2010

Willingness to Influence Indication-Based Off-Label Prescribing: an Investigation of Hospital Pharmacists

Ram Sankar Basak

Willingness to Influence Indication-based Off-label Prescribing: An Investigation of Hospital Pharmacists

A Thesis

Presented for partial

fulfillment of requirements for the

Masters of Science Degree

The University of Mississippi

Ram Sankar Basak

August, 2010

ACKNOWLEDGEMENTS

I would like to acknowledge and express my gratitude to all individuals who have made contribution.

First, I am grateful to my advisor Dr. David J. McCaffrey who has been an excellent mentor ever since I came to the University of Mississippi. Apart from his contribution toward my intellectual development, he has been a true friend. I am also thankful to my committee members Dr. Benjamin F. Banahan, Dr. John P. Bentley, Dr. Alicia S. Bouldin. Your brilliance inspires me and enriched my thesis.

I also express great appreciation for the faculty of the Department of Pharmacy Administration, its staff, and my fellow graduate students. I gratefully acknowledge the generous but crucial support extended by the participating state affiliates of the American Society of Health-System Pharmacy and grant offered by the Graduate Student Council of the University of Mississippi.

Finally, I thank my wife Surma, mom, sister, and extended family in India for love and support showered on me by all of them. Without them, my life would not be complete.

ABSTRACT

Off-label prescribing is a common and legal practice in the United States. However, off-label prescribing occurs oftentimes with inadequate evidence of effectiveness. Such practice, especially when prescribing for disease conditions different from approved clinical indications (indication-based off-label prescribing), brings about controversy and raises different issues with various stakeholders. Although indication-based off-label prescribing offers advantages in terms of providing innovative therapy, it raises concerns because the safety and efficacy of such use may not be evaluated adequately. Thus, the objective of the study was to examine whether pharmacists are willing to influence physicians while evaluating an indication-based off-label medication order. Based on the extended social power typology originally proposed by French and Raven (1965), the study examined the role of relative expert power, perceived appropriateness, and perceived negative relational consequences on pharmacist's willingness to influence using rationality tactic.

Pharmacists practicing in hospitals were recruited from the membership rolls of state affiliates of the American Society of Health-System Pharmacists (ASHP). The state affiliates were requested to distribute to their members an invitation to participate that contained a link to the survey instrument. The study employed a 2 X 2 experimental design in which relative expert power and appropriateness were manipulated using a hypothetical vignette. Respondents who reported practicing in a hospital were randomly assigned to one of the four experimental groups.

Responses from 267 pharmacists were available for analysis. After consistency inspection, 242 pharmacist respondents were included in the analysis to examine the various

propositions. Results of the analysis showed that, in general, pharmacists were willing to influence physicians to ensure rationality of indication-based off-label prescribing. Although small in magnitude, pharmacists did express concern about negative impact on inter-professional relationship quality that might arise due to influence attempts. Indeed, the effect of perceived expert power differential between the physician and pharmacist and the effect of perceived appropriateness of the off-label medication order on willingness to influence were strongly ($p<0.05$) moderated by perceived impact on relationship quality. In addition, the perceived expert power differential was associated with pharmacists' willingness to influence. Pharmacists' willingness to influence increased as perceived appropriateness decreased.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Physicians prescribe medications with an expectation that they are safe and effective. Despite these two basic assumptions, it is understood that a medication may fail to provide the expected therapeutic effect or have associated with its use, side effects. In other words, an approved medication, prescribed for a labeled (approved) indication, may have associated with it any outcome from harmful to safe and from ineffective to effective. In addition to prescribing practices that are consistent with product labeling, prescribers are granted the right to prescribe medications outside of approved indications or allowed to choose therapies that have not yet received approval from the Food and Drug Administration (FDA). Off-label prescribing is an example of such a privilege. Off-label prescribing can be considered an experimental treatment, a standard therapy, or state-of-the-art pharmacotherapeutic practice. Naturally, off-label prescribing has drawn a lot of attention in the media and among policy makers and has been subject of academic inquiry for years.

Off-label Prescribing

Off-label prescribing is the act of prescribing of a medication in a way that is not authorized or approved by a drug approval authority in a country (e.g., the FDA in the United States) (Cuzzolin, Zaccaron, and Fanos, 2003). There are different types of off-label use of medications. An off-label prescription may include an unapproved indication, dosage, formulation, route of administration, population, contraindication or a combination thereof (McIntyre et al., 2000; Conroy, 2002; Neubert et al., 2004). Off-label prescribing is a widely prevalent pharmacotherapeutic practice across many countries including the United States

(Chalumeau et al., 2000; Conroy et al., 2000; Pandolfini et al., 2002; Radley, Finkelstein, and Stafford, 2006). Additionally, off-label prescribing has been found to be practiced in ambulatory care and institutional care and in different practices settings including office-based practice (Ekins-Daukes et al., 2004; Radley, Finkelstein, and Stafford, 2006), and hospital practice (Turner et al., 1999; Bajcetic et al., 2005).

The extent of off-label prescribing had been shown to vary across different patient populations. It has been estimated that the extent of off-label prescribing may be up to 40% in adults (Brosgart et al., 1996) and 90% in pediatric patients (Conroy, McIntyre, and Choonara, 1999; Conroy et al., 2000). However, the prevalence rates of different types of off-label use (e.g., indication-based, dosage-based etc.) in adult and pediatric patient groups differ greatly. In children, as may be expected, the most frequent category of off-label use is dosage-based. Studies have found dosages used in this population were both higher and lower than what was indicated (Conroy, McIntyre, and Choonara, 1999; Pandolfini et al., 2002). Off-label prescribing for indications other than recommended ones (indication-based off-label prescribing) has been found to be prevalent in the pharmacotherapy of both adult (Chen et al., 2009) and pediatric patients (Pandolfini et al., 2002).

The practice of off-label prescribing varies across drug class. Substantial variations are observed in off-label use of different functional classes of medicines. For example, psychiatric medicines, anticonvulsants, cardiac medicines, antiasthmatics, allergy medicines, and medicines for peptic ulcers and dyspepsia are more likely to be prescribed off-label compared to other medications, such as analgesics (Radley, Finkelstein, and Stafford, 2006). Off-label prescribing was less common relatively and infrequent in medications used for glycemic control (<1%), analgesia (6%), and in antihyperlidemics (7%). Off-label prescribing was highly prevalent

among cardiac medications (e.g., antianginals, anticoagulants, and antiarrythmics) (46%), anticonvulsants (46%), asthma therapies (42%), and psychiatric medicines (31%) (Radley, Finkelstein, and Stafford, 2006). In fact, one study found that more than 70% of patients receiving anticonvulsant therapies were prescribed such medications off-label on the basis of patient age or indication (Chen et al., 2005). Drug class differences in off-label use of medicines may also vary depending on patient population. A study conducted in the UK observed that systemic antibacterial agents were the largest category of medicines prescribed off-label, followed by asthma therapies among all medicines prescribed off-label (based on unapproved dose) in children in general practice (McIntyre et al., 2000).

Off-label prescribing occurs across different medical specialties (Li et al., 1998; McIntyre et al., 2000; Haw and Stubb, 2005). Specialists may be more aware of current therapeutic developments or have better access to clinical guidelines or information on experimental uses of medicines through peers (Lin, Phan, and Lin, 2006). For example, the in one study it was observed that the cardiac specialists were more likely to prescribe β-blockers off-label as compared to the general physicians.

The extent of off-label prescribing of medicines has been shown also to vary by the intent of the therapy and disease stage (US General Accounting Office (GAO), 1991; Brosgart et al., 1996). For example, 68% cancer patients who were receiving palliative therapy were prescribed at least one medication off-label compared to only 41% of the patients receiving curative care. The proportion of the patients who received at least one medication off-label was higher in metastatic cancer than localized cancer (GAO, 1991). However, there is no agreement in the literature on whether the extent of off-label prescribing increases when there exists a lack of consensus regarding the best pharmacotherapeutic option (GAO, 1991; Brosgart et al., 1996).

Off-label prescribing of medications has many different origins. For some disease states, medications enter the market for very specific indications with narrow therapeutic goals. Once in the market, these medications are tried for different off-label indications and in some cases, off-label indications become approved indications. For example, paclitaxel, initially approved for second-line treatment of ovarian cancer, was later approved for the treatment of breast cancer and non-small-cell lung cancer (Boos, 2003). Aspirin was not approved until 1998 to reduce heart attacks even though it has been prescribed by physicians for many years (O'Reilly and Dalal, 2003). One of the most prominent examples is sildenafil, for which initial approval for marketing was for pulmonary arterial hypertension (PAH) (Klein and Tabarrok, 2004). In fact, some off-label use is so common that it finds a place in some official compendia. For example, sodium valproate is listed in the British National Formulary for the treatment of mania in bipolar affective disorder (Haw and Stubbs, 2005). Interestingly, off-label uses of some medicines exceed their labeled uses. For example, off-label prescriptions of rituximab showed near-exponential growth indicating statistically significant increase in propensity of prescribing for off-label indications compared to approved indications over time (Kocs and Frendrick, 2003).

Rationale for Off-label Prescribing

Many reasons have been cited by prescribers for using medications off-label (e.g., advice by consultants, lack of alternatives) (Ekins-Daukes et al., 2005). In general, knowledge about off-label use broadens a physician's ability to relieve symptoms or cure diseases that are refractory to standard pharmacotherapy or for which there does not exist an effective standard therapy (Li et al., 1998). However, evidence suggests that off-label prescribing decisions may not be always justified or, at least, are questionable. One study found that in the office-based practice setting, medications that are prescribed off-label with lack of support include

gabapentin, amitriptyline, and risperidone, and with support are isosorbide mononitrate, albuterol, digoxin, and atenolol (Radley, Finkelstein, and Stafford, 2006). Additionally, it was observed that among all off-label uses, more cases (15%) lacked scientific evidence than those (6%) with strong scientific evidence. This finding is supported by a review published in 2007 by the Agency for Healthcare Research and Quality (AHRQ) that highlighted the lack of evidence-based off-label prescribing of psychiatric medications.

Implications of Off-label Prescribing

Off-label prescribing is neither illegal nor unwarranted nor always inappropriate (Tabarrok, 2000). However, its practice may present uncertainty about safety and effectiveness (Nightingale, 2003). Off-label prescribing, especially in circumstances where it would be considered inappropriate, has the potential to cause harm to different stakeholders including patients and prescribers (Turner et al., 1999; Neubert et al., 2004).

Off-label prescribing has implications for increased cost for medication use. One study found that in a single academic institution $1.1 million was spent between 1997 and 2001 on rituximab prescribed off-label compared to $335,000 for FDA approved indications. However, this figure did not include various costs incurred by patients or pharmacy preparation, administration etc.

Professional organizations (e.g., American Academy of Pediatrics, Committee on Drugs, 2002) have issued guidelines for prescribers, who may prescribe medications off-label. Generally, it is advocated that the decision to prescribe off-label should be based on expert medical judgment and sound scientific evidence. Gazarian et al. (2006) recommended a decision algorithm for evaluating the appropriateness of any proposed off-label prescribing including differentiation between practice and research and judgment of evidence. The existence of off-

label prescribing guidelines may prove useful for ensuring appropriate use and thus, the adoption of any such recommendations has the potential of improving off-label prescribing decisions. However, one key to the successful application of such recommendations is the critical appraisal of and the evaluation of applicability of evidence. Health care professionals should monitor and evaluate off-label prescribing so that risk-effectiveness potential can be detected early. This begs the question how can health care achieve that goal?

Opportunity for Pharmacists

It has been documented that pharmacists' involvement in the medication selection decision results in improvement in prescribing patterns and patient care (Lipton et al., 1992; Hanlon et al., 1996; Finley et al., 2002). Pharmacists have provided and continue to provide a broad spectrum of services including consultations to physicians, medication monitoring, and the dissemination of objective information to prescribers (Pedersen, Schneider, and Scheckelhoff, 2008). Given that pharmacists have fulfilled a variety of patient care roles, how can we utilize pharmacists' expertise and service orientation to improve indication-based off-label use of medicines? Do they have or perceive any role to play in that context? Two leading professional pharmacy organizations – the American Pharmacists Association (APhA) and the American Society of Health-System Pharmacists (ASHP) – support off-label prescribing. "The freedom and responsibility to make drug therapy decisions that are consistent with patient-care needs is a fundamental precept supported by ASHP" and is not believed to be limited by FDA-approved product labeling (ASHP, 1992). ASHP also supports the role of the pharmacist to provide medication information and clinical practice standards regarding off-label use of medications. APhA has adopted a similar positions and policies and states that collaboration should be formed between pharmacists and other healthcare providers to evaluate information related off-label

prescribing of medications. However, past studies that have examined off-label prescribing from the perspective of pharmacy or pharmacists (Ansani et al., 2006; Stewart et al., 2007) did not address pharmacist-level service specific to off-label prescribing.

Given that philosophy of pharmaceutical care has envisioned pharmacists as patient advocates as well as medication experts, the objective of this study was to explore pharmacists' perceptions of their role in off-label prescribing. Specifically, using a theory of social power (French and Raven, 1959), the study investigated whether pharmacists were willing to influence different types of physicians who wrote an indication-based off-label prescription on the basis of its level of appropriateness as perceived by pharmacists. As such, the following propositions were investigated.

P1: The pharmacist's perceived relative expert power in relation to the physician is positively associated with the pharmacist's willingness to influence off-label prescribing.

P2: The perceived appropriateness of prescription medication is negatively associated with the pharmacist's willingness to influence off-label prescribing.

P3: The effect of the pharmacist's relative expert power on the pharmacist's willingness to influence off-label prescribing is moderated by the perceived appropriateness of prescription medication.

P4 The effect of the pharmacist's perceived relative expert power on willingness to influence off-label prescribing is moderated by the perceived impact on relationship quality with the physician as perceived by the pharmacist.

SIGNIFICANCE OF THE STUDY

Understanding off-label prescribing from pharmacists' perspective is important for several reasons. Off-label prescribing, if not judiciously done, has the potential of causing detrimental effects. In situations where off-label prescribing results in harm, pharmacists along with the prescriber may be liable for injury under conditions of negligence (Campbell, 1995). In addition, from an ethical perspective, the pharmacist is just as much an advocate for patient well-

being as is the physician. As such, the principles of nonmaleficence and beneficence should oblige pharmacists to question the use of medications to ensure that patients experience the maximum therapeutic benefit at the least possible risk of harm (Abella, 2003). Thus, off-label prescribing has implications for pharmacists. Although recommendations and normative guidelines by professional organizations such as APhA or ASHP regarding the role of pharmacists in off-label prescribing have been issued, it is important to examine whether such normative recommendations are consistent with pharmacists' perceptions of their role and responsibilities.

Off-label prescribing, especially indication-based off-label prescribing, oftentimes is driven by the physician's perception of unmet pharmacotherapeutic needs. Once disseminated appropriately, such uses may serve as a knowledge repository. In fact, indication-based off-label use has been posited as a potential avenue for creating new knowledge (Demonaco, Ali, and Hippel, 2006) in a cost-effective manner, if appropriately managed. Our understanding of the off-label prescribing process from the perspective of pharmacists – specifically the role of perceived power in appropriate and desirable situations – may provide us with crucial information to help design and implement the process of reengineering knowledge.

The issue of off-label prescribing has concerned various stakeholders including lawmakers, economists, lay public, payers, and the media. Off-label prescribing presents issues of risk assessment and management as safety and efficacy of such use is not oftentimes well assessed. In addition, from a societal point of view, off-label use of medications – specifically, indication-based off-label prescribing – may not be a cost-effective treatment option, at least in some cases. Thus, such practice has the potential to waste valuable and scant resources.

CHAPTER 1 REFERENCES

Agency for Healthcare Research and Quality. Efficacy and comparative effectiveness of off-label use of atypical antipsychotics. Comparative Effectiveness Review Number 6, January, 2007. Available at: http://effectivehealthcare.ahrq.gov/repFiles/Atypical_Antipsychotics_Final_Report.pdf. Accessed March 11, 2008.

American Academy of Pediatrics Committee on Drugs. Uses of drugs not described in the package insert (off-label uses). *Pediatrics*. 2002;110:181-83.

American Pharmacists Association. Report of the 2005 APhA House of Delegates. *Journal of the American Pharmacists Association*. 2005;45:557.

American Society of Health-System Pharmacists. ASHP statement on the use of medications for unlabeled uses. *American Journal of Hospital Pharmacy*. 1992;49:200G-20U8.

Ansani N, Branch R, Fedutes-Henderson B, et al. Unites States medical practice summary Innovative off-label medication use. *American Journal of Medical Quality*. 2006;21:246-54.

Bajcetic M, Jelisavcic M, Mitrovic J, et al. Off label and unlicensed drugs use in paediatric cardiology. *European Journal of Clinical Pharmacology*. 2005;61:775-79.

Boos, J. Off-label use – label off use? *Annals of Oncology*. 2003;14:1-5.

Brosgart CL, Mitchell T, Charlebois E, et al. (1996). Off-label drug use in human immunodeficiency. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology.* 1996;12:56-62.

Campbell N. Use of medications for nonapproved indications. *Journal of Managed Care Pharmacy*. 1995;1:206.

Chalumeau M, Tréluyer JM, Salanave B, et al. Off label and unlicensed drug use among French office based paediatricians. *Archives of Disease in Childhood*. 2000;83:502-05.

Chen DT, Wynia MK, Moloney MR, Alexander GC. U.S. physician knowledge of the FDA-approved indications and evidence base for commonly prescribed drugs: results of a national survey. *Pharmacoepidemiology and Drug Safety*. 2009;14:1094-00.

Chen H, Deshpande AD, Jiang R, Martin BC. An epidemiological investigation of off-label anticonvulsant drug use in the Georgia Medicaid Population. *Pharmacoepidemiology and Drug Safety*. 2005;14:629-38.

Conroy S, Choonara I, Impicciatore P, et al. Survey of unlicensed and off label drug use in paediatric wards in European countries. *British Medical Journal*. 2000;320:79-82.

Conroy S, McIntyre J, Choonara I. Unlicensed and off label drug use in neonates. *Archives of Disease in Childhood*. 1999;80:F142-F145.

Conroy S, Newman C, Gudka S. Unlicensed and off-label drug use in acute lymphoblastic leukaemia and other malignancies in children. *Annals of Oncology*. 2003;14:42-47.

Conroy S. Unlicensed and off-label drug use Issues and recommendations. *Pediatric Drugs*. 2002;4:353-59.

Cuzzolin L, Zaccaron A, Fanos V. Unlicensed and off-label uses of drugs in paediatrics: a review of the literature. *Fundamental and Clinical Pharmacology*. 2003;17:125-31.

DeMonaco JH, Ali A, Hippel EV . The major role of clinicians in the discovery of off-label drug therapies. *Pharmacotherapy.* 2006;26:323-32.

Ekins-Daukes S, Helms PJ, Simpson CR, et al. Off-label prescribing to children in primary care: retrospective observational study. *European Journal of Clinical Pharmacology.* 2004;60:349-53.

Ekins-Daukes S, Helms PJ, Simpson CR, et al. Off-label prescribing to children: attitudes and experience of general practitioners. *British Journal of Clinical Pharmacology*. 2005;60:145-49.

Finley PR, Rens HR, Pont JT, et al. Impact of a collaborative pharmacy practice model on the treatment of depression in primary care. *American Journal of Health-System Pharmacy*. 2002;59:1518-26.

French Jr. JRP, Raven BH. The bases of social power. In: Cartwright D, Zander AF, eds. *Group dynamics: Research and theory*. 3rd ed. New York, NY: Harper and Row; 1968:259-69.

Gazarian M, Kelly M, McPhee JR, et al. Off-label use of medicines: consensus recommendations for evaluating appropriateness. *Medical Journal of Australia*. 2006; 185:544-548.

Hanlon JT, Weinberger M, Samsa G, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *The American Journal of Medicine*. 1996;100:428-37.

Haw C, Stubbs J. A survey of the off-label use of mood stabilizers in a large psychiatric hospital. *Journal of Psychopharmacology*. 2005;19:402-07.

Klein DB, Tabarrok A. Who certifies off-label? *Regulation.* 2004;27:60-63.

Kocs D, Fendrick D. Effect of off-label use of oncology drugs on pharmaceutical costs: the rituximab experience. *The American Journal of Managed Care*. 2003;9:393-00.

Kogut SJ, Yam F, Dufresne R. Prescribing of antipsychotic medication in a Medicaid population: use of polytherapy and off-label dosages. *Journal of Managed Care Pharmacy.* 2005;11:17-24.

Li VW, Jaffe MP, Li WW, Haynes H. A. Off-label dermatologic therapies usage, risks and mechanisms. *Archives of Internal Medicines*. 1998;134:1459-54.

Lin HW, Phan K, Lin SJ. Trends in off-label beta-blocker use: A secondary data analysis. *Clinical Therapeutics*. 2006;28:1736-46.

Lipton HL, Bero LA, Bird JA, McPhee SJ. The Impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing: A randomized controlled trial. *Medical Care*. 1992;30:646-58.

McIntyre J, Conroy S, Avery A, et al. Unlicensed and off label prescribing of drugs in general practice. *Archives of Disease in Childhood.* 2000;83:498-501.

Neubert A, Dorman H, Weiss J, et al. The impact of unlicensed and off-label drug use on adverse drug reactions in paediatric patients. *Drug Safety*. 2004;27:1059-67.

Nightingale SL. Off-label use of prescription drugs. *American Family Physician.* 2003;68:425-27.

O'Reilly J, Dalal A. Off-label or out of bounds? Prescriber and marketer liability for unapproved uses of FDA-approved drugs. *Annals of Health Law*. 2003;12:295-24.

Pandolfini C, Impicciatore P, Provasi D, et al. Off-label use of drugs in Italy: a prospective, observational and multicenter study. *Acta Paediatrica*. 2002;91:339-47.

Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: prescribing and transcribing – 2007. *American Journal of Health-System Pharmacy*. 2008;65:827-43.

Radley DC, Finkelstein SN, Stafford RS. Off-label prescribing among office-based physicians. *Archives of Internal Medicines*. 2006;166:1021-26.

Stewart D,Rouf A, Snaith A, et al. Attitudes and experiences of community pharmacists towards paediatric off-label prescribing: a prospective survey. *British Journal of Clinical Pharmacology*. 2007;64:90-95.

Tabarrok AT. Assessing the FDA via the anomaly of off-label drug prescribing. *The Independent Review*. 2000;1:25-53.

Turner S, Nunn AJ, Fielding K, Choonara I. Adverse drug reactions to unlicensed and off-label drugs on paediatric wards: a prospective study. *Acta Paediatrica*. 1999;88: 965-68.

US General Accounting Office. Off-label drugs: reimbursement policies constrain physicians in their choice of cancer therapies. Report to the chairman, Committee on Labor and Human Resources, US Senate, September,1991. Available at: http://archive.gao.gov/d18t9/144933.pdf. Accessed March 17, 2008.

CHAPTER 2

LITERATURE REVIEW

PRESCRIBING

Medication prescribing is one of the principal forms of treating illness (Raisch, 1996). Prescribing behavior can be viewed as a reasoned action that is preceded by the medication choice decision that consists of two steps. First, an evoked set – a small set of possible treatment options, including non-drug therapies for a diagnosis – is generated. Once the evoked set is formed, a prescriber chooses a specific therapy for a patient out of the "available" options (Denig et al., 1990 as cited in Denig and Haaijer-Ruskamp, 1992). This may be based on either active problem solving that involves the process of weighing utilities, values, desirability, and expectancies of outcomes of each alternative (Segal and Hepler, 1985; Denig and Haaijer-Ruskamp, 1992) or habitual behavior, generally seen for frequently occurring or non-life threatening disease states (Denig and Haaijer-Ruskamp, 1992). However, medical-related outcomes such as efficacy, adverse effects, cost, patient health status, and comorbidities as well as non-medical factors are considered when prescriptions are written (Hemminki, 1975; Denig and Haaijer-Ruskamp, 1992; Scott, Shiell, and King, 1996). Nonmedical factors that influence prescribing can be broadly categorized as demographic and practice-related variables and psychosocial variables.

Demographic and Practice Variables Associated with Prescribing

Physician's age, gender, country of training, and relationship with colleagues, practice characteristics (e.g., number of patient seen or practice day etc.), practice setting (e.g., HMO or hospitals) are some of the factors believed to influence prescribing

(Hemminki, 1975; Davidson et al., 1994; Raisch, 1996; Sleath and Shih, 2003). Differences between general physicians and other specialties have been observed prescribing patterns of particular groups of medications (Chin et al., 1997; Sleath and Shih, 2003) or in the treatment of particular diseases (Freund et al., 1989; Saarela and Engestrom, 2003).

In addition, patients' characteristics such as age (McKinlay, Potter, and Feldman, 1996; Sleath and Shih, 2003), gender (Scott, Shiell, and King, 1996), ethnicity (Daumit et al., 2003) and socioeconomic status (Scott, Shiell, and King, 1996), insurance status (Sleath and Shih, 2003; DeWitt et al., 2006). Such associations have been found even after controlling for medical and nonmedical factors (Hohmann, 1989; Scott, Shiell, and King, 1996). Interactions between physician and patient characteristics have also been noted and may influence prescribing by physicians (Weisse et al., 2001; Hamberg, Risberg, and Johansson, 2004).

Psychosocial Factors Related to Prescribing

A host of psychosocial factors have been found to influence prescribing decisions. Patient perceived knowledge, locus of control, assertiveness, assessment of the physician's expert power, physician's relinquishment of control, and professional assessment of patient requests have been proposed as antecedents that influence prescription decisions (Verbrugge and Steiner, 1985; Krupat et al., 1999; White and Johnson, 2002). Despite objective medical training, physicians remain human actors and become socially-conditioned to show stereotyping either consciously or unconsciously (McKinlay, Potter, and Feldman, 1996). It is within the framework of socio-cultural and economic influences, and biomedical

knowledge and probabilities of outcomes, that prescribing decisions are made (Eisenberg, 1975).

OFF-LABEL PRESCRIBING

Reasons for Prescribing Off-label

Different rationale for off-label prescribing has been cited in the literature. Despite efforts to standardize treatment through the development and use of clinical guidelines by professional organizations (e.g., the American College of Cardiology), lack of awareness about appropriate use may be one of the explanations for off-label prescribing. Physicians may not be aware that each medication in a therapeutic class may not be approved by the FDA for the same indication(s) (Lin, Phan, and Lin, 2006). For example, among ACE inhibitors only lisinopril has been approved for acute myocardial infarction (Radley, Finkelstein, and Stafford, 2006). Apart from lack of awareness, some off-label prescribing may happen because of lack of concern for such use. Prescribing of certain medications in some indications, such as for pain management, are so well-established that clinicians may be unaware that the medication is being used for off-label indications (Douglas-Hall, Fuller, and Gill-Banbam, 2001). This may explain, in part why, generally, older medications are prescribed more often for off-label indications as compared to newer medications. However, on the contrary, Barbui et al. (2004) observed that the proportion of off-label use of second generation antipsychotic agents were higher than that of the first generation agents. Therefore, certain characteristics of medications (e.g., range of indications) may be underlying factors for off-label use of those agents.

Physicians may prescribe a medication off-label because of an incorrect belief that the medication is approved by the FDA for that use. For instance, Li et al. (1998) observed a positive correlation between the off-label use and belief in FDA approval for a medication

and noted that many dermatologists misidentified off-label drug/disease pairs as approved by the FDA. However, some off-label prescribing may arise from logical extensions of FDA-approved indications. For example, certain off-label uses of antibiotics can be justified on the basis of laboratory experiments on disease-causing microorganisms (Radley, Finkelstein, and Stafford, 2006) although uncertainty about interactions among drugs, patients, and comorbidities still remain.

Disease characteristics may also be associated with off-label prescribing. Off-label medication use may occur if an existing treatment does not cure or there is a lack of agreement in treatment. Laetz and Silverman (1991) noted that off-label prescribing is prevalent in chemotherapy regimens for types of cancers that are more difficult to treat and is used often in circumstances in which there are no cures, no agreement on standardized treatment, or when treatments mainly are palliative. Similarly, a study by the US General Accounting Office (GAO) (1991) noted that off-label usage increases generally in treating cases that are more difficult to treat. For example, off-label prescribing occurs in the treatment of cancer that has advanced to a point that is no longer curable, when chemotherapy is ineffective relatively, when patients are receiving second and third lines of treatment, or when physicians are desperately searching for a cure or a better way to palliate the disease (GAO, 1991). In addition, for some diseases such as non-small cell lung cancer and cystic fibrosis, off-label uses of existing therapies are the only choice or therapy of choice (Poole and Dooley, 2004). Physicians treating such diseases or physicians who have needs that are not served currently by extant options may look for innovative ways to treat their patients by applying their understanding of the disease process and/or the mechanism of action of the medication. In fact, the physicians who claimed to have discovered off-label

uses independent of pharmaceutical companies expressed a high need for that particular use of the medication in their patient care (Demonaco, Ali, and Hippel, 2006).

The efficacy and safety of medications are known through controlled clinical trials or other forms of clinical studies and medications are approved on the basis of those results. However, in some situations it may be difficult to recruit special patient groups (e.g., children) to serve as study subjects. In such cases, clinicians do not feel deterred to prescribe medications off-label. In fact, in situations where there is less evidence available for uncommon diseases, off-label prescribing may be more frequent (Haw and Stubbs, 2005a). Similar problems may arise due to patients' lack of awareness and a general unwillingness to participate in clinical trials; combined this makes it difficult to conduct and thus generalize the results of such trials (Institute of Medicine, 2000). In other cases, executing the clinical trials necessary to receive new indications is not commercially viable (e.g., populations too small or disease too rare) (Tabarrok, 2000). Therefore, some medication label use fails to receive the necessary FDA approval and the practice of off-label prescribing persists.

Another issue that is an important consideration in off-label medication use is polypharmacy. Oftentimes, patients have multiple conditions. As such, one medication used to treat one condition may be contraindicated for use in patients with other comorbidities or when used with other medications intended to treat comorbidities. However, a lack of therapeutic options may make it difficult for physicians to avoid prescribing a medication that is apparently contraindicated as described above. In one study that examined prescribing behaviors using secondary data, it was found that the physicians prescribed β-blockers off-label for health conditions for which the use of β-blockers is cautioned (Lin, Phan, and Lin,

2006). However, it is not known if physicians systematically assess benefits/risks before prescribing a medication off-label.

The role of satisfaction has been studied as a contributing factor for off-label prescribing. In a Delphi panel study, it was observed that satisfaction with available therapies for off-label indication is less than that for approved indications (Kos, Wertheimer, and Mrhar, 2005). Therefore, low levels of satisfaction or dissatisfaction with existing therapies may be a reason that provides impetus to prescribe a medication off-label (Mack, 2003; Kos, Wertheimer, and Mrhar, 2005).

Factors that Negatively Affect Off-label Prescribing

The risk of adverse events and perceived threat of litigation associated with off-label prescribing may prevent physicians from prescribing medicines off-label (Kocs and Fendrick, 2003). The practice of defensive medicine presents an interesting paradox. The practice of defensive medicine generally may inhibit off-label prescribing. However, such practice may promote off-label prescribing if physicians fear legal actions for failing to prescribe off-label in presence of published evidence (Atkins, 1998). Reimbursement by third party payers may negatively affect off-label prescribing. Some managed care organizations may deny coverage of off-label indications because they consider the use investigational or experimental (Demonaco, Ali, and Hippel, 2006). Moreover, physicians might have to seek prior authorization for reimbursement of off-label medications. Fear of such administrative hassles might deter physicians from off-label prescribing (Laetz and Silberman, 1991). In recent years, the patient's share of the cost of prescription medications has been increasing. As a result. off-label prescribing may be negatively affected if patients

are not willing to share the additional cost over and above that expected for medication use according to labeling.

Level of Evidence, Comparative Effectiveness, and Potential Adverse Effects

The existing evidence base surrounding off-label prescribing has received much attention from researchers. Whether or not enough evidence exists for off-label prescribing to be justifiable has also been debated. Chen et al. (2005) examined the off-label use of anticonvulsant medications to differentiate types of off-label use on the basis of degree of evidence in a Medicaid population. It was found that between 19% - 57% of off-label prescribing of anticonvulsant medications was not substantiated by controlled studies. A similar finding was made in a more recent study where it was noted that among all off-label uses of medicines, a substantial majority (73%) had little or no scientific evidence for clinical efficacy (Radley, Finkelstein, and Stafford, 2006). Many atypical antipsychotic medicines are being prescribed off-label for the treatment of dementia, depression, and other psychiatric disorders. Although off-label prescribing with limited or no support outnumbered that of supported off-label use, it is most strikingly prevalent in psychiatry (96% of off-label use occurred with limited or no support) (Radley, Finkelstein, and Stafford, 2006). In 2007, AHRQ published a report reviewing evidence on efficacy and comparative effectiveness of atypical antipsychotics prescribed off-label for the treatment of different psychiatric disorders. The study found either no or moderate to very low evidence supporting the off-label use of atypical antipsychotics. Specifically, there was moderate evidence for use of riserperidone and quetiapine, low for olanzepine and no studies for ziprasidone or aripiprazole for the treatment of obsessive-compulsive disorder. In addition, as reported by the AHRQ review, the results from some studies conflicted that of others. For example, olanzepine, and quetiapine showed conflicting evidence in studies that compared atypical antipsychotics with placebo for the treatment of bipolar disorder (AHRQ, 2007).

Additionally, an earlier review of off-label use in psychiatric medication use concluded that although some evidence exists supporting the use of atypical antipsychotics in off-label situations, generalization of these observations to all clinical cases might not be valid (Fountoulakis et al., 2004). This statement may be further strengthened by the fact that many published studies investigating the efficacy of off-label use of medications included only small number of patients (Schelenker, et al., 2006). Moreover, when prescribers were asked to provide the rationale for their off-label prescribing and the evidence they used while prescribing off-label, for the majority of off-label prescriptions, physicians were able to quote randomized controlled trials (RCTs), Cochrane Reviews, or consensus statements by expert panels; however, in a large number of instances (41%), the level of evidence cited by the physicians was more vague (Haw and Stubbs, 2005a).

Researchers have examined also the relationship between the off-label use of medicines and adverse drug events. In fact, the greatest concern posed by the use of off-label medications is the probable unanticipated adverse drug reaction (ADR) (Conroy, 2002). A number of studies have examined the relationship between off-label prescribing and risks of complication or adverse reactions in pediatric populations (Turner et al., 1999; Horen, Monstastruc, and Lapeyre-Mestre, 2002; Neubert et al., 2004). In fact, many studies have identified increased risks of adverse drug reactions associated with off-label medication use. Horen, Monstastruc, and Lapeyre-Mestre (2002) found an increased risk of ADR was associated with the use of off-label medications prescribed for unapproved indications, particularly in infants. In a prospective surveillance of prescriptions in pediatric wards, Turner et al. (1999) found a higher but nonsignificant risk of ADR associated with unlicensed and off-label medications when compared with licensed uses and 74% of

medications causing severe ADRs were prescribed in an unlicensed or off-label manner. Moreover, the risk of ADR was found to be associated with the percentage of off-label use or exposure to at least one off-label medication use event (Turner et al., 1999, Horen, Monstastruc, and Lapeyre-Mestre, 2002). A study of pediatric outpatients observed that of all adverse events, 42.4% were associated with the use of off-label medications and more than 20% were associated with dose-related or indication-based off-label uses (Ulfer, Kimland, and Bergman, 2004). Although adverse events caused by off-label and that by on-label were not compared specifically, Neubert et al. (2004) observed a higher incidence of ADR in the patient group prescribed off-label or unlicensed medications than in the group treated with licensed medications. However, whether the effect was due to off-label prescribing or the complexities of illness was not clear. Off-label uses of atypical antipsychotics were associated with weight gain, sedation, extrapyramidal symptoms, and neurological symptoms such as fatigue, headache, dizziness etc. (AHRQ, 2007). It is interesting to note that though elevated risk of death in elderly dementia patients treated off-label with atypical antipsychotics was small, comparable benefits were also small and further research is required to confirm the efficacy and safety of atypical antipsychotics prescribed for off-label indications (AHRQ, 2007). Use of off-label dosages of atypical antipsychotics deserves further scrutiny. While physicians' concern for the use of these potent medicines in elderly population is laudable, the use of low-doses may cause adverse effects and may fail to elicit therapeutic response (Kogut, Yam, and Dufresne, 2005). Therefore, while there may be some evidence of benefits, caution is required when medicines are used for off-label indications. Finally, 'fen-phen' is a classic example that illustrates the need for vigilance regarding the potential adverse events that may be caused by off-label prescribing.

Fenfluramine and phentermine were approved individually for short-term appetite suppression. However, 'fen-phen', the combination of the two medications prescribed off-label, caused heart-valve disease in women (Tabarrok, 2000). Unfortunately, off-label use is oftentimes without protocol, monitoring, or adequate long-term follow-up for ADRs. Moreover, these ADRs may not be identified until large number of patients are affected (Zindrick, 2000).

Is Off-label Prescribing Good or Bad?

Off-label prescribing is legal and in general, embraced by physicians and other stakeholders including payers, health care institutions, pharmaceutical companies, and the FDA (Nightingale, 2003). However, efforts have been made to regulate the promotion of off-label use by pharmaceutical companies. Arguments have been made both favoring and opposing the promotion of off-label use by pharmaceutical companies. However, historically, the FDA has avoided any conflict with physicians' decisions to prescribe medications for off-label indications or off-label in any other manner (O'Reilly and Dalal, 2003). In fact, physicians are given the freedom to lawfully prescribe medications off-label as it is believed to provide incentives to aid patients (Cohen, 1997; Blum, 2002) and as such, off-label prescribing may be a socially desirable behavior in some instances. Despite permissive laws and regulations, it is expected that caution will be exercised while prescribing medications off-label. Though not required by law, it is considered generally good practice to inform patients about the nature of treatment and to seek informed consent. If a patient is injured, he or she can file malpractice claims and tort claims against the physician for off-label prescribing or even the failure to prescribe off-label use, if appropriate. Potential liability increases as the physician decides to or not to deviate from

customary medical standard of care. Therefore, continuous communication between physicians, patients, and others in the medical community may reduce the risks of liability (O'Reilly and Dalal, 2003). In many instances, physicians' subjective knowledge, clinical experience, case reports and open-label trials are the basis of off-label prescribing. While these are valuable for directing future research, they may not constitute a sufficient basis for treatment decisions (Hamer et al., 2002; Chen et al., 2005). In fact, it may be such that there exists – due to lack of well-designed studies or laws or guidelines mandating clinical trial evidence – systematic underlying biases limiting generalizability (Chen et al., 2005). Regardless of the quality of evidence, off-label prescribing, especially of new medications, should be based on comparative studies showing advantages in effectiveness and/or safety and/or cost-effectiveness over existing alternatives, if any (Gazarian et al., 2006). Therefore, off-label prescribing warrants more stringent oversight. There is some evidence that interdisciplinary efforts do occur; one study with specialized and small number of cases observed that the psychiatrists consulted with pharmacists, multidisciplinary team members and patients' relatives while prescribing off-label medications (Haw and Stubbs, 2005a, 2005b). However, it is not known if this constitutes regular practice. Regardless of legality of off-label prescribing, it has been suggested that physicians should carefully weigh the benefit/risk ratio before, during, and after off-label prescribing (Torres, 1994). Even though physicians have knowledge about patients, their medical history, and current clinical status, they have a difficult but important job in deciding whether a specific off-label use may be safer and more effective than all existing alternatives (Nightingale, 2003). Rigorous judgment, continuous evaluation, and close monitoring by healthcare professionals regarding

off-label medication use may reduce the risks of harm, detect lack of effectiveness, ensure early benefit, and maximize patient benefit (Dresser, 2006).

PHARMACISTS AND OFF-LABEL PRESCRIBING

Information in the published literature about pharmacist involvement in and attitudes toward off-label prescribing is scant. Stewart et al. (2007) is one of the first known studies investigating off-label prescribing from the perspective of pharmacy. Through a survey of community pharmacists in the UK, the authors found that majority of community pharmacists became familiar with the concept of off-label prescribing through their dispensing experience. Age and dose were primary reasons that pharmacists believed that off-label prescribing happened. Interestingly, 78% of pharmacists surveyed believed that they have a professional duty (responsibility) to inform the physician prescribing medications off-label. Despite this stated concern, only 39% of the pharmacists in the sample stated they would always contact the physician if high dose of β-agonist or steroids were prescribed off-label whereas 74% would always contact the physician if high dose paracetamol were prescribed off-label. Ansani et al. (2006) studied off-label medication use in US academic medical centers (AMC) to determine how many AMCs have policies regarding off-label or 'innovative' off-label use and beliefs about off-label or 'innovative' off-label medication use as a source of problems within the AMC. Only a small number of AMC were reported to have a policy regarding off-label use and an even smaller number of AMCs had policies regarding innovative off-label use. Surprisingly, "problems never addressed by physicians and pharmacists" was cited as a significant reason for the AMC not having policy. Lack of data to support intervention, high cost, and potentially high risk/benefit ratio of the

intervention were also cited as issues. Fewer than half of the AMCs require follow up action and aggressive monitoring of off-label or 'innovative' off-label medication use.

PRESCRIBING PROBLEMS AND PHARMACIST INTERVENTIONS

In the complex process of medication prescribing and use, pharmacists are believed to play a pivotal role. Their role at the interface between medication distribution and medication use process is very important for the prevention of medical errors resulting from inappropriate prescribing. Because pharmacists represent the final point at which prescribing problems can be identified and corrected, they can ensure that quality care is delivered to patients (Rupp, DeYoung, and Schondelmeyer, 1992). Moreover, due to training in therapeutics, in the last two decades, the clinical role of pharmacists has gained prominence and has been expanded. In fact, the pharmacists' clinical role is acknowledged by many professional organizations of physicians and it has been suggested that pharmacists' expertise in medication therapy can be utilized through collaborative medication therapy management with physicians (Keely, 2002). As their clinical role in managing medication therapy continues to grow, so does their importance and ability to influence prescribing (Carroll, 2003). Moreover, it has been suggested that pharmacists may serve as educators, with ultimate goal of optimizing patient outcomes through influencing physicians' prescribing behavior (Grindrod, Patel, and Martin, 2006).

Pharmacist Recommendations and Acceptance by Physicians

Pharmacists are involved in the effort and measures to optimize prescribing. Past studies have found that pharmacists are willing to be involved in interventions related to medication therapy and able to identify and correct prescribing problems and to influence

prescribing in different ways (Carroll, 2003). Prescribing problems in which interventions were made by pharmacists include inappropriate dosage and schedule, pharmacokinetic monitoring, inappropriate combination, therapeutic duplication, inappropriate choice, potential drug reaction and interaction, medication-use evaluation, and non-formulary order/policy (Tamai et al., 1987; Lipton et al., 1992; Strong and Tsang, 1993; Pedersen, Schneider, and Scheckelhoff, 2008). Physicians, in variety of settings, have generally shown positive attitude toward pharmacist recommendations. Sulick and Pathak (1996) compared physicians' and pharmacists' perceptions on the importance of various clinical activities including patient specific recommendations of therapeutic alternatives, recommendations based on pharmacokinetic monitoring, and patient specific suggestions to change prescribed regimen to prevent drug interactions or adverse events. It was found that the physicians rated the importance of general clinical activities significantly and consistently higher than did the pharmacists. Such a positive attitude may be reflected in the fact that the physicians oftentimes accept and implement pharmacists' recommendations (Leape et al., 1999; Lee et al., 2002; Carroll, 2003). A recent national survey of US hospitals observed that the adoption rate of pharmacists' recommendations is highly encouraging (Pedersen, Schneider, and Scheckelhoff, 2008).

Outcomes of Pharmacist Recommendations

It should be noted that medication use evaluation by pharmacists is likely to detect medication errors which otherwise might go undetected; decreased medication error rates are associated with pharmacist-provided medication information service, ADR management, medication protocol management, and pharmacist participation on medical rounds (Leape et al., 1999; Bond, Raehl, and Franke, 2002). Pharmacists' involvement with antibiotic

prescribing has been found to result in positive outcomes with respect to medication choice, dosage used, and appropriate utilization (Dickerson, Mainous, and Carek, 2000). Lipton et al. (1992) found that the clinical pharmacists significantly improved the overall appropriateness of physician prescribing, specifically, problems related with less than optimal prescribing, no-indication prescribing, and dosage-related issues. Similarly, Lee et al. (2002) observed that in over 30% of cases, pharmacist recommendations either improved or resolved the problems; between 81 - 92% of cases potential harm would have been the result if the pharmacist had not intervened. Numerous studies have been demonstrated that pharmacist recommendations prevent medication errors and minimize adverse events (Hanlon et al., 1996; Leape et al., 1999). Overall, pharmacist services resulted in alternative therapy that was safer but equally effective and was associated with direct cost savings and cost avoidance (Lee et al., 2002; Schumock et al., 2003).

COLLABORATION AND COMMUNICATION BETWEEN THE PHARMACIST AND THE PHYSICIAN

Given the complexity of pharmacotherapeutic treatment plans, some degree of collaboration between the physician and the pharmacist in healthcare settings is necessary in order to provide comprehensive, efficient, and effective treatment to patients. Collaboration is a complex and sophisticated process that includes coordination of individual actions, cooperation in planning and decision-making, and sharing of goals, responsibilities, and power based on knowledge and expertise among other things (Henneman, Lee, and Cohen, 1995). Many investigators have found that physician-pharmacist collaboration has resulted in improved quality of prescribing (Spinewine et al., 2007) and improved patient care outcomes (Boudreau et al., 2002; Borenstein et al., 2003). However, Henneman, Lee, and

Cohen (1995) pointed out that effective communication is crucial and antecedent to effective collaboration between the pharmacist and the physician to ensure desired patient care as envisioned by the pharmaceutical care paradigm. However, it has also been recognized that the practice of pharmaceutical care has the potential of causing undesirable tension or inevitable conflict between the physician and the practicing pharmacist (Hepler and Strand, 1990). Therefore, there is a need for successful communication between physicians and pharmacists in order for pharmacists to be able to provide the entire spectrum of activities associated with the provision of pharmaceutical care. Although research on communication between different actors in healthcare abounds (see Ellingson, 2002 for a review), only a few studies (e.g., Ranelli and Biss, 2000) examined pharmacist-physician communication. Unfortunately, although pharmacist-physician communication occurs daily, over 95% of this activity was related to refills and less than 1% of pharmacist communication was directly with the physician (Kallail and Stanton, 2006). Drawing on Brown and Levinson's (1987) conceptualization of face or social impression, Lambert (1995; 1996) investigated determinants of pharmacy students' and pharmacists' decisions to communicate strategically with physicians to protect their face. Brown and Levinson (1987) proposed three factors that determine the weightiness of face threatening acts (FTAs) and that influence the selection of politeness (face-saving communication) strategies. These factors are power of the person to whom communication is targeted, social distance between the speaker and the listener, and culture-specific ranking of the issue at hand. In other words ranking refers to the extent of the imposition or the degree of severity of the FTA. The authors claimed that the sum of the three factors provides an index of the weightiness of the FTA. As the weightiness of the FTA increases, the speaker is likely to adopt more polite communication strategies. Lambert

(1995) observed, as posited by the framework of Brown and Levinson (1987), that the culture specific ranking of the FTA influenced the types of politeness strategy used by the pharmacy students. Alternative medication recommendations were considered more threatening than allergy reports and the students were concerned about taking care of the negative face wants of the physicians (communication recipients). Lambert (1996), in a later study, found that pharmacists made medication recommendations more politely than when they presented allergy reports. Interestingly, some pharmacists in the study refrained from any making recommendation in order to manage physicians' negative face wants. However, contrary to the work of Brown and Levinson, the author did not find support for the influence of power and social distance on the communication strategy chosen although it was observed that hospital pharmacists were more assertive in making recommendations than were community pharmacists. However, Lambert (1996) recognized inadequate conceptualization of power and the need for further study on the effect of power on communication. In a similar note, Ellingson (2002) argued that communication among healthcare team members is likely to be, at least partially, affected by its members' relative power.

BASES OF SOCIAL POWER AND INFLUENCE

Social power has been conceived as the resources that impart a person ability to influence another person to do what the former wants the latter to do (Raven, Schwarzwald, and Koslowsky, 1998). Influence is closely related to the concept of power. In fact, the terms power and influence are sometimes used interchangeably. However, power differs from influence in that the former refers to the potential and the latter to the actual use of the power. French and Raven (1959) defined influence as a force that an influencing agent (O) can use to induce compliance by changing the beliefs, attitudes, or behaviors of a target (P)

of influence. French and Raven (1959) originally conceptualized five bases of social power (namely, Reward, Coercion, Legitimacy, Expertise and Reference) which have been elaborated on and further differentiated from research and theories in cognitive social psychology, attitude and attitude change, and organizational psychology (Raven, Schwarzald, and Koslowsky, 1998). More recently, Raven (1992; 1993) revised and expanded the bases of power and proposed the power-interaction model of interpersonal influence.

Reward power is defined as P's perception of O's power or ability to administer positive valances and to remove or decrease negative valances. Strength of reward power increases as the magnitude of reward and P's perception of probability that O mediates the reward increase. More recently, Raven (1992; 1993) classified reward power – the ability to provide tangible rewards – as impersonal reward power and personal reward power, which is based on P's perception that O's personal approval or liking of the target can be rewarding.

Coercive power, like reward power, is of two types: personal and impersonal (Raven, 1992;1993). Impersonal coercion is defined as P's perception that O has the ability to deliver tangible punishments for noncompliance and personal coercion refers to situation when O threatens to disapprove or dislike P for failing to conform. The strength of coercive power is a function of the magnitude of negative valance of threatened punishments multiplied by P's perceived probability of avoiding punishment by complying (French and Raven, 1959).

In its original conceptualization (French and Raven, 1959), legitimate power refers to the power that stems from P's internalized values dictating that O has right to influence and P has an obligation to comply. It was conceived to consist of three bases namely, cultural (age, intelligence, caste and physical characteristics), social structure (hierarchy), and designation.

Legitimacy has been further elaborated into four distinct types (Raven, 1992; 1993). Legitimate position is defined as P's perception that O has the right to influence based on organizational position or professional role. Legitimate reciprocity refers to P's perception that P has obligation to comply with O who has done something to benefit P. Legitimate equity stems from P's perception that P is obligated to comply in order to compensate for inconvenience or harm caused by P to O or an effort put in by O. Legitimacy of dependence is defined as P's perception that P has obligation to help O who is in need of assistance.

Referent power is based on P's identification or feeling of oneness of P with O or desire for such an identity. The greater the attraction of P to O, the is greater the identification of P with O and consequently, the greater is the referent power of O. Referent power can be positive as described above or negative in which case P prefers to disidentify with the person seemingly unappealing or unattractive (Raven, 1992; 1993).

Expert power stems from P's perception that O possesses knowledge or expertise in areas relevant and interesting to P. The strength of expert power depends on the extent of O's knowledge as perceived by P in relation to P's and against an absolute standard. Expert power results in primary social influence on P's cognitive structure. For expert power to influence, it is required that P believes that O knows and trusts that O tells the truth. Such conceptualization was later referred as positive expert power. There is negative expert power when P distrusts O and does opposite of what O does or desires P to do (Raven, 1992; 1993).

Later, informational power was added to the bases of power described above. Informational power is defined as the ability of O to present information or logical argument to P in order to influence. Specifically, self-evident facts fit P's cognitive structure and

impersonal acceptance of the truth of such facts is independent of relationship between P and O. Information can be presented in direct form and indirect form. Indirect information is found to be especially useful when a person in low power position attempts to influence a person in high power position (Raven, 1992; 1993).

Research on social power has yielded different typologies (Yukl and Falbe, 1991; Peiro and Melia, 2003) in addition to that originally proposed by French and Raven. One dichotomy that has been consistently recognized is "soft" versus "hard" power bases. A commonsensical interpretation is that soft (weak) bases tend to be more subtle, positive, and noncoercive while hard (harsh) bases tend to be more overt, punitive, and "heavy-handed" (Erchul, Raven, and Ray, 2001). In other words, the soft base describes power that relies on the influencing agent's personal assets whereas the harsh or hard base refers to power that is granted to the individual by the nature of his or her status (Schwarzwald, Koslowsky, and Ochana-Levin, 2004). Within Raven's (1992; 1993) framework of power-interaction model, the soft base includes positive expert, positive referent, direct informational, legitimate dependence, and personal reward power. The hard bases indicates legitimate reciprocity, impersonal coercive, legitimate equity, impersonal reward, personal coercive, and legitimate position power (Raven, Schwarzwald, and Koslowsky, 1998). Although little difference exists in the pattern, other studies that utilized the IPI (Erchul, Raven, and Ray, 2001; Erchul, Raven, and Whichard, 2001, Koslowsky, Schwarzwald, and Ashuri, 2001) provided support that power bases can be broadly subsumed under the soft/hard two-factor solution.

STUDIES ON POWER AND INFLUENCE

Over the years, French and Raven's power typology has become a central concept in the study of organizational psychology and social interactions. In the organization setting, it has been applied to study superior-subordinate, subordinate-superior, and peer perceptions and the use of power (Yukl and Falbe, 1991; Koslowsky, Schwarzwald, and Ashuri, 2001) and outcomes and effectiveness of various power bases (see Podsakoff and Schriesheim, 1985 for a review). Koslowsky and Schwarzwald (1993) observed higher status individuals such as supervisors have greater variety of power and control of resources as compared to low status individuals. Similarly, Yukl and Falbe (1991) reported that middle level managers had more downward power because of greater coercive power than did lower level managers and peers recognized legitimacy, expertise, and persuasiveness were the most important reasons for carrying out tasks. It has been contended and empirically supported that an agent chooses particular influence strategies based on his or her evaluation of the parameters of agent-target relationship, including the relative status of each person (Raven, 1993; Stahelski and Paynton, 1995). In line with that argument, perceptions of relative power were measured by other researchers (Yukl and Falbe, 1991; Somech and Drach-Zahavy, 2002). It was observed that relative power affected superiors' choice of strategies (Somech and Drach-Zahavy, 2002) and higher status person or superiors chose strategies that follow from power bases whereas low status persons or subordinates chose influence tactics involving less control of resources (Stahelski and Paynton, 1995).

In the health care setting, perception of power, use of power, and outcomes of such uses have been examined. To influence hospital personnel, infection control nurses in US hospitals who were high in self-efficacy were more likely to report using informational and expert power and nurses with low self-efficacy legitimate and coercive power (Raven,

Freeman, and Haley, 1982 as cited in Raven, 1992). Manfredi (1996) examined the role of power in the leadership activities by nurse managers. Nurse managers reported the use of legitimate power in situations that required upholding standards, enforcing policies, and hiring, firing, or disciplining staff, expert power to bring about change, and referent power when they sought cooperation and agreement. While exercising referent power, the nurse managers asked for support from staff and communicated that they are valued and important. Past research reported that information, expertise, position and dependence legitimacy, and referent power were the top-rated power bases recognized by both hospital and nursing staff and their supervisors and there was a high congruence in compliance perception between the two groups (Raven, Schwarzwald, and Koslowsky, 1998; Koslowsky, Schwarzwald, and Ashuri, 2001). Physicians had used expert power to influence nurses (Raven, Freeman, and Haley, 1982 as cited in Raven, 1992). It has been suggested that informational power and referent power, if used by physicians, may be very effective in gaining patient compliance (Erchul and Raven, 1997).

Pharmacists' power and influence has also been studied in the organizational context. Pharmacists' power may have multitude of sources. For example, pharmacists may have requisite expertise and be in the best position to analyze and evaluate the medications for formulary decisions (Balu, O'Connor, and Vogenberg, 2004) or pharmacists may be a member of subcommittees acting as a facilitator between the P&T committee and the subcommittee (Nair, Coombs, and Ascione, 2004). Pharmacists on the P&T committee exerted substantial power over formulary decision-making although pharmacists' sources of influence were not investigated (Mannebach et al., 1999; Bagozzi, Ascione, and Mannebach, 2005). Using French and Raven's typology, Arntson (2002) observed that the bases of power

that were considered the most important determinants of the pharmacist's influence on formulary admission decisions included expert, information, and referent power. However, the importance of sources of power was found to vary by the number of members on the P&T committee. Pharmacists' expert and information power were found to be most influential in large committees while expert and referent power in smaller committees (Arnston, 2002). Thus, the growing importance of P&T and pharmacists' role in the P&T and other related subcommittees may give pharmacists a sense of power. Such sources of influence may be grouped under what Raven (1992; 1993) described as third party influence.

Social power bases have been applied in context of school teacher consultation. There have been arguments about which social power bases are most relevant to teacher consultation. Reviewing published studies that applied French and Raven's original conceptualization of power, Erchul and Raven (1997) concluded that there is some evidence that expert power and referent power are linked to school teacher consultation. Erchul, Raven, and Ray (2001) made further investigation of school psychologists' perceptions of power based on the new conceptualizations. The authors concluded that consultants viewed informational power and expert power, together labeled as credibility, to be most effective and more likely to be used. Researchers has also examined if both the consultant and the consultee held similar views of the effectiveness of the consultant's use of power (Erchul, Raven, and Whichard, 2001). Even though both the consultant and the consultee viewed direct informational and positive expert power to be more effective, the authors cautiously concluded that both parties share similar views about the effectiveness of social power in consultation when more global indicators are considered, but hold divergent views when more specific indicators are considered. Although the use of certain power bases may be

perceived effective by both the consultants and the consultee, it becomes effective in reality only if those powers are applied when attempting to influence. Recently, Wilson (2008) studied likelihood of the use of power bases unlike previous studies that focused on perceived effectiveness of power bases (Raven, Schwarzwald, and Koslowsky, 1998; Erchul, Raven, and Whichard, 2001). As such, consultants were more likely to use soft than harsh power bases. Specifically, direct information power, positive expert power and referent power are significantly more likely to be used. Getty (2006) concluded that likelihood of using soft bases, in general, is positively related – specifically, each of the three power described above was positively and significantly related – to consultants' self-perceptions of effectiveness. Finally, Lippitt et al. (1952) concluded individuals with high attributed power tend to initiate more social influence attempt than low power individuals.

LIMITATIONS OF STUDIES ON OFF-LABEL PRESCRIBING AND PHARMACISTS' ROLE

Off-label prescribing, if not judiciously done, has the potential of causing detrimental effects. In situations where off-label prescribing results in harm, pharmacists along with the prescriber may be liable for injury under conditions of negligence. One way to mitigate such liability is by assuring the appropriateness of such use. Consultation with the prescriber in order to determine the rationale, documentation, as well as review of current scientific and professional literature, and applying critical professional judgment may minimize such liability (Campbell, 1995). In addition, from an ethical perspective, the pharmacist is just as much an advocate for the patient's well-being as is the physician. Principles of nonmaleficence and beneficence oblige pharmacists to question the use of medications, certainly those used off-label, to ensure the medication offers maximum therapeutic benefit

to patients at the least possible risk of harm (Abella, 2003). Therefore, off-label prescribing has strong implications for pharmacists. Yet, past research regarding off-label prescribing inadequately examined issue from the perspective of pharmacists. It has been found that pharmacists have been consulted in some instances regarding off-label prescribing (Haw and Stubbs, 2005a). However, other studies examined opinions and beliefs about off-label prescribing only (Ansani et al., 2006; Stewart et al., 2007). Moreover, the results of these studies are not generalizable in other hospital practice settings because of the sampling design and because research subjects who practiced in community pharmacies or teaching hospitals.

Physicians consider indication and effectiveness of a medicine as the two most important of the ten parameters of appropriate medication prescribing (Samsa et al., 1994). However, while studying community pharmacists Stewart et al. (2007) focused on pediatric off-label prescribing where off-label prescribing occurs largely due to unapproved population, dosage, and formulation. Indication-based off-label prescribing deserves special attention because of inherent risk; however, existing research has failed to provide much needed information about this issue.

It has been reported that indication-based prescribing is prevalent in AMCs. However, only half of the AMCs require Pharmacy and Therapeutic Committee (P&T) review of policy on off-label or innovative off-label use (Ansani et al., 2006). It is largely unknown about off-label prescribing and the policies that govern that activity in community hospitals because this has not yet been examined in that context.

Leape et al. (1999) observed that pharmacists took responsibility to ensure safety identifying unsafe conditions and need for process improvement. Whether pharmacists go or are willing to go through the same deliberation in case of indication-based off-label prescribing has not been studied. Pharmacists have been often envisioned as professional best positioned to make sound decision and judgments concerning medication therapy. Flood and Scott (1978) argued that for optimal functioning, professional groups must be in a position to exercise power largely, compared to other groups, over decisions concerning their sphere of competence. Campagna (1995) argued that although pharmacists performing at prescriptive and consultative levels may significantly influence prescribing, few pharmacists are performing at corrective level of decision-making and even fewer in prescriptive and consultative level. Under the light of such findings, how pharmacists who are providing clinical services influence off-label prescribing merits attention. Campbell (1995) suggested that if the pharmacist is not convinced of the appropriateness of the off-label use of medications, a decision not to comply with the physician's decision would be proper course of action. However, whether pharmacists providing clinical pharmacy services are willing to influence prescribers in the context of inappropriate off-label prescribing is not yet known.

Ellingson (2002) argued that communication among health care team members is affected by power, hierarchy, and privilege within the specific hospital or other health care institutions. However, social power and its impact on pharmacist-physician communication have not been investigated well. Although power has been conceptualized as multidimensional construct (French and Raven, 1959), past research (Lambert, 1996) conceptualized and examined power as one-dimensional construct. While it is evident that pharmacists possess some power (Arnston, 2002), Lambert (1996) examined only

pharmacists' perception of physician's expert power - neither relative perception of power nor the other bases of power. Relative perceptions of power in the context of off-label medication product selection and use may affect willingness to/ likelihood of communication or influence. In addition, it is not known whether perception of power and its effect on pharmacists' decisions to influence has changed since Lambert examined pharmacist-physician communication more than a decade ago; given the way the scope of pharmacy practice has evolved in the last few years, there is the potential for these relationships to be different.

In sum, in the context of indication-based off-label prescribing, there exists a need for investigation on attitude and perceived roles and responsibilities of pharmacists providing clinical pharmacy services in community hospitals. Specifically, it is worth examining the effect of perceived social power on pharmacists' intent of influence concerning indication-based off-label prescribing.

CHAPTER 2 REFERENCES

Abella R. Students face ethical issues Kickbacks and off-label use of pharmaceuticals What should a pharmacists do? *California Pharmacists*. 2003;Autumn:18-19.

Agency for Healthcare Research and Quality. Efficacy and comparative effectiveness of off-label use of atypical antipsychotics. Comparative Effectiveness Review Number 6, January, 2007. Available at: http://effectivehealthcare.ahrq.gov/repFiles/Atypical_Antipsychotics_Final_Report.pdf. Accessed March 11, 2008.

Ansani N, Branch R, Fedutes-Henderson B, et al. Unites States medical practice summary Innovative off-label medication use. *American Journal of Medical Quality*. 2006;21:246-54.

Arnston K. The determinants of influence: an investigation of pharmacist activity in the Pharmacy and Therapeutics committee. *Master's Thesis*. The University of Mississippi, Oxford, MS; 2002.

Atkins CD. Ethics of off-label treatment. *Journal of Clinical Oncology*. 1998;16:1637.

Bagozzi RP, Ascione FJ, Mannebach MA. Inter-role relationships in hospital-based Pharmacy and Therapeutics Committee decision-making. *Journal of Health Psychology*. 2005;10:45-64.

Balu S, O'Connor P, Vogenberg FR. Contemporary Issues Affecting P&T Committees Part 2: beyond managed care. *P & T*. 2004;29:780-83.

Barbui C, Ciuna A, Nose M, et al. Off-label and non-classical prescriptions of antipsychotic agents in ordinary in-patient practice. *Acta Psychiatrica Scandinavica*. 2004;109:275-78.

Blum RS. Legal considerations in off-label medication prescribing. *Archives of Internal Medicine*. 2002;162:1777-79.

Bond CA, Raehl CL, Franke T. Clinical pharmacy services, hospital pharmacy staffing, and medication errors in United States hospitals. *Pharmacotherapy*. 2002;22:134-47.

Borenstein JE, Graber G, Saltiel E, et al. Physician-pharmacist co-management of hypertension: a randomized, comparative trial. *Pharmacotherapy*. 2003;23:209-16.

Boudreau DM, Capoccia KL, Sullivan SD, et al. Collaborative care model to improve outcomes in major depression. *Annals of Pharmacotherapy*. 2002;36:585-91.

Brodie DD, Parish PA, Poston JW. Societal needs for drugs and drug-related services. *American Journal of Pharmaceutical Education.* 1980;44:276-78.

Brown P, Levinson SC. *Politeness: Some Universals in Language Usage.* New York, NY: Cambridge University Press; 1987:61-83.

Campagna KD. Pharmacists' level of performance in making drug therapy decisions. *American Journal of Health-System Pharmacy*. 1995;52:640-45.

Campbell N. Use of medications for nonapproved indications. *Journal of Managed Care Pharmacy*. 1995;1:206.

Carroll NV. Do community pharmacists influence prescribing? *Journal of the American Pharmacists Association*. 2003;43:612-21.

Chen H, Deshpande AD, Jiang R, Martin BC. An epidemiological investigation of off-label anticonvulsant drug use in the Georgia Medicaid Population. *Pharmacoepidemiology and Drug Safety*. 2005;14:629-38.

Chin MH, Friedmann PD, Cassel CK, Lang RM. Differences in generalist and specialist physicians' knowledge and use of angiotensin-converting enzyme inhibitors for congestive heart failure. *Journal of General Internal Medicine*. 1997;12:563-30.

Cohen PJ. Off-label use of prescription drugs: legal, clinical and policy considerations. *European Journal of Anaesthesiology*. 1997;14:231-35.
Conroy S. Unlicensed and off-label drug use Issues and Recommendations. *Pediatric Drugs*, 2002;4:353-59.
Daumit GL, Crum RM, Guallar E, et al. Outpatient prescriptions for atypical antipsychotics for African Americans, Hispanics, and Whites in the United States. *Archives of General psychiatry*. 2003;60:121-28.
Davidson W, Molloy W, Somers G, Bedard M. Relation between physician characteristics and prescribing for elderly people in New Brunswick. *Canadian Medical Association Journal*. 1994;150:917-21
DeMonaco JH, Ali A, Hippel EV . The major role of clinicians in the discovery of off-label drug therapies. *Pharmacotherapy.* 2006;26:323-32.
Denig P, Haaijer-Ruskamp FM. Therapeutic decision making of physicians. *Pharmaceutisch Weekblad*. 1992;14:9-15.
DeWitt EM., Glick HA, Albert DA, et al. Medicare coverage of tumor necrosis factor (alpha) inhibitors as an influence on physicians' prescribing behavior. *Archives of Internal Medicine*. 2006;166:57-63.
Dickerson LM., Mainous AG, Carek PJ. The pharmacist's role in promoting optimal antimicrobial use. *Pharmacotherapy*. 2000;20:711-23.
Douglas-Hall P, Fuller A, Gill-Banbam S. An analysis of off-license prescribing in psychiatric medicine. *Pharmaceutical Journal*. 2001;267:890-91.
Dresser R. The curious case of off-label use. *Hastings Center Report*. 2007;May/June:9-11.
Eisenberg JM. Sociologic influences on decision making by clinicians. *Annals of Internal Medicine*. 1975;90:957-64.
Ellingson LL. Communication, collaboration, and teamwork among health care professionals. *Communication Research Trends*. 2002;21:1-21.
Erchul WP, Raven BH, Ray AG. School psychologists' perceptions of social power bases in teacher consultation. *Journal of Educational and Psychological Consultation.* 2001;12:1-23.
Erchul WP, Raven BH, Whichard SM. School psychologist and teacher perceptions of social power in consultation. *Journal of School Psychology*. 2001;39:483-97.
Erchul WP, Raven BH. Social power in school consultation: A contemporary view of French and Raven's bases of power model. *Journal of School Psychology*. 1997;35:137-71.
Flood AB, Scott WR. Professional power and professional effectiveness: The power of the surgical staff and the quality of surgical care in hospitals. *Journal of Health and Social Behavior*. 1978;19:140-54.
Fountoulakis KN, Nimatoudis I, Iacovides A, Kaprinis G. Off-label indications for atypical antipsychotics: A systematic review. *Annals of General Hospital Psychiatry.* 2004;3:4. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC379314/pdf/1475-2832-3-4.pdf. Accessed April 14, 2008.
French Jr. JRP, Raven BH. The bases of social power. In: Cartwright D, Zander AF, eds. *Group dynamics: Research and theory*. 3rd ed. New York, NY: Harper and Row; 1968:259-69.
Freund DA, Stein J, Hurley R, et al. Specialty differences in the treatment of asthma. *Journal of allergy and clinical immunology*. 1989;84:401-406.
Gazarian M, Kelly M, McPhee JR, et al. Off-label use of medicines: consensus recommendations for evaluating appropriateness. *Medical Journal of Australia*. 2006;185:544-48.

Getty KC. Gender and Professional Experience as Predictors of Consultants' Likelihood of Use of Social Power Bases. *Unpublished Dissertation*. North Carolina State University, NC; 2006. Available at: http://www.lib.ncsu.edu/theses/available/etd-04172006-105027/unrestricted/etd.pdf. Accessed June 20, 2008.

Grindrod KA, Payel P, Martin JA. What intervention should pharmacists should employ to impact health practitioners' prescribing practices? *Annals of Pharmacotherapy*. 2006;40:1546-57.

Hamberg K, Gunilla R, Johansson EE. Male and female physicians show different patterns of gender bias: a paper-case study of management of irritable bowel syndrome. *Scandinavian Journal of Public Health*. 2004;32:144-52.

Hamer AM., Haxby DG, McFarland BH, Ketchum K. Gabapentin use in a managed care Medicaid population. *Journal of Managed Care Pharmacy*. 2002;8:266-71.

Hanlon JT, Weinberger M, Samsa GP, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *American of Journal of Medicine*. 1996;100:428-37.

Haw C, Stubbs J. A survey of off-label prescribing for inpatients with mild intellectual disability and mental illness. *Journal of Intellectual Disability Research*. 2005(a);49:858-64.

Haw C, Stubbs J. A Survey of the off-label use of mood stabilizers in a large psychiatric hospital. *Journal of Psychopharmacology*. 2005(b);19:402-07.

Hemminki E. Review of literature on the factors affecting drug prescribing. *Social Science and Medicine*. 1975;9:111-15.

Henneman EA, Lee JL,Cohen JI. Collaboration: a concept analysis. *Journal of Advanced Nursing*. 1995;21:103-09.

Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *American Journal of Hospital Pharmacy*. 1990;47:533-43.

Hohmann AA. Gender bias in psychotropic drug prescribing in primary care. *Medical Care*. 1989;27:478-90.

Horen B, Montastruc JL, Lapeyre-Mestre M. Adverse drug reactions and off-label drug use in pediatric outpatients. *British Journal of Clinical Pharmacology*. 2002;54:665-70.

Institute of Medicine. Public confidence and involvement in clinical research: clinical research roundtable symposium II [summary]. September 25-26, 2000. Available at: http://www.iom.edu/Object.File/Master/4/128/CRR8pager2.pdf . Accessed April 12, 2008.

Kallail KJ, Stanton SR. Pharmacy-physician communications: Potential to reduce medication errors. *Journal of the American Pharmacists Association*. 2006;46:618-20.

Keely JL. Pharmacist scope of practice. *Annals of Internal Medicine*. 2002;136:79-85.

Kocs D, Fendrick D. Effect of off-label use of oncology drugs on pharmaceutical costs: the rituximab experience. *American Journal of Managed Care*. 2003;9:393-00.

Kogut SJ, Yam F, Dufresne R. Prescribing of antipsychotic medication in a Medicaid population: use of polytherapy and off-label dosages. *Journal of Managed Care Pharmacy*. 2005;11:17-24.

Kos M, Wertheimer AI, Mrhar A. Satisfaction with pharmacotherapy for approved and off-label indications – A Delphi study. *Annals of Pharmacotherapy*. 2005;39:649-54.

Koslowsky M, Schwarzwald J, Ashuri S. On the relationship between subordinates' compliance to power sources and organizational attitudes. *Applied Psychology*. 2001;50:455-76.

Koslowsky M, Schwarzwald J. The use of power tactics to gain compliance: Testing aspects of Raven's (1988) theory in conflictual situations. *Social Behavior and Personality*. 1993;21:135-43.
Krupat E, Irish JT, Kasten LE, et al. Patient assertiveness and physician decision-making among older breast cancer patients. *Social Science and Medicine*. 1999;49:449-57.
Laetz T, Silberman G. Reimbursement policies constrain the practice of oncology. *Journal of American Medical Association*. 1991;266:2996-99.
Lambert BL. Directness and deference in pharmacy students' messages to physicians. *Social Science and Medicine*. 1995;40:545-55.
Lambert BL. Face and politeness in pharmacist-physician interaction. *Social Science and Medicine*. 1996;43:1189-98.
Leape LL, Cullen DJ, Clapp MD, et al. Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. *Journal of the American Medical Association*. 1999;281:267-70.
Lee AJ, Boro MS, Knapp KK, et al. Clinical and economic outcomes of pharmacist recommendations in a Veterans Affairs Medical Center. *American Journal of Health-System Pharmacy*. 2002;59:2070-77.
Li VW, Jaffe MP, Li WW, Haynes HA. Off-label dermatologic therapies usage, risks and mechanisms. *Archives of Internal Medicines*. 1998;134:1459-54.
Lin HW, Phan K, Lin SJ. Trends in off-label beta-blocker use: A secondary data analysis. *Clinical Therapeutics*. 2006;28:1736-46.
Lipitt R, Polansky N, Rosen S. The dynamics of power-a field study of social influence in groups of children. *Human Relations*. 1952;5:37-64.
Lipton HL, Bero LA, Bird JA, McPhee SJ. The impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing: A randomized controlled trial. *Medical Care*. 1992;30:646-58.
Mack A. Examination of the evidence for off-label use of gabapentin. *Journal of Managed Care Pharmac*y. 2003;9:559-68.
Manfredi CM. A descriptive study of nurse managers and leadership. *Western Journal of Nursing Research*. 1996;18:314-30.
Mannebach MA, Ascione FJ, Gaither CA, et al. Activities, functions, and structure of pharmacy and therapeutics committees in large teaching hospitals. *American Journal of Health-System Pharmacy*. 1999;56:622-28.
McKinlay JB, Potter DA, Feldman HA. Nonmedical influences on medical decision making. *Social Science and Medicine*. 1996;42:769-76.
Nair KV, Coombs JH, Ascione FJ. Assessing the structure, activities, and functioning of P&T committees: A multisite case study. *P&T* . 2000;25:516-28.
Neubert A, Dorman H, Weiss J, et al. The impact of unlicensed and off-label drug use on adverse drug reactions in pediatric patients. *Drug Safety*. 2004;27:1059-67.
Nightingale SL. Off-label use of prescription drugs. *American Family Physician.* 2003;68:425-27.
O'Reilly J, Dalal A. Off-label or out of bounds? Prescriber and marketer liability for unapproved uses of FDA-approved drugs. *Annals of Health Law*. 2003;12:295-24.
Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: prescribing and transcribing – 2007. *American Journal of Health-System Pharmacy*. 2008;65: 827-43.

Peiro JM, Melia JL. Formal and informal interpersonal power in organizations: Testing a bifactorial model of power in role-sets. *Applied Psychology*. 2003;52:14-35.
Podsakoff PM, Schriesheim CA. Field studies of French and Raven's bases of power: Critique, reanalysis, and suggestions for future research. *Psychological Bulletin.* 1985;97:387-11.
Poole SG, Dooley MJ. Off-label prescribing in oncology. *Support Care Cancer.* 2004;12:302-05.
Radley DC, Finkelstein SN, Stafford RS. Off-label prescribing among office-based physicians. *Archives of Internal Medicines*. 2006;166:1021-26.
Raisch DW. Determinants of prescribing behavior. In: Smith, MC, Wertheimer, AI, eds. *Social and Behavioral Aspects of Pharmaceutical Care*. Bringhamton, NY: Pharmaceutical Product Press; 1996:149-84.
Ranelli PL, Biss J. Physicians' perceptions of communication with and responsibilities of pharmacists. *Journal of the American Pharmaceutical Association*. 2000;40:625-30.
Raven BH, Schwarzwald J, Koslowsky M. Conceptualizing and measuring a power/interaction model of interpersonal influence. *Journal of Applied Social Psychology.* 1998;28;307-32.
Raven BH. A power interaction model of interpersonal influence: French and Raven thirty years later. *Journal* of *Social Behavior and Personality*. 1992;7:217-44.
Raven BH. The bases of power: Origins and recent developments. *Journal of Social Issue.* 1993;49:227-51.
Rupp MT, DeYoung M, Schondelmeyer SW. Prescribing problems and pharmacists interventions in community practice. *Medical Care*. 1992;30:926-40.
Saarela T, Engestrom R. Reported differences in management strategies by primary care physicians and psychiatrists in older patients who are depressed. *International Journal of Geriatric Psychiatry*. 2003;18:161-68.
Samsa G, Hanlon JT, Schmader KE, et al. A summated score of the Medication Appropriateness Index: development and assessment of clinimetric properties including content validity. *Journal of Clinical Epidemiology*. 1994;47:891-96.
Schelenker B, Gratzke C, Reich O, et al. Preliminary results on the off-label use of Duloxetine for the treatment of stress incontinence after radical prostatectomy or cystectomy. *European Urology*. 2006;49:1075-78.
Schumock GT, Butler MG, Mick PD, et al. Evidence of the economic benefit of clinical pharmacy services: 1996-2000. *Pharmacotherapy*. 2003;23:113-32.
Schwarzwald J, Koslowsky M, Ochna-Levin T. Usage of and compliance with power tactics in routine vs. nonroutine work settings. *Journal of Business and Psychology.* 2004;18:385-01.
Scott A, Shiell A, King M. Is general practitioner decision making associated with patient socioeconomic status? *Social Science and Medicine*. 1996;42:35-46.
Segal R, Hepler CD. Drug choice as a problem-solving process. *Medical Care*. 1985;23:967-76.
Sleath B, Shih YT. Sociological influences on antidepressant prescribing. *Social Science and Medicine*. 2003;56:1335-44.
Somech A, Drach-Zahavy A. Relative power and influence strategy: the effects of agent/target organizational power on superiors' choices of influence strategies. *Journal of Organizational Behavior*. 2002;23:167-79.
Spinewine A, Swine C, Dhillon S, et al. Effect of a collaborative approach on the quality of prescribing for geriatric inpatients: a randomized, controlled trial. *Journal of the American Geriatric Society*. 2007;55:658-65.
Stahelski AJ, Payton CF. The effects of status cues on choices of social power and influence strategies. *Journal of Social Psychology*. 1995;*135*:553-60.

Stewart D, Rouf A, Snaith A, et al. Attitudes and experiences of community pharmacists towards paediatric off-label prescribing: a prospective survey. *British Journal of Clinical Pharmacology*. 2007;64:90-95.

Strong DK, Tsang GWY. Focus and impact of pharmacists' interventions. *Canadian Journal of Hospital Pharmacy*. 1993;46:101-08.

Sulick JA, Pathak DS. The perceived influence of clinical pharmacy services on physician prescribing behavior: a matched-pair comparison of pharmacists and physicians. *Pharmacotherapy*. 1996;16:1133-41.

Tabarrok AT. Assessing the FDA via the anomaly of off-label drug prescribing. *Independent Review*. 2000;1:25-53.

Tamai IY, Rubenstein LZ, Josephson KR, Yamauchi JA. Impact of computerized drug profiles and consulting pharmacist on outpatient prescribing patterns: a clinical trial. *Drug Intelligence and Clinical Pharmacy*. 1987;21:890-94.

Torres A. The use of Food and Drug Administration – approved medications for unlabeled (off-label) uses the legal and ethical implications. *Archives of Dermatology*. 1994;130:32-36.

Turner S, Nunn AJ, Fielding K, Choonara I. Adverse drug reactions to unlicensed and off-label drugs on pediatric wards: a prospective study. *Acta Paediatrica.* 1999;88:965-68.

Ulfer M, Kimland E, Bergman U. Adverse drug reactions and off-label prescribing for pediatric outpatients: a one-year survey of spontaneous reports in Sweden. *Pharmacoepidemiology and Drug Safety*. 2004;13:147-52.

US General Accounting Office. Off-label drugs: reimbursement policies constrain physicians in their choice of cancer therapies. Report to the chairman, Committee on Labor and Human Resources, US Senate, September,1991. Available at: http://archive.gao.gov/d18t9/144933.pdf. Accessed March 17, 2008.

Verbrugge LM, Steiner RP. Prescribing drugs to men and women. *Health Psychology*. 1985;1:79-98.

Weisse CS, Sorum PC, Sanders KN, Syat BL. Do gender and race affect decisions about pain management? *Journal of General Internal Medicine*. 2001;16:211-17.

White L, Johnson LW. Relative influence of physicians and patients in the prescribing decision. *Journal of Medical Marketing*. 2002;2:144-58.

Wilson KE. The likelihood of use of social power strategies by school psychologists when consulting with teachers. *Journal of Educational and Psychological Consultation*. 2008;8:101-23.

Yukl G, Falbe CM. The importance of different power sources in downward and lateral relations. *Journal of Applied Psychology*. 1991;76:416-23.

Zindrick MR. Orthopedic surgery and Food and Drug Administration off-label use. *Clinical Orthopedics and Related Research*. 2000;378:31-38.

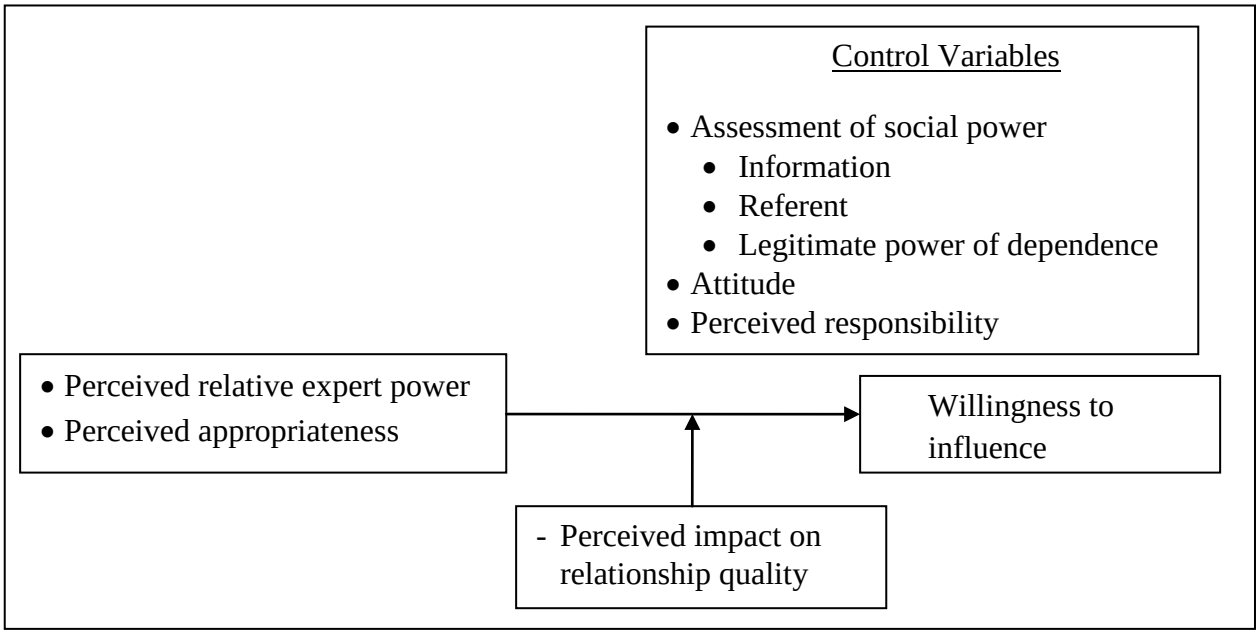
CHAPTER 3

CONCEPTUALIZATION, RESEARCH METHOD, AND TECHNIQUES

CONCEPTUALIZATION

The following describes the psychological process of assessing power and its potential and the preparation for influence attempts. The power/interaction model of interpersonal influence (Raven, 1992) provided the foundation for the conceptual framework (Figure 1) for this study of pharmacist power and willingness to influence. The model can be used to study power-influence dynamics from both the agent's perspective as well as the target's perspective. The model provides a process view of power and influence attempts and describes various antecedents to and consequences of power and influence attempts.

Figure 1: PROPOSED CONCEPTUAL FRAMEWORK



Adapted from Raven (1992)

The influencing agent, within the context of this study, the hospital pharmacist, assumed a motivated and rational person, assesses the power bases that may be available to use as well as how effective those power bases will be in implementing changes. The argument for the assessment of power appears to be intuitive as the influencing agent may have multiple influence strategies available for use and the choice of a particular influence tactic would be based on his or her evaluation of power over the target (Fung, 1991). The influencing agent's assessment of power inherently is relative in nature. Researchers have found empirical evidence of the effect of relative power on influence behavior (Somech and Drach-Zahavy, 2002). Because both physicians and pharmacists train in pharmacotherapeutics and share the domain of knowledge relevant for medication use, perception of relative power – at least for some power bases (e.g., expert power) that are relevant to the shared domain – is an appropriate representation rather than absolute perception. As such, this approach was thought to capture appropriately the hospital pharmacist's assessment of power.

Once the assessment of power is completed, the influencing agent will evaluate the potential of influence. The influencing agent may carry out a cost-benefit analysis of the influence strategy. It can be argued that such analyses are influenced critically by various factors such as personal norms and values, secondary gains and losses, and time, costs, and effort required for achieving the desired outcomes (Raven, 1992). Here, the influencing agent may consider the potential relational, situational, and/or ethical ramifications of using a particular power base (Getty, 2006). For example, the influencing agent might ask if the use of a seemingly effective power base affects relationship or if it is ethically and professionally appropriate in a given context.

After having assessed the available power bases and costs and benefits of their use, one would expect that at this point the agent might prepare for the influence attempt (Raven, 1992). This preparation for influence attempts can manifest itself in several ways. For example, the influencer can enhance (e.g., displaying diplomas or degrees) or emphasize (e.g., showing expertise or advanced knowledge for expressing expert power) activities that support his or her power position. However, before the agent decides to enhance or prepare the stage for an influence attempt, it can be argued, the agent must decide that s/he is going to influence. Such a decision may be accentuated by favorable appraisals of power bases and potential outcomes. In other words, the agent's willingness to influence precedes the preparation for an influence attempt. This argument appears valid for three reasons. First, because of the differential nature and sources of various power bases, different types of power may need different stage-setting requirements, attributes, and tools. Willingness to use different bases of power may dictate specific preparations for influence attempts. For example, for legitimate power of reciprocity, an influencing agent might try to evoke ingratiation and describe how one favored the target on previous occasions. Second, factors such as personal preferences or attributes may affect the use of power. For example, infection control nurses who perceived themselves competent were more likely to use expert and information power (Raven, Freeman, and Haley, 1982 as cited in Raven, 1992). In school consultation, gender was associated with the likelihood of use of different power bases (Wilson, Erchul, and Raven, 2008). Finally, having a power base available indicates neither that the agent will attempt to influence or prepare for the attempt nor does it mean that it will be an appropriate means of influence. However, having power may increase the willingness to influence. Kipnis (1972) found that individuals with more power attempted to

influence their workers more frequently in comparison to low power individuals. Based on the finding, the author concluded that delegated power might encourage one to exert influence. Similarly, albeit in a different context, Lippitt et al. (1952) observed that attributed power was consistent with self-perceived power and recipients of attributed power made frequent influence attempts. Therefore, it can be argued that the influencing agent deliberates over using particular bases of power before he or she finally prepares for the influencing attempt. In other words, willingness to influence is the necessary intermediate step between the assessments of relative power bases and the preparation for influence attempts.

While Raven (1992) clearly identified the role of cost-benefit implications on influence attempts, the variables and the relationship between the assessment of power and attempt to influence were not elucidated. However, it may be argued that such variables may moderate the effect of power on willingness to influence for several reasons. First, an influencing agent's decision to invoke some power may be affected by individual preferences, situational attributes, or disadvantages and advantages of using power bases. For example, the agent, as argued by Getty (2006), may decide not to use a seemingly potential and available power base because of the potential for an adverse outcome. Additionally, Raven (1993) echoed the same possibility that the use of direct form of information power may result in a disastrous interpersonal relationship problem. Second, if the agent has had previous experience, it may affect self-perception of power, perception of effectiveness, and cost of influence attempts (Raven, 1992). In other words, experience may affect the decision to invoke power. However, even in situations where the influencing agent does not have experience, it can be contended, the influencing agent – as a rational being –

will assume and prospectively assess the effects of such an influence attempt. Furthermore, the use of different bases of power has been found to be associated with differential perceived effectiveness and outcomes (Raven, 1992; Wilson, Erchul, and Raven, 2008). This evidence supports the argument that potential or perceived outcomes of influence attempts may affect one's willingness to influence.

Building on the findings of previous research as summarized in Table 1 and Raven's (1992) power/interaction model of interpersonal influence, it can be posited that the assessment of power bases affects the agent's willingness to influence and a number of relational, situational, and contingency variables moderate the relationship between power and willingness to influence. For the sake of parsimony and relevance to this research, the relationship between pharmacist's relative expert power and willingness to influence and the moderating effect of perceived impact on the interprofessional relationship quality were examined.

Table 1: Select studies on power, use of power, and influence

Authors	Summary of findings
Lippitt et al. (1952), Kipnis (1972)	*Power and influence attempts are positively related*
Erchul, Raven, and Whichard (2001), Koslowsky, Schwarzwald, and Ashuri (2001), Wilson, Erchul, and Raven (2008)	*Soft power bases are more effective and more likely to be used*
Raven (1992)	*Assessment of power bases is antecedent to influence attempt*

The extant literature on pharmacists' influence on prescribing (as described in Chapter 2) supports the thought that the perception of inappropriateness of a prescription by a pharmacist is positively associated with the decision to influence prescribing. However, in

case of off-label prescribing with inadequate evidence, the pharmacist may believe that the physician may have special reasons and knowledge or may possess adequate information supporting that choice of therapy. Such a case can also be considered analogous to what Brown and Levinson (1987) described as ranking. That is, asking a physician about the rationale of a prescription with low evidence may constitute a greater face threatening act to the physician than that with high evidence depending on the expertise of the physician. As the ranking of the act increases, the communicator's propensity to choose more polite communicative strategies increases with abstention from communication being the most polite strategy available (Lambert, 1995). The propositions described below are based on the previously mentioned rationale and have been described in the proposed conceptual framework (Figure 1).

P1: The pharmacist's perceived relative expert power in relation to the physician is positively associated with the pharmacist's willingness to influence off-label prescribing.

P2: The perceived appropriateness of prescription medication is negatively associated with the pharmacist's willingness to influence off-label prescribing.

P3: The effect of the pharmacist's relative expert power on the pharmacist's willingness to influence off-label prescribing is moderated by the perceived appropriateness of prescription medication.

P4 The effect of the pharmacist's perceived relative expert power on willingness to influence off-label prescribing is moderated by the perceived impact on relationship quality with the physician as perceived by the pharmacist.

VARIABLE OPERATIONALIZATION AND MEASUREMENT

Dependent Variable

Willingness to influence

Willingness to influence was the dependent variable in the study. Willingness to influence was defined as the pharmacist's willingness to initiate action with the physician in order to ensure rationale for an indication-based off-label prescription, perceived inappropriate by the pharmacist. In other words, willingness to initiate action with the physician implies a willingness to intervene using rationality tactic. Research focusing on influence has considered different tactics or elements of a complex array of influence forms that are used by the agent on the target to achieve the agent's desired goals (Erez and Rim, 1982; Kipnis, Schmidt, and Wilkinson, 1980; Schriesheim and Hinkin, 1990; Yukl and Falbe, 1991). A synthesis of the influence literature revealed three categories of influence behavior: hard strategy (e.g., assertiveness), rational strategy (e.g., rationality; bargain), and soft strategy (e.g., friendliness; ingratiation; norms of reciprocity) (Kipnis and Schmidt, 1985). With a rational strategy, the agent appeals to or tries to invoke instrumental reasoning on the part of the target and presents himself/herself as knowledgeable and credible in order to evoke a positive response (Farmer et al., 1997). For example, the influencing agent may offer a course of action that is supported with logic (evidence) and is consistent with the influence attempt in order to improve the expected utility or outcome that is important to the target of influence. Although rationality is used more in cases of influence in the upward direction, it is viewed as socially acceptable for influence attempts in other directions as well (Yukl and Tracey, 1992) and has fewer costs associated with it than other influence tactics (Kipnis, Schmidt, and Wilkinson, 1980). Therefore, it is appropriate to examine the use of rationality by pharmacists regardless of the fact that the pharmacist-physician relationship is not like a subordinate-superior relationship, rather a consultant-consultee dyad, although it is

widely believed that physicians enjoy more privilege than pharmacists in healthcare organizations. Finally, whereas political norm structure may vary within an institution regarding what types of upward influence attempts are considered acceptable (Allen et al., 1979), the use of reasons and logic seems to be almost universally accepted as an appropriate means of influence tactic (Farmer et al., 1997).

To date, the influence typology offered by Kipnis, Schmidt, and Wilkinson (1980) has received substantial attention in psychology literature (Schriesheim and Hinkin, 1990; Yukl and Falbe, 1991; Yukl and Tracey, 1992). Subsequently, Schriesheim and Hinkin (1990) presented an improved version of the typology and offered an empirically validated instrument. This 18-item instrument was comprised of six dimensions (ingratiation, exchange of benefits, rationality, assertiveness, upward appeal, and coalition) of influence strategy. The authors compared the 18-item scale with other potential shortened versions (e.g., a 27-item instrument) of the typology. Although Schriesheim and Hinkin (1990) suggested that the 18-item scale had superiority over the other versions, for this study, the four items from 27-item scale classified under the rationality subscale were adapted in order to measure willingness to influence using rationality. The four items consistently loaded under the rationality subscale in different studies (Schriesheim and Hinkin, 1990). The subscale showed internal consistency of 0.74 and test-retest reliability and the correlation between the rationality subscale and social desirability was not significant (Schriesheim and Hinkin, 1990). These four items were believed to capture adequately willingness to influence that may require one to use both verbal and written forms of communication that are common in pharmacist-physician communication within the hospital. In addition, consistent with the measurement of other latent variables, a global measure of willingness to

intervene was added. The participants were asked to indicate their level of agreement about their willingness to intervene and their willingness to use the rationality tactic using a 7-point scale where 1 = not at all willing and 7 = absolutely willing. This response task followed immediately the exposure to the off-label prescription order scenario.

Independent Variables

Perceived relative expert power

The pharmacist's positive relative expert power was examined in the present study. Expert power is task oriented and decision-specific and depends on personal rather than organizational resources (Koslowsky, Schwarzwald, and Ashuri, 2001). Expert power is accepted universally as a means of influence. In previous studies in educational psychology and organizational attitudes, expert power has been found to be effective (Erchul, Raven, and Whichard, 2001; Koslowsky, Schwarzwald, and Ashuri, 2001; Raven 1992). Arnston (2002) found that expert power was the most important determinant of the pharmacist's influence on the P&T committee.

Pharmacists provide professional services to physicians within their sphere of competence and expertise (pharmacotherapy). Pharmacists collaborate with physicians in order to provide such services. Therefore, it can be argued that pharmacist-physician dyad is similar to other dyadic relationships (e.g., school consultant-consultee) where power bases are utilized for influence attempts. However, unlike other contexts, pharmacists and physicians share a domain of knowledge and skill. As a result, conceptualization of pharmacist perception of relative expert power was considered appropriate and relevant in the context of the study. The pharmacist's relative positive expert power was defined as the

extent to which the pharmacist perceived to possess expertise and knowledge in a relevant area relative to that of the physician. Pharmacist relative expert power was operationalized as perceived power differential between the pharmacist and the physician described in the study. There were two experimental groups of pharmacists with high and low relative expert power. The pharmacist's relative expert power was believed to be high or power differential low when compared to a general practitioner with less knowledge and experience; the pharmacist's relative expert power was believed to be low or power differential high when compared to a specialist physician with more knowledge and experience.

Perceived appropriateness

Physicians may prescribe medications off-label; however, it is expected that they will have a reasonable expectation of therapeutic success that is supported by sound scientific evidence (Henry, 1999). Concerns for quality of care arise when evidence for use is not clear, is not sufficient, or is not well documented. Such prescribing practice with some rationale but inadequate evidence, occasionally termed as innovative off-label prescribing, becomes challenging when prescribing is not considered clinical research (Ansani et al., 2006). In the context of clinical practice, indication and effectiveness are considered most important among different parameters of prescription medication appropriateness index (Samsa et al., 1994). Effectiveness is closely related to safety and efficacy that are determined based on the strength and quality of scientific evidence. For example, little or sparse empirical data, anecdotal evidence, or methodologically flawed study designs are considered poor quality and weak evidence. Perceived appropriateness was operationalized as the extent to which the pharmacist perceived the medication as appropriate for the off-label indication based on the strength and quality of evidence. There were two categories –

"more" and "less" – of appropriateness of evidence supporting the off-label prescription. The more appropriate category (referred to in this project as off-label) had stronger and better quality evidence supporting the use of the drug for the specified off-label indication than the less appropriate category, termed in this project as experimentation.

Moderating Variable

Perceived impact on relationship quality

It has been discussed that a rational agent considers multiple factors including consequential impact of influence before making a decision to influence. Therefore, it can be argued that the pharmacist might weigh the impact of an influence attempt on the relationship with the physician before the pharmacist becomes willing to influence. More specifically, the impact on relationship quality may become critical to such intent. Developing, managing, and evaluating relationships within the context of dyadic transaction and voluntary participation has been studied well in the marketing literature. More specifically, relationship quality (RQ) and relationship management have received a great deal of attention. RQ has been empirically investigated in the domain of buyer-seller, distributor-manufacturer, and service provider-customer relationships (Crosby, Evans, and Cowles, 1990; Mohr and Speckman, 1994; Kumar, Scheer, and Steenkamp, 1995; Leuthesser, 1997; Dorsch, Swanson, and Kelly, 1998). RQ is a higher-order multidimensional construct that consists of different positive relationship outcomes reflecting overall strengths of a relationship and the extent to which it fulfills the needs and expectations of the parties involved in the relationship (Smith, 1998). However, there exists a lack of agreement on dimensions of RQ. For example, Crosby, Evans, and Cowles, (1990) proposed two

dimensions of RQ: satisfaction and trust. Smith (1998) conceptualized that RQ manifests, in the context of buyer-seller relationships, at least in three constructs namely, trust, commitment and satisfaction. Drawing upon a large number of studies in relationship marketing, Roberts, Varki, and Brodie (2003) proposed that RQ in the domain of a customer relationship with a service providing firm had five dimensions: trust in provider's integrity and benevolence, affective commitment, satisfaction and affective conflict and concluded that RQ predicted behavioral intention and subsumed service quality. RQ is determined partly by key facets of relationship management (Smith, 1990). Relationship management has been defined as the extent to which parties possess the behavioral tendency as well as orientation to actively cultivate and sustain close working relationships (Crosby, Evans, and Cowles, 1990). Among various aspects of relationship management, communication has received consistent attention from researchers and has been observed to affect trust, commitment, and satisfaction (Anderson and Weitz, 1989; Anderson and Narus, 1990; Smith, 1990). Other researchers have posited communication as key driver of or antecedent to RQ (Roberts, Varki, and Brodie, 2003). Indeed, communication quality, assessed as formal and informal interaction between members of the dyad, has been considered a dimension of a scale that measures RQ from a firm's perspective (Lages, Lages, and Lages, 2005). Finally, a study conducted with community pharmacists explored the nature of pharmacists' perceived relationship quality with physicians within the context of pharmacists' participation in interprofessional healthcare team (Dobson et al., 2006). Though not theoretically grounded, the relationship scale administered in the study had items that appeared to capture, at least in part, trust, satisfaction, communication, and commitment. In this study, perceived impact on relationship quality was defined as the extent to which the

pharmacist believed that the influence attempt would affect the pharmacist's relationship with the physician with respect to trust, commitment, communication, satisfaction, and affective conflict. Affective conflict was thought appropriate to measure because pharmacists might believe that the physician might perceive an influence attempt as encroachment on the domain of prescribing that is controlled by physicians. Unfortunately, no single scale exists that adequately captured all the dimensions considered relevant for the current study. Therefore, it was thought appropriate to adapt items from different studies that adequately captured all the relevant dimensions of RQ. Items were adapted from Dobson et al. (2006), Roberts, Varki, and Brodie (2003), and Morgan and Hunt (1994). The scale from Dobson et al. (2006) has been applied in the context of physician-pharmacist relationship. Scales used in the three studies showed adequate reliability (>0.79) and factor loadings of the items under their intended factors were satisfactory. Two items were included that measured attitudinal and affective commitment. Three items measured communication (information sharing and recommendation providing). For measuring trust, two items were used to measure credibility of pharmacist and his or her service. Additionally, items measuring affective conflict (two) and satisfaction (two) were adapted from Roberts, Varki, and Brodie (2003). Items measured the level of agreement with each statement about the perceived impact of influence attempt on relationship quality using a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Control Variables

Control variables were related to other power bases and internal factors that might affect a pharmacist's decision to act. While discussing the power/interaction model, Raven (1992) proposed that motivational factors were important for exerting influence and choosing

influence strategies. The motivational factor may be related to factors that satisfy internal needs. As such, the control variables included in this study were pharmacists' referent power, information power, and legitimate power of dependency, perceived responsibility, and attitude.

Other bases of power

In previous studies in educational psychology and organizational attitudes including the study of attitudes of nurse supervisors and nurses working in hospitals, the three power bases – direct information power, positive referent power, and legitimate power of dependency – along with expert power have been consistently grouped under the soft base of the soft/hard power dichotomy (Erchul, Raven, and Ray, 2001; Erchul, Raven, and Whichard, 2001; Koslowsky, Schwarzwald, and Ashuri, 2001; Raven, Schwarzwald, and Koslowsky, 1998). Like expert power, these three bases of power were task relevant and sought compliance through personal resources rather than organizational resources (Koslowsky, Schwarzwald, and Ashuri, 2001). In addition, expert power may be strongly related or share a common source with referent power and information power. For example, the agent's expertness may come from his/her experience, which may increase the target's desire of identification with the agent. Thus, experience may be associated with expert power and referent power. A physician's referent power may have a halo effect that may work against pharmacist's expert power (French and Raven, 1968). Similarly, the content of communication and acceptance of validity of the content are closely related – the former comes from information power and the latter comes from expert power. The underlying factor for power of dependence may be the identification of the need for knowledge-driven assistance. In sum, it can be argued, these three bases and expert power may operate

simultaneously or in tandem. Additionally, Arnston (2002) concluded that in addition to expert power, information power and referent power were significant determinants of the pharmacist's influence on the P&T committee. Therefore, these three bases of power, measured as general attributes, were controlled such that the effect of expert power could be examined. The pharmacist's direct information power was defined as the extent to which he/she perceived to have access to and control over relevant information and had logical argument in relation to that of a physician. The pharmacist's legitimate power of dependence was operationalized as the extent the pharmacist perceived that a pharmacist had obligation to help a physician and a physician was dependent on the pharmacist. The pharmacist's perception of physician's referent power was defined as the extent to which the pharmacist identified with a physician and had regard for the physician's qualities.

Although social power has been conceptualized not as the objective ability of the agent to influence but rather as the perception of the target of the potential ability of the agent, measures of pharmacists' self-perceived power were considered in this study for several reasons. First, self-perceived power generally reflects good measure of attributed power and was strongly and positively related with attributed power (Lippitt et al., 1952). Second, attribution may underrepresent actual power if the target is not aware of multiple sources of power that the agent may have but may not use or use effectively (Simon, 1953). Therefore, the agent may still intend to influence based on evaluation of power bases without the target being able to attribute until significant outcomes are achieved (El-Ansary and Stern, 1972). Third, self-perceived power seems to be more relevant in the study of one's willingness to influence. Thus, assessing pharmacist self-perceived power was considered consistent with the goal of the proposed research.

To measure pharmacists' self-perceived referent power and legitimate power of dependency, items were adapted from the Interpersonal Power Inventory (IPI), (Raven, Schwarzwald, and Koslowsky, 1998). The instrument measures the expanded conceptualization of the power bases proposed by the power/interaction model of interpersonal influence (Raven, 1992). The IPI appears to be a reliable instrument, with coefficient alpha ranging from 0.62 to 0.93 and coefficient alpha for both soft bases and hard bases greater than 0.80 (Erchul, Raven, and Ray, 2001; Schwarzwald, Koslowsky, and Allouf, 2005). The instrument showed satisfactory convergent validity when analyzed with multiple approaches and superior discriminant validity (Koslowsky, Schwarzwald, and Ashuri, 2001). The instrument was considered appropriate to examine pharmacist-physician power relationship because this relationship conceptually is similar to the school psychologist-teacher relationship as pharmacists and school psychologists provide consultation services to physicians and teachers respectively. The operationalization of the information power subscale in the IPI was not applicable in the context. Pharmacist's relative information power was operationalized on the basis of the pharmacist's perceived reasons for selection and access to and control over information in relation to that of a physician. Five items were used measure information power. As a result, a thirteen-item scale was designed to measure pharmacist direct information power, positive referent power, and legitimate power of dependency. Pharmacists' level of agreement about possessing those power traits were measured on a 7-point scale where 1 = strongly disagree and 7 = strongly agree.

Perceived responsibility in off-label prescribing

The professional responsibility for ensuring safe and effective pharmacotherapy is shared by physicians and pharmacists. In fact, there exists the need to maintain and extend interprofessional safeguards and oversight to ensure the delivery and quality of pharmaceutical care to patients (Rupp, DeYoung, and Schondelmeyer, 1992). Pharmacists – due to a unique set of professional perspectives and skills – may make valuable contributions to appropriate off-label prescribing in cases when they perceive their responsibility in the process. This argument stems from the relationship between responsibility and behavior. Role theory asserts that perceiving responsibility might imply action (Levinson, 1959). Felt responsibility has received attention in the organizational psychology literature and has been associated with employees' extra-role behavior (Pearce and Gregersen, 1991). Krebs (1970) noted subjective feelings of responsibility were a precursor to altruistic acts. Planas et al. (2005) found that community pharmacists perceived responsibility for drug therapy outcomes were associated with direct patient care behavior of the pharmacists. In the one known study that investigated off-label prescribing in the hospital setting, pharmacists were reported to delegate the responsibility of issues related to off-label prescribing to the IRB (Ansani et al., 2006) and may seek to justify their action or lack of action regarding the issue. As a result, it is appropriate to posit that perceived professional responsibility plays a role upon one's intention to act or behavior.

Incorporating philosophical, moral, legal, and psychological components of responsibility, Schlenker et al. (1994) proposed the triangle model of responsibility (TMR) that provides an integrated and clear view of responsibility. The TMR consists of three elements: prescriptions (e.g., rules, norms, expectations), events (e.g., actions and consequences), and identity images (roles, qualities, commitments) that can vary in relevance

or importance to the actor or the observer (Schlenker et al., 1994). The TMR posits responsibility as the direct function of strengths of three links – prescription-event, event-identity, and identity-prescription – as perceived by the person making evaluation. The links describe if a clear set of prescriptions exist that have relevance to the actors and actors have resources to act and to control events or outcomes. Researchers empirically tested the TMR in multiple studies and in different contexts including pharmacy and the relationships proposed in the model, in general, were supported (Schlenker et al., 1994; Britt, 1999; Planas et al., 2005). Pharmacists' perceived responsibility was operationally defined as the extent of responsibility perceived by the pharmacist in the evaluation of off-label prescribing. The items to measure perceived responsibility were adapted from Schlenker et al. (1994). The four items loaded under the responsibility factor and were found to have a theoretical basis. Perceived responsibility was measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Attitude

Attitude toward indication-based off-label prescribing was measured was also included as a control variable. Attitude has been defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly and Chaiken, 1993, p. 1). Therefore, it may be argued that favorable or unfavorable opinions about off-label prescribing may influence a pharmacist's decision to act. Generally, it has been found that an attitude has three components: cognitive, affective, and behavioral processes (Breckler, 1984). However, attitudes can be formed or expressed primarily or exclusively based on any one of the three components or some combinatory of the three. A cognitive-affective-behavioral analysis is considered as providing a convenient terminology

for analyzing differing aspects of attitude expressions (Eagly and Chaiken, 2007). The cognitive component refers to beliefs or thoughts about an attitude object. For example, a pharmacist may believe that off-label prescription is not safe. The affective component refers to feelings or emotions associated with an attitude object. For example, a pharmacist may express that they feel bad while dispensing an off-label prescription. The behavioral component refers to past behaviors or behavioral intentions with respect to an attitude object. For example, a pharmacist may not want to get involved with off-label prescription fearing negative experience with an off-label prescription. For this study, attitude was defined on the basis of the three components of attitude as described above. Semantic differential has become a popular method for measurement of attitude (Himmelfarb, 1993) and the intercorrelations among the various bipolar adjectives are sufficiently high such that few bipolar scales result in sufficient reliability (Heise, 1970). However, for the sake of appropriate operationalization and ease of interpretation, a 4-item, 7-point Likert-type scale (1=strongly disagree, 7=strongly agree) was used to measure attitude.

Communication effectiveness

Given the context of interprofessional interaction, the assessment of one's own interpersonal communication disposition is important as it may affect the decision to act. Broadly speaking, communication competence reflects the impression or judgment about one's own ability to manage interpersonal interaction (Rubin and Martin, 1994). While the conceptualization of communication competence, generally considered a multidimensional construct, is debated, effectiveness and appropriateness are universally accepted as important dimensions (Spitzberg, 2003). Appropriate communication implies whether the communication behavior meets specific situational and relational norms and obligations.

Effective communication, perceived by some scholars as necessary and sufficient condition for competence, is about accomplishing one's goals or other desired objectives. Evidence suggests that people perceive themselves competent when they were successful in achieving their goals (as cited in Canary and Spitzberg, 1987). Thus, an effective communicator has the ability to handle conflict situations and solve issues in a cooperative manner (Rubin and Martin, 1994). Communication effectiveness was measured with three items. The items were drawn from the environmental control subscale of the Interpersonal Communication Competence Scale (Rubin and Martin, 1994). While the scale has reported an acceptable reliability, the subscale has relatively less reliability. However, the scale is appealing intuitively and has strong face validity (Spitzberg, 2003). In addition, the developers have suggested that the subscale is an appropriate measure of communication effectiveness in compliance-gaining situations, consistent with its use in this context. Pharmacists were asked to respond to the three items using a 7-point response format where 1 = never and 7 = always.

Demographic variables

In additional to the control variables, several demographic characteristics of the pharmacists in the sample were captured. Time spent on clinical activities, educational background, gender, age, experience, and hospital type were collected in order to describe the study population.

Research Design

A 2X2 between-subjects design (Table 2) was used where pharmacist's relative expert power measured as perceived power differential based on physician attributes and

appropriateness of the prescribed drug were the two factors. Subjects were provided a scenario that offered one of two different physician profiles manipulating the perceived power differential between the pharmacist and physician. Additionally, the scenario described a prescribed medication that varied on the degree of appropriateness (off-label and experimentation) of use in the described medical conditions.

Table 2: Research Design

Between Subject Factors		Degree of Appropriateness	
		More (Off-label)	*Less* (Experimentation)
Power differential based on physician attributes	*High* (Specialist)	X_{11}	X_{12}
	Low (Generalist)	X_{21}	X_{22}

Experimental Procedure

Four vignettes (Appendix A) were developed for use in this study. Scenarios were designed to describe a situation where a hospitalized patient received an order for a medication (fluoxetine) from a physician. The scenarios described the disease and relevant patient characteristics (e.g., age) that would be considered necessary for the evaluation of the patient's treatment plan. Each scenario described an order for a medication that could be categorized into one of the two groups on the basis of the degree of appropriateness: indication based off-label use with suitable evidence (off-label) and indication-based off-label use with no/very minimal evidence (experimentation). Such manipulation was based on the use of the medication in different off-label indications (diabetic neuropathy and fibromyalgia) and corresponding degree of evidence described in Drugdex®. In other words, each pharmacist evaluated one of the combinations of medication order: 1) fluoxetine in

fibromyalgia (off-label) or 2) fluoxetine in diabetic neuropathy (experimentation). An actual medication name was used in order to simulate a realistic situation. In addition, using this approach would allow pharmacists the opportunity to verify indications for the drug in case they desired to do so as this was not a prohibited activity on the part of the respondents. The order was written by a physician who practiced in the hospital. However, all scenarios mentioned that the physician had been practicing in the hospital for the last two years in order to control for social distance (Lambert, 1995). In the scenarios, pharmacist relative expert power was manipulated based on perceived power differential created by describing the physician's attributes such as knowledge, experience, expertise, and practice specialty (specialist or generalist) of the physician (Table 3).

Table 3: Physician profile: high power (specialist) vs. low power (generalist)

Specialist	Generalist
Dr. Smith is a rheumatologist and highly recognized expert in the field of rheumatology. Dr. Smith is considered an extremely knowledgeable physician with extensive clinical experience. Dr. Smith has 20 years of experience of	Dr. Smith is a general practitioner. Dr. Smith has 5 years of experience of clinical practice.

The combined effect of all of these attributes was believed to create differences in perceptions of pharmacist's relative expert power. Following confirmation that the subject is practicing as pharmacist in a hospital, the subject was randomly assigned to one of the four groups that were formed based on the specialties of physicians and appropriateness of

medication orders. Subjects were asked to respond to the questions on information power, referent power, and legitimate power of dependence with reference to physicians in their hospital. Subjects were also asked about their communication behavior and beliefs about and roles in off-label prescribing. Then, a scenario was presented to the pharmacists. Following exposure to the scenario, participants were asked to imagine that they were working as pharmacist in the situation and received the order for their approval. Then respondent-pharmacist was asked to respond to a battery of questions measuring the remaining variables of interest.

Sampling Design

The sample for this study was obtained from membership rolls of state affiliates of the American Society for Health-System Pharmacists (ASHP). The ASHP state affiliates were contacted to seek access to their members. The sampling frame of membership lists of participating affiliates can be considered, at least for practical purposes, a nationally representative database of pharmacists practicing in hospitals in the United States. As noted earlier, the study aimed to examine the effect of pharmacists' self-perceived power on willingness to influence inappropriate off-label prescribing. As such, it is possible for any pharmacist to play the hypothesized role in off-label prescribing. However, pharmacists involved in clinical activities and involvement in direct patient care activities are more likely to encounter such prescribing situations. Moreover, a large number of hospitals in the U.S. follow a model of integrated pharmacy practice (Knapp, Blalock, and Black, 2001). Consistent with such practice, "clinical" pharmacy was operationalized based on time spent providing clinical pharmacy services and/or direct patient care services. Bond et al. (2001) operationalized clinical pharmacists as those who spend 50% or more time providing clinical

services. However, this definition appeared to be too restrictive for the current study. Existing evidence suggests that, on average, approximately 28% of pharmacists' time is spent on clinical pharmacy services (Knapp, Blalock, and Black, 2001). Pharmacists practicing in small hospitals may spend even less time on clinical services (Guerro, Nickman, and Bair, 1990). A recent survey reported that 14.1% and 37% hospitals had pharmacists spend less than 10% and 20% of their time monitoring medication therapy respectively (Pedersen, Schneider, and Scheckelhoff, 2007). As a result, for this study, attention was paid to recruit an adequate number of pharmacists who spent 10% or more of their time on clinical pharmacy services or direct patient care. This was thought to be consistent and appropriate with the goal of examining pharmacists' perception of off-label prescribing. Additionally, this study sought to include pharmacists practicing in community hospitals. There are several reasons for examining off-label prescribing in community hospitals. First, academic hospitals are likely to follow different working protocols than do community hospitals, as clinical trials are more likely to be conducted in academic medical centers (AMC) than they are in community hospitals. As a result, pharmacists perceived roles and responsibilities may be different in AMCs compared to those in community hospitals. Second, AMCs are likely to have an IRB that may be charged with handling off-label use of medications. As a result, pharmacists have the opportunity (or responsibility) to delegate the issue to the IRB (Ansani et al., 2006b). Finally, the number of community hospitals is larger than that of AMCs. Although anecdotal evidence suggests that off-label prescribing is as prevalent in community hospitals as in AMCs, how community hospitals address off-label prescribing has never been studied. In addition, adequate representation of pharmacists who identified themselves as a clinical pharmacist was ensured.

Sample Size

This study was powered to detect the effects of social power and appropriateness on the pharmacist's willingness to act. This approach was believed to be appropriate for pragmatic reasons (e.g., sample size) and primary research interest. Using the ANCOVA option in G*Power (version 3) with an input of medium effect size and 80% power, it was determined that 179 usable final responses would be required in order to conduct analyses (approximately 45 per group). However, it can be noted that this number of responses appears to be sufficient for analyses – including the analysis with the moderating variable – according to the rule-of-thumb for sample size suggested by Green (1991).

SURVEY INSTRUMENT DESIGN

A survey instrument (Appendix B) was designed to elicit responses on the variables that were studied. The questionnaire began with a short description of off-label prescribing. Then items measuring information power, referent power, and legitimate power of dependence with reference to physicians were placed. Items measuring pharmacist's communication effectiveness, perceived responsibility in off-label prescribing, and attitude toward indication based off-label prescribing were placed afterward. A scenario that described physician specialty and a medication order was presented. Questions were developed and asked to collect information on 1) if they are willing to influence the physician for the drug perceived as prescribed off-label in an inappropriate manner, 2) perceived impact of influence attempt on relationship with physician, 3) self-perceived relative expert power, 4) appropriateness of use, and 5) demographic information. The aforementioned order was followed to ensure appropriate and adequate utilization of

information and logical order. For example, following the exposure to the scenario, questions on willingness to influence were asked to ensure maximum utilization of information presented in the scenario. Then, questions on perceived impact on relationship quality and manipulation checks on self-perceived relative expert power and appropriateness of use were asked.

Pretesting the Survey Instrument

Before executing the survey and after obtaining the approval from The University of Mississippi's IRB, questionnaires were pretested with Pharmacy Practice faculty, professional students, and graduate students in the Department of Pharmacy Administration at The University of Mississippi. Based on feedback, necessary changes were made in order to improve interpretability and readability of the questionnaire. Finally, two of the state affiliates (smaller affiliates) that agreed to facilitate the distribution of the survey to hospital pharmacists were requested to distribute the questionnaire to their members. A group of 10 hospital pharmacists who reported to be practicing in hospitals situated across a few states participated in the pretest. Results of the pretest provided assurance that manipulations were working as expected. Thus, pretesting questionnaires with the actual subjects improved the interpretability, hence reliability, of the questionnaire.

Manipulation check

A manipulation check was conducted to determine if the pharmacist's perceived relative expert power manipulation was successful. Effort was made to create a large difference in the perception of power of the physician. To measure the manipulation of pharmacists' self-perceived relative expert power, items from the expert power subscale from

the IPI (Raven, Schwarzwald, and Koslowsky, 1998) were adapted. A 4-item scale (APPENDIX B, Q2.12) measured the manipulation of relative expert power on a scale of 1 (strongly disagree) to 7 (strongly agree). In addition, the manipulation of the perception of appropriateness of the prescription order was examined. Perception of appropriateness of the medication order was examined using a two-item 7-point scale (1= not at all appropriate, 7= very appropriate) (APPENDIX B, Q2.13) for the medication order in the scenario.

DATA COLLECTION

A self-report survey methodology was used for data collection. Data were collected using the Internet. This method of data collection is convenient, efficient, and relatively inexpensive (Ileva, Baron, and Healey, 2002). Moreover, it may be convenient for respondents to reply while at work. The survey was administered using the online survey software provided by Qualtrics. This study adopted a facilitated distribution approach for data collection. First, an email cover letter (APPENDIX C) that contained the link to questionnaire was sent to the state affiliates who agreed to participate in the study (see APPENDIX D for the initial communication requesting access to members). Then, the state affiliates were requested to resend the cover letter and link to their pharmacist members. Based on the geographic location of the completed responses, some of the ASHP state affiliates were sent a second request to distribute the survey invitation. The state affiliates were request to distribute a reminder cover letter and the link to their membership approximately 7 days from the time it was reported that the first contact survey invitation was sent.

DATA ANALYSIS

Data were analyzed using statistical software SPSS 17. Descriptive statistics analyses were performed to examine the characteristics of the respondents. Reliabilities (Cronbach's alpha) of all the multi-item scales used in the study were examined. Factor analysis on control power bases was conducted to examine whether the items loaded under the hypothesized factors. Similar analyses were performed on the scales for measuring willingness to influence, perceived impact of influence attempt on relationship, perceived responsibility, and attitude.

T-tests were performed to examine if relative expert power and appropriateness manipulations were successful. The subjects in the specialist physician group were expected to rate power differential higher (low relative expert power of pharmacist) than those in the generalist group. Hypotheses were tested using the ANCOVA analyses where relative expert power and appropriateness were independent variables. In the ANCOVA analyses, perceived responsibility, attitude toward off-label prescribing, other three power bases, and communication effectiveness were covariates. In addition to the main effects of the independent variables, interaction between relative expert power and appropriateness and that of expert power and impact of influence attempt on relationship quality were examined.

CHAPTER 3 REFERENCES

Allen RW, Madison DL, Porter LW, et al. Organizational politics: Tactics and characteristics of its actors. *California Management Review*. 1979;22:77-83.

Anderson E, Weitz B. Determinants of continuity in conventional industrial channel dyads. *Marketing Science*. 1989;8:310-24.

Anderson J, Narus J. A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing.* 1990;54:42-58.

Ansani N, Sirio C, Smitherman T, et al. Designing a strategy to promote safe, innovative off-label use of medication. *American Journal of Medical Quality*. 2006(a);21:255-61.

Ansani N, Sirio C, Smitherman T, et al. United States medical practice summary innovative off-label medication use. *American Journal of Medical Quality*. 2006(b);21:246-54.

Arnston K. The determinants of influence: an investigation of pharmacist activity in the Pharmacy and Therapeutics committee. *Master's Thesis*. 2002; The University of Mississippi, Oxford, MS.

Bond CA, Raehl CL, Franke T. Interrelationships among mortality rates, drug costs, total cost of care, and length of stay in United States hospitals: Summary and recommendations for clinical pharmacy services and staffing, *Pharmacotherapy*. 2001;21:129-41.

Breckler SJ. Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality and Social Psychology*. 1984;47:1191-05.

Britt TW. Engaging the self in the field: testing the triangle model of responsibility. *Personality and Social Psychology Bulletin*. 1999;25:696-06.

Brown P, Levinson SC. *Politeness: Some Universals in Language Usage.* New York, NY: Cambridge University Press; 1987:61-83.

Canary, DJ, Spitzberg, BH. Appropriateness and effectiveness perceptions of conflict strategies. *Human Communication Research*. 1987;14:93-18.

Crosby LA, Evans KR, Cowles D. Relationship quality in services selling: An interpersonal influence perspective. *Journal of Marketing*. 1990;54:68-81.

Dobson RT, Henry CJ, Taylor JG, et al. Interprofessional health care teams: Attitudes and environmental factors associated with participation by community pharmacists. *Journal of Interprofessional Care*. 2006;20:119-32.

Dorsch MJ, Swanson SR, Kelley SW. The role of relationship quality in the stratification of vendors as perceived by customers. *Journal of the Academy of Marketing Science*. 1998;26:128-42.

Eagly AH, Chaiken S. The advantage of an inclusive definition of attitude. *Social Cognition*. 2007;25:582-02.

Eagly AH, Chaiken S. *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich College Publishers; 1993:1-21.

El-Ansary A, Stem L. Power measurement in the distribution channel. *Journal of Marketing Research*. 1972;9:47-52.

Erchul WP, Raven BH, Ray AG. School psychologists' perceptions of social power bases in teacher consultation. *Journal of Educational and Psychological Consultation*. 2001;12:1-23.

Erchul WP, Raven BH, Whichard SM. School psychologist and teacher perceptions of social power in consultation. *Journal of School Psychology*. 2001;39:483-97.

Erchul WP, Raven BH, Wilson KE. The relationship between gender of consultant and social power perceptions within school consultation. *School Psychology Review*. 2004;33:582-90.

Erez M, Rim Y. The relationships between goals, influence tactics, and personal and organizational variables. *Human Relations*. 1982;35:871-78.
Farmer SM, Maslyn JM, Fedor DB, Goodman JS. Putting upward influence strategies into context. *Journal of Organizational Behavior*. 1997;18:17-42.
French Jr. JRP, Raven BH. The bases of social power. In: Cartwright D, Zander AF, eds. *Group dynamics: Research and theory*. 3rd ed. New York, NY: Harper and Row; 1968:259-69.
Fung S. The effects of power, relationship, and purpose in gaining compliance. *Contemporary Social Psychology*. 1991;15:44-57.
Getty KC. Gender and Professional Experience as Predictors of Consultants' Likelihood of Use of Social Power Bases. *Unpublished Dissertation*. North Carolina State University, NC; 2006. Available at: http://www.lib.ncsu.edu/theses/available/etd-04172006-105027/unrestricted/etd.pdf. Accessed June 20, 2008.
Green, SB. How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research.* 1991;26:499-10.
Guerro RM, Nickman NA, Bair JN. Using pharmacists' perceptions in planning changes in pharmacy practice. *American Journal of Hospital Pharmacy*. 1990;47:2026-30.
Heise DR. The semantic differential and attitude research. In: Summers GF, ed. *Attitude measurement*. Chicago, IL: Rand McNally; 1970:235-253.
Henry V. Off-label Prescribing. Legal Implications. *Journal of Legal Medicine*. 1999;20:365-83.
Himmelfarb S. The measurement of attitudes. In: Eagly AH, Chaiken S, eds. *The psychology of attitudes*. Orlando, FL: Hartcourt Brace Jovanovich College Publishers; 1993: 23-83.
Ilieva J, Baron S, Healey NM. Online surveys in marketing research: Pros and cons, *International Journal of Market Research*. 2002;44:361-76.
Kipnis D, Schmidt SM, Wilkinson I. Intraorganizational influence tactics: Explorations in getting one's way. *Journal of Applied Psychology.* 1980;64:440-52.
Kipnis D, Schmidt SM. The language of persuasion. *Psychology Today*. 1985;4:40-46.
Kipnis D. Does power corrupt? *Journal of Personality and Social Psychology*. 1972;24:33-41.
Knapp KK, Blalock SJ, Black BL. ASHP survey of ambulatory care responsibilities of pharmacists in managed care and integrated health systems – 2001. *American Journal of Health System Pharmacists*. 2001;58:2151-66.
Koslowsky M, Schwarzwald J, Ashuri S. On the relationship between subordinates' compliance to power sources and organizational attitudes. *Applied Psychology*. 2001;50:455-76.
Krebs DL. Altruism: An examination of the concept and a review of the literature, *Psychological Bulletin*. 1970;73:258-02.
Kumar N, Scheer LK, Steenkamp JEM. The effects of supplier fairness on vulnerable resellers. *Journal of Marketing Research*. 1995;32:54-65.
Lages C, Lages CR, Lages LF. The RELQUAL scale: A measure of relationship quality in export market ventures. *Journal of Business Research*. 2005;58:1040-48.
Lambert BL. Directness and deference in pharmacy students' messages to physicians. *Social Science and Medicine*. 1995;40:545-55.
Leuthesser L. Supplier relational behavior: An empirical assessment. *Industrial Marketing Management*. 1997;26:245-54.
Levinson DJ. Role, personality, and social structure in the organizational setting. *Journal of Abnormal Psychology*. 1959;58:170-80.
Lipitt R, Polansky N, Rosen S. The dynamics of power-a field study of social influence in groups of children. *Human Relations*. 1952;5:37-64.

Mohr J, Speckman R. Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal*. 1994;15:135-52.
Morgan RT, Hunt SD. The commitment-trust theory of relationship marketing. *Journal of Marketing*. 1994;58:20-38.
Pearce JL, Gregersen HB. Task interdependence and extrarole behavior: A test of the mediating effects of felt responsibility. *Journal of Applied Psychology*. 1991;76:838-44.
Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: monitoring and patient education – 2006. *American Journal of Health-System Pharmacy*. 2007;64:507-20.
Planas LG, Kimberlin CL, Segal R, et al. A pharmacist model of perceived responsibility for drug therapy outcomes. *Social Science & Medicine.* 2005;60:2393-03.
Raven BH, Schwarzwald J, Koslowsky M. Conceptualizing and measuring a power/interaction model of interpersonal influence. *Journal of Applied Social Psychology.* 1998;28:307-32.
Raven BH. A power interaction model of interpersonal influence: French and Raven thirty years later. *Journal* of *Social Behavior and Personality*. 1992;7:217-44.
Raven BH. The bases of power: Origins and recent developments. *Journal of Social Issue.* 1993;49:227-51.
Roberts K, Varki S, Brodie R. Measuring the quality of relationships in consumer services: An empirical study. *European Journal of Marketing*. 2003;37:169-96.
Rubin, RB, Martin, MM. Development of a measure of interpersonal communication competence. *Communication Research Reports*. 1994;11:33-44.
Rupp MT, DeYoung M, Schondelmeyer SW. Prescribing problems and pharmacists interventions in community practice. *Medical Care*. 1992;30:926-40.
Samsa GP, Hanlon JT, Schmader KE, et al. A summated score for the medication appropriateness index: development and assessment of clinimetric properties including content validity. *Journal of Clinical Epidemiology*. 1994;47:891-96.
Schlenker BR, Britt TW, Pennington J, et al. The triangle model of responsibility. *Psychological Review*. 1994;101:632-52.
Schriesheim CA, Hinkin TR. Influence tactics used by subordinates: A theoretical and empirical analysis and refinement of the Kipnis, Schmidt, and Wilkinson subscales. *Journal of Applied Psychology*. 1990;75:246-57.
Schwarzwald J, Koslowsky M, Allouf M. Usage of and compliance with power tactics in routine versus nonroutine work settings. *Journal of Business and Psychology*. 2005;18:385-02.
Simon H. Notes on the observation and measurement of political power. *Journal of Politics.* 1953;15:500-16.
Smith BJ. Buyer-seller relationships: Similarity, relationship management, and quality, *Psychology and Marketing.* 1998;15:3-21.
Somech A, Drach-Zahavy A. Relative power and influence strategy: the effects of agent/target organizational power on superiors' choices of influence strategies. *Journal of Organizational Behavior*. 2002;23:167-79.
Spitzberg BH. Methods of interpersonal skill assessment. In: Green JO, Burleson BR, eds. *Handbook of communication and social interaction skills*, Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003:93-34.

Wilson KE. The likelihood of use of social power strategies by school psychologists when consulting with teachers. *Journal of Educational and Psychological Consultation*. 2008;8:101-23.
Yukl G, Falbe CM. The importance of different power sources in downward and lateral relations. *Journal of Applied Psychology*. 1991;76:416-23.
Yukl G, Tracey B. Consequences of influence tactics used with subordinates, peers, and the boss. *Journal of Applied Psychology*. 1992;77:525-35.

CHAPTER 4

DATA ANALYSIS AND RESULTS

As was described in Chapter 3, the sampling frame for the study came from the membership rolls of state affiliates of the American Society of Health-System Pharmacists (ASHP). These membership rolls included practicing as well as nonpracticing (e.g., retirees) pharmacists. Among practicing pharmacist members were those who reported presently to be working in hospitals, retail settings, long-term care, and other health care settings. When contacted, 25 state affiliates agreed to forward the survey invitation to their membership. Because of pretest procedures, 23 affiliates were expected to distribute to its membership the survey invitation that contained a link to the Internet survey. One state affiliate was reported to have posted the invitation request on its website only. Of the remaining 22 affiliates that agreed to distribute the survey invitation, 17 reported to have distributed the survey. As such, there remains a possibility that five of the affiliates that agreed to forward the request for participation failed to do so. Consistent with the stated objectives of the study, only pharmacists reported to be currently working in the hospital setting were allowed to participate in the study. Although the study was planned initially as an evaluation of nonacademic community hospitals, it became necessary to include responses from pharmacists practicing in academic hospitals as well. However, consistent with the objective of including pharmacists with at least some clinical duties, extra responses were collected above and beyond the predetermined target of 180 responses. A total of 238 respondents completed the survey and 29 participants provided partial responses such that their responses could be included in the study (information on demographics was entirely incomplete or partially complete). Thus, 267 responses were available for analysis. Table 4 describes the number of respondents in each group.

Table 4: Number of Respondents in Experimental Groups

Between Subject Factors		Degree of Appropriateness	
		More (Evidence-based Off-label)	*Less* (Experimentation)
Power differential based on physician attributes	*High* (Specialist)	70	68
	Low (Generalist)	63	66

As was mentioned in a previous chapter, the survey was conducted through facilitated distribution. Although it is ideal to report response rate, it was not possible to do so because of non-availability of the number of participants who received an email contact along with the link to survey questionnaire (affiliates were not willing or not able to provide this information to the principal investigator). In the interest of full disclosure, it can be noted here that a large number of potential respondents started the survey but did not complete it. A total of 395 respondents were assigned to one of the four experimental groups by the questionnaire software (Qualtrics). However, over 100 potential respondents stopped their participation prior to being exposed to the experimental condition.

SAMPLE DEMOGRAPHY

Respondent Characteristics

Table 5 summarizes the characteristics of the pharmacists included in the study. Among respondents who provided demographic information, there were 126 male pharmacists and 134 female pharmacists respectively. The average age of the respondents was 44.18 years with a average hospital practice experience of 17.9 years. One hundred and sixty two pharmacists reported to have earned a Pharm.D. degree and 50 pharmacist-respondents reported to hold at least one BPS specialization. On average, respondent pharmacists spent 21.67% and 38.55% of

hours worked per week on distributive activities and clinical/ direct patient care services respectively. Thus, respondents devote a substantial part of their weekly hours on clinical pharmacy-related services.

Table 5: Respondents Demographics

Characteristics	Mean	Std. err.	N (%)
Male			126 (47.2)
Age	44.18	0.77	260
Education*			
B.S (Pharmacy)			94 (34.2)
Pharm.D.			116 (43.4)
B.S (Pharmacy) & BPS			11 (4.2)
Pharm.D. & BPS			46 (17.2)
Pharmacotherapy specialization among those with BPS			36 (72)
Job title			
Staff pharmacist			35 (13.4)
Clinical pharmacist			80(30.7)
Pharmacy manager/ director			63 (24.1)
Multiple descriptions			46 (17.6)
Other			24 (9.2)
Experience			
Present hospital	11.49	0.64	249
Total hospital practice	17.89	0.77	250
Average percentage of time spent per week			
Distributive	21.67	1.70	250
Clinical/ direct patient care	38.55	1.95	249
Administrative	29.99	2.13	250
Other	9.19	1.21	247

* Categories are not mutually exclusive

Respondents were asked also to describe their current job; pharmacists could identify themselves as having multiple job titles. One hundred and twenty four pharmacists identified themselves as

clinical pharmacists, 55 as staff pharmacists, 31 as pharmacy managers, 45 as pharmacy directors, 10 as consultant pharmacists, and 38 as other (part-time retail, residency, faculty, clinical faculty, informatics). However, a majority (nearly 70%) of pharmacists who exclusively chose to be identified as other were devoting 20% or more time to direct patient care or clinical services. As described in Table 5, a large number of pharmacists identified themselves solely as a clinical pharmacist. Altogether, respondents represent a group, which is composed of pharmacists who follow an integrated pharmacy practice model (Knapp, Blalock, and Black, 2001), pharmacists with exclusively clinical duties, and administrators who may have better ideas about hospital policies.

Hospital Characteristics

Information about the hospitals where respondents currently practice was collected (Table 6). Hospitals were distributed across all four geographic regions (as classified by the U.S. Census Bureau) with the largest group (41.6%) of them being located in the South. Over 50% of these hospitals were described as private not-for-profit community hospitals. Additionally, a majority of the hospitals in which respondent pharmacists are employed have an IRB but no policy regarding off-label prescribing.

Table 6: Respondents' Hospital Characteristics

Characteristics	N	%
Geographic region		
Northeast	82	30.7
Midwest	25	9.4
South	111	41.6
West	30	11.2
TOTAL	248	92.9
Hospital is an academic medical center	111	41.6
TOTAL	250	93.6
Type of ownership		
Private community hospital (not-for-profit)	136	50.9
Private community hospital (for-profit)	21	7.9
Public community hospital	24	9.0
Federal hospital	11	4.1
University hospital	49	18.4
Other	9	3.4
TOTAL	250	93.6
Hospital with an IRB	208	77.9
TOTAL	249	93.3
Hospital with policy on off-label prescribing	110	41.2
TOTAL	250	93.6

N.B., total represents number of participants responded to the question.

Group Comparisons on Characteristics

As was described in Chapter 3, study participants were randomly assigned to one of the four experimental groups. Therefore, the groups can be expected to be similar with regard to important demographic characteristics. Because attrition rate was high before and after group assignment, groups were compared to determine if differences between the experimental groups occurred. ANOVA analysis was performed to examine if groups differed in the distribution of age, pharmacy practice experience, and clinical duties. No differences were found among the

experimental groups on these characteristics; however, a difference ($p=0.014$) was found among the groups when experience in their present hospital was evaluated. Pharmacists in the generalist-low appropriate group showed the highest experience (mean=13.7 years, s.d.=11.4) in present hospital, followed by those in the specialist-high appropriate group. These two groups also showed the largest variance in response patterns. The lowest mean was observed for the generalist-high appropriate (mean=9.01 years, s.d.=8.8) group, which is also the smallest cell. Considering unequal variances and cell sizes, experiences in present hospital did not appear to be significantly different as revealed by post-hoc comparisons (Dunnett T3 ($p=0.07$); Games-Howell ($p=0.06$)). It can also be argued that although experience in present hospital may give familiarity with policy and influence working relationships, there may be a ceiling effect; whereas total experience may play a role in perceiving expert power differential – a variable of principal interest. Therefore, it was believed that a difference in experience in their present hospital would not affect significantly the results from subsequent analyses. Similarly, cross tabulations (chi-square) were run to determine differences between groups in the distribution of gender, job title, hospital ownership status, AMCs, hospital type, existence of IRB and off-label policy, and education. No significant differences with respect to these variables were observed among experimental groups. Although number of subjects having any BPS specialization was significantly ($p<0.05$) low in the generalist low appropriate group, no such difference was observed on having a pharmacotherapy specialization, which represents the largest category (>90%) of BPS in the respondents participating in the survey. Thus, it was believed that the experimental groups were similar.

Anomalies in Responses

Before analyzing data for inferential purposes, inspection of response patterns or 'consistency checking' (Singleton and Straits, 2005, p. 478) was required. In other words, an evaluation was undertaken in order to determine if responses to questions are intuitive or are related to those of other questions in a reasonable manner. Each case was thoroughly inspected for each variable and each dubious case was flagged. Six such cases were identified and reasons are presented in Table 7 along with any action taken. In addition, response patterns on item 8 through item 11 of the impact on relationship quality scale (IRQ) were examined. The purpose of the scale was to examine perceived negative outcomes associated with a pharmacist's action. Responses on IRQ were recorded on a 7-point scale (1=not at all; 7=absolutely). It can be noted here that if either of item 8 (angry) or item 9 (annoyed) is greater than 4 then both item 10 (content) and item 11 (happy) should be less than 4 and vice versa. However, responses on all these items can be on the lower side of the scale simultaneously, meaning that the respondent is not much concerned or concerned at all. Based on the argument, 23 cases, which include 4 cases already flagged, were identified for which responses on IRQ were considered incompatible and reclassified as missing data (Singleton and Straits, 2005).

Table 7: Inconsistency in Responses

Questions/ Scale Item	Case #	Reasons/ Action
Items from multiple variables	31	All 1s (willingness to influence < -1.96 of standardized values of the DV) - flagged
	76	Q2.5.1 onwards all are 5s, Q2.3.5 and q2.3.8 (both are 4), Q2.3.6, Q2.4.2, and Q2.4.3 (all are 6s), q2.4.1 is 3, and the rest are 5s - flagged
	100	All 7s except Q2.4.1 to Q2.4.3 all of which are 4s - flagged
	173	Q2.3.4 is 4 and Q2.5.1 onwards all are 4s and the rest are 5s
	225	All 7s except Q2.3.5 that is 6 - flagged
	232	All 7s- flagged
IRQ *Bold values are incompatible in pairs (1st two vs. 2nd two)	23, 65	**6, 6, 6, 6**– recoded as missing
	43	**6, 5, 6, 6**– recoded as missing
	71	**6, 6, 5**, 4– recoded as missing
	82	3**, 6, 5,** 4– recoded as missing
	89	**5, 5, 5, 5**– recoded as missing
	107	3**, 5, 5, 5**– recoded as missing
	109	4**, 5, 5, 5**– recoded as missing
	114	4, **5, 6, 6**– recoded as missing
	123	**5, 5,** 4, **5**– recoded as missing
	152	**5, 5,** 3, **5**– recoded as missing
	162	1, **5,** 4, **5**– recoded as missing
	206	**6, 7, 5,** 3– recoded as missing
	222	2, **5, 5,** 4– recoded as missing
	226	4, **5, 6, 5**– recoded as missing
	246	2, **6, 6, 6**– recoded as missing
	256	4, **5,** 4, **5**– recoded as missing

Manipulation Checks

Pretest results provided an initial indication that the manipulation of the independent variables (expert power differential and appropriateness) were working as expected. However, due to an inadequate number of responses available in the pretest, it was not possible to conduct statistical analyses to verify that assertion. To ensure that the experimental manipulation was working as conceived, several statistical tests (t-tests) were performed. Respondents were asked if they believed that the physician described in the vignette had more expert power – measured by average of responses on a four-item 7-point scale – than did the respondent. It can be noted

here that the four-item measure loaded under a single factor as conceptualized and reliability of the scale was acceptable (Cronbach's alpha = 0.877). The results (Table 8) that excluded flagged cases showed that pharmacists assigned to the specialist physician group rated the physician's relative expert power significantly higher ($p<0.001$) as compared to participants in the generalist group. However, in general, pharmacists in both groups rather somewhat disagreed on a great power differential between pharmacists and the physicians described in the study as indicated by the average ratings that are less than 4 (4='neutral'). This result may be a reflection of the clinical acumen of the pharmacists in the sample. A large number of respondents held advanced practice degrees (e.g., Pharm.D.) and spent a significant portion of their work-related activities on clinical functions.

In addition to evaluating power differences, pharmacist respondents were asked about the appropriateness of the medication in the disease condition as described in the scenario. Appropriateness was measured as mean of two items. As expected, respondents in the low appropriate group rated the off-label use significantly ($p<0.001$) less appropriate than did the pharmacists in the high appropriate group. The results for both manipulations did not change when either all cases were included or all cases identified in Table 7 were excluded.

Table 8: Manipulation Checks

Group		N	Mean (Std.err.)	Sig (*p*)
Relative expert power of physician	Specialist	135	3.68 (0.13)	<0.001
	Generalist	126	3.12 (0.09)	
Appropriateness	Evidence-based (high)	131	5.29 (0.10)	<0.001
	Experimentation (low)	130	3.55 (0.11)	

N.B., higher number means higher power of physician or appropriateness; flagged cases

EXAMINATION OF MEASUREMENT SCALES

Although scale items of almost all variables appear in the published literature, the population and the context of this study were different from those studies. As suggested by Churchill (1979), factor analyses (principal axis factoring (PAF)) were performed on the variables measured by scale items to determine if they loaded on the factor as conceptualized. Reliabilities (internal consistency) of multi-item scales were then estimated.

Dependent Variable

The dependent variable (DV), willingness to influence, was measured by five items. The descriptive statistics of the DV have been presented in Table 9. The distribution of the DV was negatively skewed such that the mean values of each group were above 5 on a 7-point scale. However, 95% of values lay between ±1.96 of standard deviation.

Table 9: Descriptive Statistics of Willingness to Influence (N=267)

Statistic	Value
Overall scale mean and std. error	5.54 (0.082)
Skewness	-1.072
Kurtosis	1.085
Between-group homogeneity of variance – Brown-Forsythe test (p)	0.302
Reliability (Cronbach's alpha)	0.929

N.B., Estimates include cases that are flagged.

Considerable debate exists over appropriateness of factor analysis model in a specific context (Hair et al., 2006). The scale measuring the DV had already been applied (Schriesheim and Hinkin, 1990) and its factor structure was confirmed. Thus, the objective of factor analysis here was to reassess the latent dimension in the context of the study; common factor analysis was thought appropriate as suggested by Hair et al. (2006). The factor analysis (PAF) of the five items of the DV (loadings >0.8) loaded strongly under a single factor as expected. Reliability (Cronbach's alpha) was 0.925 excluding six flagged cases. The reliability estimate did not change meaningfully when those cases were included. All inter-item correlations were significant ($p<0.01$) and ranged from 0.627 to 0.801. All item-to-total correlations were 0.767 or greater. It was concluded that the willingness to influence scale was reliable and was suitable for use in subsequent analyses (Hair et al., 2006; Peter, 1979).

In addition to willingness to influence, the survey instrument contained a three-item scale to measure a distinct, yet related, concept, likelihood to act. The scale appeared to be reliable (Cronbach's alpha 0.863) with all item-to-total correlations greater than 0.60. Although the measure of willingness to influence was adapted from past research and well validated, considering different context and population construct validity it was examined further. If the

measure is valid, it should correlate with a measure of a theoretically-related concept (Singleton and Straits, 2005). The correlation between likelihood to act and willingness to influence was 0.569, which is significant at the 0.01 level. However, pairwise correlations of the variables (items) of the willingness to influence scale with the variables of the likelihood to act scales were lesser than correlations among within-scale variables of willingness to influence. Thus, the measure of willingness to influence provided evidence of construct validity (Churchill, 1979; Churchill and Surprenant, 1982).

Covariates and Moderator

While developing the instrument (IPI) Raven, Schwarzwald, and Koslowsky (1998) used Principal Component Analysis. However, in this study common factor analyses (PAF) of the covariate power variables were performed to examine the factor structures of the IPI because of the argument (i.e., reassessing factor structure) presented above and results are displayed in Table 10. The items measuring power of dependence loaded strongly under a factor without any cross-loadings that are greater than 0.3. Referent power items were not good as evidenced from poor loadings (less than 0.5) except for one item with a factor loading greater than 0.7. Surprisingly, information power items loaded under two factors. Three items loaded strongly on a single factor with no large cross-loadings. In the present analysis, percentage of variance extracted by the first factor was slightly higher (10.61% vs. 9.49%) than the second factor.

Table 10: Factor Analysis of the Covariates and Moderator with Varimax Rotation

Scale	Item	Factor					
		1	2	3	4	5	6
Power of dependence	Q.2.3.1	0.784					
	Q.2.3.2	0.869					
	Q.2.3.3	0.551					
	Q.2.3.4	0.793					
Referent power	Q.2.3.5						
	Q.2.3.6				0.322		
	Q.2.3.7						
	Q.2.3.8				0.770		
Informational power	Q.2.3.9			0.714			
	Q.2.3.10*		0.676				
	Q.2.3.11*		0.893				
	Q.2.3.12*		0.722				
	Q.2.3.13			0.707			
IRQ**	Q.2.11.1					0.930	
	Q.2.11.2					0.899	
	Q.2.11.3					0.884	
	Q.2.11.4					0.934	
	Q.2.11.5					0.940	
	Q.2.11.6					0.890	
	Q.2.11.7					0.930	
	Q.2.11.8					0.754	
	Q.2.11.9					0.732	
	Q.2.11.10*					0.447	0.783
	Q.2.11.11*						0.825

N.B. * items are reverse coded. Only factor loadings > 0.3 in absolute value were presented. ** Run on data that excluded incompatible responses. All estimates excluded flagged cases.

As was described earlier in the text, the moderating variable IRQ contained some responses that could be considered incompatible. As such, an additional analysis was undertaken where these cases were classified as missing. As opposed to the a-priori conceptualization, IRQ emerged as two factors. First, nine items loaded on a single factor while two items loaded under another factor with a small cross-loading of one item (loaded more heavily under the first factor). It can be noted that the first factor extracted a very large amount of variance (67.68%) while the

second factor extracted only 13.15% of variance. Hair et al. (2006) suggests that a solution that explains 60% of the total variance can be considered satisfactory in some cases. While consistent with a-priori conceptualization, the one factor solution was believed to be appropriate as it would capture variance sufficiently and be parsimonious as well. In addition, dropping the last two items may alleviate the response pattern issues as described previously. Factor analysis was run again on the abbreviated IRQ scale and the single-solution factor extracted 80.55% of variance. It should be noted that the results did not change meaningfully when all cases were considered.

After examining the factor structures of the various measures, reliability estimates were examined. The results are presented in Table 11. The reliability estimate of the power of dependence scale was 0.867. All inter-item correlations ranged from 0.411 to 0.814 and item-total correlations from 0.518 to 0.844. The reliability estimate of referent power was poor (0.394) and thus not acceptable (Hair et al., 2006). In addition, inter-item correlations (<0.3) and item-total correlations (<0.4) were not high. Thus, it is concluded the scale measuring referent power was not reliable and was not included in subsequent analyses. When five items were considered together, the information power scale had a reliability of 0.679 which is not satisfactory (Hair et al., 2006). However, two items had low item-to-total correlations of 0.207 and 0.329. Moreover, these same two items loaded under a different factor when factor analysis was performed. The item-total correlations for the remaining three items were between 0.472 and 0.62. While deleting the item with the lowest item-total correlation would improve the scale's reliability (0.723), the other item still showed poor item-total correlation (0.162). Although it may be tempting to conclude that the information power measure has an underlying two-factor structure, the original conceptualization does not support this interpretation (Raven,

Schwarzwald, and Koslowsky, 1998). Moreover, unidimensionality should be ensured before reliability is established (Gerbing and Anderson, 1988). It can be noted here that although the two items causing concerns possessed face validity (they appear very close to what is potentially captured by expert power (e.g., physician has better explanation)), past research has shown empirically that expert power and information power are correlated (Raven, Schwarzwald, and Koslowsky, 1998). In that case, retaining the two items may remove some variance from expert power that it jointly shares with the DV and information power and reduce the efficiency of ANCOVA analysis (Miller and Chapman, 2001). On the other hand, if the three-item information power scale is adopted, the reliability estimate becomes 0.825. Having a measure with high reliability may also serve to satisfy – at least, partially – an assumption of ANCOVA (i.e., covariates are measured without error). Therefore, for the sake of parsimony and consistent with the theory and measurement practice, information power was measured as a single factor with three items.

Table 11: Reliability Estimates of the Covariates and Moderator

Scale	Items	N	Cronbach's α	Mean (s.d.)
Power				
Power of dependence	Q.2.3.1, Q.2.3.2, Q.2.3.3, Q.2.3.4	261	0.867	5.082 (0.669)
Referent power	Q.2.3.5, Q.2.3.6, Q.2.3.7, Q.2.3.8	261	0.394	4.045 (1.228)
Information power	Q.2.3.10*, Q.2.3.11*, Q.2.3.12*	261	0.825	3.410 (0.210)
Communication effectiveness	Q.2.4.1, Q.2.4.2, Q.2.4.3	261	0.685	5.289 (0.224)
Responsibility	Q.2.5.1, Q.2.5.2, Q.2.5.3, Q.2.5.4	261	0.909	4.963 (0.277)
Attitude	Q.2.6.1, Q.2.6.2, Q.2.6.3, Q.2.6.4	261	0.838	4.863 (0.682)
IRQ	Q.2.11.1, Q.2.11.2, Q.2.11.3, Q.2.11.4, Q.2.11.5, Q.2.11.6, Q.2.11.7, Q.2.11.8, Q.2.11.9, Q.2.11.10*, Q.2.11.11*	242	0.967	2.359 (0.195)

* Items recoded because of reverse coding

The reliability of the communication effectiveness measure was 0.685 and all inter-item and item-total correlations were larger than 0.30. The four-item responsibility scale showed very good reliability and all inter-item and item-total correlations were larger than 0.60. Similarly, the attitude measure was found to be very reliable. The reliability of estimate of IRQ (shortened) was calculated. Cronbach's alpha of the scale was 0.967. None of the inter-item correlations were less than 0.55 while all item-total correlations stood above 0.70. The scale appeared to be reliable.

EXAMINATION OF PROPOSITIONS

As proposed in Chapter 3, the propositions were examined using ANCOVA. It can be noted again that although referent power was originally proposed as a covariate, it was not

included in the analysis because of inadequate reliability of the measure. Before proceeding with ANCOVA analysis, an examination of the assumptions of ANCOVA was undertaken.

Assumptions of ANCOVA

While performing ANCOVA analysis it expected that covariates were correlated with the DV such that they account for variance in the DV that is otherwise unexplained. To examine such relationships, bivariate correlations were estimated (Table 12). All correlations between the covariates and willingness to influence were significant ($p<0.01$) and appeared in the direction conceptualized. All correlations except one among the covariates were also significant ($p<0.01$). However, these correlations were, at best, moderate (Myers and Well, 2003). Thus, it can be expected that multicollinearity should not be an issue.

Table 12: Correlations among Covariates and DV

	Pow - dep	Pow -info	Com. effect	Respon	Attitude
Willingness to influ	0.417*	-0.139*	0.356*	0.320*	0.179*
Pow - dep		-0.402*	0.313*	0.376*	0.190*
Pow - info			-0.202*	-0.254*	-0.012
Com. effect				0.213*	0.228*
Respon					0.225*

*Correlation is significant at the 0.01 level (2-tailed).

A critical assumption of ANCOVA is homogeneity of regression slopes among treatment groups. This assumption was evaluated by performing ANOVA on the DV where significance of all group by covariate interactions were examined. The group variable was a categorical variable that represented four experimental groups. None of the interactions were significant at the 0.05 level, thus, the relationships between the covariates and the DV appeared similar across all treatment groups. Concerning independence of covariates and IVs, treatment affecting

covariate was not a concern because the covariates were measured before the experimental manipulation was introduced.

There were only four extreme cases of scores on the DV considering all groups individually. The distribution of the DV in each group was negatively skewed. Responses in the specialist-high appropriate group showed the highest skewness, followed by that of the specialist-low appropriate group. The distributions of the DV in each group showed departure from normality (Shapiro-Wilk test p-value <0.05); however, departure from normality does not have serious consequences on the results of ANCOVA as long as sample sizes are large and equal and in the case of the current study, cell sizes vary very little (Myers and Well, 2003).

Results of ANCOVA Analysis

The ANCOVA results are presented in Table 13. The results revealed that two covariates, power of dependency and pharmacist's perceived responsibility, were significantly ($p<0.05$) related with a pharmacist's willingness to influence off-label prescribing. However, interpretation of main effects may not be appropriate in presence of significant interactions (Meyers and Well, 2003). Following this argument, the interactions were analyzed and discussed first. The results shows that the interaction between power differential and IRQ is significant ($F(1, 230)=4.693$; $p=0.031$). In other words, the effect of pharmacist's perceived relative expert power on willingness to influence prescribing is moderated by pharmacist's perceived negative impact on relationship quality with physician. This provides evidence in support of Proposition 4 (the effect of pharmacist's relative expert power on pharmacist's willingness to influence prescribing would be moderated by perceived appropriateness of off-label prescription medication). However, this result does not support Proposition 3 ($F(1, 230)=3.489$, $p=0.063$) at the a-priori significance level of 0.05. Interestingly, the interaction

between IRQ and appropriateness emerged to be strongly significant ($F(1, 230)=9.541$, $p=0.002$). The effect of perceived appropriateness on pharmacist's willingness to influence is moderated by perceived impact on relationship quality. It was proposed that perceived appropriateness of prescription medication would be negatively associated with pharmacist's willingness to influence prescribing. The result revealed a significant ($F(1, 230)=8.632$, $p=0.004$) main effect of appropriateness. Estimated marginal means (Table 14) of a pharmacist's willingness to influence in circumstances where the prescription is perceived less appropriate is greater than in situations where the prescription is perceived more appropriate (off-label but with more evidence). Thus, Proposition 2 was supported, although the interpretation of this main effect deserves caution in presence of a significant interaction.

Table 13: Tests of Between-Subjects Effects

Dependent Variable: Willingness to influence

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Proposition
Corrected Model	151.579[a]	11	13.780	12.462	<0.001	
Intercept	19.350	1	19.350	17.500	<0.001	
Power differential	4.353	1	4.353	3.937	**0.048**	**P1**
Appropriateness	9.545	1	9.545	8.632	**0.004**	**P2**
IRQ	26.463	1	26.463	23.932	**<0.001**	
Power dependency	20.974	1	20.974	18.968	**<0.001**	
Power information	1.062	1	1.062	.960	0.328	
Communication. Effectiveness	2.760	1	2.760	2.496	0.116	
Attitude	.003	1	.003	.002	0.962	
Responsibility	10.584	1	10.584	9.572	**0.002**	
Power diff * Appropriateness	3.858	1	3.858	3.489	0.063	P3
Power diff *IRQ	5.189	1	5.189	4.693	**0.031**	**P4**
Appropriateness * IRQ	10.549	1	10.549	9.541	**0.002**	
Error	254.322	230	1.106			
Total	7930.200	242				
Corrected Total	405.901	241				

a. R Squared = 0.373 (Adjusted R Squared = 0.343); b. Computed using alpha = 0.05

*Data excluded incompatible and flagged cases.

The effect of expert power differential between the pharmacist and the prescriber was examined. It was proposed that pharmacist's perceived relative expert power in relation to physician would be positively associated with pharmacist's willingness to influence off-label prescribing. Expert power differential did have a significant ($F(1, 230)=3.937$, $p=0.048$) relationship with pharmacist's willingness to influence. Surprisingly, direction of association appeared different from what was proposed. The estimated marginal means for willingness to

influence was lower for the low power differential (general physician) group as opposed to that for the high power differential (specialist) group. Thus, although Proposition 1 was supported partially, it should be cautiously interpreted as noted above.

Table 14: Estimated Marginal Means for Main Effects

Variable	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Degree of appropriateness	Experiment/low	5.577[a]	0.099	5.381	5.772
	off-label/high	5.535[a]	0.094	5.349	5.721
Expert power differential	GP-low	5.550[a]	0.098	5.357	5.742
	Specialist-high	5.562[a]	0.096	5.374	5.750

a. Covariates appearing in the model are evaluated at the following values: power of dependency = 5.0816, power of information = 3.4339, comm. effect = 5.2920, attitude = 4.8419, responsibility = 4.9607, IRQ = 2.3590. * N = 242.

The aforementioned results revealed significant interactions as well as main effects; especially noteworthy was the interplay between three IVs. Differences in opinion exist as to when one should look at simple effects. Following the recommendation of Myers and Well (2003), simple effects that were determined to have theoretical interest and practical utility were analyzed. In order to understand a complex set of effects that seem to be driven strongly by IRQ, separate ANCOVA analyses were undertaken within the two levels of expert power differential and the two levels of appropriateness. It should be noted here that all of these tests can be considered conservative (less powered) because error mean squares are bigger than that of the full model. As was mentioned previously (Table 13), it appeared that IRQ might play a strong role in pharmacists' willingness to influence. To interpret the effect better, IRQ was dichotomized on the median value of two so that interactions involving IRQ can be plotted. Figures 1 and Figures 2 describe interaction plots that involve IRQ. These interactions showed

what Kleinbaum et al. (2008) called the same direction effect and both were significant at the 0.05 level. Although insignificant (p=0.063), the interaction (Figure 3) between power and appropriateness showed reverse direction (Kleinbaum et al., 2008). Within the specialist group, the main effects of appropriateness (p=0.045) and IRQ (p<0.001) as well as interaction were significant (p=0.004). However, within the generalist group neither the interaction (p=0.171) between appropriateness and IRQ nor the main effects of appropriateness (p=0.056) and IRQ (p=0.118) were significant. When the simple effects within different appropriateness levels were analyzed, none of the main effects or interaction between expert power differential and IRQ were significant at p=0.05 level in the high appropriate group. In contrast, within the low appropriate group, the interaction between IRQ and power differential was significant (p=0.029). While the main effect of power differential was not significant (p=0.144), that of IRQ was significant (p=0.029). It should be noted here that none of the simple comparisons with Bonferroni adjustments under these within-group analyses were significant at the 0.05 level.

Overall, the model was significant and 34.3% variance (adjusted) was explained by the model. The variables of interest contributed substantially to the total explained variance in the model. Among the effects, IRQ stood above any other variables in terms of its ability to explain variability of willingness to influence.

Post-hoc Analyses to Examine the Sensitivity of the Results

Initially, it was planned that population would consist of pharmacists solely from nonacademic community hospitals. However, in the interest of pragmatism, data collection included pharmacists employed by academic medical centers (AMCs). ANCOVA analysis was performed to determine if there is any difference in effects based on type of hospital (AMC vs. non-AMC). A main effect term of dichotomous hospital type and three interactions with power

differential, appropriateness, and IRQ were added to the full model that was used to examine the propositions. Neither the addition of new terms changed the pattern of results nor were any of them significant. Indeed, the result from the new model with all interaction terms replicated the original findings. Thus, hospital type (AMC vs. non-AMC) does not appear to affect pharmacist's willingness to influence off-label prescribing. It was expected that nonacademic hospitals would be less likely to have an IRB, which may influence the manner in which off-label prescribing is handled within the hospital (Ansani et al., 2006). However, because only a small percentage (<20%) of hospitals reported not having an IRB, statistical analysis may not show reliable estimates. Instead, the effect of existence of policy regarding off-label prescribing in their hospital was examined by adding to the original model a new main effect term for policy and its interaction terms with three variables (power, appropriateness, and IRQ). Of all subjects who were included in the ANCOVA model, 98 respondents reported that their hospital had a policy that addressed off-label medication use. The results did not change the pattern of significant effects except that, unlike the case of hospital type, power differential and appropriateness interaction became marginally significant ($p<0.10$). It may be argued that the results from this analysis are expected and may appear redundant given that groups were similar with respect these variables. However, because our measures are not free from measurement error, the objective was to rule out any potential threat that may be associated with these variables. Do perceptions about key variables differ in different types of institution? It was observed that while hospital type did not affect the way expert power differential, appropriateness, or IRQ were perceived, the presence of an off-label medication use policy seems to have marginal effects – main effect of policy on power ($p=0.097$) and interaction of

appropriateness group and policy on appropriateness (p=0.055) – on how appropriateness and relative expert power are perceived.

The impact of inclusion of pharmacists who reported to spend 10% of their time or less on clinical duties also was investigated. The study obtained responses from 51 pharmacists who reported to spend currently 10% or more of their weekly working hours on clinical duties. Percentage of time spent on clinical duties and its interaction with appropriateness, power differential, and IRQ were added to the original ANCOVA model and the analysis was run again. No changes in significant effects were observed in the new model as compared to the main model except that time on clinical duties and its interaction with relational impact were marginally significant ($p<0.1$). Interestingly, while significance of previously found effects were retained, the main effect of power differential also became marginally significant (p=0.052) once newly added interaction terms were dropped. However, when people with less than 10% time on clinical duties were excluded and the model was run, main effects of appropriateness and IRQ and their interaction remained significant ($p<0.05$) and so did covariates as in the original model. The loss of significance of the interaction effect between power and IRQ, which was otherwise significant, was further investigated. As reported before, group composition was not different based on time spent on clinical duties. Similarly, the number of respondent pharmacists reported to devote less than 10% and 10% or more of time on clinical service in each experimental group were not different (χ^2= 0.578, df=3; p=0.90). ANOVA analyses were performed to examine if they had different perception of expert power differential, appropriateness, and relational impact. These two groups of pharmacist respondents did not differ in any of the three perceptions mentioned above as revealed by insignificant ($p<0.05$) interactions and the main effects of the dichotomous variable -time spent on clinical duty. Thus, it is possible that the failure to observe

significant power-IRQ interaction in pharmacists who devote 10% or more time may have been caused by loss of power.

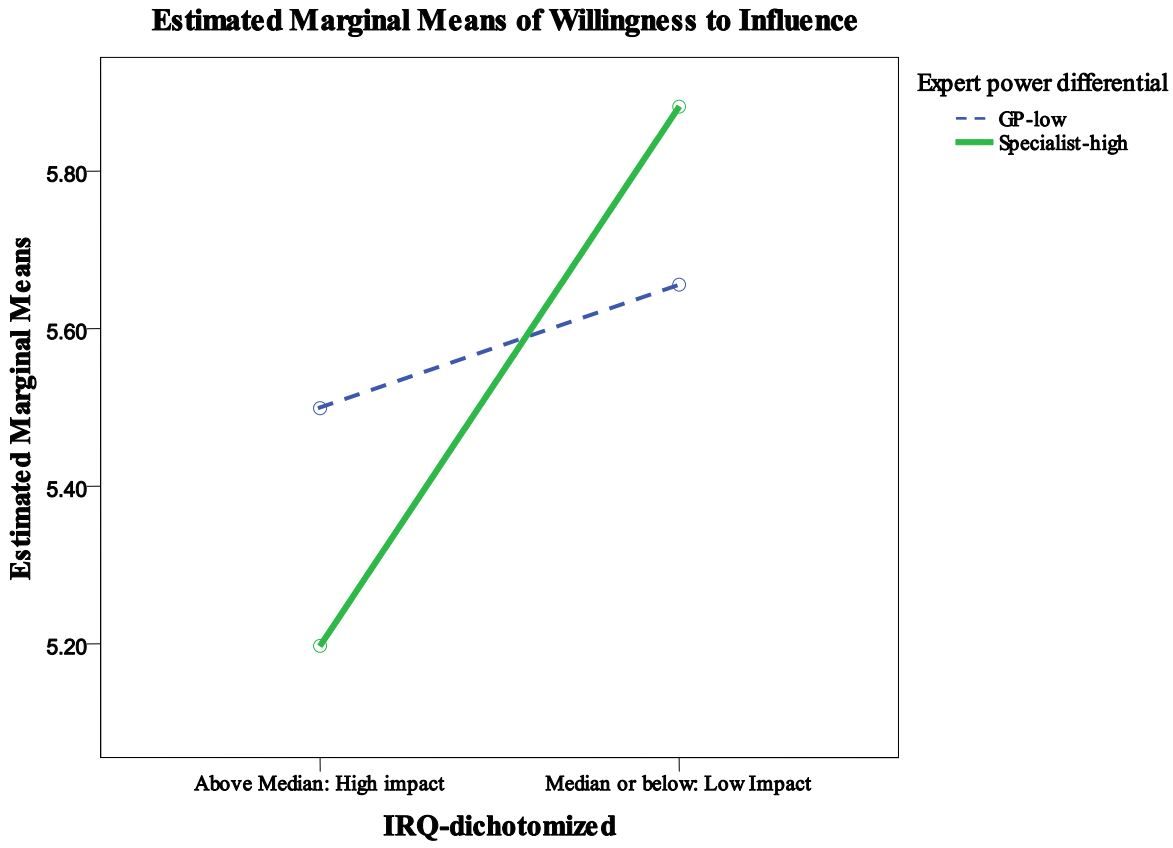
During the conceptualization phase of this project, concerns were raised that responses by pharmacists regarding willingness to influence may be subject to social desirability bias. It was suggested that including a related, but different, construct (i.e., intention to act) might provide a validity check of the results. Items measuring likelihood to act (intention) immediately followed the measure of the DV in the survey questionnaire. Likelihood to act showed high and positive correlation ($p<0.05$) with the DV. ANCOVA analysis on likelihood to act did not replicate the results but showed similar trends. While the interaction of IRQ with power differential and appropriateness remained marginally significant ($p<0.10$), the main effect of power differential was no longer significant ($p=0.34$). However, IRQ and appropriateness remained significant ($p<0.05$). Interestingly, the pattern of observed cell means (Table 15) makes strong sense. Although likelihood of intention was a different, but related, construct, such trends of similarities in results may increase our confidence in the findings of the study.

Table 15: Observed Cell Means of Likelihood to Act

Expert power differential	Degree of appropriateness	Mean	Std. Deviation	N
GP-low	Experiment/low	5.728	1.306	59
	Off-label/high	4.611	1.611	60
Specialist-high	Experiment/low	5.246	1.617	57
	Off-label/high	4.404	1.938	66

Effect of Interaction between IRQ and Expert Differential on Willingness to Influence

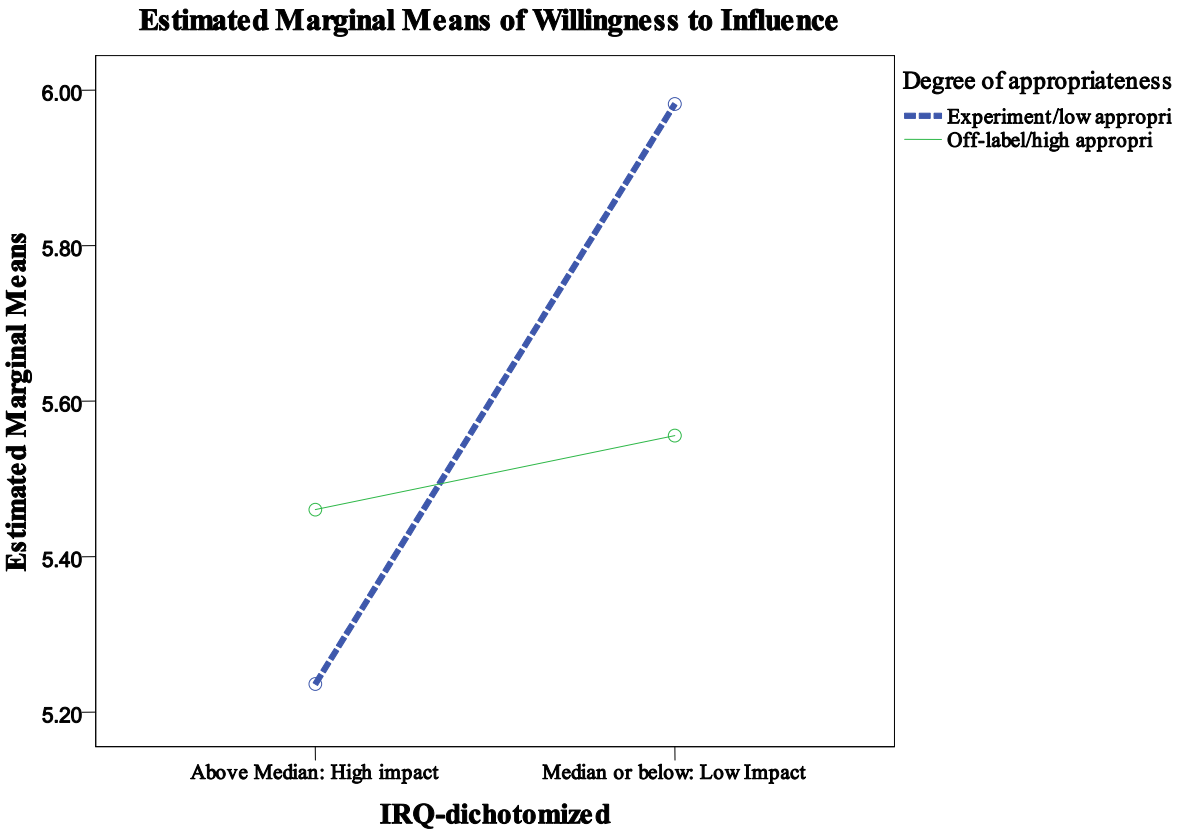
Figure 1



Covariates appearing in the model are evaluated at the following values: power_dependency = 5.0816, power_information = 3.4339, comm_effect = 5.2920, attitude = 4.8419, respon = 4.9607

Effect of Interaction between IRQ and Perceived Appropriateness on Willingness to Influence

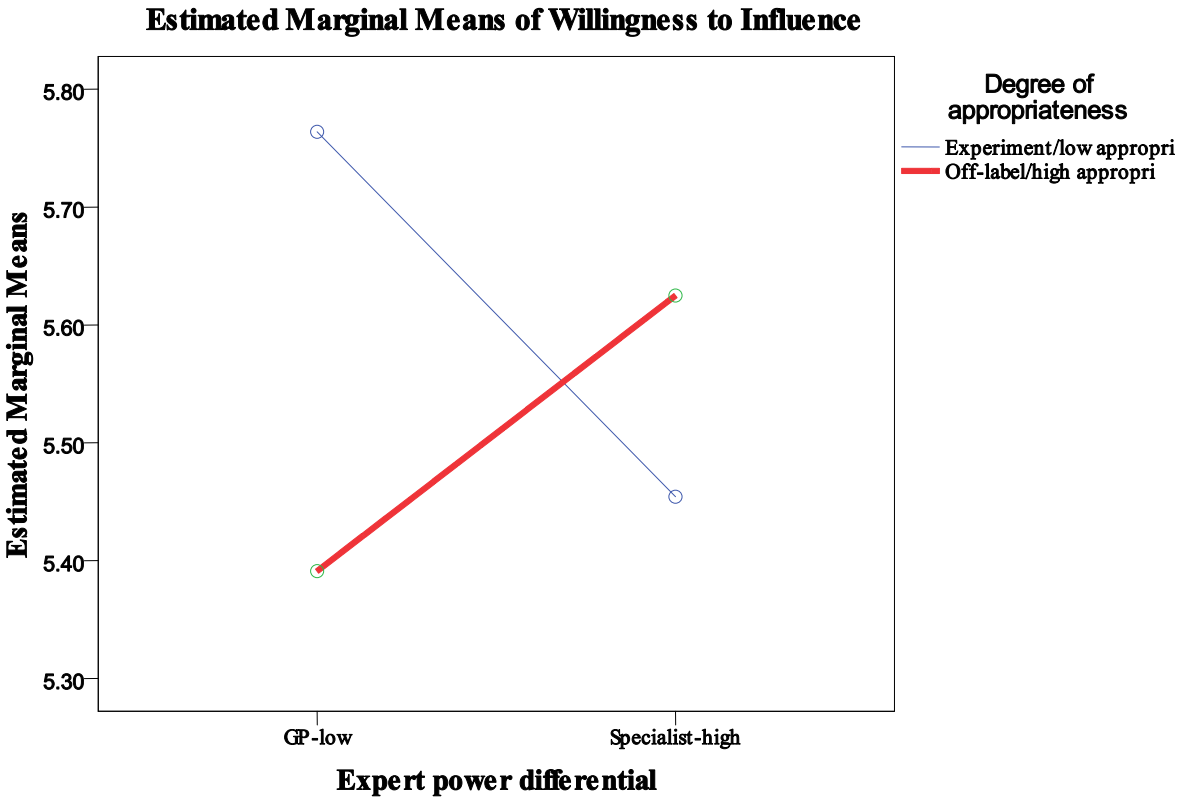
Figure 2



Covariates appearing in the model are evaluated at the following values: power_dependency = 5.0816, power_information = 3.4339, comm_effect = 5.2920, attitude = 4.8419, respon = 4.9607

Effect of Interaction between Perceived Appropriateness and Expert Differential on Willingness to Influence

Figure 3



Covariates appearing in the model are evaluated at the following values: power_dependency = 5.0816, power_information = 3.4339, comm_effect = 5.2920, attitude = 4.8419, respon = 4.9607

CHAPTER 4 REFERENCES

Ansani N, Branch R, Fedutes-Henderson B, et al. Unites States medical practice summary Innovative off-label medication use. *American Journal of Medical Quality*. 2006;21:246-54.

Black B, Babin B, et al. *Multivariate Data Analysis*, 6th ed., [Hardcover], Upper Saddle River, NJ: Prentice Hall; 2006.

Census Bureau Regions and Divisions with State FIPS Codes.US Census Bureau.http://www.census.gov/geo/www/us_regdiv.pdf. Accessed 9 July, 2010.

Churchill GA., Surprenant C. An investigation into the determinants of customer satisfaction. - *Journal of marketing Research*. 1982;19:491-04.

Churchill Jr. GA. A paradigm for developing better measures of marketing constructs," *Journal of Marketing Research.* 1979;16:64-73.

Gerbing DW, Anderson JC. An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research.* 1988;25:186-92.

Hair Jr. JF, Black WC, Babin BJ, et al. *Multivariate data analysis*. 6th ed. Upper Saddle River, NJ: Prentice Hall; 2006.

Kleinbaum DG, Kuppe, LL, Muller.KE. *Applied Regression Analysis and Other Multivariable Methods*, 4th ed., Belmont, CA: Duxbury Press; 2008.

Knapp KK, Blalock SJ, Black BL. ASHP survey of ambulatory care responsibilities of pharmacists in managed care and integrated health systems – 2001. *American Journal of Health System Pharmacists*. 2001;58:2151-66.

Miller GM, Chapman JP. Misunderstanding analysis of covariance. *Journal of Abnormal Psychology*. 2001,110:40-8.

Myers JL, Well A. *Research Design and Statistical Analysis*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003.

Peter JP. Reliability: A review of psychometric basics and recent marketing practices. *Journal of Marketing Research.* 1979;16:6-17.

Raven BH, Schwarzwald J, Koslowsky M. Conceptualizing and measuring a power/interaction model of interpersonal influence. *Journal of Applied Social Psychology.* 1998;28:307-32.

Schriesheim CA, Hinkin TR. Influence tactics used by subordinates: A theoretical and empirical analysis and refinement of the Kipnis, Schmidt, and Wilkinson subscales. *Journal of Applied Psychology*. 1990;75:246-57.

Singleton RA, Straits BC. *Approaches to Social Research*, 4th ed., New York, NY: Oxford University Press; 2005.

CHAPTER 5

INTERPRETATION AND CONCLUSION

Off-label prescribing has drawn a lot of attention from different interested parties both within healthcare and in society. A substantial extent of effort has been driven into examining the prevalence, defined broadly, of off-label prescribing in current medical practice (Cuzzolin, Zaccaron, and Fanos, 2003; Radley, Finkelstein, and Stafford, 2006). Additionally, the known literature focuses, to a relatively lesser extent, on explanations as to why such behavior exists in the first place. For example, some studies attempted to understand why physicians prescribe medications off-label and elucidate the factors that were associated with such practice (Ekins-Daukes et al., 2005; Lin, Phan, and Lin, 2006). Although not appropriate in all cases, much of current opinion stands in favor of prescribing medicines off-label; however, judicious use is expected. In other words, using the privilege where it is needed and justified has the potential greatly to benefit patients. Thus, attention should be paid to improve the quality of off-label prescribing emphasizing an extended and extensive judgment of appropriateness. Although physicians have been surveyed sporadically to understand off-label medication use, pharmacists were neglected largely in the literature. Thus, the present study was undertaken to explore if quality initiatives could be strengthened by pharmacists who are recognized as experts in pharmacotherapy. Specifically, the study focused on whether pharmacists were willing to influence the off-label prescribing behaviors of physicians. Like other studies that examined interpersonal relationships in healthcare (Fung, 1991; Raven, 1992), social power, a psychological construct, was one of the focal variables in the study. Perceived expert power difference, perceived appropriateness of the off-label prescription, and perceived negative impact on relationship quality between the pharmacist and the prescriber following an attempt to

influence were independent variables that examined pharmacist willingness to influence off-label prescribing. Using an experimental design, this survey examined the following propositions:

P1: The pharmacist's perceived relative expert power in relation to the physician is positively associated with the pharmacist's willingness to influence off-label prescribing.

P2: The perceived appropriateness of prescription medication is negatively associated with the pharmacist's willingness to influence off-label prescribing.

P3: The effect of the pharmacist's relative expert power on the pharmacist's willingness to influence off-label prescribing is moderated by the perceived appropriateness of prescription medication.

P4 The effect of the pharmacist's perceived relative expert power on willingness to influence off-label prescribing is moderated by the perceived impact on relationship quality with the physician as perceived by the pharmacist.

Perceived Relative Expert Power

In the present study, vignettes were used to manipulate the perceived expert power differential between the prescribing physician and the pharmacist respondent. Pharmacists assigned to the specialist group rated the physician as having more expert power (high power differential) than did those pharmacists assigned to the generalist group. As a result, the manipulation of power was determined to be effective. The results from the present study are summarized in Table 16 and showed that pharmacist's perceived relative expert power in relation to physician was associated with pharmacist's willingness to influence off-label prescribing. However, contrary to what was expected, willingness to influence was higher when power differential increases (Table 14). This finding is unexpected; however, it may be explained possibly by uncertainty reduction theory (Berger and Calabrese, 1975). Uncertainty reduction theory proposes that increases in information seeking behavior may be observed to reduce uncertainty. The study limited the pharmacist's evaluation of the physician's superiority

in knowledge to the descriptions in the vignettes. Such uncertainty may be reflected in the evaluation of specialists as revealed by the mean rating of power differential of specialist group that stands very close to 4 or midpoint, which means not sure or no opinion, of the scale (Table 8). As a result, uncertainty in the pharmacist's mind may have expressed itself as willingness to influence when it may have actually been an action to seek clarification about the rationale regarding the prescription. In the light of this finding, several points should be mentioned. First, the effect size of power differential may be small as opposed to medium (assumed during sample size calculation prior to the execution of the study). This point may be substantiated by the fact that, although statistically different, the difference in expert power differential as perceived by pharmacists in the two groups was, practically speaking, very narrow. In general, pharmacists slightly disagreed that the physician described in the scenario had more expert power than pharmacists as indicated by the mean scores that lay between 3 and 4 on a 7-point scale (Table 8). If the true effect size is small, increasing sample size may reveal this effect, if it exists, more strongly. Secondly, the independent effect of power differential may not either exist such that it influences pharmacist's decisions about professional judgment or it may not have any practically meaningful effect. Within the context of pharmacist-physician communication, past research found that power differential was not a significant predictor of pharmacist's communication behavior (Lambert, 1996). Presently, pharmacy education in the US emphasizes heavily pharmacotherapeutics through its didactic curriculum and clinical clerkships (ACPE, 2006). Thus, pharmacists educated in this manner may not perceive physicians superior concerning expertise in medication-related matters. Moreover, information about the residency training of the respondents was not collected during the project. It is possible that professional socialization occurred differently for pharmacists who completed residencies and may have affected the

manner in which pharmacists perceived their interaction with physicians. Lastly, the responses may suffer from social desirability bias that may be operating in different directions in different experimental groups related to power. This possibility is supported by the pattern of mean responses, as explained below, on the power manipulation. In general, pharmacists may perceive physicians slightly superior in expert power but not so much that the gap in perceived power differential is large depending on physician specialty. In other words, in the generalist group there may be floor effect such that physicians have to be rated more powerful, whereas in the specialist group there may be both floor and ceiling effect. This effect may be accentuated by the characteristic, i.e., high clinical acumen, of the respondents. Moreover, the standard error of the mean scores in the power manipulation (Table 8) was larger in the specialist group even though the number of subjects was greater. A relatively less precise estimate in the specialist group may attest to the existence of such an effect. As such, the potential bias may have affected responses to the DV. For example, within the high appropriate group, willingness to influence was second highest among all – conceptually predicted to be the lowest – in the specialist group as compared to the generalist group (Table 14). Although some potential explanations are offered below, this pattern of response remains to be understood clearly. Finally, power differential may not have any independent effect but may act in a complex manner as reflected by the interaction of perceived power differential with IRQ. At this point, it can be noted that the independent effect of power did not appear in some of the post hoc analyses (Table 16). Thus. the main effect of power differential should not be emphasized or, at best, it should be interpreted cautiously.

Table 16: Summary of Results

Analysis Model		Results
Main Analysis	Full ANCOVA model	Power, Appropriateness, IRQ, Power*Appropriateness^, Power*IRQ, Appropriateness*IRQ
	ANCOVA within Specialist	Appropriateness, IRQ, Appropriateness*IRQ
	ANCOVA within Generalist[1]	Appropriateness^
	ANCOVA within high Appropriateness	
	ANCOVA within low Appropriateness	Power, Power*IRQ
Post-hoc analysis	ANCOVA: AMC vs. Non-AMC included	Power, Appropriateness, IRQ, Power*IRQ, Appropriateness*IRQ;
	ANCOVA: with Policy vs. No-policy[2] included	Power, Appropriateness, IRQ, Power*Appropriateness^, Power*IRQ, Appropriateness*IRQ
	ANCOVA: Clinical service (<10% vs. ≥10%) included	Power, Appropriateness, IRQ, Power*Appropriateness^, Power*IRQ, Appropriateness*IRQ Duty^, Duty*IRQ^
	ANCOVA excluding pharmacists with Clinical service <10%	Appropriateness, IRQ, Appropriateness*IRQ
	ANCOVA: Likelihood to act as dependent variable	Appropriateness, IRQ, Appropriateness*IRQ^, Power*Appropriateness^

Terms that appear are significant at $p<0.05$ level.
^ $p<0.10$
[1] $p>0.05$ for all variables of interest;
[2] Two-way ANOVA analyses showed policy had marginal ($p=0.097$) effect on power perception and the interaction of appropriateness and policy on appropriateness perception ($p=0.055$).

Perceived Appropriateness of Off-label Medication

The appropriateness of off-label prescribing, not the practice itself, is debated most heavily and has raised concerns among different stakeholders (AHRQ, 2007). Knowing this, the judgment of appropriateness is critical and as long as appropriateness is evaluated carefully, off-label prescribing has the potential to provide positive outcomes not achievable with current therapies. Although "appropriateness" may be debated, or driven by case-specific variables, this study relied on ratings on different aspects of appropriateness as recommended by a standard drug monograph. During the instrument development and pretest, general opinions about the appropriateness of the medication demonstrated that the two examples of off-label prescriptions were, in fact, different on this variable. The manipulation check further confirmed that the two medications were indeed considered different, as hypothesized, in terms of appropriateness. Unlike the power manipulation, the difference in appropriateness as perceived by pharmacists in the respective groups was large and ratings lay on two sides of the mid-point of the scale (Table 8). The between-subject ANCOVA results confirm that perceived appropriateness of medication is negatively associated with pharmacist's willingness to influence off-label prescribing. In other words, if a pharmacist has evidence that does not support an off-label use he or she will be more willing to influence the prescriber's judgment. This result makes sense and is consistent with the pharmacy literature. Past studies confirm that pharmacists intervene in order to improve prescribing and to change prescribing practices that are considered inappropriate (Rupp, DeYoung, Schondelmeyer, 1992; Hanlon et al., 1996). Moreover, institutional practices in many US hospitals are governed by protocols or policies; practices that deviate from this norm may make the pharmacist less concerned about questioning the judgment of physician. In the present study, pharmacists in both appropriateness groups demonstrated a willingness to influence;

however, those in the low appropriateness group reported a higher willingness to influence the prescriber. A potential explanation for pharmacist's higher willingness to intervene in the case of evidence-based off-label medicine may be because they may opine that any medication order that is not on-label necessitates additional judgment. The present study does not permit us to draw such a conclusion; however; performing a role that brings about expert evaluation by pharmacists would, at the very least, assure society about safe and effective prescribing and medication use. Another potential reason may be the effects of other variables and their interactions (three-way type of influence). In this context, it should be mentioned that the main effect of a variable cannot summarize its effect in the presence complex interactions. Thus, it is emphasized here that the main effect of appropriateness is not sufficient and not appropriate to understand its effect on willingness to influence as revealed in the study.

Table 17: Estimated Marginal Means of Power-Appropriateness Interaction (N=242)

Dependent Variable: willingness to influence

Degree of appropriateness	Expert power differential	N	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Experiment/low	GP-low	59	5.696	0.140	5.420	5.973
	Specialist-high	57	5.453	0.140	5.177	5.729
Off-label/high	GP-low	60	5.399	0.138	5.127	5.672
	Specialist-high	66	5.673	0.131	5.414	5.932

Although the study's third proposition (the effect of pharmacist's relative expert power on pharmacist's willingness to influence off-label prescribing is moderated by perceived appropriateness) was not supported, the interaction between appropriateness and IRQ, was significant. Proposition 3 was not supported possibly because of some of the limitations or reasons discussed in the previous discussion on social power. Specifically noteworthy is that the

study may lack power to detect such effect. It can also be noted here that the plot (Figure 3) of the interaction between power and appropriateness, although not significant (p=0.063), presents an interesting reverse direction effect. Although it cannot be concluded, it is possible that low appropriate conditions create an uncertainty, as may be implied by higher standard error in the low appropriate condition (Table 17). When a highly expert consultant physician writes an off-label prescription that appears to be lacking in evidence for its use, because of uncertainty, the evaluating pharmacist might attribute the lack of evidence to either lack of information possessed by the pharmacist or to the physician's special expertise and skill that are critical to utilizing such information. Under such uncertainty, pharmacists may rely on a limited number of heuristics (Kahneman and Tversky, 1973) such as specialty and experience of the physician and as a result overestimate the physician's power such that it reduces their relative ability to perceive risk. Now one may argue that it should not happen as information power was not significant. However, rather than experimentally controlling for information power, it was measured. In addition, information may be meaningful but meaning is not inherent in information; it requires interpretation (Johnson, 1993). Due to lack of interpretation of information or uncertainty, the pharmacist may perceive the physician to be more expert than the physician actually is and thus reduce his or her willingness to influence. Alternatively, fibromyalgia, a disease state that is debated (Berenson, 2008), might have prompted pharmacists' willingness to report that they would intervene when the objective of the interaction was to secure knowledge from the specialist.

Impact on Relationship Quality (IRQ)

In the framework of the power/interaction model of interpersonal influence, Raven (1992) postulated that influence attempts might result in negative outcomes in interpersonal relationships. The social psychology literature is replete with studies that show such outcomes (Yukl and Tracey, 1992) exist. In the context of the pharmacist-physician relationship, concerns such as those mentioned are not unfounded. As a result, effort was made to measure the pharmacist-physician collaborative relationship (Zillich et al., 2004; Doucette, Nevins, McDonough, 2005). Unlike the other two independent variables, IRQ was measured with multiple items that were taken from multiple studies (Morgan and Hunt, 1994; Roberts, Varki, and Brodie, 2003; Dobson et al., 2006) such that it examined all relevant negative outcomes. However, in contrast to the conceptualization, IRQ emerged as a two-factor construct. It should be mentioned that the relationship quality scale proposed by Dobson et al., (2006) also had two factors (relationship with physician and profession prepared to participate). However, in order to be consistent with the study's conceptualization and in the interest of model parsimony a single factor IRQ that explained a substantial part of total variance was used in subsequent analysis. Pharmacists, in general, did not perceive a substantial negative impact on their interpersonal relationship with the prescriber in the event that they made an attempt to influence (mean=2.36, s.d.=1.24 using a 7-point scale (1=not at all, 7=absolutely)). IRQ was measured after manipulations were introduced. However, manipulated variables did not appear to affect ($p>0.1$) the manner in which pharmacists responded to the IRQ measure.

After controlling for covariates, perceived expert power differential between the physician and pharmacist affects pharmacist's willingness to influence differentially in different power groups with changes in IRQ as perceived by the evaluating pharmacist (Figure 1). Thus,

in situations where the pharmacist perceives a high power difference, the pharmacist's willingness to influence off-label prescribing reduces more sharply with an increase in perceived IRQ as compared to willingness to influence in the low power difference condition. In other words, when there is an increase in pharmacist's relative power (as in the generalist group) IRQ has a weaker effect on the pharmacist's willingness to influence off-label prescribing. This statement is further supported by the findings in the post-hoc analyses. In the generalist group, only appropriateness significantly affected the pharmacist's willingness to influence (Table 16). This is an interesting finding and is consistent with what Raven (1992) suggested. It can be noted here, that power is not a zero sum game and in order to be effective, professional groups may exercise power over decisions within their sphere of competence (Flood and Scott, 1978). Although perceived power differential has been conceptualized as a physician's power it can be applied to a pharmacist's power thus making the role of power differential more generalizable.

While the study did not hypothesize a priori the interaction between appropriateness and IRQ, post-hoc analysis supported the moderating effect of IRQ being more pronounced in the low appropriateness group than in the high appropriateness group (Figure 2). When pharmacists are less concerned about relational outcomes, decreases in appropriateness of therapy appear to increase the pharmacist's willingness to influence. What this implies is that appropriateness (or lack thereof) of a prescription creates a logical ground for the pharmacist to make an influence attempt on a physician; however, it may not be very straightforward if pharmacists are concerned about the outcomes of those influence attempts.

Indeed, like any other professional relationship, IRQ seems to have a consistent and pronounced influence in pharmacists' decision-making. This is consistent with the pharmacy

literature where concerns about fostering good relationships with physicians are echoed (Comer et al., 2009).

The results of the study appear to be robust. Under different assumptions as examined in several post-hoc analyses, the effect of variables of primary interest did not change. A striking difference in the results was observed when the post-hoc analysis included pharmacists spending 10% or more of their working hours on clinical pharmacy services or direct patient care services. Even in this condition, the same effects as in the original model were observed with the exception of those related to power differential. One reason for such a result may be a lack of power. Expert power appears to have a subtle effect. As a result, when clinical duty is added as continuous variable in the model some effects involving expert power reappeared. Another reason for such result may be that the effect of expert power is subsumed in responsibility and power of dependence both of which appear significant consistently as these are groups that may perceive such duties as part of their normal routine. For some, it may be disturbing that the concern over the impact on relationships overrides or dictates over evidence-based appropriateness judgments with regard to pharmacist's willingness to influence. However, such findings represent realism. More assuring was the pharmacists' willingness to influence off-label prescribing, in general. Although concerns about relational consequences and attempt to influence relationship exists, increasing pharmacist's expert power or another social power (i.e., decreasing power differential) may alleviate some of this concern. Although this study did not provide evidence to conclude as such, it is also possible that in the present practice framework, pharmacists are not interacting with physicians on this issue on a regular basis. Thus, concerns about relationships may be overstated.

LIMITATIONS OF THE STUDY

This study has limitations that may affect generalizability and should be kept in mind while interpreting its results. Important limitations and a discussion of their potential impact on the findings of the present study follow.

Manipulation of variables

One of the assumptions of ANCOVA is that independent variables (IV) do not affect each other. Manipulation checks reveal that power differential may have affected the appropriateness ratings by the respondents. This means that the medications appeared more appropriate if it was prescribed by a specialist rather than a generalist (Table 18). In the real world, expert power and appropriateness judgments are combined inextricably and thus there was a degree of realism in this study. Order bias may be present in the study because the power manipulation check was introduced before the appropriateness manipulation check in all instances, thus creating an anchoring effect (Landon, 1971) and as such, this effect appeared only in the manipulation rating. Although manipulation checks that are rated much later do not convincingly state that IVs affect each other that were fixed by the design in the present study, the results should be cautiously interpreted. Under the circumstance of non-independent or falsified manipulation, misleading results may be possible (Perdue and Summers, 1986).

Table 18: Tests of Between-Subjects Effects on Independence of Independent Variables

Dependent Variable: appropriateness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	216.52[a]	3	72.17	53.57	<0.001
Intercept	5073.42	1	5073.42	3765.47	<0.001
Power dif	19.81	1	19.81	14.71	**<0.001**
Appropriateness	193.91	1	193.91	143.92	<0.001
Power dif * Appropriateness	0.01	1	0.014	0.01	0.919
Error	346.27	257	1.35		
Total	5674.00	261			
Corrected Total	562.79	260			

[a]. R Squared = 0.385 (Adjusted R Squared = 0.378)

Vignette design

The study designed four vignettes that came from crossing two manipulated variables. Vignettes have been used in past research in clinical settings including studies examining quality of clinical practice (Epstein et al., 2001; Peabody et al., 2004). However, the vignettes had some limitations in terms of providing adequate information (e.g., treatment history) that may be required for evaluation by pharmacists. In other words, the vignette might lack realism and may suffer because of lack of essential information. It is also possible that vignette had a cuing effect for the appropriateness measure and demand characteristics for the DV. Responses to vignettes with cueing items are believed to lead to overestimation of performance (Sandvik, 1995) and may have inflated the pharmacists' willingness to influence off-label prescribing. How a pharmacist assesses appropriateness in a real-life off-label prescribing situation may not be reflected accurately using a vignette-based research design.

Coverage error

The study sample was not drawn randomly using any probability sampling technique. Data collection for this study occurred online through an email invitation sent out by the participating state affiliates of the ASHP. As such, some pharmacists may not hold membership with the respective state affiliate. Additionally, it is possible that pharmacist members may not have email access.

Response rate and related issues

Generally, it is considered good practice, if not mandatory, in survey research to report response rate, which provides primary evidence about generalizability of the results. In addition, nonresponse bias may be examined by using different methods for the purpose of generalizability (Singleton and Straits, 2005). This study adopted a facilitated distribution approach via email. As a result, it was not possible to estimate the number of pharmacists who received the request to participate in the study and to determine when they received it; it was not possible to calculate response rate and evaluate potential nonresponse bias, as is suggested (Armstrong and Overton, 1977). Attrition rate during this study was high. Many of potential respondents (approximately 40%) left very early after starting the survey. This group of people may have different opinions on the issue than those responded. The design of the present study does not allow us to analyze this group of potential participants because the respondent terminated the survey before they were exposed to the experimental treatment. Thus, it can be argued that attrition rate did not occur because of treatment, a noted threat to internal validity.

Issues related to measures

In this study, measures were adapted from past studies that were not always related to health care. Although the measures used were all multi-item measures and the reliability estimates of the scales were good or acceptable, caution should be exercised while interpreting the results for several reasons. First, these scales are not well validated within the context of health care. Second, some measures did not behave according to conceptualization. For example, factor loadings of items of referent power were ambiguous and the scale's reliability was poor. Referent power may produce a halo effect or sleeper effect (French and Raven, 1965) and is related to expert power. The effects of referent power could not be adjusted, which may or may not bias the result. The information power scale emerged as a two factor solution as opposed to theory that suggested that it was unidimensional. The IRQ measure also exhibited this characteristic. As a result, the information power scale that was used in the analysis may not adequately capture what it purported to do. While conducting post-hoc analysis using the likelihood to act scale it was observed that information power became significant. It was not clear if that result occurred because of measurement inadequacy. One of the assumptions of ANCOVA is that covariates are measured without error. This assumption may not be tenable, especially in the light of the fact that our measures may have issues as described previously. Although expert power or appropriateness was not used in the analysis such concerns may apply to the measures that were included in the analyses as well. Measurement errors may have serious consequences on the conclusions of survey studies (Hair et al., 2006). Although the post hoc analyses provided some confidence, estimates may not be very robust unless advanced techniques such as structural equation modeling are used to account for measurement errors. Finally, the disease state fibromyalgia might have driven the response patterns. For example, the

existence of fibromyalgia is debated (Berenson, 2008) and if respondents believed it as such it might have affected their response.

Future Research Opportunities

The dependent variable in the present study was willingness to influence. Responses to willingness to influence, on average, were on the higher side of the scale (all cell means above 5.5) and cell means were very close. It could be such that pharmacists are by nature willing to influence regardless of whether the prescription is off-label or on-label. Alternatively, the word "off-label" may have sensitized respondents and thus created demand characteristics. Future research should explore pharmacist's willingness to influence off-label prescribing in comparison to on-label prescribing. Another potential reason for such high scores may stem from social desirability bias. Although suggested techniques (e.g., assurance of anonymity, highlighting the importance of the topic in cover letter, etc.) (Singleton and Straits, 2005) had been applied to control such bias, it may be still an issue. Specifically, impression management, which is associated with the desire to present oneself in a socially desirable manner (Paulhus, 1991) may be driving the response patterns observed. Respondents may be motivated to bias their self-reported responses to the extent that the value is strongly prescribed or expected within the social context or norms and has social meaning (King and Bruner, 2000). Future research should disentangle the effect of such bias, if any.

Although pharmacists may be willing to influence, do they actually influence – moot point of substantive concerns – when confronted with off-label prescribing situations that require additional evaluation? In this study, the cell means of likelihood of influence were lesser then their respective average values for willingness to influence. The models examining willingness to influence and likelihood to act showed little difference with the most striking being the

significance of information power in the latter, although differentiation between these constructs exist (Armitage and Conner, 2001). The intention-behavior literature suggests that intention does not correspond to behavior always (Sniehotta, Scholz, and Schwarzer, 2005; Sheeran, 2002). Another interesting question that can and should be explored is what mode of communication strategies pharmacists adopt when making their influence attempts. Pharmacist-physician communication is understudied relatively when compared to patient-physician or patient-pharmacist communication. Thus, it would be interesting and enlightening to examine pharmacist-physician communication with regard to influencing off-label prescribing, especially in those low appropriate conditions where a degree of uncertainty exists.

It should be noted here that in all of the aforementioned analyses, appropriateness was a fixed effect variable; however, it can also be considered a random effect variable with the assumption that two scale points as represented by two groups were randomly chosen on a continuum of appropriateness scale. Alternatively stated, can the study results be replicated in situations that compose the universe of degrees of appropriateness?

The manipulation check on the power measure raises an interesting point. The large standard error seen in the specialist group reflects variability of the scores and attests to imprecision of the estimate and implies that our tests may have little power (Meyer and Well, 2003). In fact, this study was not powered to detect all effects in the model, including power and appropriateness interaction. Future studies should be appropriately powered to examine the effect before such effect is ruled out with confidence. This is important especially due to the contaminating effect of manipulation.

Finally, the selected disease condition in the vignette did not have imminent life threatening potential. The existing literature on off-label prescribing is replete with evidence that

off-label prescribing occurs largely in life threatening diseases (Brosgart et al., 1996; Poole and Dooley, 2004). Pharmacists' intent and perceived responsibility in those cases may be interesting to study. It may be worth studying especially, in the light of the fact that responsibility was a strong and consistent predictor of willingness to influence. In addition, future research may also revisit the results of the study in other disease conditions.

CONCLUSION

This study examined pharmacist's willingness to influence off-label prescribing. Willingness to influence represents a pharmacist's willingness to ensure the rationality of off-label prescribing. Experimental manipulations were used to examine the effect of perceived relative expert power and perceived appropriateness on willingness to influence. Perceived negative impact on interprofessional relationship quality was measured to investigate its moderating effect on a pharmacist's willingness to influence. The effects of power of dependence, informational power, communication effectiveness, attitude, and responsibility were statistically controlled. The variables were measured using multi-item measures that showed acceptable or satisfactory reliabilities. Physician's expert power relative to pharmacist or perceived power differential between the pharmacist and physician affects pharmacist's willingness to influence off-label prescribing. Perceived appropriateness of off-label prescription medication negatively affects pharmacist willingness to influence as one would expect. However, the effect of perceived power differential on willingness to influence does not appear to depend on perceived appropriateness. In addition, significant moderating influences of perceived impact on relationship quality were observed. With an increasing perception of impact on relationship quality, perceived expert power differential more negatively affects pharmacist's willingness to influence. Thus, it indicates pharmacists are less willing to influence when

perceived power differential increases (e.g., specialist physician vs. general physician) if such an attempt is speculated to bring about higher negative impact on the interprofessional relationship. Similarly, combined effect of appropriateness and impact on relationship quality was observed. With anticipation of increasing adverse relational outcomes, pharmacist's willingness to influence off-label prescribing decreases more in the low appropriate condition than in the high appropriate condition. That is, pharmacists are less willing to influence off-label prescribing that is perceived low as compared to high in appropriateness under an anticipated condition of adverse relational consequences. Reverse phenomenon occurs when low negative outcomes anticipated. Interestingly, perceived negative impact on relationship quality has an independent effect on pharmacist's willingness to influence. This study has basic requirements (random assignment, manipulation of IV, measurement of DV) of a true experiment that ensure the internal validity of the results (Singleton and Straits, 2005). In addition, the study had participants from across the US including pharmacists from a mix of large and small states, academic and nonacademic hospitals, private and public hospitals and pharmacists having different job titles or responsibilities. Thus, such heterogeneity of respondents also ensures generalizability of the results of the study. In summary, the findings show that pharmacists are willing to ensure rationale behind off-label prescribing by intervening in off-label prescribing situations. This should comfort the patient community and justify the pharmacist's role and strengthen their image as a provider of evidence-based healthcare solutions.

CHAPTER 5 REFERENCES

Accreditation Council for Pharmacy Education. Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree. Available at:http://www.acpe-accredit.org/pdf/ACPE_Revised_PharmD_Standards_Adopted_Jan152006.pdf. Accessed August 14, 2010.

Agency for Healthcare Research and Quality. Efficacy and comparative effectiveness of off-label use of atypical antipsychotics. Comparative Effectiveness Review Number 6, January, 2007. Available at:http://effectivehealthcare.ahrq.gov/repFiles/Atypical_Antipsychotics_Final_Report.pdf. Accessed March 11, 2008.

Armitage CJ, Conner M. Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*. 2001;40:471-99.

Armstrong JS, Overton TS. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research.* 1977;14:396-02.

Berenson, A. Drug Approved. Is Disease Real? Available at: http://www.nytimes.com/2008/01/14/health/14pain.html?_r=1&oref=slogin.Accessed September 13, 2010.

Berger CW, Calabrese RJ. Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research*. 1975;1:99-12.

Brosgart CL, Mitchell T, Charlebois E, et al. (1996). Off-label drug use in human immunodeficiency. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology.* 1996;12:56-62.

Cromer J, Hojjat R, Peker S, Aprile J. Fostering the pharmacist-physician relationship *American Journal of Health System Pharmacy*. 2009;66:118-19.

Cuzzolin L, Zaccaron A, Fanos V. Unlicensed and off-label uses of drugs in paediatrics: a review of the literature. *Fundamental and Clinical Pharmacology*. 2003;17:125-31.

Dobson RT, Henry CJ, Taylor JG, et al. Interprofessional health care teams: Attitudes and environmental factors associated with participation by community pharmacists. *Journal of Interprofessional Care*. 2006;20:119-32.

Doucette WR, Nevins J, McDonough RP. Factors affecting collaborative care between pharmacists and physicians. *Research in Social and Administrative Pharmacy.* 2005;1:565-78.

Ekins-Daukes S, Helms PJ, Simpson CR, et al. Off-label prescribing to children: attitudes and experience of general practitioners. *British Journal of Clinical Pharmacology*. 2005;60:145-49.

Epstein SA, Gonzales JJ, Weinfurt K, et al. *Are psychiatrists' characteristics related to how they care for depression in the medically ill? Results from a national case-vignette survey. Psychosomatics. 2001;42:482-89.*

Flood AB, Scott WR. Professional power and professional effectiveness: The power of the surgical staff and the quality of surgical care in hospitals. *Journal of Health and Social Behavior*. 1978;19:140-54.

French Jr. JRP, Raven BH. The bases of social power. In: Cartwright D, Zander AF, eds. *Group dynamics: Research and theory*. 3rd ed. New York, NY: Harper and Row; 1968:259-69.

Fung S. The effects of power, relationship, and purpose in gaining compliance. *Contemporary Social Psychology*. 1991;15:44-57.

Hanlon JT, Weinberger M, Samsa GP, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *American of Journal of Medicine*. 1996;100:428-37.

Hair Jr. JF, Black WC, Babin BJ, et al. *Multivariate data analysis*. 6th ed. Upper Saddle River, NJ: Prentice Hall; 2006.

Kleinbaum DG, Kuppe, LL, Muller.KE. *Applied Regression Analysis and Other Multivariable Methods*, 4th ed., Belmont, CA: Duxbury Press; 2008.

Johnson BB. Advancing understanding of knowledge's role in lay risk perception.http://www.piercelaw.edu/risk/vol4/summer/johnson.htm. Accessed July 23, 2010.

Kahneman D, Tversky A. . On the psychology of prediction. *Psychological Review*. 1973;80, 237-51.

King MF, Bruner GC. Social desirability bias: A neglected aspect of validity testing .*Psychology and Marketing*. 2000;17:79-03.

Lambert BL. Face and politeness in pharmacist-physician interaction. *Social Science and Medicine*. 1996;43:1189-98.

Landon EL Jr. Order bias, the ideal rating, and the semantic differential. *Journal of Marketing Research*. 1971;8:375-78.

Lin HW, Phan K, Lin SJ. Trends in off-label beta-blocker use: A secondary data analysis. *Clinical Therapeutics*. 2006;28:1736-46.

Morgan RT, Hunt SD. The commitment-trust theory of relationship marketing. *Journal of Marketing*. 1994;58:20-38.

Myers JL, Well A. *Research Design and Statistical Analysis*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003.

Paulhus DL. Measurement and control of response bias. In: Robinson JP, Shaver PR, and Wrightsman LS, eds., *Measures of Personality and Social Psychological Attitudes*. San Diego, CA: Academic Press; 1991:17-59.

Peabody JW, Luck J, Glassman P, et al. Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Annals of Internal Medicine*. 2004;141:771-80.

Poole SG, Dooley MJ. Off-label prescribing in oncology. *Support Care Cancer*. 2004;12:302-05.

Radley DC, Finkelstein SN, Stafford RS. Off-label prescribing among office-based physicians. *Archives of Internal Medicines*. 2006;166:1021-26.

Raven BH. A power interaction model of interpersonal influence: French and Raven thirty years later. *Journal* of *Social Behavior and Personality*. 1992;7:217-44.

Roberts K, Varki S, Brodie R. Measuring the quality of relationships in consumer services: An empirical study. *European Journal of Marketing*. 2003;37:169-96.

Rupp MT, DeYoung M, Schondelmeyer SW. Prescribing problems and pharmacists interventions in community practice. *Medical Care*. 1992;30:926-40.

Sandvik H. *Criterion validity of responses to patient vignettes: an analysis based on management of female urinary incontinence. Family Medicine. 1995;27:388-92.*

Sheeran P. Intention-behaviour relations: a conceptual and empirical review. *European Review of Social Psychology*, 2002;12:1-36.

Singleton RA, Straits BC. *Approaches to Social Research*, 4th ed., New York, NY: Oxford University Press; 2005.

Sniehotta FF, Scholz U, Schwarzer R. Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology and Health*. 2005;20:143-60

Yukl G, Tracey B. Consequences of influence tactics used with subordinates, peers, and the boss. *Journal of Applied Psychology*. 1992;77:525-35.

Zillich AJ, McDonough RP, Carter BL, et al. Influential characteristics of physician/pharmacist collaborative relationships. *Annals of Pharmacotherapy.* 2004;38:764-70.

BIBLIOGRAPHY

Abella R. Students face ethical issues Kickbacks and off-label use of pharmaceuticals What should a pharmacists do? *California Pharmacists*. 2003;Autumn:18-19.

Accreditation Council for Pharmacy Education. Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree. Available at:http://www.acpe-accredit.org/pdf/ACPE_Revised_PharmD_Standards_Adopted_Jan152006.pdf. Accessed August 14, 2010.

Agency for Healthcare Research and Quality. Efficacy and comparative effectiveness of off-label use of atypical antipsychotics. Comparative Effectiveness Review Number 6, January, 2007. Available at: http://effectivehealthcare.ahrq.gov/repFiles/Atypical_Antipsychotics_Final_Report.pdf. Accessed March 11, 2008.

Allen RW, Madison DL, Porter LW, et al. Organizational politics: Tactics and characteristics of its actors. *California Management Review*. 1979;22:77-83.

American Academy of Pediatrics Committee on Drugs. Uses of drugs not described in the package insert (off-label uses). *Pediatrics*. 2002;110:181-83.

American Pharmacists Association. Report of the 2005 APhA House of Delegates. *Journal of the American Pharmacists Association*. 2005;45:557.

American Society of Health-System Pharmacists. ASHP statement on the use of medications for unlabeled uses. *American Journal of Hospital Pharmacy*. 1992;49:200G-20U8.

Anderson E, Weitz B. Determinants of continuity in conventional industrial channel dyads. *Marketing Science*. 1989;8:310-24.

Anderson J, Narus J. A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing.* 1990;54:42-58.

Ansani N, Branch R, Fedutes-Henderson B, et al. Unites States medical practice summary Innovative off-label medication use. *American Journal of Medical Quality*. 2006;21:246-54.

Ansani N, Sirio C, Smitherman T, et al. Designing a strategy to promote safe, innovative off-label use of medication. *American Journal of Medical Quality*. 2006;21:255-61.

Armitage CJ, Conner M. Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*. 2001;40:471-99.

Armstrong JS, Overton TS. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research.* 1977;14:396-02.

Arnston K. The determinants of influence: an investigation of pharmacist activity in the Pharmacy and Therapeutics committee. *Master's Thesis*. The University of Mississippi, Oxford, MS; 2002.

Atkins CD. Ethics of off-label treatment. *Journal of Clinical Oncology*. 1998;16:1637.

Bagozzi RP, Ascione FJ, Mannebach MA. Inter-role relationships in hospital-based Pharmacy and Therapeutics Committee decision-making. *Journal of Health Psychology*. 2005;10:45-64.

Bajcetic M, Jelisavcic M, Mitrovic J, et al. Off label and unlicensed drugs use in paediatric cardiology. *European Journal of Clinical Pharmacology*. 2005;61:775-79.

Balu S, O'Connor P, Vogenberg FR. Contemporary Issues Affecting P&T Committees Part 2: beyond managed care. *P & T*. 2004;29:780-83.

Barbui C, Ciuna A, Nose M, et al. Off-label and non-classical prescriptions of antipsychotic agents in ordinary in-patient practice. *Acta Psychiatrica Scandinavica*. 2004;109:275-78.

Berenson, A. Drug Approved. Is Disease Real? Available at: http://www.nytimes.com/2008/01/14/health/14pain.html?_r=1&oref=slogin.Accessed September 13, 2010.

Berger CW, Calabrese RJ. Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research*. 1975;1:99-12.

Black B, Babin B, et al. *Multivariate Data Analysis*, 6th ed., [Hardcover], Upper Saddle River, NJ: Prentice Hall; 2006.

Blum RS. Legal considerations in off-label medication prescribing. *Archives of Internal Medicine*. 2002;162:1777-79.

Bond CA, Raehl CL, Franke T. Clinical pharmacy services, hospital pharmacy staffing, and medication errors in United States hospitals. *Pharmacotherapy*. 2002;22:134-47.

Bond CA, Raehl CL, Franke T. Interrelationships among mortality rates, drug costs, total cost of care, and length of stay in United States hospitals: Summary and recommendations for clinical pharmacy services and staffing, *Pharmacotherapy*. 2001;21:129-41.

Boos, J. Off-label use – label off use? *Annals of Oncology*. 2003;14:1-5.

Borenstein JE, Graber G, Saltiel E, et al. Physician-pharmacist co-management of hypertension: a randomized, comparative trial. *Pharmacotherapy*. 2003;23:209-16.

Boudreau DM, Capoccia KL, Sullivan SD, et al. Collaborative care model to improve outcomes in major depression. *Annals of Pharmacotherapy*. 2002;36:585-91.

Breckler SJ. Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality and Social Psychology*. 1984;47:1191-05.

Britt TW. Engaging the self in the field: testing the triangle model of responsibility. *Personality and Social Psychology Bulletin*. 1999;25:696-06.

Brodie DD, Parish PA, Poston JW. Societal needs for drugs and drug-related services. *American Journal of Pharmaceutical Education.* 1980;44:276-78.

Brosgart CL, Mitchell T, Charlebois E, et al. (1996). Off-label drug use in human immunodeficiency. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology.* 1996;12:56-62.

Brown P, Levinson SC. *Politeness: Some Universals in Language Usage.* New York, NY: Cambridge University Press; 1987:61-83.

Campagna KD. Pharmacists' level of performance in making drug therapy decisions. *American Journal of Health-System Pharmacy*. 1995;52:640-45.

Campbell N. Use of medications for nonapproved indications. *Journal of Managed Care Pharmacy*. 1995;1:206.

Canary, DJ, Spitzberg, BH. Appropriateness and effectiveness perceptions of conflict strategies. *Human Communication Research*. 1987;14:93-18.

Carroll NV. Do community pharmacists influence prescribing? *Journal of the American Pharmacists Association*. 2003;43:612-21.

Census Bureau Regions and Divisions with State FIPS Codes.US Census Bureau.http://www.census.gov/geo/www/us_regdiv.pdf. Accessed 9 July, 2010.

Chalumeau M, Tréluyer JM, Salanave B, et al. Off label and unlicensed drug use among French office based paediatricians. *Archives of Disease in Childhood*. 2000;83:502-05.

Chen DT, Wynia MK, Moloney MR, Alexander GC. U.S. physician knowledge of the FDA-approved indications and evidence base for commonly prescribed drugs: results of a national survey. *Pharmacoepidemiology and Drug Safety*. 2009;14:1094-00.

Chen H, Deshpande AD, Jiang R, Martin BC. An epidemiological investigation of off-label anticonvulsant drug use in the Georgia Medicaid Population. *Pharmacoepidemiology and Drug Safety*. 2005;14:629-38.

Chin MH, Friedmann PD, Cassel CK, Lang RM. Differences in generalist and specialist physicians' knowledge and use of angiotensin-converting enzyme inhibitors for congestive heart failure. *Journal of General Internal Medicine*. 1997;12:563-30.

Churchill GA., Surprenant C. An investigation into the determinants of customer satisfaction. - *Journal of marketing Research*. 1982;19:491-04.

Churchill Jr. GA. A paradigm for developing better measures of marketing constructs," *Journal of Marketing Research.* 1979;16:64-73.

Cohen PJ. Off-label use of prescription drugs: legal, clinical and policy considerations. *European Journal of Anaesthesiology*. 1997;14:231-35.

Conroy S, Choonara I, Impicciatore P, et al. Survey of unlicensed and off label drug use in paediatric wards in European countries. *British Medical Journal*. 2000;320:79-82.

Conroy S, McIntyre J, Choonara I. Unlicensed and off label drug use in neonates. *Archives of Disease in Childhood*. 1999;80:F142-F145.

Conroy S, Newman C, Gudka S. Unlicensed and off-label drug use in acute lymphoblastic leukaemia and other malignancies in children. *Annals of Oncology*. 2003;14:42-47.

Conroy S. Unlicensed and off-label drug use Issues and recommendations. *Pediatric Drugs*. 2002;4:353-59.

Cromer J, Hojjat R, Peker S, Aprile J. Fostering the pharmacist-physician relationship *American Journal of Health System Pharmacy*. 2009;66:118-19.

Crosby LA, Evans KR, Cowles D. Relationship quality in services selling: An interpersonal influence perspective. *Journal of Marketing*. 1990;54:68-81.

Cuzzolin L, Zaccaron A, Fanos V. Unlicensed and off-label uses of drugs in paediatrics: a review of the literature. *Fundamental and Clinical Pharmacology*. 2003;17:125-31.

Daumit GL, Crum RM, Guallar E, et al. Outpatient prescriptions for atypical antipsychotics for African Americans, Hispanics, and Whites in the United States. *Archives of General psychiatry*. 2003;60:121-28.

Davidson W, Molloy W, Somers G, Bedard M. Relation between physician characteristics and prescribing for elderly people in New Brunswick. *Canadian Medical Association Journal*. 1994;150:917-21

DeMonaco JH, Ali A, Hippel EV . The major role of clinicians in the discovery of off-label drug therapies. *Pharmacotherapy.* 2006;26:323-32.

Denig P, Haaijer-Ruskamp FM. Therapeutic decision making of physicians. *Pharmaceutisch Weekblad*. 1992;14:9-15.

DeWitt EM., Glick HA, Albert DA, et al. Medicare coverage of tumor necrosis factor (alpha) inhibitors as an influence on physicians' prescribing behavior. *Archives of Internal Medicine*. 2006;166:57-63.

Dickerson LM., Mainous AG, Carek PJ. The pharmacist's role in promoting optimal antimicrobial use. *Pharmacotherapy*. 2000;20:711-23.

Dobson RT, Henry CJ, Taylor JG, et al. Interprofessional health care teams: Attitudes and environmental factors associated with participation by community pharmacists. *Journal of Interprofessional Care*. 2006;20:119-32.

Dorsch MJ, Swanson SR, Kelley SW. The role of relationship quality in the stratification of vendors as perceived by customers. *Journal of the Academy of Marketing Science*. 1998;26:128-42.

Doucette WR, Nevins J, McDonough RP. Factors affecting collaborative care between pharmacists and physicians. *Research in Social and Administrative Pharmacy*. 2005;1:565-78.

Douglas-Hall P, Fuller A, Gill-Banbam S. An analysis of off-license prescribing in psychiatric medicine. *Pharmaceutical Journal*. 2001;267:890-91.

Dresser R. The curious case of off-label use. *Hastings Center Report*. 2007;May/June:9-11.

Eagly AH, Chaiken S. The advantage of an inclusive definition of attitude. *Social Cognition*. 2007;25:582-02.

Eagly AH, Chaiken S. *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich College Publishers; 1993:1-21.

Eisenberg JM. Sociologic influences on decision making by clinicians. *Annals of Internal Medicine*. 1975;90:957-64.

Ekins-Daukes S, Helms PJ, Simpson CR, et al. Off-label prescribing to children in primary care: retrospective observational study. *European Journal of Clinical Pharmacology*. 2004;60:349-53.

Ekins-Daukes S, Helms PJ, Simpson CR, et al. Off-label prescribing to children: attitudes and experience of general practitioners. *British Journal of Clinical Pharmacology*. 2005;60:145-49.

El-Ansary A, Stem L. Power measurement in the distribution channel. *Journal of Marketing Research*. 1972;9:47-52.

Ellingson LL. Communication, collaboration, and teamwork among health care professionals. *Communication Research Trends*. 2002;21:1-21.

Epstein SA, Gonzales JJ, Weinfurt K, et al. *Are psychiatrists' characteristics related to how they care for depression in the medically ill? Results from a national case-vignette survey. Psychosomatics. 2001;42:482-89.*

Erchul WP, Raven BH, Ray AG. School psychologists' perceptions of social power bases in teacher consultation. *Journal of Educational and Psychological Consultation.* 2001;12:1-23.

Erchul WP, Raven BH, Whichard SM. School psychologist and teacher perceptions of social power in consultation. *Journal of School Psychology*. 2001;39:483-97.

Erchul WP, Raven BH, Wilson KE. The relationship between gender of consultant and social power perceptions within school consultation. *School Psychology Review*. 2004;33:582-90.

Erchul WP, Raven BH. Social power in school consultation: A contemporary view of French and Raven's bases of power model. *Journal of School Psychology*. 1997;35:137-71.

Erez M, Rim Y. The relationships between goals, influence tactics, and personal and organizational variables. *Human Relations*. 1982;35:871-78.

Farmer SM, Maslyn JM, Fedor DB, Goodman JS. Putting upward influence strategies into context. *Journal of Organizational Behavior*. 1997;18:17-42.

Finley PR, Rens HR, Pont JT, et al. Impact of a collaborative pharmacy practice model on the treatment of depression in primary care. *American Journal of Health-System Pharmacy*. 2002;59:1518-26.

Flood AB, Scott WR. Professional power and professional effectiveness: The power of the surgical staff and the quality of surgical care in hospitals. *Journal of Health and Social Behavior*. 1978;19:140-54.

Flood AB, Scott WR. Professional power and professional effectiveness: The power of the surgical staff and the quality of surgical care in hospitals. *Journal of Health and Social Behavior*. 1978;19:140-54.

Fountoulakis KN, Nimatoudis I, Iacovides A, Kaprinis G. Off-label indications for atypical antipsychotics: A systematic review. *Annals of General Hospital Psychiatry*. 2004;3:4. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC379314/pdf/1475-2832-3-4.pdf. Accessed April 14, 2008.

French Jr. JRP, Raven BH. The bases of social power. In: Cartwright D, Zander AF, eds. *Group dynamics: Research and theory*. 3rd ed. New York, NY: Harper and Row; 1968:259-69.

Freund DA, Stein J, Hurley R, et al. Specialty differences in the treatment of asthma. *Journal of allergy and clinical immunology*. 1989;84:401-406.

Fung S. The effects of power, relationship, and purpose in gaining compliance. *Contemporary Social Psychology*. 1991;15:44-57.

Gazarian M, Kelly M, McPhee JR, et al. Off-label use of medicines: consensus recommendations for evaluating appropriateness. *Medical Journal of Australia*. 2006; 185:544-548.

Gerbing DW, Anderson JC.An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research.* 1988;25:186-92.

Getty KC. Gender and Professional Experience as Predictors of Consultants' Likelihood of Use of Social Power Bases. *Unpublished Dissertation*. North Carolina State University, NC; 2006. Available at: http://www.lib.ncsu.edu/theses/available/etd-04172006-105027/unrestricted/etd.pdf. Accessed June 20, 2008.

Green, SB. How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research.* 1991;26:499-10.

Grindrod KA, Payel P, Martin JA. What intervention should pharmacists should employ to impact health practitioners' prescribing practices? *Annals of Pharmacotherapy*. 2006;40:1546-57.

Guerro RM, Nickman NA, Bair JN. Using pharmacists' perceptions in planning changes in pharmacy practice. *American Journal of Hospital Pharmacy*. 1990;47:2026-30.

Hair Jr. JF, Black WC, Babin BJ, et al. *Multivariate data analysis*. 6th ed. Upper Saddle River, NJ: Prentice Hall; 2006.Hamberg K, Gunilla R, Johansson EE. Male and female physicians show different patterns of gender bias: a paper-case study of management of irritable bowel syndrome. *Scandinavian Journal of Public Health*. 2004;32:144-52.

Hamer AM., Haxby DG, McFarland BH, Ketchum K. Gabapentin use in a managed care Medicaid population. *Journal of Managed Care Pharmacy*. 2002;8:266-71.

Hanlon JT, Weinberger M, Samsa G, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *The American Journal of Medicine*. 1996;100:428-37.

Hanlon JT, Weinberger M, Samsa GP, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *American of Journal of Medicine*. 1996;100:428-37.

Haw C, Stubbs J. A survey of off-label prescribing for inpatients with mild intellectual disability and mental illness. *Journal of Intellectual Disability Research*. 2005;49:858-64.

Haw C, Stubbs J. A survey of the off-label use of mood stabilizers in a large psychiatric hospital. *Journal of Psychopharmacology*. 2005;19:402-07.

Heise DR. The semantic differential and attitude research. In: Summers GF, ed. *Attitude measurement*. Chicago, IL: Rand McNally; 1970:235-253.

Hemminki E. Review of literature on the factors affecting drug prescribing. *Social Science and Medicine*. 1975;9:111-15.
Henneman EA, Lee JL,Cohen JI. Collaboration: a concept analysis. *Journal of Advanced Nursing*. 1995;21:103-09.
Henry V. Off-label Prescribing. Legal Implications. *Journal of Legal Medicine*. 1999;20:365-83.
Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *American Journal of Hospital Pharmacy*. 1990;47:533-43.
Himmelfarb S. The measurement of attitudes. In: Eagly AH, Chaiken S, eds. *The psychology of attitudes*. Orlando, FL: Hartcourt Brace Jovanovich College Publishers; 1993: 23-83.
Hohmann AA. Gender bias in psychotropic drug prescribing in primary care. *Medical Care*. 1989;27:478-90.
Horen B, Montastruc JL, Lapeyre-Mestre M. Adverse drug reactions and off-label drug use in pediatric outpatients. *British Journal of Clinical Pharmacology*. 2002;54:665-70.
Ilieva J, Baron S, Healey NM. Online surveys in marketing research: Pros and cons, *International Journal of Market Research*. 2002;44:361-76.
Institute of Medicine. Public confidence and involvement in clinical research: clinical research roundtable symposium II [summary]. September 25-26, 2000. Available at: http://www.iom.edu/Object.File/Master/4/128/CRR8pager2.pdf . Accessed April 12, 2008.
Johnson BB. Advancing understanding of knowledge's role in lay risk perception.http://www.piercelaw.edu/risk/vol4/summer/johnson.htm. Accessed July 23, 2010.
Kahneman D, Tversky A. . On the psychology of prediction. *Psychological Review*. 1973;80, 237-51.
Kallail KJ, Stanton SR. Pharmacy-physician communications: Potential to reduce medication errors. *Journal of the American Pharmacists Association*. 2006;46:618-20.
Keely JL. Pharmacist scope of practice. *Annals of Internal Medicine*. 2002;136:79-85.
King MF, Bruner GC. Social desirability bias: A neglected aspect of validity testing .*Psychology and Marketing*. 2000;17:79-03.
Kipnis D, Schmidt SM, Wilkinson I. Intraorganizational influence tactics: Explorations in getting one's way. *Journal of Applied Psychology*. 1980;64:440-52.
Kipnis D, Schmidt SM. The language of persuasion. *Psychology Today*. 1985;4:40-46.
Kipnis D. Does power corrupt? *Journal of Personality and Social Psychology*. 1972;24:33-41.
Klein DB, Tabarrok A. Who certifies off-label? *Regulation*. 2004;27:60-63.
Kleinbaum DG, Kuppe, LL, Muller.KE. *Applied Regression Analysis and Other Multivariable Methods*, 4th ed., Belmont, CA: Duxbury Press; 2008.
Knapp KK, Blalock SJ, Black BL. ASHP survey of ambulatory care responsibilities of pharmacists in managed care and integrated health systems – 2001. *American Journal of Health System Pharmacists*. 2001;58:2151-66.
Kocs D, Fendrick D. Effect of off-label use of oncology drugs on pharmaceutical costs: the rituximab experience. *American Journal of Managed Care*. 2003;9:393-00.
Kogut SJ, Yam F, Dufresne R. Prescribing of antipsychotic medication in a Medicaid population: use of polytherapy and off-label dosages. *Journal of Managed Care Pharmacy*. 2005;11:17-24.
Kos M, Wertheimer AI, Mrhar A. Satisfaction with pharmacotherapy for approved and off-label indications – A Delphi study. *Annals of Pharmacotherapy*. 2005;39:649-54.

Koslowsky M, Schwarzwald J, Ashuri S. On the relationship between subordinates' compliance to power sources and organizational attitudes. *Applied Psychology*. 2001;50:455-76.
Koslowsky M, Schwarzwald J. The use of power tactics to gain compliance: Testing aspects of Raven's (1988) theory in conflictual situations. *Social Behavior and Personality*. 1993;21:135-43.
Krebs DL. Altruism: An examination of the concept and a review of the literature, *Psychological Bulletin*. 1970;73:258-02.
Krupat E, Irish JT, Kasten LE, et al. Patient assertiveness and physician decision-making among older breast cancer patients. *Social Science and Medicine*. 1999;49:449-57.
Kumar N, Scheer LK, Steenkamp JEM. The effects of supplier fairness on vulnerable resellers. *Journal of Marketing Research*. 1995;32:54-65.
Laetz T, Silberman G. Reimbursement policies constrain the practice of oncology. *Journal of American Medical Association*. 1991;266:2996-99.
Lages C, Lages CR, Lages LF. The RELQUAL scale: A measure of relationship quality in export market ventures. *Journal of Business Research*. 2005;58:1040-48.
Lambert BL. Directness and deference in pharmacy students' messages to physicians. *Social Science and Medicine*. 1995;40:545-55.
Lambert BL. Face and politeness in pharmacist-physician interaction. *Social Science and Medicine*. 1996;43:1189-98.
Landon EL Jr. Order bias, the ideal rating, and the semantic differential. *Journal of Marketing Research*. 1971;8:375-78.
Leape LL, Cullen DJ, Clapp MD, et al. Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. *Journal of the American Medical Association*. 1999;281:267-70.
Lee AJ, Boro MS, Knapp KK, et al. Clinical and economic outcomes of pharmacist recommendations in a Veterans Affairs Medical Center. *American Journal of Health-System Pharmacy*. 2002;59:2070-77.
Leuthesser L. Supplier relational behavior: An empirical assessment. *Industrial Marketing Management*. 1997;26:245-54.
Levinson DJ. Role, personality, and social structure in the organizational setting. *Journal of Abnormal Psychology*. 1959;58:170-80.
Li VW, Jaffe MP, Li WW, Haynes H. A. Off-label dermatologic therapies usage, risks and mechanisms. *Archives of Internal Medicines*. 1998;134:1459-54.
Lin HW, Phan K, Lin SJ. Trends in off-label beta-blocker use: A secondary data analysis. *Clinical Therapeutics*. 2006;28:1736-46.
Lipitt R, Polansky N, Rosen S. The dynamics of power-a field study of social influence in groups of children. *Human Relations*. 1952;5:37-64.
Lipton HL, Bero LA, Bird JA, McPhee SJ. The Impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing: A randomized controlled trial. *Medical Care*. 1992;30:646-58.
Mack A. Examination of the evidence for off-label use of gabapentin. *Journal of Managed Care Pharmacy*. 2003;9:559-68.
Manfredi CM. A descriptive study of nurse managers and leadership. *Western Journal of Nursing Research*. 1996;18:314-30.

Mannebach MA, Ascione FJ, Gaither CA, et al. Activities, functions, and structure of pharmacy and therapeutics committees in large teaching hospitals. *American Journal of Health-System Pharmacy*. 1999;56:622-28.

McIntyre J, Conroy S, Avery A, et al. Unlicensed and off label prescribing of drugs in general practice. *Archives of Disease in Childhood.* 2000;83:498-501.

McKinlay JB, Potter DA, Feldman HA. Nonmedical influences on medical decision making. *Social Science and Medicine*. 1996;42:769-76.

Miller GM, Chapman JP. Misunderstanding analysis of covariance. *Journal of Abnormal Psychology*. 2001,110:40-8.

Mohr J, Speckman R. Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal*. 1994;15:135-52.

Morgan RT, Hunt SD. The commitment-trust theory of relationship marketing. *Journal of Marketing*. 1994;58:20-38.

Myers JL, Well A. *Research Design and Statistical Analysis*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003.

Nair KV, Coombs JH, Ascione FJ. Assessing the structure, activities, and functioning of P&T committees: A multisite case study. *P&T* . 2000;25:516-28.

Neubert A, Dorman H, Weiss J, et al. The impact of unlicensed and off-label drug use on adverse drug reactions in pediatric patients. *Drug Safety*. 2004;27:1059-67.

Nightingale SL. Off-label use of prescription drugs. *American Family Physician.* 2003;68:425-27.

O'Reilly J, Dalal A. Off-label or out of bounds? Prescriber and marketer liability for unapproved uses of FDA-approved drugs. *Annals of Health Law*. 2003;12:295-24.

Pandolfini C, Impicciatore P, Provasi D, et al. Off-label use of drugs in Italy: a prospective, observational and multicenter study. *Acta Paediatrica*. 2002;91:339-47.

Paulhus DL. Measurement and control of response bias. In: Robinson JP, Shaver PR, and Wrightsman LS, eds., *Measures of Personality and Social Psychological Attitudes*. San Diego, CA: Academic Press; 1991:17-59.

Peabody JW, Luck J, Glassman P, et al. Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Annals of Internal Medicine*. 2004;141:771-80.

Pearce JL, Gregersen HB. Task interdependence and extrarole behavior: A test of the mediating effects of felt responsibility. *Journal of Applied Psychology*. 1991;76:838-44.

Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: prescribing and transcribing – 2007. *American Journal of Health-System Pharmacy*. 2008;65: 827-43.

Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: monitoring and patient education – 2006. *American Journal of Health-System Pharmacy*. 2007;64:507-20.

Peiro JM, Melia JL. Formal and informal interpersonal power in organizations: Testing a bifactorial model of power in role-sets. *Applied Psychology*. 2003;52:14-35.

Peter JP. Reliability: A review of psychometric basics and recent marketing practices. *Journal of Marketing Research.* 1979;16:6-17.

Planas LG, Kimberlin CL, Segal R, et al. A pharmacist model of perceived responsibility for drug therapy outcomes. *Social Science & Medicine.* 2005;60:2393-03.

Podsakoff PM, Schriesheim CA. Field studies of French and Raven's bases of power: Critique, reanalysis, and suggestions for future research. *Psychological Bulletin.* 1985;97:387-11.
Poole SG, Dooley MJ. Off-label prescribing in oncology. *Support Care Cancer.* 2004;12:302-05.
Radley DC, Finkelstein SN, Stafford RS. Off-label prescribing among office-based physicians. *Archives of Internal Medicines*. 2006;166:1021-26.
Raisch DW. Determinants of prescribing behavior. In: Smith, MC, Wertheimer, AI, eds. *Social and Behavioral Aspects of Pharmaceutical Care*. Bringhamton, NY: Pharmaceutical Product Press; 1996:149-84.
Ranelli PL, Biss J. Physicians' perceptions of communication with and responsibilities of pharmacists. *Journal of the American Pharmaceutical Association*. 2000;40:625-30.
Raven BH. A power interaction model of interpersonal influence: French and Raven thirty years later. *Journal* of *Social Behavior and Personality*. 1992;7:217-44.
Raven BH. The bases of power: Origins and recent developments. *Journal of Social Issue.* 1993;49:227-51.
Roberts K, Varki S, Brodie R. Measuring the quality of relationships in consumer services: An empirical study. *European Journal of Marketing*. 2003;37:169-96.
Rubin, RB, Martin, MM. Development of a measure of interpersonal communication competence. *Communication Research Reports*. 1994;11:33-44.
Rupp MT, DeYoung M, Schondelmeyer SW. Prescribing problems and pharmacists interventions in community practice. *Medical Care*. 1992;30:926-40.
Saarela T, Engestrom R. Reported differences in management strategies by primary care physicians and psychiatrists in older patients who are depressed. *International Journal of Geriatric Psychiatry*. 2003;18:161-68.
Samsa GP, Hanlon JT, Schmader KE, et al. A summated score for the medication appropriateness index: development and assessment of clinimetric properties including content validity. *Journal of Clinical Epidemiology*. 1994;47:891-96.
Sandvik H. *Criterion validity of responses to patient vignettes: an analysis based on management of female urinary incontinence. Family Medicine. 1995;27:388-92.*
Schelenker B, Gratzke C, Reich O, et al. Preliminary results on the off-label use of Duloxetine for the treatment of stress incontinence after radical prostatectomy or cystectomy. *European Urology*. 2006;49:1075-78.
Schlenker BR, Britt TW, Pennington J, et al. The triangle model of responsibility. *Psychological Review*. 1994;101:632-52.
Schriesheim CA, Hinkin TR. Influence tactics used by subordinates: A theoretical and empirical analysis and refinement of the Kipnis, Schmidt, and Wilkinson subscales. *Journal of Applied Psychology*. 1990;75:246-57.
Schumock GT, Butler MG, Mick PD, et al. Evidence of the economic benefit of clinical pharmacy services: 1996-2000. *Pharmacotherapy*. 2003;23:113-32.
Schwarzwald J, Koslowsky M, Ochna-Levin T. Usage of and compliance with power tactics in routine vs. nonroutine work settings. *Journal of Business and Psychology.* 2004;18:385-01.
Scott A, Shiell A, King M. Is general practitioner decision making associated with patient socioeconomic status? *Social Science and Medicine*. 1996;42:35-46.
Segal R, Hepler CD. Drug choice as a problem-solving process. *Medical Care*. 1985;23:967-76.
Sheeran P. Intention-behaviour relations: a conceptual and empirical review. *European Review of Social Psychology*, 2002;12:1-36.

Simon H. Notes on the observation and measurement of political power. *Journal of Politics.* 1953;15:500-16.
Singleton RA, Straits BC. *Approaches to Social Research*, 4th ed., New York, NY: Oxford University Press; 2005.
Sleath B, Shih YT. Sociological influences on antidepressant prescribing. *Social Science and Medicine*. 2003;56:1335-44.
Smith BJ. Buyer-seller relationships: Similarity, relationship management, and quality, *Psychology and Marketing.* 1998;15:3-21.
Sniehotta FF, Scholz U, Schwarzer R. Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology and Health*. 2005;20:143-60
Somech A, Drach-Zahavy A. Relative power and influence strategy: the effects of agent/target organizational power on superiors' choices of influence strategies. *Journal of Organizational Behavior*. 2002;23:167-79.
Spinewine A, Swine C, Dhillon S, et al. Effect of a collaborative approach on the quality of prescribing for geriatric inpatients: a randomized, controlled trial. *Journal of the American Geriatric Society*. 2007;55:658-65.
Spitzberg BH. Methods of interpersonal skill assessment. In: Green JO, Burleson BR, eds. *Handbook of communication and social interaction skills*, Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2003:93-34.
Stahelski AJ, Payton CF. The effects of status cues on choices of social power and influence strategies. *Journal of Social Psychology*. 1995;*135*:553-60.
Stewart D, Rouf A, Snaith A, et al. Attitudes and experiences of community pharmacists towards paediatric off-label prescribing: a prospective survey. *British Journal of Clinical Pharmacology*. 2007;64:90-95.
Strong DK, Tsang GWY. Focus and impact of pharmacists' interventions. *Canadian Journal of Hospital Pharmacy*. 1993;46:101-08.
Sulick JA, Pathak DS. The perceived influence of clinical pharmacy services on physician prescribing behavior: a matched-pair comparison of pharmacists and physicians. *Pharmacotherapy*. 1996;16:1133-41.
Tabarrok AT. Assessing the FDA via the anomaly of off-label drug prescribing. *Independent Review*. 2000;1:25-53.
Tamai IY, Rubenstein LZ, Josephson KR, Yamauchi JA. Impact of computerized drug profiles and consulting pharmacist on outpatient prescribing patterns: a clinical trial. *Drug Intelligence and Clinical Pharmacy*. 1987;21:890-94.
Torres A. The use of Food and Drug Administration – approved medications for unlabeled (off-label) uses the legal and ethical implications. *Archives of Dermatology*. 1994;130:32-36.
Turner S, Nunn AJ, Fielding K, Choonara I. Adverse drug reactions to unlicensed and off-label drugs on pediatric wards: a prospective study. *Acta Paediatrica.* 1999;88:965-68.
Ulfer M, Kimland E, Bergman U. Adverse drug reactions and off-label prescribing for pediatric outpatients: a one-year survey of spontaneous reports in Sweden. *Pharmacoepidemiology and Drug Safety*. 2004;13:147-52.
US General Accounting Office. Off-label drugs: reimbursement policies constrain physicians in their choice of cancer therapies. Report to the chairman, Committee on Labor and Human Resources, US Senate, September,1991. Available at: http://archive.gao.gov/d18t9/144933.pdf. Accessed March 17, 2008.

US General Accounting Office. Off-label drugs: reimbursement policies constrain physicians in their choice of cancer therapies. Report to the chairman, Committee on Labor and Human Resources, US Senate, September,1991. Available at: http://archive.gao.gov/d18t9/144933.pdf. Accessed March 17, 2008.

Verbrugge LM, Steiner RP. Prescribing drugs to men and women. *Health Psychology*. 1985;1:79-98.

Weisse CS, Sorum PC, Sanders KN, Syat BL. Do gender and race affect decisions about pain management? *Journal of General Internal Medicine*. 2001;16:211-17.

White L, Johnson LW. Relative influence of physicians and patients in the prescribing decision. *Journal of Medical Marketing*. 2002;2:144-58.

Wilson KE. The likelihood of use of social power strategies by school psychologists when consulting with teachers. *Journal of Educational and Psychological Consultation*. 2008;8:101-23.

Yukl G, Falbe CM. The importance of different power sources in downward and lateral relations. *Journal of Applied Psychology*. 1991;76:416-23.

Yukl G, Tracey B. Consequences of influence tactics used with subordinates, peers, and the boss. *Journal of Applied Psychology*. 1992;77:525-35.

Zillich AJ, McDonough RP, Carter BL, et al. Influential characteristics of physician/pharmacist collaborative relationships. *Annals of Pharmacotherapy*. 2004;38:764-70.

Zindrick MR. Orthopedic surgery and Food and Drug Administration off-label use. *Clinical Orthopedics and Related Research*. 2000;378:31-38.

APPENDICES

APPENDIX A

Experimental Vignette

Dr. Smith is a general practitioner [rheumatologist] and joined your hospital two years ago. [Dr. Smith is a highly recognized expert in the field of rheumatology. Dr. Smith is considered an extremely knowledgeable physician with extensive clinical experience in rheumatology.] Dr. Smith has 5 [20] years of experience of clinical practice. Previously, Dr. Smith has [successfully] treated a few [many] patients with various medications prescribed for off-label indications.

Dr. Smith has written an order for fluoxetine for the treatment of diabetic neuropathy [fibromyalgia] for Jody Jones, 35, who was admitted to your hospital 1 day ago for a minor injury. Fluoxetine treatment has been ordered using 20 milligrams/day for seven days and then will be titrated until 40 milligrams/day is reached in two weeks in an out-patient setting.

Existing [peer-reviewed] reports on efficacy of fluoxetine in diabetic neuropathy [fibromyalgia] are inconsistent and inconclusive [favorable]. This information is based on data derived from disjointed personal experience, or a few case reports [well-designed randomized controlled trials or well-designed nonrandomized studies (e.g., cohort studies, case-control studies, observational studies)].

APPENDIX B

Study Instruments

Pharmacist in off-label prescribing - final

Block Filter

Q1.0

Thank you for agreeing to help a graduate student with this Master's thesis project.

Please complete this short survey as INCOMPLETE/ partial responses may NOT be analyzable.

Q1.1 **Are you a pharmacist practicing in any type of hospitals?**

○ Yes ○ No

☐ If **Yes** Is **Selected**, Then Skip To **End of Block**

Q1.2 **Researchers at the Department of Pharmacy Administration of the University of Mississippi School of Pharmacy strive to address issues facing pharmacists, the business and profession of pharmacy, and patient care. In order to access pharmacists and pharmacy technicians for future research, the Department intends to develop a research panel. Such panel will be used for ACADEMIC RESEARCH ONLY. It is assured that your email id and your practice information that you provide, if any, will be under the safe custody of the Department and managed following professional and ethical norms.**

Do you wish to be considered for inclusion in the research panel being developed by the Department?

○ Yes ○ No

☐ If **No** Is **Selected**, Then Skip To **End of Survey**

Display This Question:

If Researchers at the Department of Pharmacy Administration ... **Yes** Is **Selected**

Q1.3 **Please provide your e-mail id(s) for participating in the research panel.**

Display This Question:
If Researchers at the Department of Pharmacy Administration ... **Yes** Is **Selected**

Q1.4 **Please provide the following information.**

Job title	
State where you practice	
Practice setting	

Q1.5

If Is **Displayed**, Then Skip To **End of Survey**

Pharmacist in off-label prescribing - final

Block 11

Q2.1 INSTRUCTIONS

Please carefully read the instructions before you answer and be assured that there are NO right or wrong answers. Without your honest and thoughtful response, the objectives of this research will NOT be realized.

Definitions:

OFF-LABEL PRESCRIBING is the act of prescribing a medication outside its FDA-approved (labeled) recommendations, including different disease conditions, different dosage (over or under) range, different age groups, different route of administration, and different formulations.

In this survey, we are also interested in ***INDICATION-BASED off-label*** prescribing. This occurs when a medication is prescribed outside its FDA-recommended (labeled) disease conditions (e.g., β-blockers prescribed for the treatment of thyrotoxicosis or neurotic disorders, which are not approved indications for β-blockers).

This survey is organized into three sections:

Section I: Questions regarding your beliefs and the roles of your physician colleagues

Section II: Clinical scenario presentation and reaction (IMPORTANT)

Section III: Demographic information

Q2.2 **Section I**

Q2.3 **We would like you to think about the hospital in which you practice currently. Considering the physicians who practice in your hospital, please indicate your level of agreement or disagreement with each of the following statements using a 7-point scale where 1=strongly disagree and 7=strongly agree.**

	Strongly disagree = 1	2	3	4	5	6	Strongly agree = 7
Unless I help physicians select medications, their job will be more difficult.							
I understand that physicians really need my help with the selection of medications.							
I realize that physicians need assistance and cooperation from those working with them.							
It is clear to me that physicians really depend on me to help select medication.							
Because I respect physicians, I do not wish to disagree with them.							
I see physicians as persons with whom I can identify.							
As part of the health care team, physicians and I should see eye-to-eye on things.							
I look up to physicians to model my work.							
Physicians have better rationale for selecting medications than I do.							
I have better information required for the selection of medications than physicians possess.							
I have more control over information required for selecting medications than physicians do.							
I have more access to information required for the selection of medications than physicians do.							
Physicians have more explanations for the basis of medication selection than I do.							

Q2.4 **The following statements address your interactions with your physician colleagues. Please rate your behavior using a 7-point scale where 1=never and 7=always.**

	Never =1	2	3	4	5	6	Always = 7
I have trouble convincing physicians to do what I want them to do.							
I can persuade physicians to my position.							
I accomplish my communication goals.							

Q2.5 **As mention before, off-label prescribing is prescribing a medication outside its FDA-approved (labeled) recommendations. Considering your roles in off-label prescribing, please indicate your level of agreement or disagreement with the following statements on a 7-point scale where 1=strongly disagree and 7=strongly agree.**

	Strongly disagree = 1	2	3	4	5	6	Strongly agree = 7
I have to evaluate off-label prescriptions in order for my performance to be considered satisfactory.							
Evaluating off-label prescriptions is my responsibility.							
I consider evaluating off-label prescriptions as my obligation or duty.							
I would blame myself if I do not evaluate off-label prescriptions satisfactorily.							

Q2.6 **Note that INDICATION-BASED off-label prescribing is prescribing a medication outside its FDA-recommended (labeled) disease conditions. Please respond to the following statements using a scale of 1 (strongly disagree) to 7 (strongly agree).**

	Strongly disagree = 1	2	3	4	5	6	Strongly agree = 7
Indication-based off-label prescribing is important for assuring appropriate treatment.	○	○	○	○	○	○	○
Indication-based off-label prescribing is advantageous for patients.	○	○	○	○	○	○	○
Indication-based off-label prescribing provides effective therapies to patients.	○	○	○	○	○	○	○
Indication-based off-label prescribing ensures safety.	○	○	○	○	○	○	○

Q2.7 **Section II**

Q2.8

IMPORTANT:

Please read the hypothetical situation very carefully. Imagine yourself as a pharmacist in the following situation.

Dr. Smith is a rheumatologist and joined your hospital two years ago. Dr. Smith is a highly recognized expert in the field of rheumatology. Dr. Smith is considered an extremely knowledgeable physician with extensive clinical experience in rheumatology. Dr. Smith has 20 years of experience of clinical practice. Previously, Dr. Smith has successfully treated many patients with various medications prescribed for off-label indications.

Dr. Smith has written an order for fluoxetine for the treatment of fibromyalgia for Jody Jones, 35, who was admitted to your hospital 1 day ago for a minor injury. Fluoxetine treatment has been ordered using 20 milligrams/day for seven days and then will be titrated until 40 milligrams/day is reached in two weeks in an out-patient setting.

Existing peer-reviewed reports on efficacy of fluoxetine in fibromyalgia are favorable. This information is based on data derived from well-designed randomized controlled trials or well-designed nonrandomized studies (e.g., cohort studies, case-control studies, observational studies).

Q2.9 **On the basis of the situation that was just described, please indicate your willingness to act in each of the following ways using a 7-point scale where 1=not at all willing and 7=absolutely willing.**

I am willing to ...

	Not at all willing = 1	2	3	4	5	6	Absolutely willing = 7
use logic to convince Dr. Smith about the use of the medication	○	○	○	○	○	○	○
explain the reasons for my request as to why the medication is appropriate or inappropriate	○	○	○	○	○	○	○
present Dr. Smith with the information in support of my point of view about the use of the medication	○	○	○	○	○	○	○
present a detailed plan that justifies my idea about the use of the medication	○	○	○	○	○	○	○
ensure rationale of this medication order with Dr. Smith	○	○	○	○	○	○	○

Q2.10 **Please indicate your likelihood of acting as described by the following statements where 1=not at all likely and 7=very likely.**

	Not at all likely = 1	2	3	4	5	6	Very likely = 7
I will intervene with Dr. Smith on the medication order.	○	○	○	○	○	○	○
I will work with Dr. Smith on the medication order.	○	○	○	○	○	○	○
I will contact Dr. Smith about the medication order.	○	○	○	○	○	○	○

Q2.11 **On the basis of the situation that was described, please indicate how acting on the prescription order may affect your relationship with the prescriber. Please indicate your response on a 7-point scale where 1=not at all and 7=absolutely.**

Contacting Dr. Smith about this off-label prescription will ...

	Not at all = 1	2	3	4	5	6	Absolutely = 7
diminish Dr. Smith's willingness to work closely with me	○	○	○	○	○	○	○
diminish the likelihood that Dr. Smith will continue with my service	○	○	○	○	○	○	○
diminish Dr. Smith's trust in me	○	○	○	○	○	○	○
diminish Dr. Smith's counting on my service	○	○	○	○	○	○	○
diminish the likelihood that Dr. Smith will seek my advice	○	○	○	○	○	○	○
diminish the extent of patient information sharing between us	○	○	○	○	○	○	○
reduce communication between us	○	○	○	○	○	○	○
make Dr. Smith angry with me	○	○	○	○	○	○	○
make Dr. Smith annoyed	○	○	○	○	○	○	○
make Dr. Smith content with my service	○	○	○	○	○	○	○
make Dr. Smith happy with my service	○	○	○	○	○	○	○

Q2.12 **On the basis of the information in the scenario, please indicate your level of agreement or disagreement with each of the following statements using a 7-point scale where 1=strongly disagree and 7=strongly agree.**

	Strongly disagree =1	2	3	4	5	6	Strongly agree = 7
Dr. Smith knows a better way of selecting a drug therapy than I do.	○	○	○	○	○	○	○
Dr. Smith knows more about selecting a medication than I do.	○	○	○	○	○	○	○
Dr. Smith has more clinical knowledge about medicine than I do.	○	○	○	○	○	○	○
Dr. Smith has more clinical knowledge about the treatment than I do.	○	○	○	○	○	○	○

Q2.13 **Based on the information in the scenario, please evaluate the level of appropriateness or inappropriateness of the medication order using a 7-point scale where 1=not at all appropriate and 7=very appropriate.**

	Not at all appropriate = 1	2	3	4	5	6	Very appropriate = 7
In my opinion, the medication order is	○	○	○	○	○	○	○
Overall, the fluoxetine order for fibromyalgia is	○	○	○	○	○	○	○

Q2.14 **Section III**

This section asks about you and your practice setting.

Q2.15 **Gender:**

○ Male ○ Female

Q2.16 **What was your age on your last birthday?**

	Years
Age	

Q2.17 **Which of the following describes your pharmacy education? (check all that apply)**

☐ B.S. (Pharmacy) ☐ Pharm.D.

Q2.18 **Do you currently have any BPS specialization?**

○ Yes ○ No

Display This Question:
If Do you currently have any BPS specialization? **Yes** Is **Selected**

Q2.19 **IF YES: Which of the following do you hold? (check all that apply)**

☐ Nuclear Pharmacy ☐ Nutrition Support Pharmacy ☐ Oncology Pharmacy ☐ Pharmacotherapy ☐ Psychiatric Pharmacy

Q2.20 **For how long have you been practicing ?**

	Years
In a hospital setting	
In this hospital	

Q2.21 **What percentage of your working hours, on average, do you spend in each of the following activities? (Please be sure the rows sum to 100%)**

	%
Distributive pharmacy services	
Direct patient care/clinical pharmacy services	
Administrative duties	
Other	
Total	

Q2.22 **What title best describes your job? (check all that apply)**

☐ Clinical pharmacist ☐ Staff pharmacist ☐ Pharmacy manager ☐ Consultant pharmacist ☐ Pharmacy Director

☐ Other (specify)

Q2.23 **Is your hospital an academic medical center?**

- ○ Yes
- ○ No

Q2.24 **The ownership status of your hospital is . . . (check only one)**

- ○ a private community hospital (not-for-profit)
- ○ a private community hospital (for-profit)
- ○ a public community hospital
- ○ a federal hospital
- ○ a university hospital
- ○ other (specify)

Q2.25 **In what state is your hospital located?**

Alabama

Q2.26 **Does your hospital have an Institutional Review Board (IRB)?**

- ○ Yes
- ○ No

Q2.27 **Does your hospital have any policy regarding off-label prescribing?**

- ○ Yes
- ○ No

Display This Question:
If Does your hospital have any policy regarding off-label pr... **Yes** Is **Selected**

Q2.28 **IF YES, please describe briefly this policy.**

Q2.29 **Please describe if you have any thing to share about this study or your experience about off-label prescribing.**

Q2.30 **Do you wish to receive a summary report of this study?**

- ○ Yes
- ○ No

Display This Question:
If Do you wish to receive a summary report of this study? **Yes** Is **Selected**

Q2.31 **Please provide your e-mail id(s).**

E-mail id(s)

Q2.32 **Researchers at the Department of Pharmacy Administration of the University of Mississippi School of Pharmacy strive to address issues facing pharmacists, the business and profession of pharmacy, and patient care. In order to access pharmacists and pharmacy technicians for future research, the Department intends to develop a research panel. Such panel will be used for ACADEMIC RESEARCH ONLY. It is assured that your email id will be under the safe custody of the Department and managed following professional and ethical norms.**

Do you wish to be considered for inclusion in the research panel being developed by the Department?

○ Yes ○ No

☐ If **No** Is **Selected**, Then Skip To **End of Survey**

Display This Question:
If Researchers at the Department of Pharmacy Administration ... **Yes** Is **Selected**

Q2.33 **Please provide e-mail id(s) for participating in the research panel. In case you wish to be contacted at the address, which you have already specified, if any, skip this question.**

Q2.34

☐ If Is **Displayed**, Then Skip To **End of Survey**

APPENDIX C

Cover Letters

Email Cover Letter 1

Dear Pharmacist,

Subject: Please participate in a Master's thesis project on off-label prescribing

This is to request your participation in a University of Mississippi-led research project on off-label prescribing that is largely prevalent in US hospitals. Currently, there is a lack of knowledge on pharmacists' beliefs and opinions about off-label prescribing. Such information is believed to provide insight on the off-label prescribing practice and may be utilized for the advancement of pharmacy practice.

Please complete this short survey (approximately 15 minutes) in a single attempt as partially completed responses can NOT be saved for a later attempt and avoid incomplete responses. Please be assured that your responses will be kept confidential and anonymous. As an appreciation of your time and effort, we offer you a summary report of this study. If you wish to participate, please click on the link below.

http://survey.qualtrics.com/SE?SID=SV_9XLL9OWrNqPKxsE

This study has been approved by the Institutional Review Board (IRB) at the University of Mississippi. Should you have any questions or concerns, please contact the University's IRB at 662-915-7482. Thank you in advance for your time and support.

Sincerely,

Ram Sankar Basak, B.Pharm.
Graduate Student, University of Mississippi School of Pharmacy
Faser 211, University, MS 38677
Phone: 662 801 6484 (M)
Fax: 662 915 5102
Email: rsbasak@olemiss.edu

David J. McCaffrey, R.Ph., Ph.D.
Professor
University of Mississippi School of Pharmacy
Faser 217A, University, MS 38677
Phone: 662 915 5490 (O)
Email: davidjm@olemiss.edu

Email Cover Letter 2 (Reminder)

Dear Pharmacist,

Subject: Please participate or complete your participation in an academic off-label prescribing study

This is a friendly reminder about your participation in an off-label prescribing survey. If you have already done so, please accept our thanks and disregard this email.

As a pharmacist, your beliefs and opinions about off-label prescribing will provide insight on the off-label prescribing practice and may be utilized for the advancement of pharmacy practice.

This survey will take approximately 15 minutes to complete. Please complete it in a single attempt because partially completed responses can NOT be retrieved after you close the browser. If you have not completed the survey previously, please do now as partly completed responses may NOT be analyzable. Please be assured that your responses will be kept confidential and anonymous. As an appreciation of your time and effort, we offer you a summary report of this study. If you wish to participate, please click on the link below.

http://survey.qualtrics.com/SE?SID=SV_9XLL9OWrNqPKxsE

This study has been approved by the Institutional Review Board (IRB) at the University of Mississippi. Should you have any questions or concerns, please contact the University's IRB at 662-915-7482.

Thank you in advance for your time and support.

Sincerely,

Ram Sankar Basak, B.Pharm.
Graduate student
University of Mississippi School of Pharmacy
Faser 211, University, MS 38677
Fax: 662 915 5102
Email: rsbasak@olemiss.edu

David J. McCaffrey, R.Ph., Ph.D.
Professor
University of Mississippi School of Pharmacy
Faser 217A, University, MS 38677

Phone: 662 915 5490
Email: davidjm@olemiss.edu

APPENDIX D

Initial Communication to State Affiliates of ASHP

Dear Dr White,

Subject: Request for access to members for an academic research

Off-label prescribing – especially, for medications prescribed for uses other than their approved ones – has garnered the attention of many stakeholders in healthcare, including physicians, lawmakers, and payers. Although off-label prescribing is believed to be driven by unmet pharmacotherapeutic needs it, if not practiced judiciously, has the potential of causing detrimental effects because of reasons including but not limited to the fact that safety and efficacy/effectiveness of such use may not be well assessed. Unfortunately, pharmacists' beliefs and attitudes toward this behavior as well as their perceptions of their roles and responsibilities in the off-label prescribing process remain largely unexplored. Researchers at the University of Mississippi School of Pharmacy believe that a study on the pharmacists' role in off-label prescribing will generate knowledge that has the potential to improve patient care and advance pharmacy practice.

Because of budgetary constraints and the demands of the research design employed, we have determined that an Internet-based survey would be the most appropriate method of data collection. However, we do not have e-mail access to pharmacists who are practicing in community hospitals. As a responsible and caring organization of health-system pharmacists, your support of this study will be greatly appreciated. In other words, we would appreciate your organization's support for this research by sharing our offer to participate with your members. We do not require that you send your membership list to us. However, we require only that you forward our request to your pharmacist colleagues.

Please note that this study will not be fielded until it has met all of the human subject protections required by our Institutional Review Board (IRB) and federal law. We assure you that we will maintain professional norms and we will protect the confidentiality and anonymity of your members who choose to participate in the study. As an appreciation of your participation and support, we will submit a summary report of the findings of the study to your organization.

We believe that the results from this Master's thesis project will have implications for pharmacists and facilitate pharmacists' professional advancement. We will gladly provide further information, if needed. Please let us know at your earliest convenience if you agree to participate.

Thank you in anticipation of your support.

Sincerely,

Ram Sankar Basak, B.Pharm.
Graduate student
The University of Mississippi School of Pharmacy
662 801 6484 (M)

Email: rsbasak@olemiss.edu

David J. McCaffrey III, Ph.D.
Thesis Advisor
Associate Professor
The University of Mississippi School of Pharmacy
662 915 5490 (O), 662 915 5102 (F)
Email: davidjm@olemiss.edu

VITA

Ram Sankar Basak was born in 1973 in India. Ram is the son of Dhirendra Nath Basak and Kalpana Basak. Ram completed his Bachelor's of Pharmacy from Jadavpur University in Calcutta, India. After his graduation, Ram worked for a couple of years as a marketing professional for an Indian pharmaceutical company. Due to his passion for learning, Ram joined the Department of Pharmacy Administration of the University of Mississippi in 2005 in order to pursue his Master's degree with emphasis in pharmaceutical marketing. Ram completed his MS in 2010 and is currently enrolled as a Ph.D. student in the Department.