when survey results were averaged across departments and the hospital as a whole.

Another benefit of using Q Methodology in Valenta's study was the identification of physicians who had completely adopted the use of EMRs in their practice. These physicians were ideal candidates to train their peers and promote the use of EMRs. They were the necessary champions to aid organization-wide adoption of the new technology.[101] While this example is specific to adoption of technology, analogous examples can be used in pain management as well. Prescribers who are identified as more aware of patient psychosocial status can be champions of new ideas within their local departments. They can give first-hand accounts of how their practice has changed or benefitted from the consideration of psychosocial status of a patient in pain.

The findings from the Valenta study also had implications for policy and decision-making at the organization-level, represented by decisions made by management in the implementation of the EMR. A key change made to the implementation was the roll out of the EMR department-by-department, rather than organization-wide. This was a direct result of finding that different departments had different concerns with the EMR and used the EMR in different ways. This makes complete sense given that the nature of the work in different departments places differing needs on the EMRs. In a similar sense, each

department has a unique composition of providers; not all providers have equal concerns or reservations about new technology or ideas. An appropriate response by management is to address individual concerns at the time of implementation to improve adoption and morale, as such changes can be challenging.

c. Q Methodology to Study Prescriber Viewpoints of a Health System

Shabila used Q Methodology to complete a comprehensive assessment of physician viewpoints of the Iraqi Healthcare System for the purpose of informing policy-makers at the national-level.[88] Physician opinions of the health care system were identified and disseminated to policy makers, to aid them in the allocation of resources during reconstruction/reorganization. The main rationale provided by Shabila for studying physicians is that they are the individuals confronted with real-world challenges of treating patients in an environment created by policy-maker decisions. Individually, they decided the specific operation and execution of policies. Collectively, their actions and decisions formed an agenda and influence the direction of policy. In short, to neglect their perspectives on the healthcare system and its current inadequacies was to have an incomplete picture of what the actual problems were. Shabila states that while the findings of the study were not novel, the presentation of the findings and the richness of detail provided by Q Methodology were novel, and greatly contribute to a better understanding of the problems facing physicians in the Iraqi health care system.[88]

This study underscores the importance of taking the prescribers' perspective into account when revising policies related to health care. Not only are prescribers affected by policies, they are the ones who interact and provide the health care to patients. It is important to present their perspectives in a way that retains the context that the prescribers intended.

D. SUMMARY

The aims of the study are to 1) explore a prescriber-level model of what influences decision-making in pain management and 2) identify and describe prescriber types, as defined by what influences a prescriber's decision while managing pain. The method used to achieve these aims is Q Methodology. The Literature Review described the conceptual frameworks that provide a context for which the study approached decision-making and pain management, and provided an overview of Q Methodology and examples of how Q Methodology has been used in previous studies of prescriber perceptions.

Prescriber decision-making plays a large role in the quality of care delivered to patients in pain. Although the study of prescriber decision-making covers a wide-range of literature, the conceptual framework described in this literature review establishes that three types of decisions compose a clinical decision: diagnostic decisions, treatment decisions, and follow-up decisions. This study focuses on treatment decisions, and it recognizes that diagnostic decisions influence treatment decisions, given that treatments follow diagnosis.

Cognition is a concept central to decision-making. Previous studies have applied a normative model of cognition—that is, they have focused on the question: does the decision-maker deviate from a set standard? More recently, studies have focused on how decision-makers actually make decisions, using descriptive models to do so. A vast body of literature on heuristics and biases was spawned by these descriptive studies. Three biases identified in the literature that are most relevant to treatment decision-making are: 1) Regret/Outcome bias, 2) Framing bias, and 3) Number of Alternatives bias.

The complexity of decision-making in pain becomes apparent when what is known is applied to the decision-making conceptual framework. Prescribers often face

uncertainty during assessment, making it difficult to definitively diagnose a condition. The Biopsychosocial Model of Pain conceptualizes pain and its effects at the patient-level. This model is a helpful starting point for discussing the full array of characteristics, attributes, and circumstances that prescribers might think about with regard to patient factors. It is particularly important because it incorporates patient psychosocial attributes with biomedical attributes.[44] The psychosocial attributes are particularly important in pain management because they predict the conversion from acute to chronic pain and the potential for abuse and addiction to opioids.

Compounding the uncertainty of assessment is the uncertainty in treatments; no single treatment option stands out as superior to others in many cases. In addition, some pain treatments have undesirable side effects or risk associated with them. These add to the complexity of prescribing decisions made when treating pain.

The complexity of prescribing decisions in pain management highlights the need to study how prescribers come to their decisions when treating pain. This study uses Q Methodology to study prescriber decision-making in pain management. This method provides the ability to consider a prescriber holistically. Traditional methods measure an individual's perceptions construct-by-construct or factor-by-factor. Q Methodology identifies concepts important to the individual in relation to the other factors studied. The strengths of this method are the qualitative depth afforded to a quantitative approach to studying perceptions. In Q Methodology, representation refers to the ideas or opinions that could be important to an individual in a specific context. Unlike traditional quantitative methodologies where the goal is to describe or characterize a population from the sample population, Q Methodology identifies clusters of ideas commonly held by individuals practicing or utilizing a given item (e.g., a policy, technology, or service). A limitation to Q Methodology is its inability to generalize to populations. In this exploratory study, however, this limitation is off-set by the method's ability to generate testable

hypotheses. Thus, the use of Q Methodology strengthens this study over a more traditional, qualitative methodology that may also lack the ability to generalize findings.

III. METHODS

To better understand prescriber perceptions when managing pain, this study aims to 1) explore prescriber perceptions of patient psychosocial attributes when managing pain and 2) identify and describe prescribers types based on what influences their decision-making in pain management. The findings from this study will enable us to study the role of perceptions on prescribing behavior.

This chapter details the two-phase, mixed-methods approach used in this study. This method, known as Q Methodology, uses by-person factor analysis, rather than by-variable factor analysis, to holistically study individual psychology. The goal is a description of the perceptions held by study participants. This analysis varies from typical scale development methodologies in that the perceptions can be compared relative to each other, as all the measures of perception are taken together in the Q-Sort.

This chapter begins with a description of the study setting. What follows is a description of the methods used in each phase of the study. In a Q-Methodological study, qualitative methods work to identify all possible responses to a research question. The complete set of responses is called the Concourse. In the second phase of a Q-methodological study, quantitative methods are used to perform by-person factor analysis on data collected using a Q-sort.

The Q-sort is a central component of a Q-Methodology study. The Q-sort is an exercise where participants sort and rank a set of concepts from the Concourse, based on a prompt, called the Condition of Instruction. The Condition of Instruction provides the context for which to rank and sort the responses, and to interpret the findings of the study. For a more complete description of Q-Methodology, please refer to the Q Methodology section of the Literature Review.

In this study, semi-structured interviews were used address Aim 1: to explore a prescriber-level model of what influences decision-making when managing pain. The themes identified in this phase of study represents the Concourse of responses.

A quantitative method of data collection and analysis was used to address Aim 2: to identify and describe prescriber types based on what influences their decision-making in pain management. From the themes, the Q-set was developed with a specific focus on treatment decision-making, as opposed to diagnostic decision-making. The Q-sort incorporated statements representing the themes from phase one in the Q-set. The Q-set was developed with a specific focus on treatment decision-making, not including diagnostic decision-making. Data for the by-person factor analysis was collected in a self-administered, paper-based survey that included the Q-sort. Lastly, factors identified in the factor analysis were interpreted qualitatively. Interpretation of the factors was validated by small groups of PCPs.

A. STUDY SETTING

The qualitative phase of this study was conducted at two community-based health systems in Madison, WI. One health system is a for-profit health system that is affiliated with its own hospitals and specialist groups. The other health system is a member-owned cooperative that provides primary care, complementary medicine, and limited access to specialist care.

The quantitative phase of this study was conducted at three community-based health systems in Madison, WI. The two previous health systems were included again. The third is a non-profit clinic within a health system that serves an indigent and low-income population. This clinic employs only Family Medicine, and serves as a training site for Family Medicine Residents.

Within each health system, prescribers were recruited from Family Medicine and Internal Medicine departments. These two departments were chosen because they provide the majority of adult primary care to the patients they serve. Physicians, Physician Assistants, and Nurse Practitioners were invited to participate. All procedures were reviewed and approved by the UW-Madison Social and Behavioral Sciences Institutional Review Board.

B. AIM 1- EXPLORING PRESCRIBER PERCEPTIONS

The purpose of this phase of the study was to explore all the possible concepts that influence a prescriber when managing pain. The results of this phase formed the Concourse, from which statements for the Q-set are generated. In a questionnaire administered to prescribers prior to the interview, prescribers were presented with a clinical scenario that they might see in primary care. They were asked what their treatment recommendations were. Prescribers were then asked if they would change their treatment recommendations as additional details of the clinical scenario were revealed. In semi-structured interviews that followed, prescribers were questioned about the motivation behind their decision.

1. Development of the Pre-Interview Questionnaire and Semi-Structured Interview

The breadth of concepts that influence prescriber perceptions were explored using a semi-structured interview. Prior to the interview, participants were asked to complete a questionnaire on which the interview was based. In the pre-interview questionnaire participants were given one of three clinical scenarios they might see in a primary care setting. The pre-interview questionnaire focused on what the participant

would do in that situation. Their responses were reviewed and individualized semi-structured interviews were developed with their responses in mind.

The goal of the pre-interview questionnaire was to establish prescriber behavior with the intent that the time spent in the interview would draw out the motivation and reason for the prescriber's self-reported behavior. This was done to increase participation by shortening the amount of time required to conduct the interview, yet still make the most of the limited interview time. Each participant was given one of the three scenarios described below. The physician expert advising on research procedures suggested this, and it worked well.

Each pre-interview questionnaire was built around a clinical scenario that captured both an issue central to quality care in pain management and related psychosocial components of pain, as identified in the Biopsychosocial Model[40] and published guidelines.[9; 14] Table 3.1 provides an overview of the pre-interview questionnaires. Each pre-interview questionnaire can be found in Appendix A.

Table 3.1 Conceptualization for Clinical Scenarios			
Scenario	Focus	Framework	Important Concepts
Frozen shoulder: Restoring Function	Psychological presentation Cognitive Behavioral Therapy	Biopsychosocial Model of Pain[40]	• Anxiety/depression • Anger • Catastrophizing • Self-efficacy
Acute Low-back Pain: Preventing Chronic Pain	Chronic pain risk factors How to determine if a patient is at risk of Chronic Low-back pain.	Table 2 from University of Michigan Health Systems Acute Low Back Pain Guidelines[14]	• Job (computer programmer vs. construction worker) • Work environment (friendly vs. hostile) • Pending/threatening litigation • Maladaptive pain beliefs (pain won't go away, invasive treatment is necessary) • Patient returns after four weeks of Physical Therapy and pain has not resolved.
Trigeminal Neuralgia with uncertain symptoms: Prevention of Opioid Abuse and Addiction	Opioid abuse and addiction risk factors How to determine if a patient is a good candidate for opioid treatment or Pain Specialist Care.	Table 3 from the University of Michigan Health Systems Chronic Pain Guidelines[9]	• Prescriber suggests antidepressants/gabapentin for neuralgia. Patient refuses. She does not want people to think she is depressed. • Patient has been to Chiropractor, with temporary, incomplete relief. • Patient unable to separate neuralgia with radiation therapy received for breast cancer. • Recent divorce from long-time spouse.

The pre-interview questionnaire was implemented using Qualtrics (Qualtrics, LLC), a web-based survey administration tool[72], accessed through the UW-Madison. Participants recorded their responses prior to the interview at their leisure. Prior to the scheduled interview, responses were reviewed and a semi-structured interview was drafted. All interviews were conducted within a week of the participant completing the semi-structured interview; most were conducted within four days.

Semi-structured interviews focused on the motivations, explanations, or clarification of responses to the pre-interview questionnaire. The semi-structured nature of the interview reflected differences between individual participants. For example, when prescribers indicated they would change their recommended treatments in the pre-interview questionnaire, they were asked in the interview what about the situation prompted them to change their treatment recommendations. When they did not change their treatment recommendations, prescribers were asked what the additional information told them about the patient. An example of the semi-structured interview can be found in Appendix B.

2. Qualitative Study Procedures

a. Interview Participants

This study included Primary Care Prescribers, i.e., Physicians (MDs), Physician Assistants (PAs), or Nurse Practitioners (APNs), who were involved in direct outpatient Primary Care. In addition, at least 50% of their patient population was adults older than 18 years of age. They were responsible for prescribing decisions, and also able to complete a questionnaire and interview in English.

Excluded from the study were prescribers who work primarily in Urgent Care, Emergency Departments, or Inpatient Settings. Prescribers who work primarily in a Pain Clinic, Oncology, Hospice, or Long-term Care were also excluded. In addition, prescribers who see mostly pediatric patients were excluded from the study. These prescribers were excluded because the patients they see may have different pain needs compared with the patients seen in an ambulatory Primary Care setting. And finally, Psychologists, Physical Therapists, Chiropractors, or other health care professions who may interact with patients in pain, but are not responsible for prescribing decisions were excluded from the study.

Respondents were recruited by word of mouth, using a snowballing technique. Participants were recruited from two health systems in which the author had existing relationships. At the end of the pre-interview questionnaire, respondents were asked to nominate another prescriber who they thought would be a good candidate to participate in the study. Surveys were conducted until saturation was reached. An initial, generous estimate was set at 20 interviews. Participants were compensated $50 cash upon completion of the interview.

b. Consent Procedure

Consent forms were sent to the participant electronically prior to completing the pre-interview questionnaire. Signed consent was waived, as proceeding with the pre-interview questionnaire indicated consent to participation.

c. Data Collection

Pre-interview questionnaires and interviews were administered during June and July 2014. Interviews were conducted at the respondent's place of choosing. Most of the

interviews were conducted in exam rooms, while some were conducted in the respondent's private office. Interviews were recorded and transcribed for analysis. Verbal consent to record the interview was obtained during the interview.

d. Analysis

Coding of the data was conducted using Dedoose (http://www.dedoose.com; SCRC, LLC), a qualitative data analysis software available online. An inductive approach to data analysis was used in this study. Please note that although a conceptual framework was used to develop the concepts included in the interviews, it was not used to code or group themes that emerged from the qualitative data.

Data were first flagged for all statements that indicated an influence on decision-making. Flagged data were then coded to represent themes. Themes were then reviewed and either collapsed or expanded in an iterative manner to reflect the meaning of each theme. The resulting themes were used in the second phase of the study to develop the statements used in the Q-sort.

C. AIM 2—IDENTIFICATION OF PRESCRIBER TYPES

Identification of prescriber types is carried out using by-person factor analysis. By-person factor analysis is the hallmark of a Q-Methodology study. The by-person factor analysis requires that the measures taken during data collection have the same unit of measure. This allows the correlations to be calculated by-person, rather than by-variable as they are in an R methodological study.

The Q-Sort allows the same unit of measure across all measurements in a Q-Methodology study. Because the participants sort and rank the statements at the same

time, based on the same prompt, the measures take on the same unit of measure as defined by the participant.

Accurate completion of the Q-sort is paramount to the reliability of this method. As such, great lengths were taken to ensure the accuracy of data collection in this study, especially because the survey was self-administered. The survey instrument contained 1) the Q-sort, 2) qualitative questions to further explain the Q-sort, 3) demographic questions to better understand the respondent group.

1. Instrument development

This study investigated prescriber perceptions using a novel, mixed-method approach called Q Methodology, described in Chapter 2. Central to Q Methodology is the Q-Sort, an exercise in which participants rank a given number of statements based on a prompt, called the Condition of Instruction. The Q-sort is the method of data collection that allows by-person factor analysis.

The survey in this second phase of study included a Q-Sort. In addition, the methodology incorporates open-ended, qualitative questions to gain further insight into why participants ranked the statements in the order they did. Demographic questions are also included to better understand the participants themselves. An example of the survey, including the Q-sort can be found in Appendix C.

a. The Q-sort

As noted, the Q-sort is a central component to a Q-Methodological study. It consists of 1) the Q-set, the statements to be sorted and ranked by survey respondents; 2) the Condition of instruction, the prompt by which all respondents sort and rank the

statements in the Q-set; and 3) a set of standard qualitative questions to better understand the ranking of the statements.

In many Q-methodology studies, data collection is done using a face-to-face survey administration, and the researcher is able to be present and ensure accurate completion of the Q-sort. Given the busy PCP population studied, a lengthy, scheduled commitment was thought to threaten getting a sufficient number of responses. Therefore, a self-administered survey was chosen because it offered prescribers the flexibility of responding at their convenience, rather than face-to-face administration. Computer-based administration was considered as well. However, the paper-based format was chosen over the computer-based administration due to insufficient data warehousing capabilities, inability to ensure confidentiality and cost.

Given the self-administered format, much attention was given to both the development of the Q-set and the format of the Q-sort.

i. Q-Set Development

The Q-set is the list of statements to be ranked in the Q-sort. Statements in the Q-Set were derived from the Concourse of concepts identified by prescribers in the quantitative phase of the study. The Concourse is defined as all the concepts that could be used in the Q-sort—basically, the themes identified in the qualitative analysis that formed the quotes from the semi-structured interviews.

The Q-set needs to include enough statements to represent the breadth of responses (and thereby avoid confusing respondents) and to allow statistical significance among factors. However, too many statements can lead to respondent fatigue.[104] Q Methodology texts suggest a minimum number of 30 statements and a maximum number of 100 statements in a Q-set, with 40 statements being ideal. The Q-set in this study was developed by examining the themes identified in the qualitative

phase, and creating statements to reflect each theme. The Q-set was drafted and revised for clarity, neutrality, and representativeness. The statements were piloted and revised iteratively with a PCP to ensure their meaning was interpreted as intended.

Forty-three statements were included in the Q-set. They appear in Table 3-1, in the format in which they were presented to participants. The Q-set was printed on heavy weight cardstock and cut along the dotted lines. The statements were separated by the researcher, the cards were shuffled by the researcher to randomize the order in which the statements were presented.

Statements were also constructed to reflect the varying degrees or aspects of the theme when more than one perspective could be taken. This included instances where the prescribers mentioned only one perspective of the theme, but logically there are other considerations not mentioned by prescribers. For example, prescribers mentioned access in the sense of the patient's ability to receive treatment. Related to this, but not specifically mentioned in interviews, is the concept of the patient's ability to pay. If the patient is not able to pay, the treatment remains inaccessible to him/her. The statements were constructed to be as neutral as possible, so as not to lead the respondent in any way. Respondents applied their own interpretation to the statement, and completed the Q-sort with their interpretation.

The patient wants a quick fix for the pain. 1	How the patient copes with pain. 2	The pain causes the patient to become anxious. 3	The pain causes the patient to become depressed. 4	The patient's motivation to do what it takes to relieve the pain. 5
The patient's expectations about pain relief. 6	The patient receives adequate support from friends and family. 7	The patient's stress level. 8	The patient has a history of being abused physically, psychologically or sexually. 9	The patient has a dysfunctional social environment. 10
The patient's work is physically demanding. 11	The patient's beliefs about health and pain are non-scientific. 12	The patient's ability to pay for recommended treatment options. 13	The patient's relationship with former providers. 14	The patient's trust in the health care system. 15
How compliant the patient has been with exercises recommended to relieve the pain. 16	The patient requests opioids and will not consider anything else. 17	The patient threatens to sue care providers. 18	The patient's pain prevents engaging in health behavior (e.g., physical activity). 19	The patient has many comorbid conditions. 20
The patient has few comorbid conditions. 21	The pain is of recent onset. 22	The pain has been present for a long time. 23	The patient associates the pain with a positive experience (e.g., marathon training). 24	The patient associates the pain with a negative experience (e.g., car accident). 25

The patient's age. 26	The patient's gender. 27	Patient history of substance abuse. 28	The recommended medications may cause intolerable or unacceptable side effects. 29	The recommended medications for treating pain interact with the patient's medications. 30
The recommended treatment options are too risky for the expected benefit. 31	The most helpful recommended treatment options are unavailable to the patient. 32	You believe recommended treatment options treat symptoms, not the underlying causes of pain. 33	Your familiarity with the best treatment options for treating the patient's pain. 34	The treatment options that the patient has tried previously. 35
The number of patients you have to see in a day. 36	How much time you have available during the office visit. 37	Your general attitude towards treating patients with ill-defined pain. 38	You feel primary care providers are supposed to help patients with their pain. 39	Patient access to other health care providers, such as Physical Therapists. 40
The impact of patient satisfaction scores on your compensation. 41	The possibility of disciplinary action by your employer. 42	The possibility of disciplinary action by the State Medical Board. 43		

ii. Condition of Instruction

The Condition of Instruction is another crucial component of Q Methodology. It is what gives the study meaning and context. In this study, the Condition of Instruction was worded and appeared as follows:

Sort and rank the statements answering the question: How much does each statement influence your decision-making when managing ill-defined pain?

iii. Qualitative questions

Qualitative questions are included in a Q-sort in order to better understand why a participant ranked their responses as they did.[104] The questions are standard, and are based on the number of statements in the two extremes of the grid. In this study, there were two statements ranked in the two extremes (-4 and +4). Therefore, participants were asked to explain their rationale for ranking the two most influential and the two least influential statements in the qualitative question immediately following the Q-sort.

There was a discrepancy with the polarity of the scale and label used in the Q-sort. Bipolar scales are a convention of Q Methodology.[104] To have negative influence would indicate that an item influences the prescriber away from a certain behavior; the “0” would indicate neutral or no influence. In this study, the Condition of Instruction did not allow for bipolar influence, and for ease of reading, the verbal labels were unidimensional. In this study, the -4 pole indicates no influence, and the “0” indicates the “middle” influence. Unfortunately, the mis-matched scale and labels may cause confusion for the participant. Future studies should consider this.

iv. Format of the Q-sort

The format of the Q-sort was adapted from existing Q-sort texts.[12; 104] Important considerations in the formatting of the Q-sort included: 1) instructions for sorting the statements into three anchoring groups, 2) the orientation of the grid where statements are ranked, 3) the instructions for ranking statements, and 4) the grid itself.

In a Q Methodology study, participants are asked to sort and rank items in a two-step process.[104] The sorting exercise anchors the items into three groups, a positive anchor, a negative anchor and a neutral anchor. In this study, participants were asked to sort the statements into the following groups: 1) those that strongly influence, 2) those that do not influence, and 3) those that somewhat influence their decision-making.

After the statements have been sorted into the three groups, participants then ranked the statements within each group by placing the statement in the provided grid. This step differentiates items within each group. The participants first rank the items within the “positive”/”most influential” group, then items within the “negative”/”least influential” group. Finally, they rank items within the “neutral”/”somewhat influential” group, filling in the middle of the Q-sort grid. In this study, the participants were instructed to rank the statements in the following order: 1) those that strongly influence, 2) those that do not influence, and 3) those that somewhat influence their decision-making.

Q-sort instructions, the Q-set, and the sorting grid were formatted to ensure the Q-sort was as easy to complete as possible. The Q-sort instructions were revised and edited numerous times in order to direct participants in a clear and concise manner. Breaks in the instructions were strategically placed in order to reduce cognitive burden for the participants. White-space was optimized and crowding of text was reduced to improve readability and reduce clutter on the page.

Ultimately, the font size of the text in the statements to be ranked determined the grid that was used. Arial size 10 was determined to be the smallest font size that could be used, based on readability. The statements were put into a table and formatted based on these criteria. The size of each cell was used to format the grid on which the statements were ranked. Using a ledger-sized (11" x 17") grid allowed all the statements to be printed using the minimum font size and sorted onto the grid. The grid was printed and folded in half, to create a "folio" to contain the "answer sheet" described in the next paragraph.

The separate "answer sheet," was used to streamline the data collection process for the participants. After sorting and ranking the statements on the 11' x 17" grid, the smaller answer sheet was used to record the statement numbers. The qualitative questions and additional demographic questions (discussed further in the next section) were also included on the answer sheet to streamline data collection; respondents had just one sheet to return, easing the respondent's administrative burden.

2. Demographic questions

In this study, the primary goal is to identify types of prescribers based on their perceptions when managing pain. Demographic questions were included to further describe the study participants. In other methodologies, demographic questions are often used to predict or categorize participants. In Q Methodology, demographics supplement the interpretation of results.

Items collected in the demographic questions included: participant role at work (MD, PA, APN), years in practice (0-5, 6-10, 11-15, 16-20, 21-25, or 26+), whether the participant had completed training that included how to treat patients with ill-defined pain and their mental health, social status, and functional capacity (Yes, No), and the length of time scheduled for office visits for a primary pain diagnosis. Also included were questions related to pain management behaviors: how often patients spent more than the allotted time with

pain patients, how often they cut short other visits to address a patient's pain management, how often they assess or discuss stress, anxiety, and depression with patient with ill-defined pain, and how often they refer patients to a Behavioral Health Specialist when the patient does or does not exhibit signs of stress, anxiety or depression.

3. Pilot testing

The instrument was pilot tested for two main purposes: 1) the clarity of the statements in the Q-set and 2) the format of the survey. As with all surveys, clarity of the statements is critical to the study's validity, as participants must be able to rank the statements reliably. While some degree of interpretation is left to the participant, the statement must reflect the intention of the researcher to the participant. For example, the statements in the Q-set were written to be as neutral as possible, leaving positive or negative interpretation to the participant. Various tiers were included in the statements to allow for study of the degree of influence and possibly serve to internally validate the statements.

The format of the survey is also crucial. This survey was self-administered, so it was important that participants completed the survey, especially the Q-sort, accurately.

Four prescribers individually pilot tested the instrument. Each provided new ideas to make the format more fail-proof until the last had no further suggestions. A scaled down version of the instrument (to accommodate the ledger-size Q-sort grid) can be found in Appendix C.

2. Survey Administration

Surveys were distributed and collected from November, 2014, to February, 2015, at the participant's desired location. All surveys were collected from participants within one

month of distribution. Some surveys were collected the same or next day; most were collected around three weeks after distribution. Participants were compensated $20 cash upon completion of the survey.

a. Survey Participants

As previously mentioned, survey participants were recruited from three health systems located in Madison, WI (see Study Setting, page 47). Again, respondents were recruited by word of mouth. The inclusion and exclusion criteria for participation were the same as in the qualitative phase of this study (see Interview Participants, page 51). At the end of this survey, respondents were again asked to nominate another prescriber who they thought would be a good candidate to participate in the study at the end of the survey. Participants from the qualitative phase were eligible to participate in the quantitative phase, but were not required to.

Watts and Stenner suggest an initial factor extraction based on the number of Q-sorts completed during data collection.[104], Rather than choose the number of factors to be extracted arbitrarily, they suggest having four to six Q-sorts for each factor to be extracted. For data collection purposes for this study, a target was set based on this suggestion and the four themes that emerged from the qualitative phase (described in the next chapter); anywhere between 16-24 Q-sorts would yield sufficient data to support an initial four-factor extraction. The results from that initial factor extraction would determine the subsequent number of factors to be extracted, as described below. The four themes were not used to determine the number of themes, nor were they used to interpret the results of the study; they were used to estimate the number of Q-sorts needed to satisfy needs of the study.

b. Consent procedures

Consent forms were given with the survey. Signed consent was waived as completion of the survey indicated consent.

c. Q-Sort Procedures

Surveys were self-administered in a paper-based format. Four participants preferred to complete the survey in the presence of the researcher, in order to immediately return the survey. This provided an excellent opportunity to observe the participants completing the survey and ensure they were able to accurately complete the survey. None of the participants reported difficult with the completing the survey, whether completed in the presence of the researcher or not.

3. Mechanics of Quantitative Data analysis

Factor analysis was conducted using PQMethod (vs. 2.35, Schmlock). After entering the statements and the data collected from study participants, factors were extracted unrotated using a centroid factor analysis [12], then rotated manually.[104] Multiple solutions were compared for parsimony based on the factor loadings as described below. The first model was run with four factors. This number was chosen as a starting point as this was the number of categories identified in the qualitative portion of the study, and there was a sufficient number of Q-sorts to support an initial extraction of four factors.[104]

The following section details the criteria for each step of the factor analysis. What is perhaps most important to understand about this analysis is the iterative nature of analysis and interpretation, yielding a final solution that is both statistically sound and substantively meaningful.

Table 3.2. List of formulae used in the factor analysis		
(a)	Significance	• $Significance_{0.001} = 3.09*SE$
(b)	SE	• SE= 1/√#of statements in the Q-set • Here, SE=1/√43 = 0.152
(c)	EV	• EV for Factor X = $(F_{QS1})^2 + (F_{QS2})^2 + (F_{QS3})^2 + \ldots (F_{QSN})^2$ • Where F=Factor loading, QSN=Q-sort number(N).
(d)	Variance	• Variance for Factor X = 100 * (EV/[no. of Q sorts in study])
(e)	Humphrey's rule	Cut-off for Humphrey's Rule = 2 * SE

a. Factor Extraction

Factors were considered significant if there were two or more significant Q-sorts for that factor. Q-Sorts with a factor loading of 0.39 or greater were considered significant at the 0.01 level. The cutoff for significance was calculated using the formula (a) in Table 3.2. After the initial factor extraction, data were rotated by hand, two factors at a time. One-, two-, and three-factor solutions were also extracted for comparison.

Solutions were compared on the basis of how many Q-sorts loaded on each factor, how many Q-sorts were confounded (meaning that the Q-sort loaded on more than one factor), and how many Q-sorts were non-significant (meaning that the Q-sort did not load significantly on any factor).[104]

Figure 3.1 is an example of the table used to help assess the solutions run in the analysis:

Figure 3.1. Example Table Used to Compare Solutions after Hand Rotation						
	Factor 1	Factor 2	Factor 3	Factor 4	Confounded	Non-significant
Q-sorts that fall into these categories						
Variance explained						
EV†						
†Eigenvalues						

Additional criteria for accepting a solution were the unrotated factor Eigenvalues (EV) and the variance explained by the rotated solution. This is overall variance explained, not to be confused with individual variances; greater than 35-40% of variance explained is generally acceptable for a solution. Together, these two criteria indicate a factor's strength and potential explanatory power. The more factors with EV greater than 1.0, the better the solution. EV is the sum of the squared factor loading for all of the Q-sorts for each factor. Likewise, the greater the variance explained, the better the solution. Variance explained is defined as the shared meaning in the data that explains the relationships between the Q-sorts.[104] Finally, Humphrey's rule was used to assess statistical significance. Humphrey's rule states that a factor is significant if the product of the two highest factor loadings (absolute value) is greater than two times the standard error. The formulae used to calculate EV, variance, and Humphrey's rule can be found in rows (c), (d) and (e) of Table 3.2.

b. Creation of Factor Arrays

Factor arrays were created once the solution was accepted. Each array represents a prescriber type or profile that is used to describe prescribers by their perceptions. All Q-sorts that load significantly on a factor were included in the factor array. A factor array is the order of the statements as they load on that factor, and is created by weighting the factor loadings.

A z-statistic is also calculated in order to compare the factor loadings of individual statements across factors. Bipolar factors are factors in which the significant factors are all negative. Bipolar factors were rotated 180 degrees, in order to accurately calculate the factor loadings for that factor for interpretation.

4. Interpretation of Factor Arrays

Appropriate interpretation of the factor arrays is fundamental to a successful study involving factor analysis, regardless of whether the factor analysis is run by-person or by-factor. However, keep in mind that the resulting interpretation of the factors describes a profile or “thought type” of an individual when factor analysis is run by-person as it is in Q Methodology. When running factor analysis by-factor, the result is a scale that averages the various components of the scale to describe a person based on the traits measured in the data collection tool.[12]

The meaning of each thought type is derived qualitatively by interpreting the arrays. Interpretation of the factor arrays was conducted using an abductive approach. Factor arrays were analyzed systematically using multiple indices from each factor array. Each index provides a different angle from which to gather meaning from the array.

To establish general trends across the array, consensus and controversy statements were reviewed for what prescribers agreed and disagreed on. To review each factor individually, extreme statements and a crib sheet were used. Extreme statements identify notable statements for each factor singly and were defined as statements with a z-score greater than 1.0. A crib sheet (Figure 3.2) establishes which statement for each factor are ranked highest (+4; i.e., having greatest influence on decision-making), higher for that factor compared with other factors, lower for that factor compared with other factors, and at the

negative end (-4; i.e., having the least influence on decision-making). Interpretation was also aided by the demographic factors provided by respondents.

Figure 3.2. Example Crib Sheet used to Aid Interpretation	
Item #s	Statements
Items ranked +4 in this factor	
Items ranked higher for this factor than by other factors	
Items ranked lower by this factor than by other factors	
Items ranked -4 in this factor	

5. Validation of Interpretation

Validation of the interpretation was done by two small groups of stakeholders. In each group were two PCPs, who would be able to place themselves in the position of the hypothetical respondent who was described by the factor array. Participants of the either phase of the study were eligible to participate in the validation process, but were not required to, and additional PCPs were also recruited. Validation carried out in this manner minimizes researcher bias from the process.

Participants were invited to a small group discussion on the findings of a study on prescriber perceptions. The participants were asked to review and summarize each factor. Together, the small groups of PCPs evaluated the content of the arrays, found common themes within the array and reached consensus regarding the perspective described in each array. The goal of the discussion was to summarize each array based on the qualitative meaning revealed through interpretation.

D. PARTICIPATION

Table 3.3 summarizes participation across the phases of study. Participants from Phase 1 were eligible to participate in subsequent Phases, though it was not overtly encouraged, and every effort to recruit new prescribers was made. There were 9 participants who participated in both Phases 1 and 2. One prescriber participated both phases of study and the Validation of results. Another prescriber participated in Phase 2 and the Validation of results.

Table 3.3. Participation Across Phases

Study ID	Phase 1	Phase 2	Validation
1	X	X	
2	X	X	
3	X	X	X
4	X	X	
5	X		
6	X	X	
7	X	X	
8	X	X	
9	X	X	
10	X	X	
11	X		
12		X	
13		X	X
14		X	
15		X	
16		X	
17		X	
18		X	
19		X	
20		X	
21		X	
22		X	
23		X	
24		X	
25			X
26			X

E. SUMMARY

This is a two-phase, mixed-methods study aimed at 1) exploring prescriber perceptions when managing pain, and 2) describe types of prescribers based on their perceptions. The first phase of the study used semi-structured interviews to qualitatively explore what influences a prescriber when managing pain. This addresses the first research aim: to explore what influences a prescriber when managing pain.

The themes identified in the analysis of these interviews were then used to create statements that, in the second phase of the study, were sorted and ranked according to a Q Methodology approach to data collection, known as the Q-sort. The second phase of the study addresses the second research aim: to identify "prescriber types" based on the perceptions they hold when managing pain. The Q-sort was self-administered in a print questionnaire. In addition to the Q-sort, the questionnaire included qualitative questions to better understand the rationale for why prescribers ranked the statements as they did and demographic questions to better understand the survey participants. By-person factor analysis was used to mathematically identify "prescriber types," or profiles, which describe the ways prescribers approach pain management. These prescriber profiles were interpreted and validated qualitatively.

For each phase of the study, a new group of participants were recruited. Participation in one phase of the study did not preclude the prescribers from participating in a subsequent phase of the study, including validation.

The next two chapters present the results of this study. The results of the qualitative phase of the study will be presented in the next chapter, titled "Influences on Decision-Making." The results of the quantitative phase of the study are presented in the following chapter, titled "Describing Prescriber Types."

IV. PHASE 1— INFLUENCES ON DECISION-MAKING

The first phase of study addresses Aim 1: to explore what influences PCP decision-making in pain management. Following their identification, these influences also generate the Concourse, which produces the Q-set that is central to the second phase of the study.

Semi-structured interviews were conducted to explore Aim 1. Prior to the interview, prescribers completed a pre-interview questionnaire to establish their decisions in pain management. Each prescriber responded to a questionnaire that randomly contained one of three clinical scenarios. During the interview, prescribers were asked about the motivation and rationale behind decisions that they indicated in the questionnaire.

Interviews were audio recorded[1] and transcribed. The transcripts from the interviews were then qualitatively analyzed to identify items that influence decision-making. Items were grouped into themes and sub-themes to further establish relationships between the themes. These items form the Concourse, which represents the breadth of items that influence a prescriber when managing pain.

A. INTERVIEW PARTICIPANTS

In total, 11 participants completed interviews during the months of June and July 2014. Table 4.1 summarizes their demographics. Participants were generally well distributed across gender, role and health-system.

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[1] It should be noted that, due to technical difficulties, Interview 4 was not audio recorded. This was discovered immediately upon completion of the interview. Fortunately, copious notes were taken during the interview, and once discovered, all the details of the interview were recorded as best as possible by the interviewer. These provided in-depth coverage of the interview.

Table 4.1. Demographic Description of Participants

		Number of participants	Percent of participants (%)
	Total	11	100
Gender	Male	6	55
	Female	5	45
Role	MD†	7	64
	PA‡	4	36
Organization	For-profit	6	55
	Co-op	5	45
Setting	Family Medicine	8	73
	Internal Medicine	3	27

†MD=Physician
‡PA=Physician Assistant

Although Advanced Practice Nurses (APNs) were recruited to participate in this study, none responded. The reason for this is unclear. One possibility is that physicians and physician assistants constituted the preponderance of PCPs who work in the clinics where the recruiting efforts took place. The small sample size and the relatively small proportion of APNs could account for their absence in the sample. Another possibility is that recruitment was conducted by word-of-mouth and by snow-balling. Prescribers may be more likely to nominate colleagues they see regularly, with whom they work closely, and who are similar to themselves. With a greater representation of physicians and physician assistants in the original recruitment effort, it follows that fewer APNs would subsequently be identified as potential participants.

B. INFLUENCERS OF PRESCRIBER DECISION-MAKING: THE CONCOURSE

Four major categories of themes emerged from the interview data: patient characteristics, therapy, provider characteristics, and organizational characteristics. Organizational characteristics were combined with provider characteristics because it is the perception of organizational characteristics that influence providers. Table 4.2 presents the themes in this way. As a general trend, prescribers prioritized patients first. Treatment considerations were mentioned in the context of a specific patient, as opposed to focusing on the treatments themselves. The exception to this is opioid pain medications, which some prescribers felt were more of a danger due to the medication's addictive nature. Provider characteristics were mentioned more as an afterthought, when probed further during the interview.

For each theme, details and example quotations from the interviews are presented in the following sections of this chapter. Sub-categories and themes emerged from within each of the three categories that emerged from the data. In the identification and categorization of themes, it was oftentimes challenging to put a theme into just one category. For example, are treatment goals a characteristic of the treatment or of the prescriber? Either category makes sense. For simplicity sake, themes have been presented as falling within one category, rather than two. The choice of category was based on the "subject" of the theme. Returning to the example of treatment goals, it was decided that treatment goals are a characteristic of the treatment, not the prescriber. Prescribers have a philosophy about how treatments are used, and take into account the treatment goals. Another example is patient demographics, which fall under patient and are both clinical and social. The perspective of the prescriber participating in the interview was used to categorize patient demographics. If the prescriber spoke of demographics as a clinical characteristic, it is categorized as such.

Table 4.2. Themes Identified from Qualitative Interviews

	Theme Identified
Patient	
Clinical	Demographics
	Previous treatments
	Comorbidities
	Pain associations
	Duration
	History of addiction
Access	Treatment Access
	Provider access
Behavioral	Poor function
	Poor compliance
	Red-flag behaviors
Social	Social environment
	Relationship with other providers
Social Psychological Traits	Poor coping
	Poor motivation
	Unrealistic expectations
Psychological	Mental Health Status
	Health beliefs
Therapy	
Treatment goals	Treating symptoms versus the problem
Safety	Side effects Drug interactions Risk-benefit ratio
Provider	
Psychological	Poor attitude towards pain patients
	Role
	Confidence/Self-efficacy
Organizational Context	Too many patients to see, not enough time
	Pressures for patient satisfaction and giving in to patient demands
	Disciplinary action by employer or Medical Examining Board

1. Patient Characteristics

Themes within the patient characteristics category were further categorized as clinical, access, behavioral, psychological, social psychological and social. Patient characteristics are the most complex, with the greatest detail. This is not surprising considering pain management is an art that requires a thorough study and strong understanding of the patient.

Clinical characteristics can be described as the general demographics (e.g., age), previous pain management attempts, co-morbid conditions, pain presentation, duration and history of addiction. Access issues can be described as access to treatments (e.g., prescription medication) and to other providers who administer a therapy (e.g., physical therapy). Patient behavioral characteristics can be described as compliance, function, and red-flag behaviors (i.e., treatment non-response, threatening litigation, requesting opioids, and adversarial body language or behavior). Psychological characteristics can be described as health beliefs and mental health considerations (e.g., anxiety, depression). Social psychological characteristics can be described as coping, motivation, and expectations. Social characteristics can be described as the patient's environment (e.g., family, friends, work), relationship with health care providers, and access to care.

a. Clinical Characteristics

Prescribers started pain management decision-making, not surprisingly, with patient clinical characteristics. They described the patient history and physical assessment as their main mechanisms for gathering this information. Most of the information gathered was to determine the root cause of the pain and how to best treat it.

i. Diagnostic information

Much of the purpose of the history and physical was to establish a diagnosis from which to make decisions regarding treatment options. This follows the conceptual framework presented in the Literature Review, where the first step in clinical decision-making is to determine a diagnosis. Only after the diagnosis is determined can the prescriber make treatment decisions. In the quotes following and throughout this chapter, the relevant text is underlined to indicate why the quote was coded as such.

> *"So in a clinical scenario, I wanted to do more evaluation. I want to know what my physical exam showed, but [the clinical scenario] didn't provide me with that. It said use this information to make the decision.*
> [INTERVIEWER: What would you look for if you were doing a physical assessment?]
> *Her full range of motion, where she had pain with her range of motion, if she had any weakness in her shoulder motion. I'd want to see what her shoulder looked like on exam, see if she had weakness by her scapula, if there was any nerve impingement, check her nerve findings."—Respondent 1*

ii. Previous Pain Management

After establishing the diagnosis, prescribers then considered what the patient had already tried in managing their pain, whether directed by another prescriber or as self-care. The first consideration was whether the patient had tried a treatment previously, and, if so, to what extent they had given it an adequate trial. While this could also be considered a treatment consideration, prescribers viewed this within the context of the patient, in establishing the patient history. What didn't work was in some ways "diagnostic," helping the prescriber know how to manage the pain. They might also question whether the original diagnosis was correct.

> *"[The] two most important was that things they tried were not working and that now there's more kind of impairment and impact on just daily living and daily life warrants kind of trying some new things."—Respondent 8*

> *"I try to first off figure out is the diagnosis reasonable? Is it plausible? If so, what are the evidence-based proven treatment options? Next would be, what has the patient tried?" –Respondent 3*

> *"The non-response to treatment, you know, could have multiple aspects of it. Maybe it's a mental health overlay. Maybe it's true pain and we're not high enough with pain medications, per se. Maybe we're on the wrong diagnostic path. So that's, you know, those are the things that you have to reconsider, I guess."—Respondent 7*

iii. Comorbidities

Additional information on the clinical status of the patient helped the prescriber in making treatment decisions. Co-morbid conditions and past medical history rule out certain treatment options, leading the prescriber to choose one option over another. Past medical history can also explain some of the patient's desires, which prescribers also took into consideration when making treatment recommendations.

> *"It depends on whether the patient has a history of any stomach, intestinal kind of issues where you want to go with something that's particularly lower stomach intestinal risk than ibuprofen might be."—Respondent 7*

> *"But in terms of chronic pain, pretty much any previous health or illness experiences, I think, can affect that."—Respondent 9*

iv. Duration

Duration of pain is discussed in the pain management literature as being important because it is an indication of possible conversion of acute pain to chronic pain.[14; 56] In addition, some prescribers noted that the underlying problem of pain changed as the duration of pain lengthens, affecting how they manage the pain.

> *"If we have truly ruled out everything else, then duration of pain doesn't bother me so much. If I am certain that this is all just musculoskeletal, then I will give physical therapy some time."—Respondent 7*

> *"It's not uncommon for shoulder issues, particularly adhesive capsulitis can go on, I mean, even not everybody responds to a steroid shot. I mean, it can go on for a year or two."—Respondent 2*

> *"Well, so because it was painful, that's usually the first thing we start with. If she was having trouble sleeping, more muscle relaxers. Otherwise, we would need to use those, yeah.*
> [INTERVIEWER: Okay, so it's the pain. Are you trying to address inflammation or . . .]
> *Probably not after two months, yeah."—Respondent 9*

v. Age

Prescribers noted that they observe cultural differences in patients of different age groups. Patient age explained part of how the patient responds to pain, and their desires for pharmacologic pain management and referral to behavioral health. Only with extremely elderly patients did they consider differences in treatment effect.

> *"So I do strongly believe that start conservative and work your way up is the way to go because, depending on the age group, 20's, 30's, 40-year-olds come in wanting pain medication. So in your mind, you have to just kind of have a protocol that you're going to follow, and you tweak it."—Respondent 11*

> *"It depends on the individual and their background. You know, sometimes I find that some older folks, that's kind of taboo, particular, to talk about that there's a mental health component."—Respondent 5*

> *"Patients deal with pain differently. The younger generation--20s and 30s-- can't handle any pain. Older people in their 80s deal with it way better."—Respondent 4*

> *"She's not that old, but we do a lot of much older, 80-, 90-year-olds, so we have to think about medications that don't necessarily go to their gut. They don't process them the same way."—Respondent 11*

vi. History of opioid addiction

A history of opioid addiction influenced prescribers away from prescribing opioids to these patients. For all patients, they would screen for substance abuse, not limited to opioids, in order to safely treat pain. It was commonly acknowledged that addiction is a side effect of opioid pain medications, which is discussed later as a treatment characteristic.

> *"I try to do good screening, and talk to patients about dependence issues and addiction issues. I keep people under good surveillance. I bring them back for follow-up. I don't, there are certain situations where I wouldn't prescribe an analgesic if I had concerns, especially in someone that's already suffered from some opioid addiction. Then I'd typically, or even alcoholism, I'm pretty careful about, I tend to not prescribe."—Respondent 6*

b. Access

i. Treatment access.

Access refers to how readily available treatments are to the patient. This refers to the absence of the potential barriers that may prevent a patient from receiving treatment. To receive treatment, a patient must generally see a prescriber, or somehow determine which treatment is best. Then they must be able to pay for or otherwise acquire the treatment. Treatments must also be administered, whether by the patient or by a provider. Depending on the provider, different options may exist; for example, a pain specialist may offer a wider array of treatment options than the PCP.

> *"So then somebody comes when they've injured themselves sort of on the run in their everyday life, I can't always get acupuncture or chiropractor or other things paid for. Whereas when somebody comes in as a workers comp issue or as a car accident issue, I can get those kind of things covered more easily for them. Because I think medically they're indicated often, and especially for muscle spasm and musculoskeletal kind of concerns, they're very helpful and can be indicated, so."—Respondent 7*

> *"Encourage him to go to physical therapy and, you know, try and do things to say, why are you not going to physical therapy? You can't get time off work? You have transportation problems? You're not sure how to make the appointment? Here, my nurse will help you get this appointment, it's right downstairs here."—Respondent 10*

> *"And the things I would be offering the patient would be, the patient would be something very similar to what my other, my colleagues would. And so the pain clinic can offer more, or at least be more expert about it than primary care can be."—Respondent 9*

ii. Provider access

In addition to the patient's relationship with other providers, prescribers referred their own relationships with other providers. If the prescriber has a good relationship with another provider, he/she might get their patient in to see the other provider sooner. Having services in the same building facilitated relationships.

> *"For certain patients with certain conditions I direct them to specific physical therapists, yeah. There are some things that are more routine. There are, a lot of our therapists are very good at. I don't specifically direct somebody for that. But, yeah, there are a lot of conditions where I say, I want you to see this person.*
> [INTERVIEWER: Okay. And you have a relationship with the physical therapist then as well?
> *Mm-hmm. Yeah, part of my job as the provider is to figure out, because as a family doc I don't fix most of the things. I try to help people figure out where to get that help."—Respondent 1*
>
> *"Because they're in the same building with me, and I have a pretty good relationship with some of them, especially the ones whose wives are pregnant, who I'm seeing for their pregnancy. No. That almost borders on [Personal Health Information] there. No, I mean, because I have a good, sometimes I go down and go like, this is a bad situation, it's been more than two weeks, but here's why I think it's appropriate in this situation anyway. Can you make exceptions?"—Respondent 10*
>
> *"So when I'm done with the patient, or even while the patient is waiting for me, [the Behavioral Health Specialist] can come in and talk to the patient and talk about behaviors around pain, lifestyle changes, things they may have to do mentally to get themselves well. And so that's very helpful, because it's sort of an intervention right in the office, right with me. They don't have to wait again. They don't have to schedule anything. So that's helpful for some of the patients."—Respondent 7*

c. Behavioral Characteristics

Unlike clinical characteristics, prescribers passively observed behavioral characteristics. One prescriber noted that patients seen for pain are commonly seen just once. These patients want to know how to manage their pain and move on. This is important to point out because the patients who return repeatedly or are "problem" patients are oftentimes the patients who come to mind first when pain patients are discussed. It's important to note that there are patients who are not a problem, and get better quickly, with minimal attention from the prescriber, and provide a contrast to the patients who are "problem" patients.

> *"You know, typically, oftentimes, you see when, you know, somebody has shoulder injury, and she's like, okay, come in and what can I do about this? How can I change it?...They get their shot, and they're like, Thanks Doc, see you." – Respondent 5*

i. Compliance

Prescribers referred to compliance with regard to the patient returning for follow-up visits. They wanted to know if the patient had followed the recommended treatment options from the initial or previous visit, and if so, how that was going. If not, they asked them to try a little harder at them, rather than moving on to something else. It was as though each prescriber had their preferred treatment protocol that they started with and altered/tailored based on the patient's status. If the patient was compliant, but felt the treatment was not helping, the prescriber would change his/her treatment recommendations.

If the patient was not compliant, they would reiterate the importance of following through with treatment recommendations. Some prescribers would question the patient about barriers to following through, to see if he/she (the prescriber) could help minimize the barriers.

> *"How is PT going? How often are you going? Are you going twice a week? Do you feel like you're making some improvement? And usually, if you break it down and you ask them, they'll say, you know what, I am getting better, I'm just so frustrated that I'm not doing my ceramics…. How are you taking the ibuprofen? Are you doing it like we talked about, three times a day? How often are you needing the pain medications? Because that can make people really groggy and really out of it and really not feel well, which can lead to you being frustrated and depressed and all of that, so reiterating all parts of it."—Respondent 11*

> *"Patients feel like they've lost control and decision-making properties, so they gain control by, you know, saying I'm not going to take his blood pressure med. I'm going to use my vitamin, you know, or my supplement or herbal preparation."—Respondent 3*

ii. Function

Prescribers spoke of patient function both with regards to personal function (activities of daily living) and social function (getting out and about). This is related to but still different

from physical function (e.g., range of motion), as physical function is a clinical criterion. Prescribers underscored the importance of the patient functioning in society, as social withdrawal can lead to depression. Prescribers also noted that similar pain symptoms can have different effects on different patients.

> *"And then with the [activities of] daily living, it's because that's what people are only . . . for a short time. And they're doing their life the rest of the time. And so if that's impacted, we have to figure out how to mitigate that, help them get back to their baseline."—Respondent 8*

> *"I definitely want to have the patient be able to work and function. So that's probably a top priority and sleep."—Respondent 6*

> *"If someone has pain, they're not going to want to be able to do things that add color to life, you know, have relations with their spouse or have enjoyment with their spouse or do the activities that are necessary to run a household, go to work. There may be financial implications, you know, not being able to hold down a job."—Respondent 3*

> *"Pain varies. If somebody comes in with a mild rotator cuff tendonitis, and they can still function, it's less important to try to provide pain control."—Respondent 2*

> *"The goal is to, you know, if we are able to keep them working, that's great, or keep them doing their normal activities, because that's what keeps people sane is doing their normal activities. People get very depressed quickly if you take them away from all of their activities."—Respondent 11*

iii. Red flags

Prescribers reported "red flag" behaviors, which included: 1) exhibiting pain that doesn't improve, 2) threatening litigation, 3) requesting an opioid, and 4) adversarial body language or behavior. These behaviors caused prescribers to think further about the patient and their pain.

Threatens litigation

> *"I mean, I have patients, well, I'm going to sue you too. You know, if they kind of make it more of a, would I change my treatment recommendations? Probably not. The only thing I think it would*

change is, you know, like imaging studies for documentation of what's going on with him."—Respondent 2 (transcribed as 1)

"And so I also think that litigation always makes medical doctors nervous. So I think that that, you know, affects us some."—Respondent 7

Requests opioids

"The classic scenario is when someone comes to you and tells you that they need a particular brand name of pain medication. You know, that's a red flag right there. And it doesn't have to be a prohibitive red flag, but it just catches your attention as a provider. Usually the doctor is the one recommending specific brand names or specific medications, not the patient. And so that's a red flag. And it's, you know, it's complicated as to when, how you cross the threshold with pain from non-narcotic to narcotic. And it would generally not be something I would want to do on a first visit with somebody."—Respondent 9

"I think, you know, if the patient makes specific requests for things, that either can raise some red flags, or maybe they say, well, I want to try chiropractic, or I want to try something that's not medication. That would change it, because then I would do more either acupuncture, recommendations for acupuncture, massage, and maybe more chiropractic care. So sort of if they come in and say, no, I want to try this, or I want to try that, or if they come in and say, I just want some hydrocodone, because I borrowed it from my buddy. Then that does kind of change things a little bit and, you know, just puts you in a different perspective on what the patient believes. That starts to go towards the patient's belief about their care, what's really wrong, and what they want to do about it, so.—Respondent 1

"I'm really trying to change the mindset of patients of, I understand that oxycodone helps you, but we also need to involve PT and comp med and behavioral health specialists and mental health, you know, to try to comprehensively control your pain. That just, you know, using this drug and not doing anything else is not really acceptable. That's not something that I feel comfortable with, so."—Respondent 6

Adversarial body language or behavior

"They'll be looking, they'll be crossing their arms, telling you that there's no way they're going to do what you tell them to do, or there's lack of eye contact, or there's adversarial comments or just you get a good sense of that they're not on board."—Respondent 3

"[When] the patient is being belligerent to you, that's when you refer to the pain clinic to try and . . .
[INTERVIEWER: Okay. So the belligerence is kind of the last straw?]

> *Yeah. That's, well, I mean, yeah. How, you know, it's, if she doesn't want to work with me, then she doesn't want to work with me. And that's her choice, and we can find other people for her to see, basically."—Respondent 9*

These behaviors didn't always result in changes to the prescriber's treatment recommendations. Some felt the red flags were an indication of the patient's psychosocial function; others simply felt it was an indication of what the patient was willing to try. Almost all prescribers used these red flags as discussion points with the patient, sometimes explaining more about the treatment, other times trying to understand the needs of the patient better.

> *"You know, I wouldn't tell them that that's unnecessarily unreasonable. I would just say that it's premature, and that it would be something we'd get to if these other things don't work. And that's pretty much how I feel. I mean, I don't think it would be inappropriate at some point to consider those medications, but you want to just make sure you've done some other things first."—Respondent 9*

> *"And then I would have them follow up, and then I would probe about compliance, progression of symptoms, co-morbid conditions, their feelings about whether they're going to get better or not."—Respondent 3*

One prescriber did not use red flags as a starting point for discussion, and simply offered opioid pain medications or referred the patient to a specialist. In reference to requesting opioids, the prescriber stated:

> *"I feel like they're looking for relief. And, I mean, maybe not at this point in someone, but, you know, looking for relief, looking for things to be better…. So probably actually I'd, probably actually I would say, do you need something stronger for your pain, then here's this narcotic."—Respondent 10*

In reference to the patient threatening litigation, that prescriber stated:

> *"At that point, that's when I would refer them to a pain specialist, to a, I'm referring them to Spine Clinic now. I do not want to have anything else to do with this guy with back pain, with litigation problems."—Respondent 10.*

d. Social Characteristics

"Patient social characteristics" encompasses a wide variety of factors. Prescribers interviewed in this study discussed three main aspects of the patient's social life as being important to pain management the patient's: 1) social environment, 2) relationships with health care providers and 3) access to health care.

i. Social Environment

Similar to a physical environment, the social environment can be thought of as the social relationships that surround the patient and form the context through which the patient experiences life. The elements of a patient's social environment include 1) individuals, such as friends and family, and 2) groups, such as a church or neighborhood. The social environment can also describe the general atmosphere, such as conflict or support, in which the patient lives.

> *"I talk about support system a lot. And obviously, she's going to want to utilize other supports because her main, potentially her main support system is kind of undergoing a transformation. So I brainstorm about, you know, different supports in her family, with friends, in the community, like through church."—Respondent 6*

> *"It would be interesting to know if she has other social contacts, friends that she can talk to about this stuff or deal with her stress. I'd want to know about her job, any, so any sort of outside, any social contacts outside of her marriage, whether it's friends or coworkers. You know, family too, I guess. I don't know, other family, I should say."—Respondent 9*

> *"If someone has pain, they're not going to want to be able to do things that add color to life, you know, have relations with their spouse or have enjoyment with their spouse or do the activities that are necessary to run a household, go to work. There may be financial implications, you know, not being able to hold down a job."—Respondent 3*

> *"You know, if she's putting all her energy toward trying to get along with her husband, and her husband isn't putting any energy toward getting along with her, how is she going to have energy to take care of her shoulder?"—Respondent 2*

> *"It also depends on, you know, do they have children? Are you involved in your children? What else does this entail? What does this injury entail?"—Respondent 11*

ii. Relationship with Health Care Providers

Related but separate from the social environment is the patient's relationship with health care providers. Implicit in this is how the patient views the health care system, as providers are the connection between the patient and the health care system.

Prescriber decision-making was described as being influenced by patient relationships in two ways: 1) the relationship between the patient and the PCP, if they had known the patient a long time or not, and 2) if the patient needs referral for specialist care, the PCP directed the patient to the right specialist and prepared the patient for what to expect in that relationship.

> *"I think a relationship with healthcare providers. So she has, if this is somebody I've known for 20 years, and I was giving her advice, obviously, if she'd continue to see me for 20 years she trusts my advice. So that would be a step that would allow her to be feeling like she's heading in a positive way. You know, if I sent her to get meds, and the pharmacist instructs her, and they have a good relationship, that's another good step. If she's ever met the physical therapist before, the physical therapist treats her with respect and compassion, she's going to be more likely to follow through with the treatment recommendations and do the exercises and return for the next visit. So I think every relationship a patient has impacts how they do."—Respondent 1*

> *"There are some things that are more routine. There are, a lot of our therapists are very good at. I don't specifically direct somebody for that. But, yeah, there are a lot of conditions where I say, I want you to see this person. Yeah, part of my job as the provider is to figure out, because as a family doc I don't fix most of the things. I try to help people figure out where to get that help. You know, if I'm sending somebody to a surgeon, I choose the surgeon they're seeing. I mean, there was a surgeon here, a very, very good technician, terrible bedside manner. I prepared people in advance. I say when you meet this doctor, you need to be prepared that he is going to be very fast, very brusque. You know, he's going to ask a few questions. He's already going to have read your chart. He's going to know what's going on, and he's going to make a recommendation. And if you have*

> *questions, ask them quickly, because he's going to walk out of the room. And then call me when you're done if you have questions. That's how I do it. Or there's some surgeons who I wouldn't send people to, period."—Respondent 1*

e. Social psychological traits

Social psychological traits refer to how well a patient copes, the patient's expectations, and motivation. These are related to psychological characteristics, yet are differentiated by their inherent relational qualities. For example, coping implies that there is stress or conflict that needs to be dealt with; individuals do not generally cause themselves stress, indicating a relationship with another individual or situation.

i. Coping

Prescribers noted that some patients in pain don't cope well, and that those who don't cope well don't function well and deteriorate faster than patients with better coping skills. Poor coping indicated potential psychological issues, which caused concern for some of the prescribers.

> *"A lot of folks it's like, okay, well, you cope with it, and you go on."—Respondent 5*

> *"[Pain] really just is right there, kind of in their face, but can't get around it to be able to do the other things in their life that they want to do, which might be part of their coping skills, you know, it makes their coping skills kind of less effective for them."—Respondent 2*

> *"There's somebody who doesn't tolerate pain very well, because they'll be sitting there looking perfectly comfortable and saying they have a pain level of 14. Okay. That tells me there's somebody who's just not dealing well with things. And so they're very emotional. I'm worried more about the emotional status, not their pain status, yeah."—Respondent 1*

ii, Expectations

Expectations referred to what the patient anticipated in terms of what treatment they would receive and the outcome desired. Prescribers felt they could help the patient set

realistic expectations. They noted they set his or her expectations for the patient in terms of getting better, in order to get through the tough days, which the patient also should expect.

> *"And generally, in my kind of discussion with the patient, and, you know, the anticipatory guidance with this may take a little while. You know with a steroid shot, you hope that actually, if it is indeed very inflamed, and particularly if there is adhesive capsulitis, that hopefully, she might even get some fairly fast benefit. But with these other things, if that doesn't help enough that these other things may take a little more time."—Respondent 5*

> *"And so you know, there's always going to be little setbacks when things are healing. You know, a day or two might not go as planned, or you might overdo it and then get a setback. So I think that all plays into your . . . mood or anxiety."—Respondent 8*

> *"It's reassurance to the patient that you are going to get better and you are going to get back to ceramics, which is the hobby that she loved. So most of our patients feel like if you've taken it away, they can never get it back. And so you can get back to that point, but we obviously aggravated something, and we need to settle it down. And it could take six weeks, six months of PT, we don't quite know. But we, you know, the patient sometimes needs reassurance that they are going to get better."—Respondent 11*

> *"Placing the diagnosis in some sort of context. And then going, you know, sort of connected to that is where they want to go in terms of doing something about this. I mean, some people are very much not interested in medication. Other people are all about the medication."—Respondent 9*

> *"Then the muscle relaxer is sort of a plus/minus. I think it's more kind of standard care, a little bit of patient expectation that we do something else, but and often does, a brief course really does often resolve what they need to kind of get them over some of the lingering pain or the pain that they have."—Respondent 2*

> *"Patients have expectations, and patient satisfaction is a company goal. If I have poor patient satisfaction, up to 5% of my pay is withheld."—Respondent 4*

iii. Motivation

Prescribers described motivation as more a heritable trait, one that is difficult to change.

> *"I try to first off figure out is the diagnosis reasonable? Is it plausible? If so, what are the evidence-based proven treatment options? Next would be, what has the patient tried? Then what is the patient's willingness to get better?"—Respondent 3*

> *"There are people that are optimists and move on in life, and no matter what, they will be active and they will challenge themselves. And no matter how bad the pain is, they will work on it, which, I think, leads them to function better despite the pain, at least, which doesn't feed back into the depression and anxiety as much. And then there are people who won't go that route and who will more indulge in that, in the pain, so to say."—Respondent 7*

e. Psychological Characteristics

As with patient characteristics, patient psychological characteristics were identified as having influence on pain, and how likely it is to go away. Psychological characteristics became more important to prescribers when patients exhibited poor compliance, poor coping or red flag behaviors.

Psychological components were categorized as traits (motivation, expectations, and health beliefs) and mental health issues (anxiety and depression).

i. Mental Health Status

Most prescribers reported depression was a definite problem. They spoke of depression both in terms of how depression can influence pain and how pain can cause depression. Therefore, it was generally agreed that in order to adequately manage pain, depression, if it exists, must also be managed.

Depression

> *"So some people do have underlying depression that they just are able to manage, and then it just takes a situation like this and it becomes full blown. So that's why you want to stay on top of it so it doesn't get out of control."—Respondent 11*

> *"Everybody with chronic pain is at high risk for depression."—Respondent 9*

> *"When people are depressed, I think it's harder to have adequate treatment of their pain."—Respondent 3*

> *"I think depression and anxiety feeds on pain. Pain feeds back into that. So it's a cycle. So if you don't address both, you're not going to get very far with the pain treatment, when it's somebody that returns and comes back and the pain isn't getting better. And so, to me, you have to address both."—Respondent 7*

> *"There is a book called The Trauma Spectrum by Robert Scaer, who actually talks about, from a neurology standpoint, how people who have had traumatic events in the past probably make new brain connections, and how the brain connections and the physical connections are all one after all. It's not a separate body. And so I think it directly affects people. PTSD, depression, we know that depression increases pain levels. Anxiety increases pain levels. And it feeds each other, so it's hard to separate those out. I think they directly affect that."—Respondent 7*

Prescribers also reported anxiety is an issue, but differed in how they thought of it. Some reported anxiety was an indication of how bad the situation had gotten for the patient; others reported that anxiety and depression were similar in that they can influence pain. Therefore, some prescribers indicated they would increase or change treatment recommendations to better manage the pain, whereas others would treat the anxiety as its own symptom in addition to the pain symptoms.

Anxiety

> *"You know, and the heart racing, sweating, and blood pressure, you know, those three would be high on the, you know, really a change in fundamental functioning and clearly the emotional manifestations all really kind of like, ooh, red flags."—Respondent 5*

> *"The fact that she's got anxiety related to that stresses how much this is an issue, so we really need to work on that."—Respondent 11*

ii. Health Beliefs

Health beliefs were referred to as an indication of what the patient wanted. Sometimes this does not coincide with the treatment recommendations and other times it had no impact. However prescribers were cognizant of the patient's beliefs and tried to work with them.

> *"Or maybe she has some preconceived notion about narcotics that she doesn't even want to tell me how bad the pain is because she doesn't want hydrocodone. So there are people like that, especially in our elderly population that don't want narcotics. So they may not tell you how bad it really is."—Respondent 11*

> *"And, you know, sometimes it's difficult, because people have very firmly held beliefs, even if they're not accurate."—Respondent 3*

iii. Pain Associations

Pain associations refer to what the patient attributes the pain to. Generally, pain has a negative connotation—being related to injury or another cause of dysfunction. Some prescribers stated that pain can also be attributed to something that the patient wants to do. In this quote, the prescriber gives running a marathon as the example. Although the pain itself is not desired, the goal of running a marathon diminishes the perceived effects of the pain. Prescribers stated that patients had difference responses depending on what the pain is attributed to.

> *"I think all pain has a psychological, a potential psychological context, or psychological association. And pain that's associated with good things, like maybe running a marathon or something like that, is perceived as totally different than pain that's related to bad things like a car accident, or. And so, and I think when they've studied actual pain perception, it's, you can prove that it's, that pain is perceived differently depending on the context like that." —Respondent 8*

> *"So you don't own the reason for the pain. Whereas, if you're, if this is overuse injury, you know, it's because you are doing this with the mouse all the time or bending over or whatever. You have, there is some responsibility on yourself for the pain and to get over it. And I think some people stumble with the fact that this is not fair this happened to me, and they can't kind of get over that fact that it's unfair, I shouldn't have to deal with this. Whereas, you know, they did something, an overuse is a good example." —Respondent 1*

2. Treatment Considerations

Aside from patient characteristics, prescribers also considered features of possible recommended treatments as well. It is important to understand, though, that prescribers had

a prescriber philosophy that they followed, whether consciously or not. While prescriber philosophy is a prescriber characteristic, their philosophy was based on their perceptions of the treatment, mostly about whether it treated the underlying problem or managed symptoms of the problem.

Treatment considerations were thought of within the context of the diagnostic decision, and were grouped in one of two categories: 1) whether the patient had tried it and 2) safety (side effects, drug interactions, risk vs. benefit).

a. Treatment goals

Each prescriber had a preferred treatment plan that could be tailored to a specific patient. Some prescribers preferred non-pharmacologic treatments, such as ice and physical therapy, while others preferred non-opioid pain management. Their reasons for preferring non-opioid pain management varied, which were to restore function, either physically (e.g., improve range-of-motion) or occupationally (e.g., get back to work, be able to perform activities of daily living). Some prescribers viewed pharmacologic pain management as a means to alleviate pain enough to enable the patient to do physical therapy that would correct anatomical dysfunction; others sought to simply reduce pain with pharmacologic pain management.

> *"So in your mind, you have to just kind of have a protocol that you're going to follow, and you tweak it. Every patient is different. But you have to know what you're willing to give."—Respondent 11*

> *"I usually tell patients as far as a medicine goes, that's the foundation of everything else, that we're going to kind of build along that, that that is something that we really are committed to doing for muscular pain like this."—Respondent 2 (transcribed as 1)*

> *"About 15 years ago, we switched from codeine to hydrocodone. I'm not sure why. Tradition?*
> [Interviewer: So it doesn't have anything to do with side effects?]

Don't know."—Respondent 4

None of the prescribers preferred opioid pain medications as primary treatment of pain; those who would prescribe opioid pain medications used them for only “severe” pain, such as when the pain interfered with daily living or sleep, or if the patient requested them, the prescriber might give a small amount. The explanation for this is that opioids treat only the symptoms of pain, but not the underlying problem causing the pain.

How prescribers went about treating the underlying problem varied by prescriber. Some were more passive while others were more aggressive. This also depended upon the problem they were treating. However, when treating the underlying problem, it was generally accepted that physical therapy (including ice and rest) with or without pharmacologic management of pain was preferred over purely pharmacologic treatment.

> *“So usually, I have the patient stop the aggravating activity for a week, ice and heat anybody can tolerate safe, and then ibuprofen if they’re able to take it. Usually with that, I’ll do 600 mg 3 times a day. And then I like to get people into PT or OT right away, depending on, you know, where it’s at, so PT, because the sooner we start the better. And again, if I can avoid medications, I think that’s better for most people.”—Respondent 11*

> *“Next on the list would be the anti-inflammatory as kind of a priority. I usually tell patients as far as a medicine goes, that’s the foundation of everything else, that we’re going to kind of build along that, that that is something that we really are committed to doing for muscular pain like this.”—Respondent 2*

> *“If the patient said, I’m only going to do one thing, what one thing should I do, I would say ice….Get, you know, the reduction in the inflammation down.”—Respondent 5*

> *“I try to make them better as quick as we can without a lot of medication. So I want this to be something that we can fix kind of once and for all and not become a chronic issue. And that’s where I think PT really helps. So I’m a big fan of PT because I think they can give you useful techniques and exercises to do at home and all of*

> *those things that medication just can't give you. Medication is a quick fix."—Respondent 1*

> *"If you can make a connection with PT and get people, that relationship developed, that's amazing because that's really what they need is to, PT helps diagnose the issue…. So for me, the pain is a symptom, not the diagnosis. So if someone comes in with a headache, I need to know why they have a headache. I can't just say, oh, you have a headache. Here, I'm going to treat you this way. I need to know what caused the headache and what type of headache and what else is going on, or I'm not treating it appropriately. The same thing with the shoulder."—Respondent 1*

b. Safety

Safety referred to side effects, drug interactions, and the risk-benefit ratio. Prescribers mentioned they would look up the information on these characteristics of treatments if they were unsure about them.

i. Side Effects

Prescribers spoke of treatment considerations, such as side effects and drug interactions, in the context of the patient. Within this context, they often considered whether side effects were acceptable or contraindicated for that specific patient. For example, they would not prescribe a muscle relaxant for a patient who operates heavy machinery in their occupation, but they might prescribe if for a patient who has the option to sleep and rest.

> *"And then gabapentin is, I like that for all sorts of neuropathic kinds of pain, just mainly because it's so well tolerated and so nontoxic, so that that would be a good second choice in almost any situation, in my experience."—Respondent 9*

> *"How often are you needing the pain medications? Because that can make people really groggy and really out of it and really not feel well, which can lead to you being frustrated and depressed and all of that, so reiterating all parts of it."—Respondent 11*

> *"I think you need to deal with all those other things first, and if, in the end, your only option is to treat the patient with opiates, you know,*

> *there's going to be addiction as part of that. And that's just a side effect, just like any other side effect. And no,t you know, not that it's a trivial side effect, but that it's just an outcome of the treatment. And if you can avoid it, it's great. But if you can't, then it's something you have to deal with."—Respondent 9*

ii. Drug Interactions

With regard to drug-interactions, one prescriber stated he would prefer a medication that had no drug-interactions over a drug that has many known drug interactions, even if the patient was not on any other drugs. However, if the drug with many drug interactions worked better to treat the patient's pain, he would use it with no concerns.

> *"The patient's other medications might impact me. I don't like carbamazepine, partly because of drug interactions, and so the gabapentin again is easy that way."—Respondent 9*

iii. Risk versus Benefit

Implicit to assessing safety is the risk-benefit assessment that prescribers conduct. Whether consciously or subconsciously, prescribers calculated this risk-benefit assessment by weighing the clinical condition and the patient's needs with the risks associated with a given treatment option.

> *"I try not to use [muscle relaxers] for very long, because one, they're awfully sedating, and they can cause problems all by themselves, that you don't need to use them for very long."—Respondent 2*

> *"Are they pushing [opioids] because they're really in a lot of pain, and they feel, you know, really, like they're not functioning. They're not sleeping. Like they really do could benefit from this medication. Because they can be beneficial, for sure."—Respondent 6*

3. Prescriber Characteristics

Prescriber characteristics refer to features of each individual prescriber. Prescriber characteristics were further categorized into two groups of themes. Psychological

Characteristics refer to the prescriber's emotional and mental processes; themes included are attitude, role, and confidence/self-efficacy. Organizational Context refers to how organizational policies and decisions impact the prescriber; themes included are time pressure, patient satisfaction, and disciplinary action. Organizational context could have been its own theme. However, because what matters is how an individual prescriber perceives, responds to or is affected by the organization-level directives, it is considered here as a prescriber characteristic.

a. Psychological Characteristics

Prescribers described their attitudes, role, and self-efficacy as affecting their decision-making. These are common concepts in psychology, and are known to influence behavior in numerous contexts. These concepts are difficult to draw out of an individual about themselves, however, as individuals oftentimes are unaware of their own psychology. As such, much of this was implicit during the interview and difficult to summarize in one short quote. Presented below are the statements most representative of these themes. It should also be noted that these characteristics emerged during the interview process. They were not included in the Biopsychosocial Model of Pain nor the clinical guidelines that the pre-interview questionnaires were based on. Thus, results presented here are more preliminary than those presented in previous sections.

i. Attitude

> *"My emotions do play a part in how I interact with patients. And then when it is, when you see this person on the schedule who now they've had pain for, back pain for three months, you go, oh, gosh, is he here again? And, you know, feel negatively, and then you have a whole negative interaction where you feel like going"—Respondent 10*

ii. Role

> *"And my skills are not in counseling, so I let the counselors take care of that.... PT has really good outcome measures for function, but that isn't what we do in medicine. Even though psychosocial needs*

influence the pain experience, I try to keep my recommendations separate from the psychosocial needs of the patient."—Respondent 4

iii. Confidence/Self-efficacy

""I mean, I know that it makes things worse, because I've been to conferences that say people with back pain do worse when they're unhappy in their work situation or whatever it is, that they do worse. I don't know what to do differently about it. I mean, I feel frustrated that I can't do things differently."—Respondent 10

"Sometimes I'll print off just stretches or things they can do, especially if it's more of a rotator cuff and she's having loss of range of motion. I'll show her the pendulum exercises and, you know, walking your hand up the wall, things like that, to keep it moving. But I don't do injections here…. I believe there are some people [in the clinic who do injections]…, but I don't see enough of these cases."—Respondent 8

b. Organizational Context

i. Time Pressure

Time was conceptualized in a number of ways. First, there was the amount of time the prescriber had with the patient. This affected the depth to which the prescriber was able assess the patient. Some information might not be revealed until subsequent visits.

"And then hopefully, you know, that they would have gotten to that stuff. But I can't say that I do a comprehensive psychosocial evaluation in my first visit with a patient, just because there's not time. But, and obviously, if something comes up, you might pursue it."—Respondent 9

"I was taught about the Biopsychosocial Model, but I just don't see how there is time in the day to deal with all that stuff, given everything else I have to deal with at the organizational level"—Respondent 4

"Sometimes the challenge is that you are in a limited time office visit. You don't really have that luxury of in-depth discussion, and it can kind of foster an adversarial relationship, so you really have to almost use the ask-tell-ask approach…. I mean, remember, we're in a very limited time situation.So if the person seems to be on board and seems like, you know, they understand my approach and understand

> *why I'm recommending this particular medication, then you don't really need to stir anything up."—Respondent 3*

> *"To be honest, I probably don't as much as I should, just because there's, you know, there's only a limited amount of time and there's people to move on to and things like that. But it, you know, I mean, I guess it would be really good to ask, to try to bring out what positive things there are. Okay, so, you know, work kind of sucks, what are the other parts of your life like?"—Respondent 10*

There was also the notion that if you take extra time with one patient you were taking time away from another patient. For other prescribers, taking extra time with a patient led to running late.

> *"I've been doing this a long time, so I just, I don't know. It may take me a little longer than a 15-minute visit. But usually, I am able to get, you know, what I need to get in 20, it may be 30 minutes, and then I just cut my time on another patient that might be less complicated."—Respondent 6*

> *"Some days clinic just drags. You get enough of these people, and you run behind. That's just what you have to do to get at these issues."—Respondent 5*

ii. Patient Satisfaction

Patient satisfaction measures were reported as influencing decision-making. One prescriber stated his organization prioritized patient satisfaction over other performance measures, as the service area is saturated with high quality health care. If his patient satisfaction scores are not satisfactory in the monthly performance report he receives, his pay will be cut. The same physician also stated his salary is high enough that financial penalties resulting from low patient satisfaction does not change his behavior. It is important to note, however, that all prescribers employed by the same organization would have the same expectations for satisfying the patient's needs. Financial situations may differ for individual prescribers, and although the one prescriber stated the influence is minimal, other

prescribers who are in a worse financial situation may be more influenced by organizational policies aimed at promoting patient satisfaction.

> *"Patients have expectations, and patient satisfaction is a company goal. If I have poor patient satisfaction, up to 5% of my pay is withheld."—Respondent 4*

iii. Disciplinary Action

In addition to the themes identified through the interviews, one more theme was identified during pilot testing. The idea of disciplinary action taken by either the prescriber's employer or the Medical Examining Board (MEB) were described by one pilot test respondent as being a huge influence on his prescribing. He noted that with pain management, the possibility of being seen as an irresponsible prescriber of opioids was enough to limit his opioid prescribing. As such, this theme was added to the list of themes. and two statements were included to reflect this (Statements 42 and 43).

C. DEVELOPMENT OF THE Q-SET

The themes identified by prescribers in the semi-structured interviews were used to create the Q-set, the collection of statements that were sorted and ranked by prescribers in the Q-sort. The next phase of study investigates the relative influence prescribers give each of the themes identified when making treatment recommendations in pain management. Statements reflecting each theme were drafted and revised for clarity. The 43 statements in Table 4.3 comprised the Q-set, and were sorted and ranked by survey respondents.

The large majority of the themes were included in the Q-set as they were qualitatively identified in the data. One theme, clinical diagnostics, was not included in the Q-set. Although it is necessary to have a diagnostic decision made in order to make treatment decisions, the diagnostic theme was not included for two reasons. First, the psychosocial

factors of the Biopsychosocial Model of Pain were the focus of this study. The diagnostic theme represented much of what is included in the Biomedical Model. Second, to include factors from the diagnostic theme properly would have increased the number of statements dramatically, potentially causing respondent fatigue while not adding any benefit to better understanding perceptions related to treatment decision-making.

Another theme, access to other providers, was described as a prescriber trait in the interviews. In reality, however, it could be a patient trait, as the patient's access will ultimately determine the availability of any given treatment to a specific patient. Consequently, access to other providers is captured as a patient-level theme in the Q-set, as opposed to a prescriber-level theme as in the qualitative results.

Table 4.3. Themes and corresponding statements

	Theme Identified	Statement in Q-set
PATIENT		
Clinical	Demographics	26. Patient age. 27. Patient gender.
	Previous treatment	35. Treatment options the patient has tried previously
	Comorbidities	20. Patient has many comorbid conditions. 21. Patient has few comorbid conditions.
	Pain associations	24. Patient associates pain with positive experience. 25. Patient associates pain with negative experience.
	Duration	22. Pain is of recent onset. 23. Pain has been present for a long time.
	History of addiction	28. Patient history of substance abuse.
Access	Treatment Access	13. Patient ability to pay for treatment options 32. Recommended treatment options are unavailable
	Provider access	40. Patient access to other providers, like PT
Behavioral	Poor function	19. Patient pain prevents engaging in healthy behavior
	Poor compliance	16. Patient compliance with exercise to relieve pain
	Red-flag behaviors	17. Patient requests opioids and will not consider other treatment 18. Patient threatens to sue care providers
Social	Social environment	7. Patient receives adequate social support. 8. Patient stress level 9. Patient history of being abused. 10. Patient dysfunctional social environment. 11. Patient work is physically demanding
	Relationship with other providers	14. Patient relationship with former providers. 15. Patient trust in the health care system.
Social Psychological	Poor coping	2. How patient copes with pain.
	Poor motivation	1. Patient wants a quick fix. 5. Patient motivation to do what it takes
	Unrealistic expectations	6. Patient expectations about pain relief.
Psychological	Depression	4. Pain causes patient depression.
	Anxiety	3. Pain causes patient anxiety.
	Health beliefs	12. Patient beliefs are non-scientific.
TREATMENT		
Treatment goals	Treating symptoms versus the problem	33. Recommended treatment options treat symptoms, not the causes of pain
Safety	Side effects Drug interactions Risk-benefit ratio	29. Recommended meds may cause side effects. 30. Recommended meds interact with pt meds. 31. Recommended treatment options are too risky for expected benefit.
PROVIDER		
Psychological	Bad attitude towards pain patients	38. Your attitude towards patients with ill-defined pain.
	Role	39. You feel PCPs are supposed to help pain pts.
	Confidence/Self-efficacy	34. Your familiarity with the best treatment options
Organizational Context	Too many patients to see, not enough time	36. The number of patients you have to see in a day. 37. How much time you have available during the office visit.
	Pressures for patient satisfaction	41. The impact of patient satisfaction on your compensation.
	Disciplinary action	42. Possibility of disciplinary action by your employer. 43. Possibility of disciplinary action by the Medical Board.

D. SUMMARY OF PHASE 1—EXPLORING PRESCRIBER DECISION-MAKING

Prescribers were, for the most part, very concerned with patients, their pain, and helping the patient to the best of their ability. They focused a large part of their effort on establishing an accurate diagnosis, then tailoring their preferred treatment protocol to the patient's needs and desires. The patient characteristics they considered included the patient's: 1) clinical characteristics; 2) behaviors, both generally and specifically pain-related; 3) psychology, including mental health status; and 4) social characteristics, including social environment and access to care. Patient characteristics often had primary and secondary themes. For example, prescribers noted that poor coping is a behavioral indication of underlying psychological concerns. This becomes important in the interpretation of factor arrays when analyzing the data collected in the Q-sorts, the next phase of study.

Treatment considerations also were identified as playing a large role in treatment decision-making. Treatments were placed in context of the patient's pain and diagnosis. Prescribers emphasized safety and meeting the desires of the patient. Prescribers followed their own philosophy regarding what treatment recommendations they start with and how they approach pain management. Some were most comfortable with non-pharmacologic therapies, such as physical therapy, while others relied more heavily on pharmacologic therapies, both non-opioid and opioid options.

Lastly, when prompted, prescribers described their own emotions and attitude towards patients in pain. They ranged from supportive and understanding to feeling frustrated with difficult patients and with themselves. They also described the need to work within the constraints of the system; identifying the limited amount of time in the office visit and organizational goals, such as patient satisfaction, as important considerations.

The resulting themes in the Concourse were used to create the Q-set, a collection of statements that were sorted and ranked by participants in the Q-sort. This next chapter

presents the results of the quantitative phase of the study, which addresses Aim 2, describing prescribers based on their perceptions.

V. PHASE II—DESCRIBING PRESCRIBER TYPES

The second phase of study addresses Aim 2: to quantitatively identify "prescriber types" based on what influences a prescriber in pain management. The objectives of Aim 2 are to: 2a) demonstrate the use of Q Methodology to identify "prescriber types" and 2b) describe the prescriber types identified. This was carried out using by-person factor analysis on data collected using a survey, which included a Q-sort. Differences between by-person and by-factor factor analysis are described in Chapter 1.

A. DESCRIPTION OF SURVEY RESPONDENTS

A total of 22 respondents participated in the quantitative phase of this study. Respondents were fairly well distributed across demographic criteria. There were a greater proportion of physicians (68%) compared to physician assistants (32%); no advanced practice nurses were included. A greater proportion of respondents practiced in Family Medicine (73%) over Internal Medicine (27%). Recall from Chapter 2 that a third recruitment site, the non-profit, was added for the second phase of the study. Respondents were well-distributed across the three organizations (36%, 41%, and 23%).

Table 5.1. Demographic Description of Quantitative Participants

		Number of participants	% of participants (%)
	Total	22	100
Gender	Male	12	55
	Female	10	45
Role	Physician	15	68
	Physician Assistant	7	32
Years of Service	0-5	5	23
	6-10	2	9
	11-15	4	18
	16-20	2	9
	21-25	4	18
	>26	5	23
Organization	For-Profit	8	36
	Co-op	9	41
	Non-Profit	5	23
Setting	Family Medicine	16	73
	Internal Medicine	6	27

B. DETERMINING THE NUMBER OF FACTORS

Recall that factors are the “prescriber types” that identify prescribers by the perceptions they hold when managing pain. Determining the number of factors is both a quantitative and qualitative process. The quantitative factor analysis and mathematical

solutions help guide and narrow the number of solutions to both add rigor and expedite the qualitative process. However, without the qualitative process of seeking meaning from the quantitative solution, the most rigorous mathematical solution can still yield little value.

1. Criteria for keeping a factor

Recall from the Methods Chapter that the initial solution was run as a four-centroid solution based on the number of Q-sorts. There were 22 Q-sorts in total, one per respondent. Watts and Stenner[104] suggest starting with one factor for every 4-6 Q-sorts. This initial solution was a starting point for determining the number of factors that would emerge from the data.

Statistical criteria were used to aid the number of factors to be included in the solution. These criteria were: 1) statistical significance of individual factor loadings; 2) eigenvalues (EV); 3) percent of variance explained; and 4) Humphrey's Rule. The formulae for these calculations can be found in Table 3.2 of the Methods Chapter.

These four criteria were used to determine if a factor should be kept. The primary criterion was the significant factor loadings. A factor should have at least two significant Q-sorts load on it to be retained. Additional criteria were EV>1, additional percentage of variance explained, and Humphrey's rule, where a factor is kept if the product of the two highest factor loadings is greater than 2*SE (2*SE=0.304).

2. Four Factor Solution

Based on the EV and variance explained, the unrotated factor loadings clearly indicated two significant factors. A third factor could not be ruled out, so both three- and two-factor solutions were run. It was unlikely that a fourth factor would emerge. Table 5.2 presents the unrotated factor loadings for the four-factor solution. Each line represents the factor loadings for each respondent's Q-sort.

Table 5.2. Unrotated Factor Matrix for a 4-Factor Solution

Study ID	Factor 1	Factor 2	Factor 3	Factor 4
QS001	0.6717	-0.0706	0.1335	0.2359
QS005	0.8458	-0.0188	-0.0523	-0.0322
QS006	0.6349	-0.2718	-0.0545	-0.2236
QS007	0.8665	-0.2211	-0.0100	0.0812
QS003	0.6724	0.4433	-0.0396	-0.3098
QS002	0.7944	0.2278	0.1059	-0.2377
QS004	0.3421	0.4616	-0.2585	0.2796
QS011	0.6797	-0.3511	-0.1877	-0.2489
QS015	0.3993	-0.2036	0.3101	-0.4012
QS014	0.7228	-0.1518	0.2507	0.2326
QS013	0.7716	-0.1169	-0.1387	0.0269
QS010	0.5927	-0.3663	-0.2416	0.0827
QS008	0.6823	-0.2848	0.0958	0.3398
QS012	0.7520	0.1311	0.3278	0.0526
QS018	0.7478	-0.3546	-0.1908	-0.1169
QS024	0.4510	0.2610	-0.0645	0.1816
QS020	0.8181	0.1394	-0.3638	-0.047
QS019	0.6364	0.2002	0.2791	-0.0830
QS021	0.4502	0.1640	-0.4144	0.3316
QD016	0.6953	0.0037	0.0562	-0.1384
QS025	0.7343	0.1845	0.1531	-0.1146
QS023	0.8010	0.2019	0.0870	0.1077
EV	10.3461	1.3789	0.9484	0.9545
% Variance Explained	47	6	4	4

3. Two-Factor Solution

After undergoing hand rotation, the two-factor solution indicated two factors were significant. The Eigenvalues, percent of Variance Explained, and Humphrey's Rule

confirmed this. However, with nearly one-third of the Q-sorts either not significant or confounded (i.e., loading on more than one factor), a three-factor solution was run to see if more of the data could be utilized in the analysis and provide additional insight.

Table 5.3 presents the two-factor solution. The information contained in the table was used to compare solutions. Column A presents the series of rotations that resulted in the ideal two-factor solution. Recall an ideal solution is one where the greatest number of Q-sorts load onto one factor or another. Q-sorts that are not significant (Column D) or confounded (Column E) are not included in the solution. The numbers in Columns B and C refer to the Q-sorts that load significantly to those factors. Fifteen Q-sorts loaded significantly onto one factor. At the bottom of the table are the EV for each factor and the percent variance explained by each factor. Each factor has an EV greater than 1.0, and the total percent variance explained is 53%, an sufficiently high percentage to accept the solution.

Table 5.3. Two-Factor Solution				
A. Rotations	**B. Factor 1 Q-sorts**	**C. Factor 2 Q-sorts**	**D. Not Significant**	**E. Confounded**
1. 1,2 = -34	1 2 3 4 8 10 11 12 13 15 20	5 7 16 18	9 19	6 14 17 21 22
EV	10.35	1.38		
% Var Explained	35	18		

4. Three-Factor Solution

After undergoing hand rotation, the three-factor solution indicated that three factors were significant, based on the number of significant Q-sorts loading on each factor (Table 5.4, Columns B, C, and D). However, additional criteria were conflicting. The third factor would increase the percent of Variance Explained by 10%, although the EV was not greater than 1.0, and Humphrey's Rule was not met. However, with EV at 0.95, it was marginally different from 1.0; more Q-sorts loaded significantly onto one of the three factors (18 vs. 15 in the two-factor solution). Given the conflicting results, it was not possible to determine which solution to accept based solely on the quantitative data. The final determination of the accepted solution was made by a preliminary qualitative comparison of the solutions, explained below.

Table 5.4 Three-Factor Solution

A. Rotations	B. Factor 1 Q-sorts	C. Factor 2 Q-sorts	D. Factor 2 Q-sorts	E. Not Significant	F. Confounded
1. 1,2 = -35 2. 2,3 = 16 3. 1,3 = -31 4. 1,2 = -4 5. 1,3 = -5 6. 2,3 = -1 7. 1,2 = 4	2 3 4 8 11 12 15 17 19 20	5 6 7 14 18 21	9 10	1 16	13 22
EV	10.3	1.4	0.9		
% Var Explained	47	6	4		

5. Choosing a Solution

Given the pros and cons of the two- and three-factor solutions, a qualitative approach was used to determine which solution to keep. As a first-pass, crib sheets (described in the Methods Chapter and in greater detail below) were created for both solutions. This was helpful in providing both the details regarding which statements were influential to the providers whose Q-sorts loaded on each factor and an overview of the meaning of each factor relative to the other factors.

The three-factor solution was qualitatively superior to the two-factor solution. It drew out more nuanced differences between the factors. For example, the differences between patient social and psychological characteristics were expressed in the three-factor solution, while in the two-factor solution, these groupings of themes were not differentiated and the statements within the two factors did not form meaningful groups. Preliminary interpretation indicated the three-factor solution would yield more meaningful results, and was kept as the solution of choice.

Table 5.5 lists the factor loadings for the three-factor solution. The "X" in the column to the right of each factor indicates the Q-sorts which define the factor.

Table 5.5. Three-factor Factor Loadings

Q-sort	Factor 1		Factor 2		Factor 3	
1	0.4552		0.3471		0.3824	
2	0.6747	X	0.4339		0.2738	
3	0.6003	X	0.1172		0.3254	
4	0.7333	X	0.2960		0.4177	
5	0.3838		0.7090	X	-0.0151	
6	0.4649		0.6437	X	0.2526	
7	0.2521		0.4844	X	-0.3143	
8	0.7357	X	0.0432		0.2781	
9	0.1935		0.1397		0.4900	X
10	0.4544		0.3420		0.5338	X
11	0.7000	X	0.2924		0.2298	
12	0.7055	X	-0.0309		0.2124	
13	0.5554		0.1729		0.4663	
14	0.3393		0.6029	X	0.4598	
15	0.7900	X	0.0769		0.3020	
16	0.2907		0.4370		-0.0214	
17	0.7778	X	0.4611		-0.0601	
18	0.2567		0.5816	X	0.3449	
19	0.5203	X	0.2658		-0.2448	
20	0.4922	X	0.3983		0.2927	
21	0.4071		0.5890	X	0.2899	
22	0.4892		0.6217		0.2535	
X indicates the Q-sorts defining each factor						

Recall that a Q-sort was considered significantly associated with a factor if the factor loading was equal to or greater than 0.47 ($p<0.001$). By definition, non-significant Q-sorts (Q-sorts #1 and #16) are those where the factor loadings do not meet criteria for significance for any of the factors. Confounded factors (Q-sorts #13 and #22) are those where the Q-sort loaded significantly on more than one factor. Some Q-sorts were close to being confounded. What this indicates is that although the Q-sort was statistically associated with one factor, the prescriber may have some features of another factor. For example, Q-sort #6 was statistically associated with Factor 2, however with a Factor 1 loading of 0.4649, the prescriber shares some features with Factor 1 prescribers.

C. DESCRIBING PRESCRIBER TYPES

Hand rotation yielded an ideal three-factor solution with 18 of the 22 Q-sorts loaded significantly on three factors. The plurality of participants (n=10) fell in the first factor. Another large proportion (n=6) fell in the second factor. And a small proportion (n=2) fell in the third factor. Recall that in a Q-Methodology study, demographic data (Table 5.5) simply add another dimension to the qualitative interpretation of the quantitative results. The data are not intended as predictor or control variables, such as in a regression model. Within each factor, participants in Factors 1 and 2 were fairly well distributed across the demographic categories. The exception to this was that all Factor 2 prescribers practiced as Family Medicine prescribers. However, the two participants represented in the third factor were homogenous, fitting a very similar profile.

Table 5.6. Demographic description of participants by factor

		Overall	Factor 1	Factor 2	Factor 3
	Total	**18**	**10**	**6**	**2**
Gender	Male	9	4	3	2
	Female	9	6	3	0
Organization	For-Profit	7	3	2	2
	Co-op	5	3	2	0
	Non-Profit	6	4	2	0
Setting	Family Medicine	14	8	6	0
	Internal Medicine	4	2	0	2
Role	Physician	12	6	4	2
	Physician Assistant	6	4	2	0
Years of service	0-5	4	3	1	0
	6-10	2	2	0	0
	11-15	3	1	2	0
	16-20	2	2	0	0
	21-25	3	1	2	0
	>26	4	1	1	2
Training	Yes	11	6	4	1
	No	7	4	2	1

The statements for each factor are weighted and standardized. These standardized measures are used to establish which statements are influential in defining each factor and

also in relation to other factors. Factor arrays were created from the standardized results to describe each of the factors that emerged from the data in the three-factor solution (Table 5.7).

Table 5.7. 3-Factor Array

Item #	Statement	Factor 1	Factor 2	Factor 3
1	Patient wants a quick fix	-1	2	-2
2	How the patient copes with pain	1	3	3
3	Pain causes the patient anxiety	0	-1	1
4	Pain causes the patient depression	0	1	-1
5	Patient motivation to do what it takes	3	3	2
6	Patient expectation about pain relief	0	3	2
7	Patient receives adequate social support	-1	-1	3
8	Patient stress level	-1	-1	0
9	Patient history of being abused	0	1	-2
10	Patient has a dysfunctional social environment	0	0	1
11	Patient's work is physically demanding	0	0	1
12	Patient beliefs are non-scientific	-2	0	0
13	Patient's ability to pay for treatment options	1	0	3
14	Patient relationship with former providers	0	0	-2
15	Patient trust in the health care system	-2	-2	-2
16	Patient compliance with exercise to relieve pain	2	3	1
17	Patient requests opioids and will not consider other treatment options	1	4	-1
18	Patient threatens to sue other care providers	-2	-3	-2
19	Patient's pain prevents engaging in healthy behavior	3	0	0
20	Patient has many comorbid conditions	2	1	0
21	Patient has few comorbid conditions	-2	-1	-3
22	Pain is of recent onset	1	1	-1
23	Pain has been present for a long time	2	-2	-3
24	Patient associates pain with a positive experience	-3	-2	-1
25	Patient associates pain with a negative experience	-2	-1	-1
26	Patient age	-1	-3	2
27	Patient gender	-4	-4	-4
28	Patient has a history of substance abuse	4	4	2
29	Recommended medications may cause side effects	1	2	4
30	Recommended medications interact with patient medications	3	2	3
31	Recommended treatment options are too risky for expected benefits	2	2	1
32	Recommended treatment options are unavailable	2	-2	2
33	Recommended treatment options treat symptoms, not the causes of pain	-1	0	0
34	Your familiarity with the best treatment options	4	1	2
35	Treatment options the patient has tried previously	3	-1	4
36	The number of patients you see in a day	-3	-3	-1
37	How much time you have available during the office visit	-3	-3	-1
38	Your attitude towards patients with ill-defined pain	1	1	-2
39	You feel PCPs are supposed to help pain patients	-1	2	1
40	Patient access to other providers, like Physical Therapy	2	2	0
41	The impact of patient satisfaction on your compensation	-4	-4	-3
42	Possibility of disciplinary action by your employer	-3	-2	-3
43	Possibility of disciplinary action by the Medical Board	-2	-2	-4
	EV	10.35	1.38	0.95
	Percent Variance Explained (%)	47	6	4

Interpretation of quantitative results was carried out systematically, to ensure that all aspects of the analysis were included and to minimize researcher bias. Keep in mind that although the data were quantitatively generated, interpretation was conducted qualitatively, using an abductive approach. First, general trends were assessed by looking at the agreement of statements between factors. Next, extreme statements that describe each factor and crib sheets[104] were used to assess each factor individually. Extreme statements were defined as statements that had a z-score of >1.000 or <-1.000. Crib sheets took the information in each array and compared all three factors for relative influence. This step includes statements that were not significant and, therefore, were excluded from the extreme ranking statements. The extreme ranking statements and crib sheets were looked at together, each supporting the contents of the other. .

1. General trends

General trends revealed in the Q-sorts are captured in the consensus and controversy statements. First we look at the consensus statements that indicate where prescribers agreed about the influence of each statement. Next, we will review the controversy statements, which indicated what may differentiate perspectives in prescribing.

a. Consensus Statements

Consensus statements were defined as statements with less than one rank spread across the three factor arrays. This does not say whether the prescribers felt the statement was or was not influential. Rather, it indicates that prescribers in the various factors agree upon a statement's influence relative to other factors.

Of the 43 statements, prescribers agreed upon eight statements (Table 5.8). Four of these statements related to patient social or behavioral considerations. These social-behavioral considerations were ranked in the middle with regard to their level of influence. Similarly, but ranked as much more influential, was the patient's motivation to "do what it takes" to get better. Also ranked as relatively influential by all three prescriber types was whether patient medications interacted with recommended pain treatment options. And finally, prescribers agreed that patient satisfaction on compensation and patient gender had little influence on their decision-making.

Table 5.8. Statements of Agreement

Category	Item	Statement	Factor 1	Factor 2	Factor 3
Patient Psychology	5	Patient motivation to do what it takes	3	3	2
Treatment Safety	30	Recommended medications interact with patient medications	3	2	3
Patient Social	10	Patient dysfunctional social environment	0	0	1
Patient Social	8	Patient stress level	-1	-1	0
Patient Social	15	Patient trust in the health care system	-2	-2	-2
Patient Behavior	18	Patient threatens to sue care providers	-2	-3	-2
Organizational Context	41	Impact of Patient Satisfaction on your compensation	-4	-4	-3
Patient Clinical	27	Patient Gender	-4	-4	-4

b. Controversial Statements

Controversial statements are important because these are what differentiates prescriber types. These statements were defined as statements where there was a difference of four or more between the highest rank and the lowest rank for each statement across the three factors.

Of the 43 statements, only four statements were controversial (Table 5.9). Interestingly, two of these statements relate to patient social-behavioral considerations

(Items 7 and 17). Although there was agreement with some of the psychological, social-behavioral statements, these statements indicate prescribers differ in their perceptions of the influence these statements have on their decision-making.

The other two controversial statements relate to clinical factors. Prescribers in Profiles 1 and 3 disagreed with one another regarding the influence of chronicity on pain, but agreed with regard to the treatment options previously tried. This is an indication that prescribers may agree on certain aspects within a theme, but disagree on others.

Table 5.9. Statements of Controversy

Category	Item	Statement	Factor 1	Factor 2	Factor 3
Patient Social	7	Patient receives adequate social support	-1	-1	3
Patient Behavioral	17	Patient requests opioids and will not consider other treatments	1	4	-1
Patient Clinical	23	Pain has been present for a long time	2	-2	-3
Patient Clinical	35	Treatment options the patient has tried previously	3	-1	4

2. Review of Individual Factors

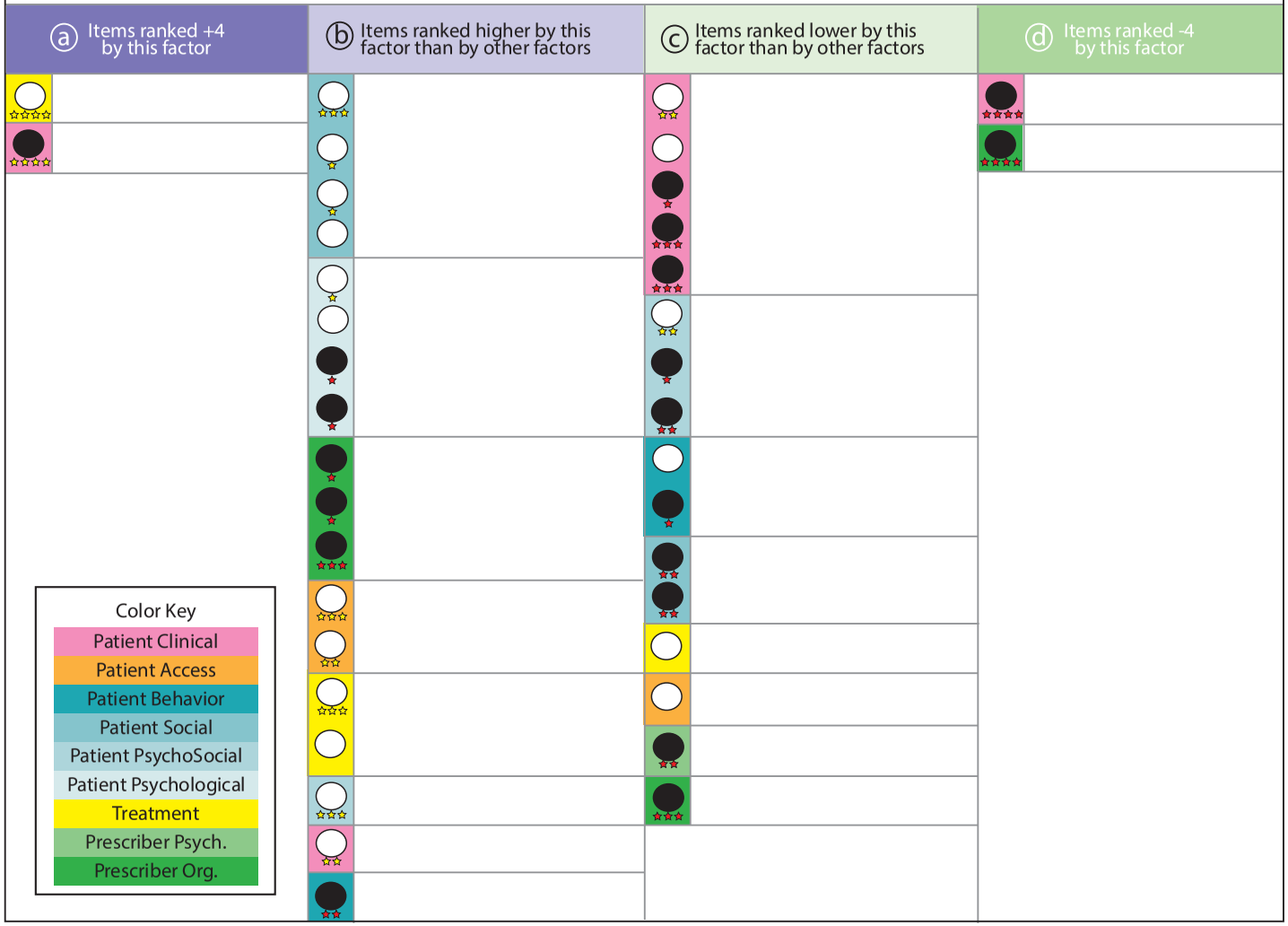
Although it is helpful to review the trends of consensus and controversy revealed by the Q-sorts, one goal of interpretation is to summarize the factors for what they represent. To do this, we review the factor arrays resulting from the analysis by reviewing the extreme ranking statements and crib sheets that describe each factor.

Each factor is represented by two figures. Figures 5.1 and 5.2 are templates to help introduce the layout of these figures. The first figure (Figure 5.1) is the crib sheet. The four columns categorize the statements relative to how each statement was ranked in the other factors. Columns A and D present the items that ranked +4 and -4, respectively, in the described factor. Columns B presents the statements that were ranked higher in the described factor, compared with the other two factors. Columns C presents the statements that were ranked lower in the described factor, compared with the other two factors. Only the

highest and lowest ranked statements were included in the crib sheet. If a statement ranked the same for two factors, it was included in both crib sheets for the two factors. For example, if an item was ranked +2 in Factors 1 and 2, but -2 in Factor 3, it would be included in Column B for both Factors 1 and 2 and Column C for Factor 3. When the statement was ranked in the middle when compared with the other two factors, it was not included in the crib sheet for that factor. For example, if an item was ranked +2 in Factor 1, 0 in Factor 2, and -2 in Factor 3, it would appear in Column B for Factor 1, Column C for Factor 3, and would not appear in the cribsheet for Factor 2.

The white circles with yellow stars indicate the statement was ranked positively in the grid; the number of stars indicate the rank within the grid. For example, four stars indicate the rank was +4. The black circles with red stars indicate the statement was ranked negatively on the grid. The colors in the grid represent the theme from which the statement was derived.

Figure 5.1. Example Crib Sheet



The second figure (Figure 5.2) presents an example of the Extreme Ranking Statements. Extreme Ranking Statements are those that have a z-score ≥1.000. The numbers in the grid represent each statement's respective place in the Q-sort grid. When available, associated qualitative responses from the survey are included to aid interpretation. These responses came from prescribers who loaded on the individual factor. For instance, Statement 28 was significant in both Factors 1 and 3. The quotes included in each figure came only from the prescribers who are represented in each factor. Statements without an associated quote are listed together by number, for convenience to the reader. Extreme Ranking Statements are both positive and negative, as indicated at the top of each figure.

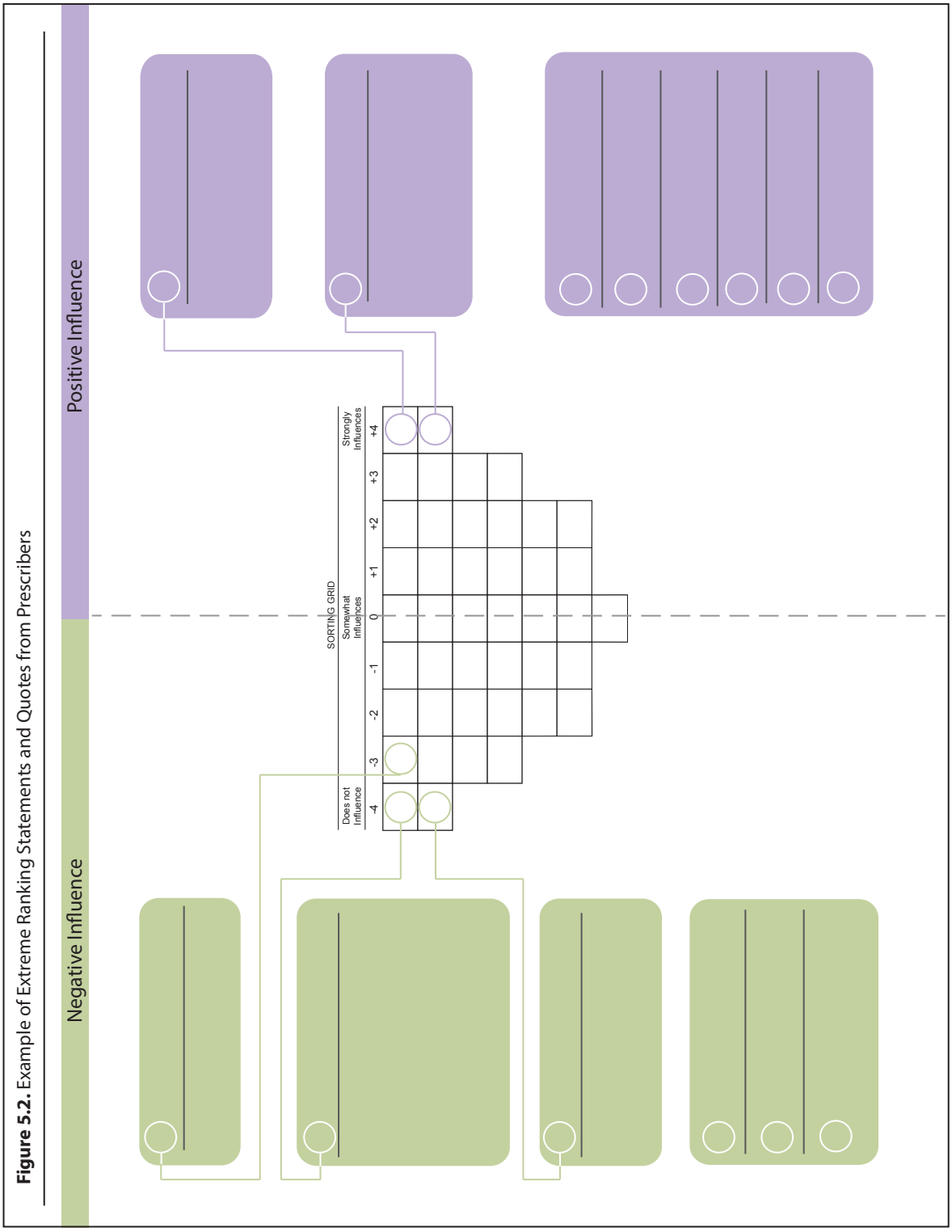


Figure 5.2. Example of Extreme Ranking Statements and Quotes from Prescribers

It is important to note that although the positive statements represented a broad spectrum of the themes, the negative statements overlapped considerably between factors. Statements 27, 41, 42, and 43 appeared as extreme negative ranking statements for all three factors. Statements 18, 36 and 37 appeared as extreme negative ranking statements for Factors 1 and 2. These statements fell in various categories, including: clinical considerations, specifically patient demographics (Statement 27), patient behavior, specifically threatening litigation (Statement 18), and perceived organizational pressures (Statements 36, 37, 41, 42, and 43). It is interesting that so many of the negatively influencing statements are the same. It underscores the importance of holistic and qualitative interpretation of the factors, because the reasons for their rankings may or may not be the same.

a. Factor 1—The Confident Clinician

Factor 1 has an eigenvalue of 10.35 and explains 47% of the variance (Table 5.6). Ten participants were significantly associated with this factor (Table 5.5). There were six females and four males. They worked for all three of the organizations where recruitment occurred; three for the for-profit organization, three the member-owned cooperative, and four for the non-profit academic clinic. Of these ten participants, eight practiced in Family Medicine and two practiced in Internal Medicine. Six received training on non-opioid pain management, whereas four had not. Six of the participants were physicians and four were physician assistants. Of the ten participants, three had practiced 0-5 years; two had practiced 6-10 years; one had practiced 11-15 years; two had practiced 16-20 years; one had practiced 21-25 years; and one had practiced more than 26 years.

As long as these prescribers had enough time to gather the information needed to be confident in their decision-making, organizational pressures did not influence their treatment

decision (Figure 5.3, #36, -3; Figure 5.4, #36). As a prescriber type, disciplinary action by their employer (Figure 5.3, #42, -3; Figure 5.4, #42) or the Medical Board (Figure 5.3, #43, -2) was not a concern for them. Other organizational pressures, such as the impact of patient satisfaction on their compensation (Figure 5.3, #41, -4), did not influence their decision-making in part because their compensation is not affected by patient satisfaction.

Figure 5.3. Factor 1 Crib Sheet Interpretation

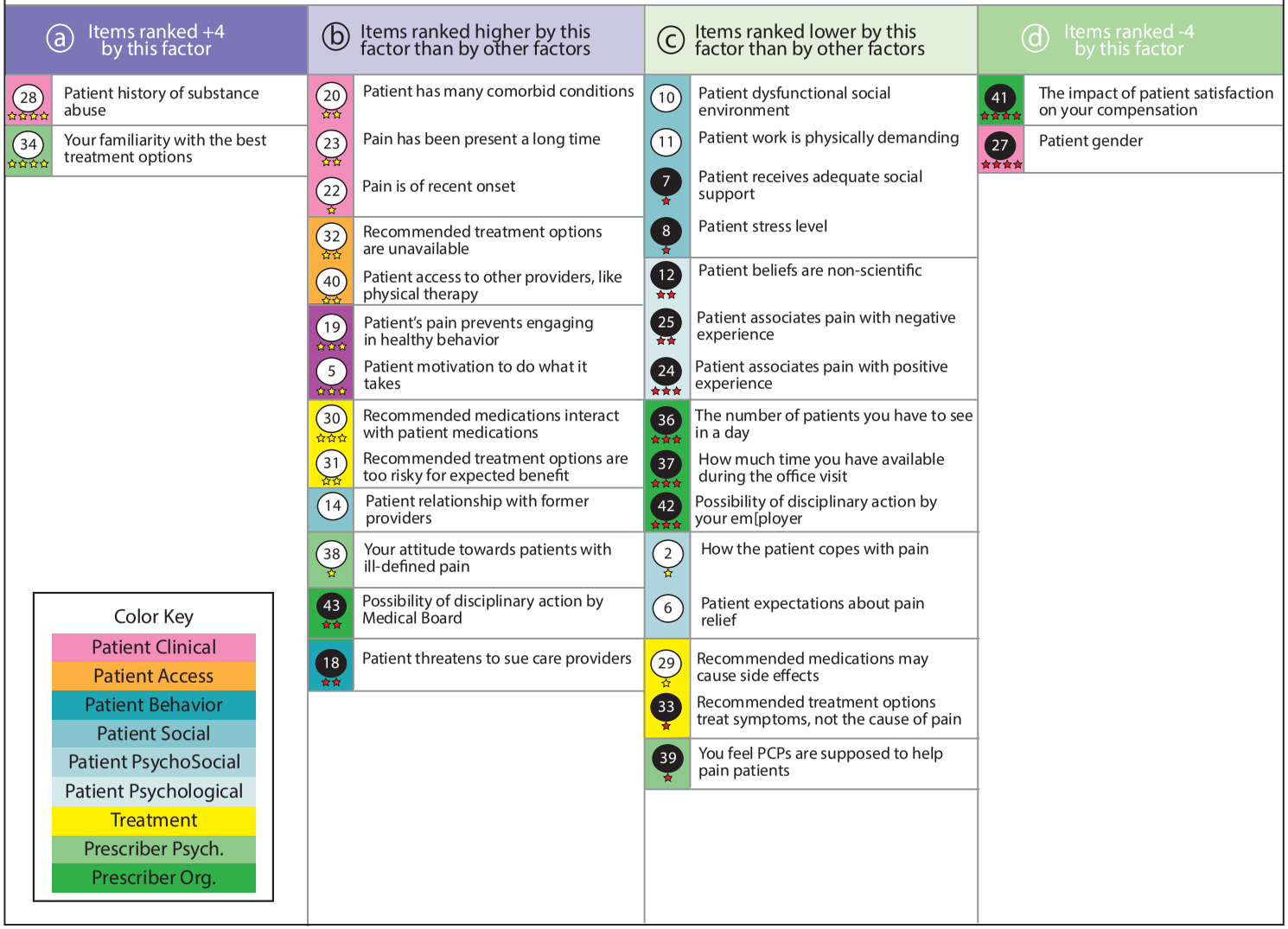
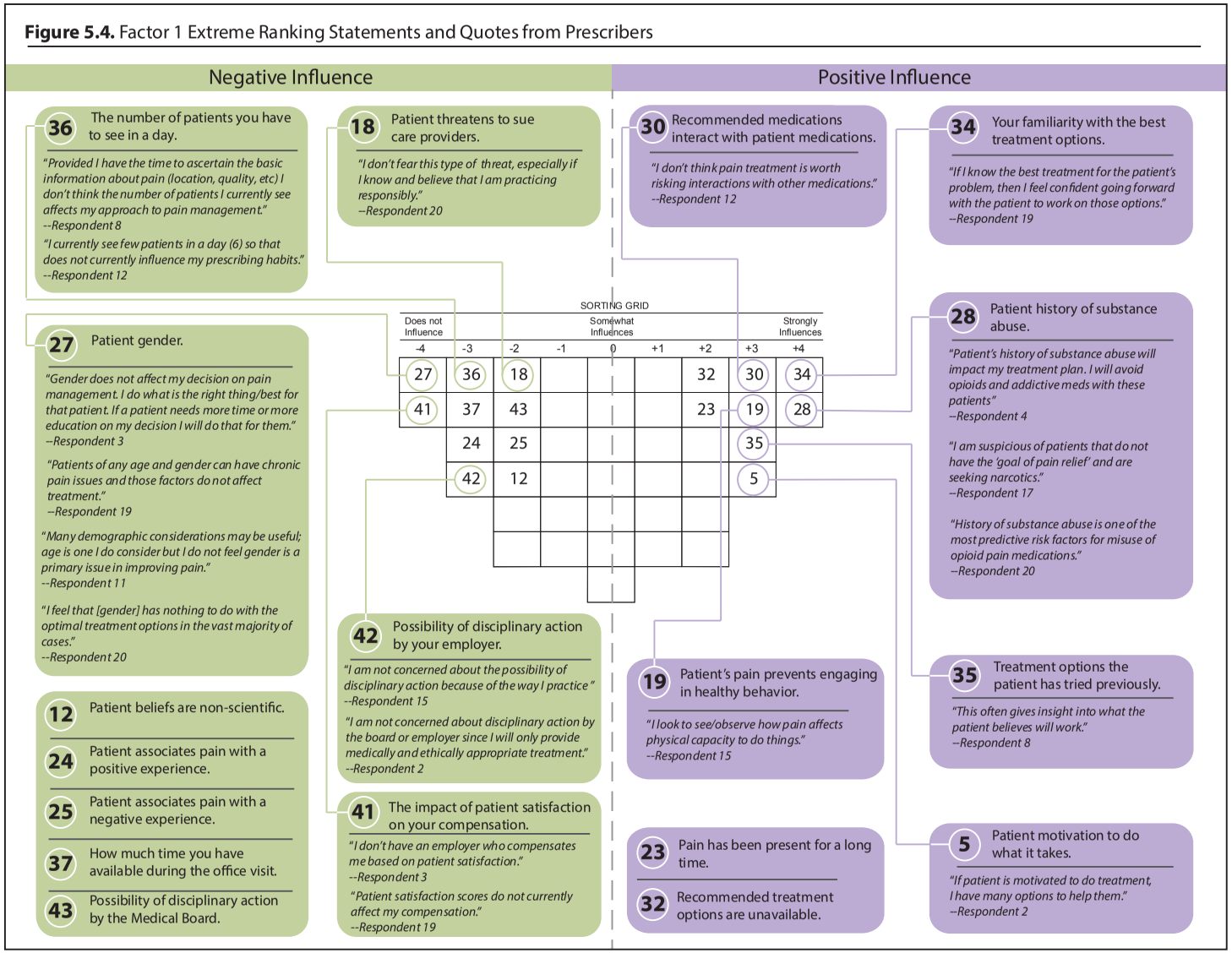


Figure 5.4. Factor 1 Extreme Ranking Statements and Quotes from Prescribers



During the office visit, prescribers gathered information on a wide range of clinical factors that influence their decisions, including: history of substance abuse (Figure 5.3, #28, +4), co-morbid conditions (Figure 5.3,#20, +2), and duration of symptoms (Figure 5.3, #23, +2; #22, +1). Also influencing their decision was their familiarity with the treatment options (Figure 5.3, #34, +4), drug interactions (Figure 5.3, #30, +3), and risks related to the treatment (Figure 5.3, #31, +2). Treatments the patient had tried gave them insight into what the patient believes will work (Figure 5.3, #35, +3; Figure 5.4, #35).

The focus on patient characteristics is centered on physiologic characteristics and how pain affects the patient's behavior (Figure 5.3, #19, +3; #5, +3). These traits help the prescriber identify the best treatment options for this patient. They are actively avoiding substance abuse (Figure 5.4, #28); however, social factors and individual psychological factors had little influence on these prescribers (Figure 5.3, #10, 0; #11, 0; #7, -1; #8, -1). These prescribers become confident about their treatment of choice and the best way to move forward, and work with the patient on those treatment options (Figure 5.4, #34). Prescribers who are knowledgeable about treatments (Figure 5.3, #34, +4) are less influenced and more willing to accept side effects and the fact that some treatments options treat only symptoms and not the underlying causes of pain (Figure 5.3, #33, -1).

Although patient motivation influenced these prescribers, other patient psychological traits are less influential (Figure 5.3, #2, +1; #6, 0; #12, -2; #24, -2; #25, -2). A motivated patient gives the prescriber a broader number of options for treating the patient's pain.

The feeling one gets when reviewing the factor array for this type of prescriber is that they are confident, knowledgeable, and believe their abilities as prescribers are able to help the patient. They consider all facets of the patients physical well-being and are willing to accept some of the risks inherent to treatment.

b. Factor 2—The Sensitive Psychologist

Factor 2 has an eigenvalue of 1.38 and explains an additional 6% of the variance (Table 5.6). Six participants were significantly associated with this factor (Table 5.5). There were three females and three males. They worked all three organizations; two at each organization. All six of these participants practiced in Family Medicine. Four were physicians and two were Physician Assistants. Four of the six prescribers received training on non-opioid pain management, although two had not. Of the six participants, one had practiced 0-5 years; two had practiced 11-15 years; two had practiced 21-25 years; and one had practiced more than 26 years.

These prescribers are aware that much of the effectiveness of a treatment is dependent upon the patient's response to treatment, regardless of clinical presentation (Figure 5.5, #23, -2; #24, -2; #22, +1), their own familiarity with treatments (Figure 5.5, #34, +1) or other patient-specific clinical considerations (Figure 5.5, #21, -1). They know that a positive patient response relies on patient coping (Figure 5.5, #2, +3; Figure 5.6, #2), motivation (Figure 5.5, #5, +3; #1, +2; Figure 5.6, #5), realistic expectations (Figure 5.5, #6, +3; Figure 5.6, #6), and compliance with treatment (Figure 5.5, #16, +3). These prescribers are also influenced by side effects of the treatment options (Figure 5.5, #22, +1), and are less likely to prescribe risky treatments (Figure 5.5, #31, +2) or treatments that only treat symptoms (Figure 5.5, #33, 0).

Figure 5.5. Factor 2 Crib Sheet Interpretation

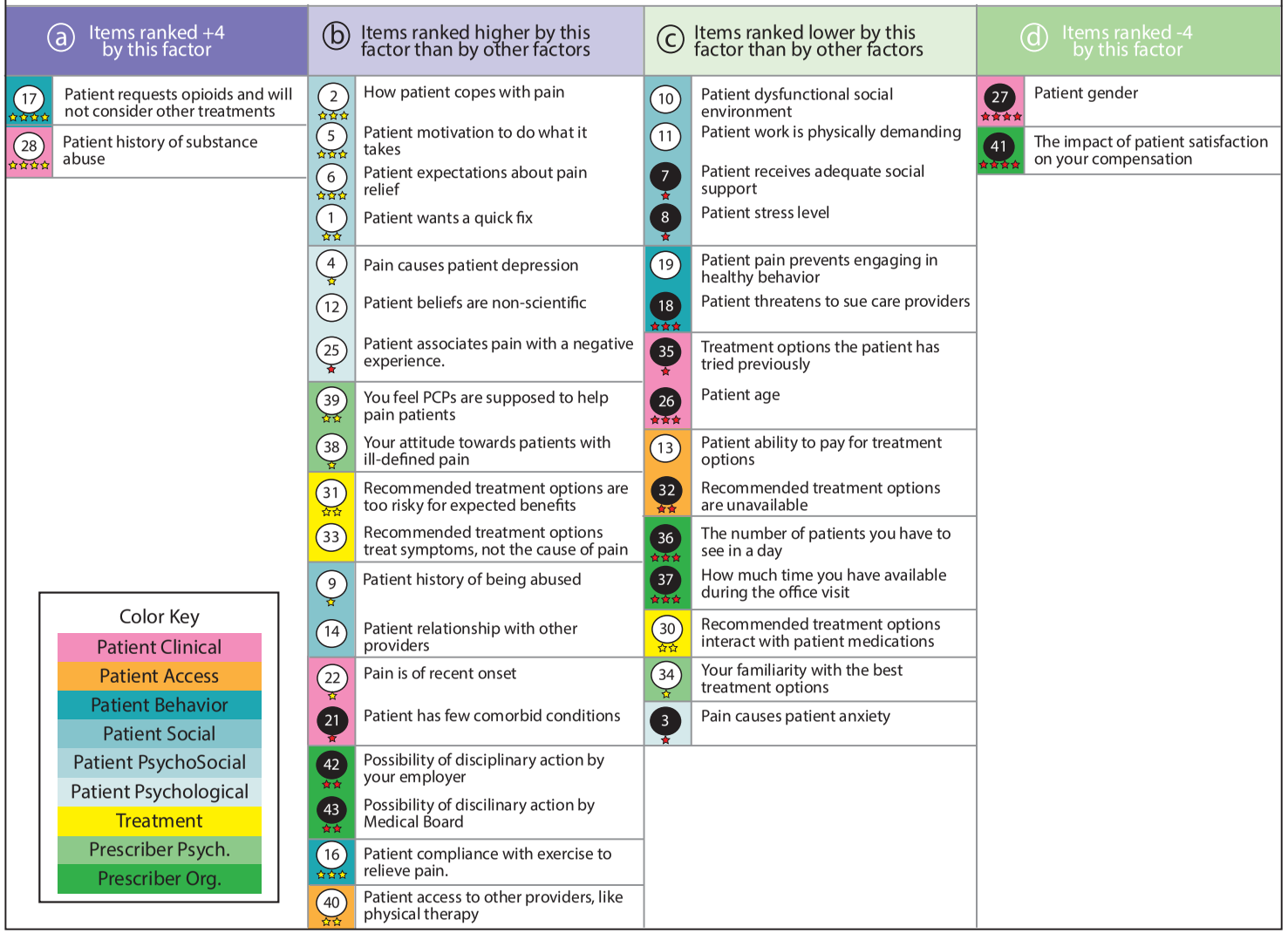
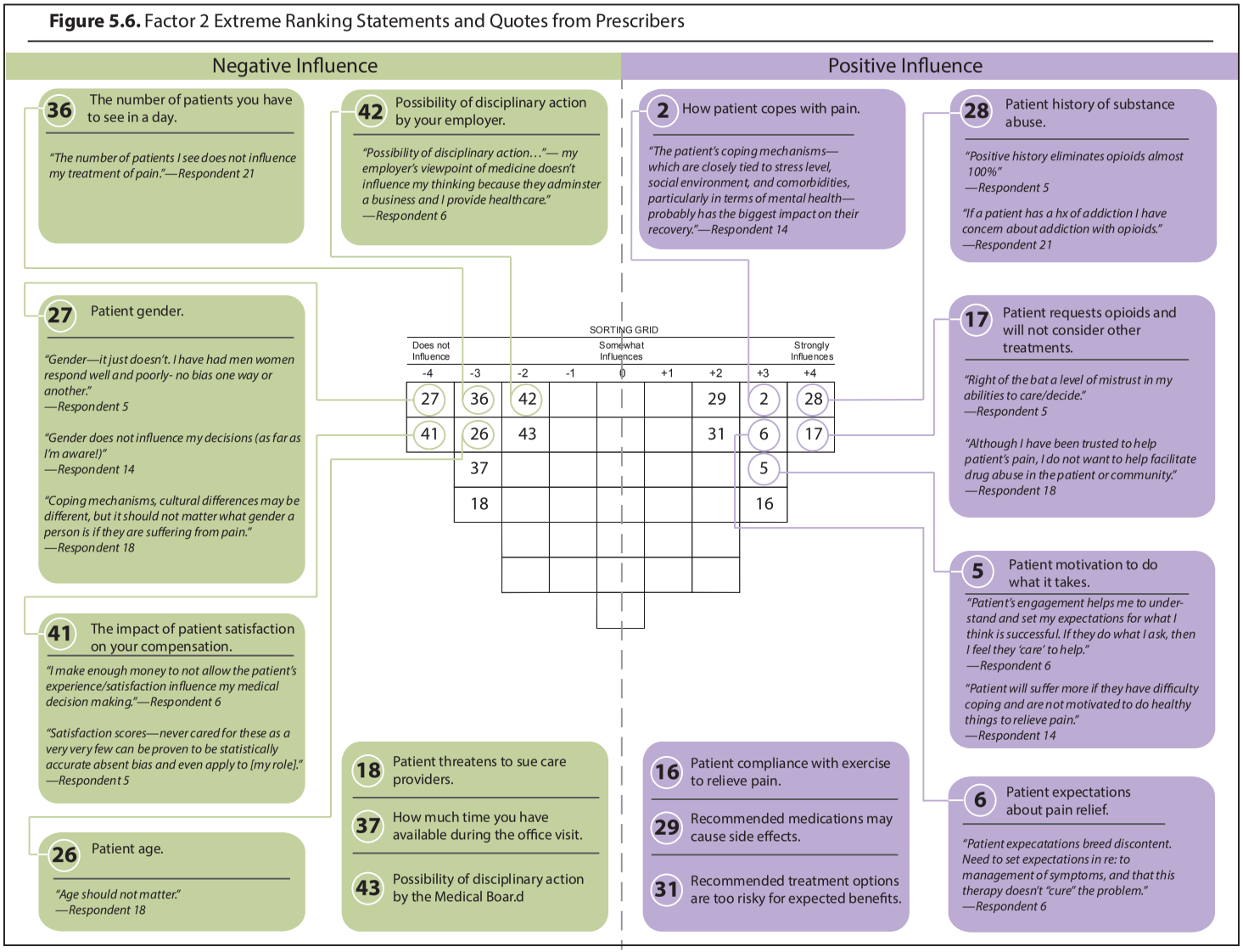


Figure 5.6. Factor 2 Extreme Ranking Statements and Quotes from Prescribers



Because these prescribers are in touch with the patient's psychological disposition, these prescribers were very concerned with facilitating drug abuse in both the individual patient and in the community. These prescribers actively avoid prescribing opioids when addiction is a concern (Figure 5.6, #28), for example, when the patient has a history of drug abuse (Figure 5.5, #28, +4). These prescribers are suspicious of patients who request opioids (Figure 5.5, #17, +4; Figure 5.6, #17). Generally, however, social (Figure 5.5, #10, 0; #11, 0; #7, -1; #8, -1) and individual psychological considerations did not influence these prescribers (Figure 5.5, #12, 0; #25, -1; #3, -1). Depression (Figure 5.5, #4, +1) was the only psychological factor that was influential to these prescribers.

Although these prescribers were not influenced by organizational pressure (Figure 5.5, #41, -4; #42, -2; #43, -2), their rationale seemed different from their Confident Clinician (Factor 1) colleagues. They seem skeptical of how well they can be judged by their employer (Figure 5.6, #41, #42).

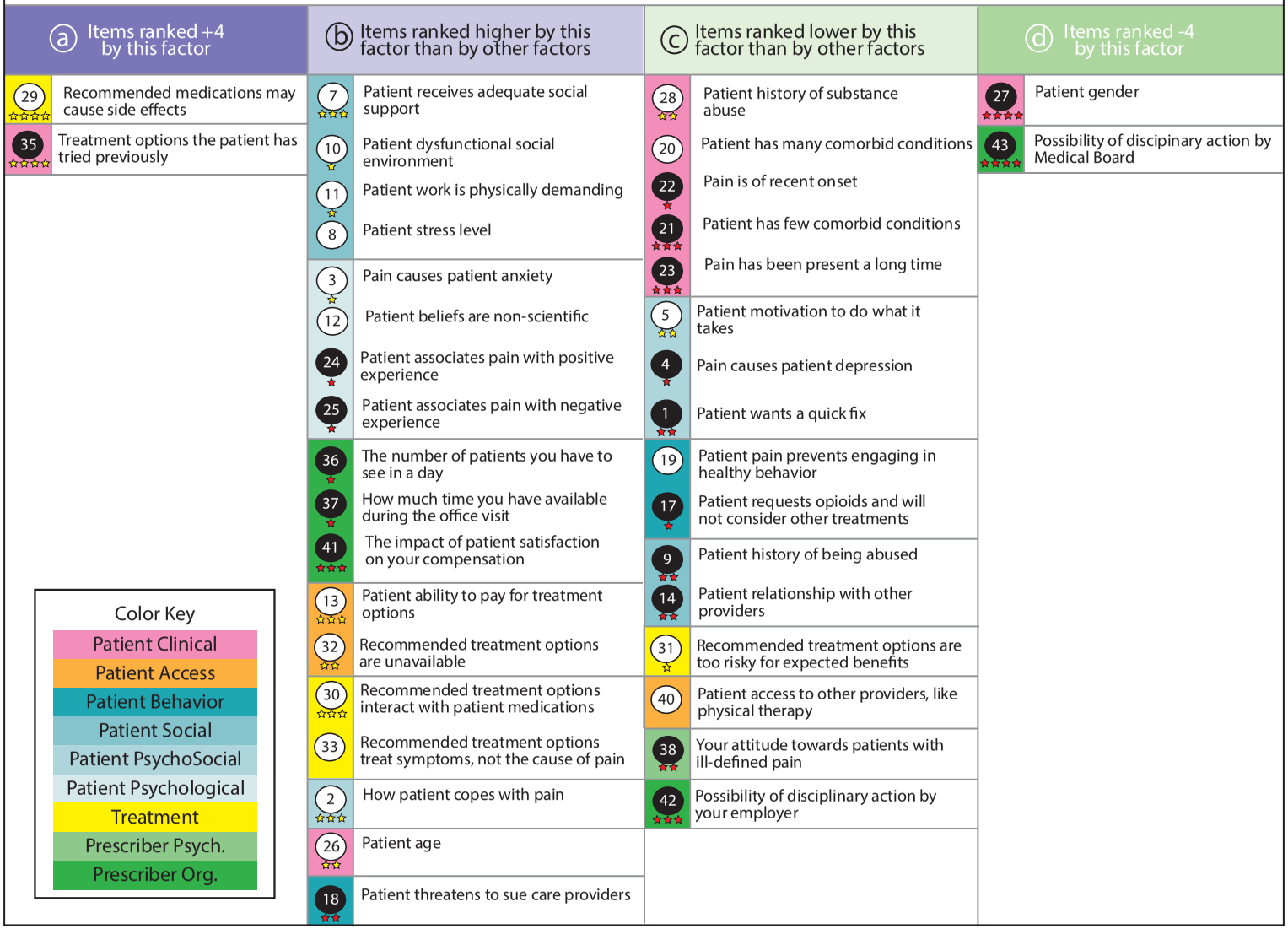
c. Factor 3—The Seasoned Realist

Factor 2 has an eigenvalue of 0.95 and explains an additional 4% of the variance (Table 5.6). Two participants were significantly associated with this factor (Table 5.5). Both participants were males, worked the same organization—the for-profit health system—were physicians, and had greater than 26 years experience in Internal Medicine; one of these prescribers received non-opioid pain management training.

These prescribers were most influenced by treatment options (Figure 5.7, #29, +4; #35, +4; #30, +3; #31, +1; #33, 0), but know that those are not the only considerations that will yield success. These prescribers identified one consideration in each theme from the spectrum of statements that influenced them more than other statements. These most influential considerations were: access (Figure 5.7, #13, +3; #32, +2; Figure 5.8, #13), coping (Figure 5.7, #2, +3), and social environment (Figure 5.7, #7, +3). Specific clinical

considerations—duration (Figure 5.7, #22, -1; #23, -3) and the number of comorbid conditions (Figure 5.7, #21, -3; #20, 0) were less influential. These prescribers make decisions based on specific considerations from a theme, focusing on the various aspects of the patient, rather than focusing on only ideas in the same theme. This indicates the prescribers recognize the nuances in the patient and the patient's situation. They don't rely on one type of indicator, but look at the patient globally as a whole. They have married the patient's body and mind, and consider the patient in the context of their social environment and access to treatment options.

Figure 5.7. Factor 3 Crib Sheet Interpretation



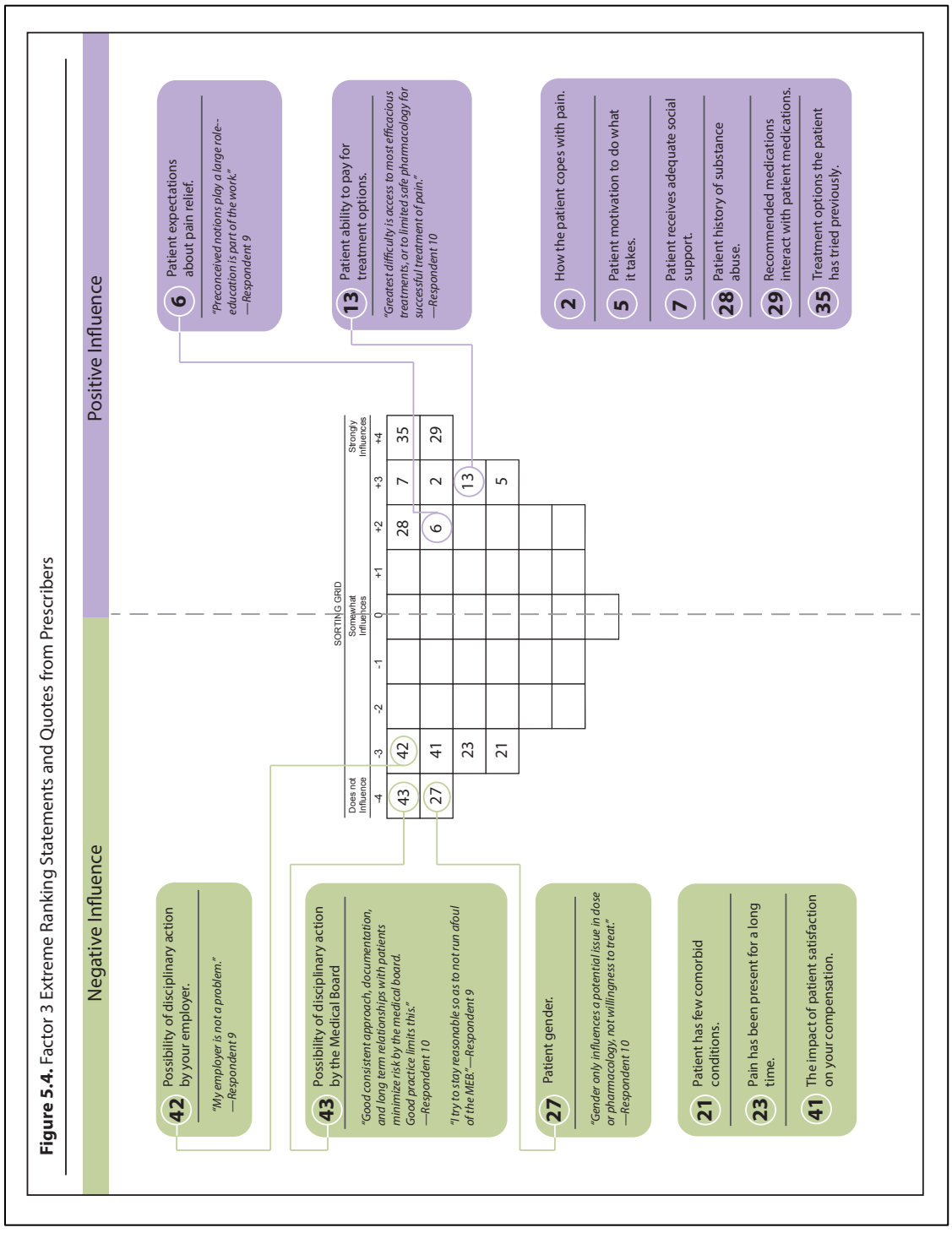


Figure 5.4. Factor 3 Extreme Ranking Statements and Quotes from Prescribers

Several additional considerations are noteworthy because although they were ranked in the middle by these prescribers, they were ranked higher by these prescribers than the other respondents. For example, these prescribers considered the patient's social situation (Figure 5.7, #10, +1; #11, 0; #8, 0) to be more influential than did their colleagues, and recognized that their own schedule (Figure 5.7, #36, -1) and availability to the patient (Figure 5.7, #37, -1) influence their decision-making to any extent.

These prescribers were well-seasoned and share similar demographic profiles, which could explain their focus on the social aspects of pain management. Their experience tells them the treatment must be available to the patient in order for it to be beneficial. However, experience and demographics cannot fully explain the shared perceptions. There were other prescribers who also fit these demographics. There are likely additional factors not included in these data that explain why these prescribers are more influenced by patient social and perceived organizational pressures than are their colleagues.

3. Validation of the factors

Factors were qualitatively validated by asking small groups of PCPs who were presented with the three-factor results and then asked to interpret each factor. The prescribers who participated followed the same inclusion and exclusion criteria as the PCPs who participated in data collection.

Validation was conducted as two groups of two prescribers. All participants were physicians. Three of the prescribers practice in Internal Medicine, and the fourth in Family Medicine. Two of the prescribers had practiced at least 10 years, one was in the second year of practice, and the fourth was in the first year of residency. Each meeting was led by a facilitator who is trained in facilitating qualitative discussion groups.

The first group of validators felt that the first two factors were easier to interpret than the third factor. Factors 1 and 2 were both very patient-centered, the first oriented towards biomedical considerations and the second oriented towards psychosocial considerations. The third was more difficult to summarize. One validator described factor 3 as a combination of the two other factors. This validator was surprised by the fact that the impact of patient satisfaction on compensation was ranked as a more influential consideration while the patient requesting opioids (and not considering other treatments) was ranked as less influential.

The second pair of validators summarized the first factor as influenced by "patient pain factors and diagnosis," "physical conditions and treatment options, but not necessarily patient specific issues," and "objective, not subjective issues." Factor one prescribers were less influenced by the patient's environment or prescriber issues. They summarized the second factor as influenced by "subjective, touchy feely things—patient beliefs, perspectives, or actions," and "takes into consideration the patient situation and qualities about the patient's ability and interactions, rather than the pain." They described this prescriber is more "jaded, more reactionary, and concerned with not giving narcotics to someone who they think will abuse them." This prescriber was "more concerned with patient issues," and also "less concerned with prescriber issues." However, they noted that patient stress, anxiety, and ability to pay for treatment options were not fitting in the "not influential" group. They also felt the prescribers' low ranking of influence of patient satisfaction and time pressures were potentially caused by reporting bias, given that the socially desirable response is to not be influenced by these things. Finally, the prescribers summarized prescribers in the third factor as being "a confluence of Factors 1 and 2," considering both "objective things and psychosocial things." These prescribers are "more well-rounded, and not as much about the quality of the pain." These prescribers were "most concerned with the

treatment and how it will affect the patient. Is it the best for the patient?" and "looks at the whole picture." They felt the "negative things about a patient are not so important to this provider." Interestingly, these prescribers stated they would like to be prescribers in Profile 3 because they are not reacting to fear, they have a mix of patient environment and psychosocial factors, and they seem most influenced by what is "best for the patient."

In all, the prescribers who participated in the validation discussion groups corroborated the interpretation of the factors.

D. SUMMARY OF PHASE 2—DESCRIBING PRESCRIBER TYPES

A four-factor solution was run as a starting point, based on the number of Q-sorts received during data collection. The four-factor solution indicated there were two factors that would emerge from the data and that a third factor was possible as well. Therefore, two- and three-factor solutions were run and rotated by hand. The two-factor solution was statistically sound, but seven of the Q-sorts were not included in the solution due to non-significance or confounding. The three-factor solution included more of the Q-sorts, but the third factor was not statistically as sound as the other two. A qualitative comparison of the factors revealed meaningful differences in the two factors, and the three-factor solution was chosen for this reason.

The quantitative analysis revealed that prescribers in Factor 1, referred to here as "Confident Clinicians" follow a biomedical approach to managing pain. They are concerned with the clinical history of the patient and how treatments will either help the patient or potentially cause the patient harm. Prescribers in Factor 2, the "Sensitive Psychologists," are more concerned with the patient's psychological state. This is not to say they disregard biomedical concerns, but relative to their Factor 1 colleagues, they are more apt to consider the patient's psychology and mental health. Factor 3 prescribers, the "Seasoned Realists,"

were more strongly influenced by patient social concerns and their own organizational pressures. Again, this is not to say they disregard biomedical considerations, but relative to their Factor 1 and 2 colleagues, they consider patient social concerns and organizational pressures in addition to the biomedical concerns.

When demographic data are included, an interesting observation is revealed, perhaps warranting further study. The plurality of prescribers (n=10) was Factor 1 prescribers. They were spread across most demographic criteria evenly. Factor 2 prescribers were the next largest group (n=6); they were also spread across most demographic criteria. Factor 3 prescribers, however, were the smallest group (n=2), and were a very specific demographic: Internal Medicine male physicians who have practiced greater than 26 years or more and currently work in the same organization.

The findings from this study demonstrate that Q Methodology can be used to identify prescribers based on their perceptions. The statistical method used to do this was by-person factor analysis, which was made possible by the Q-Sort, the sorting and ranking exercise unique to Q Methodology. The next chapter presents a discussion of the findings and conclusions to be drawn from the study.

VI. DISCUSSION

A. SUMMARY OF THE STUDY

After conducting 11 semi-structured interviews, transcripts were analyzed for themes that influence Primary Care Prescriber (PCP) decision-making when managing pain. There were 27 themes identified in the qualitative phase of the study. These themes were categorized as Patient Themes, Prescriber Themes, and Treatment Themes.

These 27 themes were used to develop 43 statements included in the Q-set that were subsequently sorted and ranked in the Q-sort. A total of 22 respondents completed the questionnaire, which included the Q-sort. Three prescriber types emerged from by-person factor analysis: 1) the Confident Clinician, 2) the Sensitive Psychologist, and 3) the Seasoned Realist.

B. QUALITATIVE MODEL/THEMES

Despite being analyzed inductively (without pre-determined themes or categories), the themes identified in the qualitative phase of the study mirrored the Research Conceptual Framework in Figure 1.1. The patient themes identified align closely with the themes in the Biopsychosocial Model of Pain in Figure 1.3. The Prescriber and Treatment themes were newly identified in this study. Prescriber themes related to personal psychology of the prescriber, represented as cogs in Figure 1.1, as well as the context within which they practice. The treatment themes identified related to treatment goals and patient safety (i.e., drug interactions and side effects), represented in Figure 1.1 as alternatives to consider when making a treatment decision.

C. QUANTITATIVE FINDINGS

Table 5.2 presents the unrotated factor loadings of the 4-factor solution. Almost all of the Q-sorts load on the first factor, indicating shared variance among the Q-sorts. Interpretation of the factors should reflect this predominant factor loading. The prescriber types that emerged from the quantitative analysis can be thought of as sharing common perceptions, and the items that differentiate the prescriber types are secondary to these common perceptions. For example, in general, patient and treatment themes were considered more influential than prescriber themes. In clinical practice, treatment decisions are made only after thorough assessment of the patient and consideration of the various treatment alternatives. This logic is reflected in the largely shared variance, which may result from the fact that prescribers are relatively homogeneous. This homogeneity manifests in the practice setting as all prescribers practice in primary care, in the same community and geographic location, and in their training in the allopathic tradition. In future studies, the amount of variability can be further evaluated using a parallel test.

D. METHODOLOGICAL PRINCIPLES

The reason Q Methodology was used in this study is its ability to study subjective concepts such as perceptions. However, every methodology has weaknesses as well. This section will discuss the weaknesses and limitations of Q Methodology.

1. Biopolar scale

The bipolar scale at the top of the Q-sort grid is standard to a Q Methodological study. Stephenson go into great detail about the importance of a bipolar scale and the inclusion of negative attributes.[47] However, in this application, the inclusion of negative attributes does not match the verbal anchors of “no influence.” *No* influence is different from

negative influence; negative influence means that the item influences the respondent away from a behavior. However negative influence does not fit the Condition of Instruction. The mismatch of labeling might have led to respondent confusion.

A number of alternatives exist which can reduce the likelihood of respondent confusion. First, the numeric scale and the verbal labels can be designed to match. In this situation, the Condition of Instruction could be revised to fit a bipolar scale. On the other hand, the scale could be revised to fit unidimensional labels. Each alternative has strengths and weaknesses. For example, a unidimensional scale is easier for respondents to understand and reduces response burden. However, as Stephenson point out, there is inherent value in negative perceptions and they should, therefore, be included in the Q-sort as well. If both the numeric scale and verbal labels are to be included, it is important that the scale and labels match, to avoid confusion.

Alternatively, the Q-sort grid could include either the numeric scale or the verbal labels, but not both. Including only the numeric scale requires additional interpretation. However including only the verbal scale makes quantitative analysis more unreliable. Ideally, future developments in Q Methodology instrumentation will assist researchers in determining which scale alternative is most appropriate for a given application. This is an important future direction.

2. Reliance on self-report.

This study relies on prescribers' self-report of their perceptions. Perceptions are inherently subjective; however, self-report, despite being vulnerable to social desirability, is necessary at some point. For example, in this study gender was consistently ranked as not influential to prescriber decision-making. While this may be true for these individuals, it is also possible that respondents are simply unaware of their own biases. Existing studies show gender differences in many aspects of pain management. Studies indicate men and

women experience physiologic pain differently: women are more prone to painful conditions than men, and men have greater pain inhibition pathways that modulate painful experiences.[32] In addition to these physiologic differences, previously published vignette studies have shown that prescribers can exhibit gender bias.[32]

Methods such as vignette studies and secret shopper studies objectively measure behavior. This is particularly helpful when social desirability is a concern. Despite their objectivity, vignette studies and secret shopper studies do not address perceptions directly as can be done using Q Methodology; rather they address behavior related to perceptions. Each method addresses different research questions that can elucidate different components of this complex issue. These approaches complement each other and add to the overall knowledge base about prescriber decision-making.

3. Limitations

As with all studies, this study has limitations. The greatest limitation of this study is the lack of generalizability, a result of the sampling method and use of Q Methodology. The sampling method was self-selecting and, therefore, prohibits generalizability. Although Q Methodology is a mixed method, it truly lies on the more qualitative end of the continuum.[78] By analyzing the Q-sorts using by-person factor analysis, results are truly subjective. As a result, it is not possible to draw inferences from a Q Methodology study to a population.[12; 78; 104] The strengths of Q Methodology overshadow the limitations, however, as the first phase of a Q Method study is to qualitatively develop the Concourse from which statements for the Q-set are drawn. This qualitative exploration was important to this study as a prescriber-level pain management decision-making model did not yet exist. Another limitation to this study is that it focused solely on PCPs. This study did not aim to describe all prescribers who manage pain, and the limited focus of practice setting was intentional. It may be that Specialist prescribers have different approaches to pain

management, and future studies can explore this. PCPs were chosen as the focus of this study as they are often the first to see patients with pain. Additional prescriber groups should be studied to investigate the possibility of additional prescriber types. [32]Prescriber groups need not be limited to allopathic medicine; alternative/complementary medical providers (e.g., Naturopaths, Chiropractors, Acupuncturists) can also provide effective in pain management. Studying alternative providers may yield very different prescriber types not identified by this study. Geographic location may also influence perceptions. This study is not representative of other geographic locations, and can be replicated to study similarities and differences in other locations.

E. CONCLUSIONS

1. Implications

The ability to identify prescribers by the perceptions they hold is fundamental to behavior change. Perceptions influence behavior in meaningful and modifiable ways. With this ability, perceptions can be used to predict meaningful health outcomes, such as pain scores or impact of pain on daily activities. Alternatively, they can serve as outcomes themselves, such as in the evaluation of interventions aimed at behavior change.

This study demonstrated a novel way of identifying and describing prescriber perceptions. The use of Q Methodology retained the contextual richness of individual perceptions, yet presented the prescriber types with the precision of a quantitative study. The utility of being able to identify and describer prescribers has implications in policy-making and evaluation.

Organizations may find it useful to identify “types” of prescribers for two reasons. Perceptions can be used as predictor variables when studying health outcomes. This would allow study of the relationships between antecedent predictors of behavior and health

outcomes. In doing so, policy-makers can structure and employ process-oriented quality and safety interventions that address perceptions, rather than just the behaviors themselves. In this study, prescribers were identified by their perceptions while managing pain. The ability to do this can allow the pairing of pain management “type” and clinical outcomes, such as pain score, impact of pain on daily activities, or abuse and addiction of opioid pain medications.

Likewise, perceptions can be used as outcomes to interventions aimed at changing behavior. Behavior change can result from a number of policies. However, policies can often be restrictive or add to prescriber workload in the form of additional paperwork, or simply be ineffective or short-lived. Should interventions target perceptions or other antecedents to behavior change, it may be possible to achieve behavior change without restricting behavior. In pain management, much attention has been given to prescriber education.[71] The literature on patient psychosocial factors and their role in pain management should be included in prescriber education efforts. Changes in prescriber perceptions before and after receiving education can be used to evaluate the effectiveness of the educational intervention.

2. Future Research

This study explored a prescriber-level model of decision-making in pain management. The themes identified in this study can be expanded and further developed, particularly with regard to the relationships between themes. For example, the relationship between patient mental health status and prescriber attitude could be developed further. With a better understanding of this relationship, prescribers may be taught how to respond to patients with poor mental health status, particularly when Behavioral Health Specialists are not available.

This study also identified and describer prescriber “types” based on their perceptions while managing pain. Future studies can investigate if additional prescriber types exist in other practice settings or traditions of medicine. Prescriber type can be paired with prescribing patterns and health outcomes, to determine if perceptions influence prescribing and/or subsequent health outcomes.

Of particular importance is the need to study how prescriber perceptions in pain management relate to the prescribing of opioid pain medications for their patients and the subsequent abuse or addiction to opioid pain medications. Prescribing of opioid pain medications has increased over recent years,[58] and has been implicated in accidental poisoning deaths.[1] Perceptions are a modifiable characteristic and could prove to be an important target of intervention in promoting appropriate use of opioid pain medications and preventing abuse of these medications.

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APPENDIX A. PRE-INTERVIEW QUESTIONNAIRES

Pre-Interview Questionnaire v1

Q1 In order to participate, you must:

1) be a prescriber involved in direct outpatient Primary Care (Internal Medicine or Family Medicine)
2) have the majority (>50%) of your practice be adult patients (>18 years old)
3) be responsible for treatment management decisions
4) be able to complete a questionnaire and interview in English Do you meet all of the eligibility criteria?

- ❍ Yes (1)
- ❍ No (2)

Q2 This study is NOT intended for:

1) Prescribers who work primarily in Urgent Care, Emergency Departments, or Inpatient Settings
2) Prescribers who work primarily in a Pain Clinic, Oncology, Hospice or Long-term Care facilities
3) Prescribers who work primarily with pediatric patients
4) Psychologists, Physical Therapists, Chiropractors, or other health care professionals who may interact with patients in pain, but who are not responsible for prescribing decisions Do you still meet all the eligibility criteria?

- ❍ Yes (1)
- ❍ No (2)

If “No” is selected:

Q3 Based on your responses to the previous two questions, you do not meet the eligibility criteria. In order to participate, you must:

1) be a prescriber involved in direct outpatient Primary Care (Internal Medicine or Family Medicine)
2) see a majority (>50%) of adult patients
3) be responsible for treatment management decisions
4) be able to complete a questionnaire and interview in English

This study is not intended for:

1) Prescribers who work primarily in Urgent Care, Emergency Departments, or Inpatient Settings
2) Prescribers who work primary in a Pain Clinic, Oncology, Hospice or Long-term Care facilities
3) Prescribers who work primarily with pediatric patients
4) Psychologists, Physical Therapists, Chiropractors, or other health care professionals who may interact with patients in pain, but who are not responsible prescribing decisions

Select the appropriate response below to continue or terminate this questionnaire.

- ❍ Yes, I meet the eligibility criteria and would like to continue with the study. (9)
- ❍ No, I do NOT meet the eligibility criteria and am not able to continue with the study. (10)

Q39 The following is a questionnaire aimed at understanding the thoughts processes of prescribers when managing pain.

There are no right or wrong answers. It is important that you answer from your perspective and as honestly as possible.

Q4 When did you first learn about the clinical management of pain?

- professional school (medical, nursing, physician assistant) (1)
- post-graduate training (residency) (2)
- on-the-job training (3)
- other. (4)

If “Other” is selected:

Q5 If "other," please fill in the answer:

Q6 For the following scenario, imagine the patient described is the next patient you will see for an office visit. You are scheduled for 30 minutes with the patient. You can assume:

1. You are the patient's Primary Care Provider
2. You know the patient and his/her medical history
3. The patient does not have an acute condition that warrants an ED visit
4. Vitals for the patient are normal
5. There are no barriers that limit treatment options for this patient.

Q7 A 37 year-old Asian-American male woke up with severe low back pain four weeks ago. He is generally healthy and has not been seen for this same complaint before. He reports he has tried some OTCs, but they haven't been helpful. The patient tells you he had recently started a strenuous exercise program. He is able to attend and perform his job as a computer programmer, though the pain persists. By history, you are able to rule out malignancy, arthritis, disk herniation, and fracture, and conclude it is muscuoloskeletal in origin. Given this amount of information, what treatment options would you recommend for this patient?

Q8 Why did you recommend the treatment options you did?Select all that apply.

- ❑ This is what I was taught to recommend for patients with musculoskeletal low back pain. (1)
- ❑ This is what clinical guidelines recommend for patients with musculoskeletal low back pain. (6)
- ❑ This is what patients with musculoskeletal low back pain expect. (8)
- ❑ This is what I have found to be the best first steps for patients with musculoskeletal low back pain. (4)
- ❑ Other (5)

Q42 Use this information to answer the next TWO questions:

Q40 The patient confides to you that he has been unhappy in his job. He feels his boss treats him poorly and gives him boring projects. He has begun looking for a new job, but has not had much luck finding new employment.

Q9 Would you change your treatment recommendations?

- ❍ Yes (11)
- ❍ No (12)

If answer to Q9 is “Yes”

Q10 You answered: Yes, you would change your treatment recommendations if the patient confided to you he is unhappy in his job. How would you change your treatment recommendations?

Q11a To review:The patient confides to you that he has been unhappy in his job. He feels his boss treats him poorly and gives him boring projects. He has begun looking for a new job, but has not had much luck finding new employment.

Do you think the patient's frustrating work situation significantly influences his reported pain symptoms and potential improvement?

- ❍ Yes (9)
- ❍ No (10)

If answer to Q11b is “Yes”

Q41 You answered: Yes, you think that the patient's frustrating work situation influences his reported pain symptoms and potential improvement. Please explain how you think the patient's work situation impacts his reported pain symptoms and potential for improvement

Q12 Use this information for the next THREE questions:

The patient returns after two weeks for a follow-up visit. He continues to have low back pain, and has missed work because of it. He's anxious he will lose his job because his boss doesn't like him and he's missed work.

What treatment options would you now recommend for this patient?

Q13 If your treatment recommendations have changed from your initial treatment recommendations, what new information described in the situation above warrants the change in treatment recommendation?Select all that apply.

- ❑ The initial treatment recommendations were not helping. (9)
- ❑ The duration of pain warrants a change in treatment recommendations. (5)
- ❑ Patient has missed work. (2)
- ❑ Patient is anxious about losing his job. (3)
- ❑ The treatment recommendations have not changed. (13)

Q15 Would you change your recommendations if the patient were a construction worker, rather than a computer programmer?

- ❍ Yes (1)
- ❍ No (2)

If answer to Q15 is “Yes”

Q16 You answered: Yes, you would change your treatment recommendations if the patient were a construction worker, rather than a computer programmer.How would you change your treatment recommendations?

If answer to Q15 is “Yes”

Q17 What is it about the patient's occupation as a construction worker changes your treatment recommendations?

Q19 During the visit, the construction worker reveals he is considering litigation with his employer. Would you change your treatment recommendations?

- ❍ Yes (1)
- ❍ No (2)

If answer to Q19 is “Yes”

Q20 You answered: Yes, you would change your treatment recommendations if the patient revealed he is considering litigation with his employer. How would you change your treatment recommendations?

If answer to Q19 is “Yes”

patient revealed he is considering litigation with his employer. What is it about the potential for litigation that affects your treatment recommendations?

Q23 From your perspective, what patient factors, if any, do you think impact significantly on the patient's progression from acute to chronic pain?

Q24 Beyond diagnosis and providing therapy (referral to ancillary or specialty care, medication, etc.) what other ways can you help the patient as their health care provider?

APPENDIX B. SAMPLE SEMI-STRUCTURED INTERVIEW

Introduction:

I'd like to begin this interview with a review of the clinical scenario you were presented in the questionnaire:

A 37 year-old Asian-American male woke up with severe low back pain four weeks ago. He is generally healthy and has not been seen for this same complaint before. He reports he has tried some OTCs, but they haven't been helpful. He is able to attend and perform his job as a computer programmer, though the pain persists. By history, you are able to rule out malignancy, arthritis, disk herniation, and fracture, and conclude it is musculoskeletal in origin.

Let's begin the interview.

1. You responded that you would recommend beginning treatment with 1) short course of muscle relaxers, 2) back care handbook or seminar with detailed stretching exercises, 3) aggressive icing, 4) prescription dose NSAIDs if not using OTCs at a high enough strength.

   1a. Tell me about what led you to these recommendations.

   Probe 1: Is this the order of priority you give the recommendations?

   1b. Tell me more about the back care handbook. If possible, can I have a copy of the handbook?

   Probe 1: Is this something available to you in the clinic?

   Probe 2: What is contained in this book?

•

2. In the questionnaire, you responded that the patient's frustrating work situation influences his reported pain symptoms and potential improvement. However, you did not change your recommendations.

- Is there ever a situation where you would change your recommendations based on a patient's poor social situation?
-
- What would you do to help a patient with frustrating or negative social situations that can affect his or her pain or improvement?

3. In the questionnaire, you responded that the following aspects of the scenario warranted change in treatment recommendations:
   - The duration of pain warrants a change in treatment recommendations
   - The initial treatment recommendations were not helping

   3a. Are there other aspects you consider important that were not included on the list provided? **Y** **N**

   3b. Which aspect do you consider the most important?

   3c. Why do think this aspect is the most important?

   3d. Tell me more about the duration of pain influencing your treatment recommendation.

   Probe 1: What about the duration of pain warrants the change?

   Probe 2: Is there a specific amount of time that you use to define the duration of pain?

4. In the questionnaire, you responded that potential litigation between the patient and his employer would not change your treatment recommendations.

   Would any circumstances change your view on this?

5. In the questionnaire, you state the patient response to stress of injury and/or response to stress of work significantly impacts on the patient's progression from acute to chronic pain.

   - 5a. How do you assess the patient's response to stress?
   - Probe 1: What signs are you looking for?
   - Probe 2: What causes uncertainty in your assessment?

   - 5b. Do you feel pain, as a condition, causes stress differently from other conditions? If yes, how?

6. In situations such as the scenario presented in the questionnaire, what other social factors do you consider important other than work?

   Probe 1: What happens if the patient does not offer the information?

   Probe 2: How do you leverage relationships in a patient's life to promote wellness?

7. What are your priorities when faced with a pain management task such as the scenario presented in the questionnaire?

- Probe: Where does preventing chronic pain fit in?

Prescriber Perceptions While Managing Pain

A study conducted by the University of Wisconsin-Madison

Thank you for agreeing to participate in this study.

The purpose of this study is to investigate how Primary Care Providers make decisions when managing patients with pain of uncertain origin.

The statements in the included envelope came from interviews with providers who were presented with clinical scenarios of patients with pain.You will be asked to 1) sort the statements into three piles, 2) rank them on the SORTING GRID on the next two pages, and 3) record your rankings on the enclosed SORTING ANSWER SHEET.

Please keep the following in mind as you complete this activity:

- ☆ Sort and rank the statements based on your initial response. Do not over-think your responses.
- ☆ There are no right or wrong answers; I am interested in YOUR opinions.
- ☆ Answer as truthfully as possible.

Sort and rank the statements
answering the question:

How much does each statement influence <u>your decision-making</u> when managing ill-defined pain?

First, Sort

1. Remove the 43 statements from the included envelope. Take a moment to familiarize yourself with the statements.

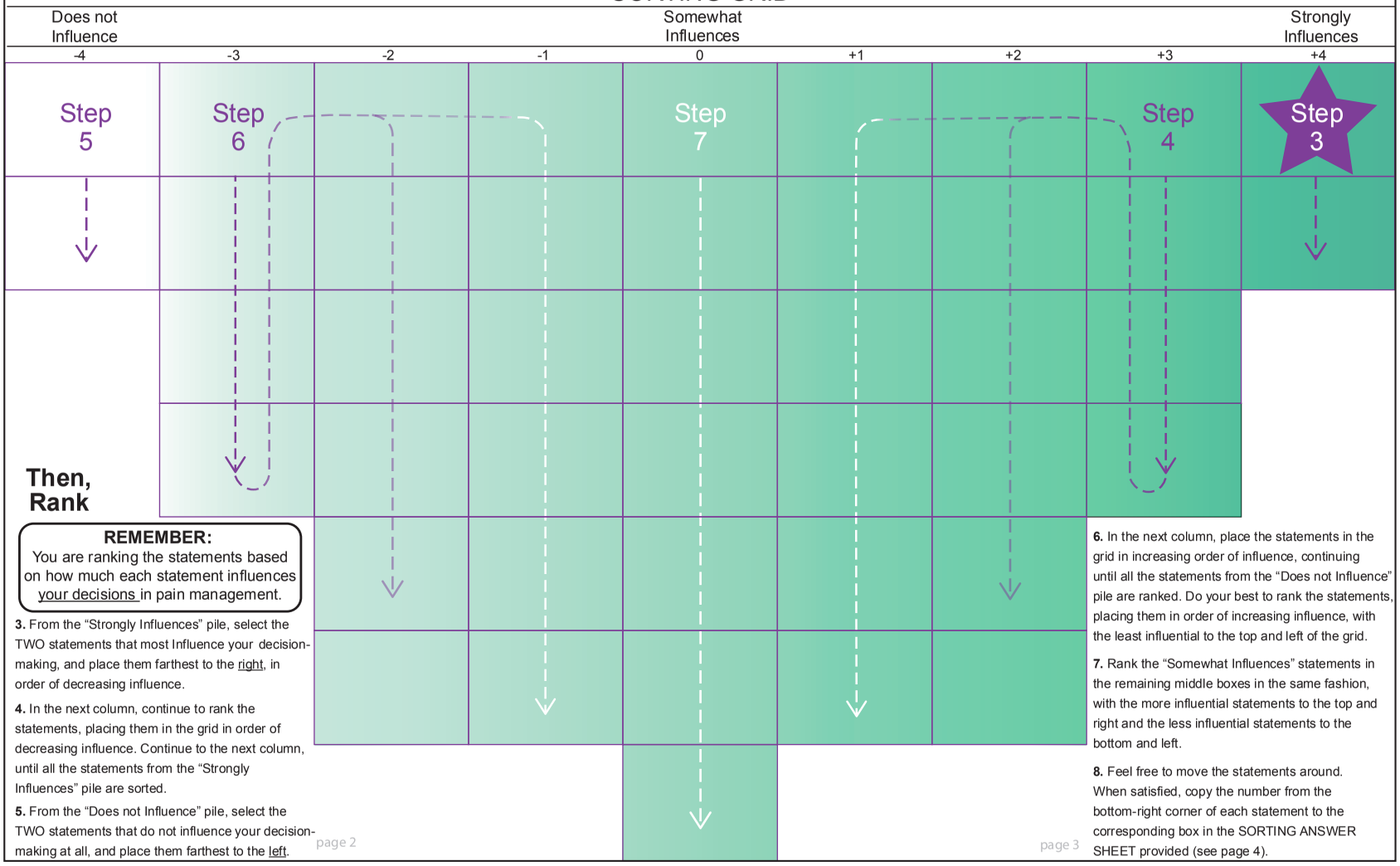
2. Sort the statements into three piles as below, based on how much you feel each statement influences your decision-making in pain management.

Does not Influence your decision-making	Somewhat Influences your decision-making	Strongly Influences your decision-making

In the next step, you will rank the statements in the provided grid (pages 2-3). In the end, the most influential statements should be on the right, and the least (or not) influential statements should be on the left. Statements in the middle are those you feel somewhat influence your decision making in pain management.

CONTINUES ON NEXT PAGE.

SORTING GRID



Then, Rank

REMEMBER:
You are ranking the statements based on how much each statement influences your decisions in pain management.

3. From the "Strongly Influences" pile, select the TWO statements that most Influence your decision-making, and place them farthest to the right, in order of decreasing influence.

4. In the next column, continue to rank the statements, placing them in the grid in order of decreasing influence. Continue to the next column, until all the statements from the "Strongly Influences" pile are sorted.

5. From the "Does not Influence" pile, select the TWO statements that do not influence your decision-making at all, and place them farthest to the left.

6. In the next column, place the statements in the grid in increasing order of influence, continuing until all the statements from the "Does not Influence" pile are ranked. Do your best to rank the statements, placing them in order of increasing influence, with the least influential to the top and left of the grid.

7. Rank the "Somewhat Influences" statements in the remaining middle boxes in the same fashion, with the more influential statements to the top and right and the less influential statements to the bottom and left.

8. Feel free to move the statements around. When satisfied, copy the number from the bottom-right corner of each statement to the corresponding box in the SORTING ANSWER SHEET provided (see page 4).

SORTING ANSWER SHEET

Does not Influence				Somewhat Influences				Strongly Influences
-4	-3	-2	-1	0	+1	+2	+3	+4

1. Explain the reason you chose each statement that STRONGLY INFLUENCES your decisions in pain management.

Influences the most:

Influences the second most:

2. Explain the reason you chose each statement that DOES NOT INFLUENCE your decisions in pain management.

Influences the least:

Influences the second least:

3. Are there any considerations that influence your decision-making in pain management that are not included in the statements you sorted? If so, please explain them here.

Administrative purpose only:

CONTINUES ON NEXT PAGE.

Demographic Questions (optional):

Responses to these questions aid in better applying research results. It is possible a unique combination of demographics could be connected with an individual.

For each question, please select ONE response.

1. What is your role in patient care?

◯ Physician ◯ Advanced Practice Nurse ◯ Physician Assistant

2. How many years have you practiced in Primary Care?

◯ 0-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26+

3. Have you completed any training that included material on patients with ill-defined pain and their mental health, social status, and functional capacity?

◯ Yes ◯ No

4. How long is an office visit for a primary diagnosis of pain scheduled?

◯ 15-29 min ◯ 30-45 min ◯ 46-60 min ◯ 61-90 min ◯ ≥91 min

5. Please select one response to indicate how often you:

	Never	Rarely	Sometimes	Often	Always
a. Spend more than the scheduled amount of time with patients with ill-defined pain.	◯	◯	◯	◯	◯
b. Cut short other office visits because a patient with ill-defined pain took longer than the schedule amount of time.	◯	◯	◯	◯	◯
c. Assess stress, anxiety or depression with patients with ill-defined pain.	◯	◯	◯	◯	◯
d. Discuss stress, anxiety or depression with patients with ill-defined pain.	◯	◯	◯	◯	◯
e. Discuss stress, anxiety or depression with patients with ill-defined pain not responding to pain management therapies.	◯	◯	◯	◯	◯
f. Refer patients with ill-defined pain to a Behavioral Health Specialist.	◯	◯	◯	◯	◯
g. Refer patients with ill-defined pain showing signs of stress, anxiety or depression to a Behavioral Health Specialist.	◯	◯	◯	◯	◯

Thank you for completing this questionnaire.

Please place the SORTING ANSWER SHEET in the return envelope provided.
Contact Grace Welham (welham@wisc.edu or 608-358-1241) to arrange for pick-up.