Behavioral Factors in Medical Prescribing

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Prescribing Behavior IQP
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Abstract:

Cognitive biases are present in all people, and as such inevitably influence professionals in their career-oriented decisions. This project involved a survey designed to identify 5 areas of bias, within the context of medical prescribing. The study as a whole aimed to identify whether or not any of the biases were expressed in the data, concretely demonstrating how cognitive bias can affect decisions in medicine. The first 3 biases that were tested included the self-serving bias, conformity bias, and obedience to authority bias. The fourth bias was incrementalism and the final bias tested involved perceptions of nuances in medical dogma through euphemism. From the data analyzed, findings indicate that specific biases were expressed in at least 3 of the 5 tested. Furthermore, the data from the other 2 questions displayed patterns suggesting other unintended types of psychological biases occurring. As a whole, the study showed concrete indications for the occurrence of bias in the first 3 questions, specifically the self-serving bias, conformity bias, and obedience to authority bias . The data also suggest bias-related psychological phenomenon occurring for the 4th and 5th question.

Introduction:

Within all professions, negative aspects of cognition emerge that can greatly affect decision-making in many contexts. These negative aspects of cognition are often expressed through both conscious and unconscious biases, biases that emerge in almost every component of the decision-making process. This innate human psychology includes susceptibility to concepts like basic self-interest, allowing the emergence of a self-serving bias to varying degrees. Social pressures are especially influential, as human psychology is wired to desire inclusion in groups, thus allowing for a conformity bias to emerge. Such phenomenon are

difficult to be aware of metacognitively, and therefore are easier to detect from an outsider standpoint.

Numerous examples of how these types of cognitive factors affect decision making are available. Examples in industry include construction workers finishing buildings early and in a rush, when faced with being penalized with a late fee for being more meticulous (Prentice, 2015). Another example would be in the legal field, where lawyers are subject to the self-serving bias as well as other ethical dilemmas/biases (Prentice, 2015). As previously discussed, this innate expression of self-serving bias can be highly influential in one's decision making process.

Psychological biases are also present in medicine. As an example, prescribing doctors are often faced with difficult and nuanced choices for treatment. These can include things such as raising doses of addictive medication, while weighing the patient's current wellbeing against the eventual drug withdrawal period. This is especially prevalent in the case of pain medication, and the incrementalism question in my survey is designed to test for this. In other situations, prescribing doctors must decide between a variety of medications, that is hopefully the correct choice for the patient's condition. For my IQP project, I chose to focus on analyzing 5 decision biases in the context of medicine, as this is the field I wish to pursue, and wish to determine if such biases have a significant effect in this context. For example, pharmaceutical companies can provide indirect incentives to prescribe their new medications, thus presenting doctors with a clear, potential self-serving bias (Kirsch, 2014).

Literature Review:

Outside of the specific medical focus within this experiment, there has been extensive psychological research done on various aspects of bias in professional decision making (Schneider and Bramstedt, 2006)(Prentice, 2015). Furthermore, a vast amount of the supporting research used in the design and indications of the study, were drawn from a range of sources analyzing innate, human ethical/psychological biases and associated behavioral phenomenon. For the purposes of gathering critical information for my experimental design, this background research was split into 2 parts, with each serving to reinforce the way in which specific biases were tested.

The first half of this background research focused on the underlying and innate psychological mechanisms that are responsible for all people expressing some forms of cognitive bias (Jones & Goldsmith, 2005). This goal of this review was to compare research regarding just the psychology component outside of the medical context, culminating in a better informed decision when deciding upon the 5 biases in the survey. Second, was a thorough examination of the research surrounding behavioral ethics and bias expressed in various professions, in order to be informed of how to relate this understanding to the medical context (Crouch, 2016). In the context of civil engineering and lawyering for example, it has been found that innate cognitive biases exert a great deal of influence in professionals' lives, and that this phenomenon is difficult to perceive oneself (Prentice, 2015). In total, this research into both aspects of expressed psychological bias aided a great deal in achieving an effective survey design.

Lastly, there was one other area of literature that I examined during the preliminary stages of designing the project. Most of these surround the psychology of individuals who are going through medicated treatment under the supervision of their doctor. In psychiatry specifically, there is a great deal of literature on how bias can emerge on the side of the prescriber, without proper consideration of the patient's subjective assessment (Liégeois and Eneman, 2008). Biases can become engrained over time, and even those with awareness of their psychology can be susceptible to biases. Furthermore, there is also a great deal of research regarding the relationship between psychiatry and capitalism (U'Ren, 1997). In total, it was research such as this that contributed greatly to the ideas used in the construction of the eventual survey.

Questionnaire Design:

For the purposes of the study, 5 psychological biases were tested to determine if any showed a clear indication of affecting professional decision-making in doctors' prescribing of psychoactive medications. Medical studies on commonly prescribed psychoactive medications were gathered in order to only have the survey contain well-known medications across a variety of applications. For each of the 5 biases selected for testing, 2 iterations of each question were constructed, with one being a generic and the other containing a slight change meant to potentially elicit the specific bias. Secondarily, a small set of preliminary questions was added to the beginning of the survey outside of the 5 bias questions. These preliminary questions served to supplement the researchers' knowledge of a participants involvements, relations, experiences, and perception of medicated treatment. Furthermore, these questions also drew upon the medical literature regarding the drugs used in each question (Griffin et al.,

2013). Lastly, research was also examined on how these pharmaceuticals affects the specific psychological disorders present in the medical questions (Wang et al., 2016).

Methodology and Reasoning:

In total there were 5 sets of two questions each, breaking down into the following categories:

1. Self-serving bias set.
2. Conformity bias set.
3. Ethical fading through incrementalism set.
4. Fading through the use of common medical euphemism set
5. Obedience to authority bias set.

The survey is formatted in 2 iterations, with 2 sample groups, where the first iteration of the survey is given to only the random first sample group, and the second iteration only to the second random sample group. The first iteration of each question of the survey is meant to elicit no biases, so contains only the unbiased and empirical prescribing questions. The second iteration of each question of the survey is meant to elicit the 5 aforementioned biases, so these questions are mostly homogenous to those in iteration 1, but with small changes designed to identify biases in the eventual data. One specific example would be the Self-Serving Bias question's (A01/A02) second iteration, which mimics the scenario of pharmaceutical companies promoting their products through financial incentives to prescribing doctors. Given this setup for the survey, each iteration of the questions received an equal number of responses.

Design and Implementation:

Once the questionnaire was completed and approved by the WPI IRB, the survey was formatted onto the survey distribution platform, Qualtrics. To surmount the issue of each question having 2 iterations and thus requiring pseudo-randomization, the program allowed for this naturally in the "Survey Flow" settings (Fink, 2017). In this way, the program would itself ensure that equal numbers of participants received each of the 2 iterations for each of the 5 primary questions. After the survey was formatted properly into Qualtrics, it was then activated as live in WPI's Sona Systems exclusively, to limit our participants to only the WPI participant pool. Due to issues stemming from the COVID-19 pandemic, data collection ran longer than is typical, from the beginning of November, 2020 until the end of February, 2021. In total, 48 responses were gathered over the data collection period, with the question allocation software making sure each question iteration received equal responses.

As previously discussed in the methodology section, 5 specific cognitive biases are tested in the survey. The first 3 questions (A01/A02, B01/B02, and C01/C02) have answer choices formatted into a 1 to 7 confidence gradient regarding the prescribing of a predetermined medication. However, questions D01/D02 and E01/E02 are formatted differently, as these questions were more nuanced in nature (Fowler, 2006). Question 4 has answer choices that are still confidence-oriented, but each outlines a greatly different treatment approach to the scenario given. Question E01/E02 is very similar in this way to the formatting of the question D01/D02 answer choice scheme, but involves treatment options that are not affiliated with specific medications.

Analysis and Discussion:

For the sake of consistency and clarity, the analysis and discussion of the data is organized in the same manner as my questionnaire design, starting with the 2 iterations of question 1. However, it is key to note that questions A01/A02, B01/B02, and C01/C02 are based around the same exact answer format, being the confidence level, that the participant has in prescribing a medication. For this reason, the analysis of these first 3 questions are more comparable, with the trend being analyzed here a commonality across all these questions pairs. In this same way questions D01/D02 and E01/E02 are similar, and therefore will be analyzed separately from questions A01/A02, B01/B02, and C01/C02. The findings within the data suggested the occurrence of bias in the first 3 questions, and other interesting phenomenon present in the 4th and 5th question.

For each question set, both the "No Bias" and "Bias Present" iterations are reproduced here, with differences in the "Bias Present" iterations meant to illicit a specific bias highlighted.

A01 and A02-See Appendix B: (Self-Serving Bias)

<u>A01: (No Bias)</u>

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's new antidepressant and the many other, more proven drugs available.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

<u>A02: (Bias Present)</u>

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a

pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's antidepressant and the many other, more proven drugs available. Because of the difficulty in penetrating this already crowded market of drugs, the pharmaceutical company offers financial incentives to doctors that meet certain prescription targets.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

In analyzing the individual data across both iterations of question 1(A) concerning the Self-Serving Bias, a clear trend was found between the 2 iterations of the question. The answer choice scheme for questions A01/A02 was a 1-7 confidence interval on prescribing a medication, with 1 being least confident and 7 being extremely confident. From this format, it was found that iteration 2 of question 1 (A02), offering a self-serving reward for prescribing, was found by participants to be much more favorable in a high confidence answer choice. The histogram in figure 1 displays this trend well, with the right side of the histogram dominated by the high confidence answers of (orange) A02.

Table 1:

1-7 Gradient	A01	A02
1	3	1
2	4	0
3	0	6
4	11	6
5	5	6
6	0	3
7	0	0

Table 1 shows the prescribing confidence data for both iterations of question A01/A02, concerning the Self-Serving Bias.

Figure 1:

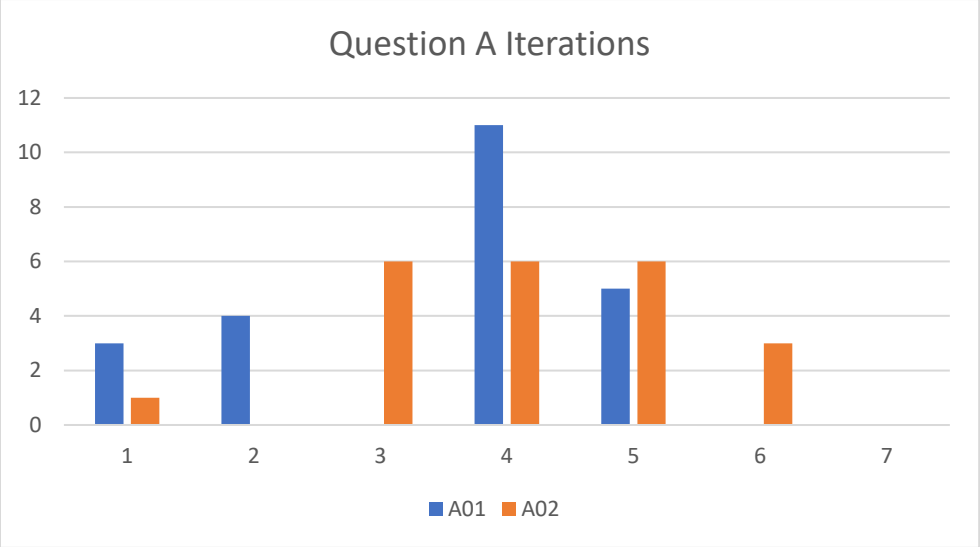

Figure 1 shows the data from table 1 graphed in the form of a histogram, with iteration 1 data in blue and iteration 2 data in orange.

B01 and B02-See Appendix B: (Conformity Bias)

<u>B01. (No Bias)</u>

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. There are a variety of medications used to treat anxiety. Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam) have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for treating anxiety, these off-label medications may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

<u>B02: (Bias Present)</u>

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. While there are a variety of medications used to treat anxiety, your medical group most commonly prescribes Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam). These medications have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for

treating anxiety, these drugs may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety. Furthermore, your peers adhere to the medical group's preferred medications in most cases.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

As with the analysis for question A01/A02, question B01/B02 saw the same trend in the data across iterations of the question. The second iteration of the question containing the prospective trigger for Conformity Bias, showed higher confidence on average than iteration 1 in prescribing. This could indicate that this bias is a work in both questions A01/A02 and B01/B02 so far, with the same trend appearing across the iterations of question C01/C02 as well.

Table 2:

1-7 Gradient	B01	B02
1	1	1
2	1	1
3	4	3
4	4	4
5	3	5
6	6	7
7	0	2

Table 2 shows the prescribing confidence data for both iterations of question B01/B02, concerning the Conformity Bias.

Figure 2:

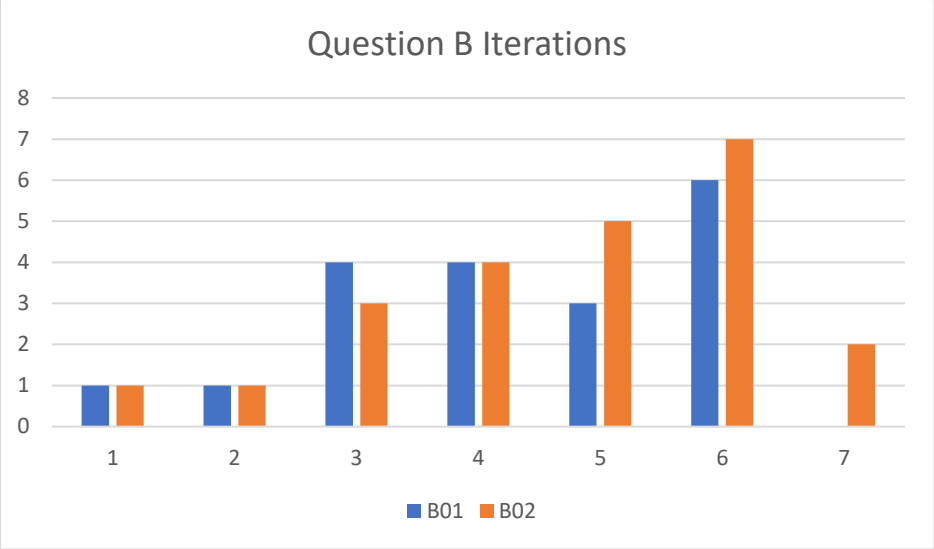

Figure 2 shows the data from table 2 graphed in the form of a histogram, with iteration 1 data in blue and iteration 2 data in orange.

C01 and C02-See Appendix B: (Obedience to Authority Bias)

C01: (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

C02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical foundation/organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. Generally, you have found that your workplace administrators and superiors greatly prefer that doctors in the foundation prescribe from company data, with these decisions appearing in annual employee reviews. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

Showing the same trend in the data as questions A01/A02 and B01/B02, question C01/C02 followed this pattern as well. This question focused on testing for the Obedience to Authority Bias, and iteration 2 of the questions containing the prospective trigger, saw higher confidence prescribing answers than the unbiased version. As mentioned, this is the same pro-bias confidence trend expressed across questions, as shown in table 3 for question C01/C02, and table 4 in the answer set averages across questions A01/A02, B01/B02, and C01/C02.

Table 3:

1-7 Gradient	C01	C02
1	2	0
2	2	2
3	5	2
4	4	8
5	2	3
6	4	4
7	2	3

Table 3 shows the prescribing confidence data for both iterations of question C01/C02, concerning the Obedience to Authority Bias.

Table 4:

	A01	A02	B01	B02	C01	C02
Average	3.48	4.14	4.48	4.74	4.00	4.64

Table 4 shows the difference in the averaged values of the answer sets, across all iterations of questions A01/A02, B01/B02, and C01/C02.

Figure 3:

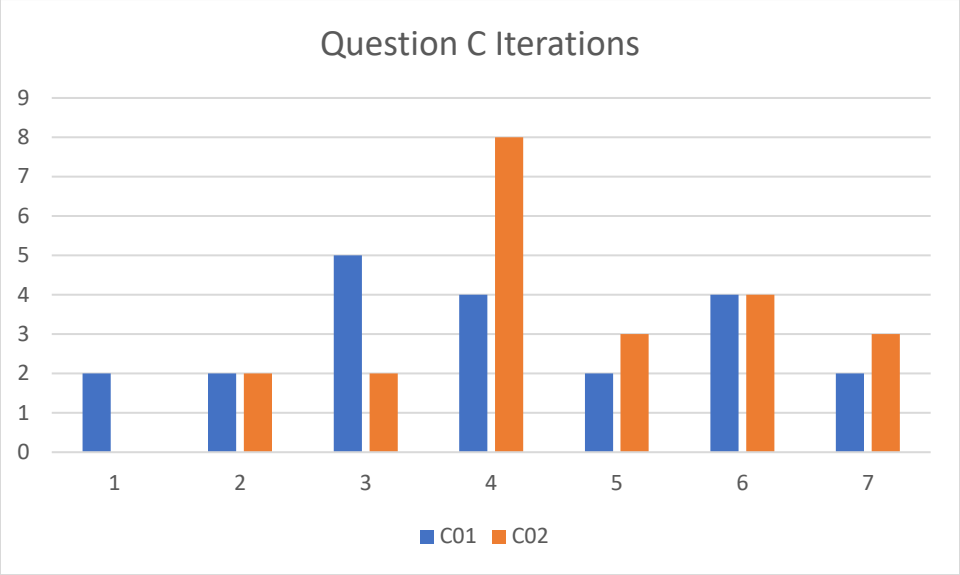

Figure 3 shows the data from table 3 graphed in the form of a histogram, with iteration 1 data in blue and iteration 2 data in orange.

D01 and D02-See Appendix B: (Incrementalism Bias)

D01: (No Bias)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and have been doing so for 5 years at 20mg per day, with none of the common side effects usually encountered with opiates. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 30mg, thus slightly increasing tolerance and addiction potential, but still well within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

D02: (Bias Present)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and have been doing so for 5 years, starting at 20 mg but are now taking 40mg per day, with none of the common side effects usually encountered with opiates. The medical records indicate that the patient has had 2, 10mg dosage adjustments as tolerance built gradually over time, thus resulting in the current dose of 40mg. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 50mg, thus slightly increasing tolerance and addiction potential, but still within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

Table 5:

1-7 (see key below)	D01	D02
1	5	3
2	2	1
3	6	4
4	6	6
5	1	3
6	1	4
7	0	0

Table 4 shows the prescribing confidence data for both iterations of question D01/D02, concerning incrementalism-based bias.

Key:
1. I will make the dosage adjustment, as it is small and I consider it fully acceptable for the patient's current treatment timeframe and FDA prescribing guidelines.

2. I will make the dosage adjustment, because my worries around receptor dependency are not prevalent enough to cause concern in this dosage range.

3. I may make the dosage adjustment as I am not hugely worried about receptor dependency, but would like to establish a closer look at this patient going forward in all future appointments.

4. I am somewhat skeptical about the dosage adjustment given the stigma around opioids, but would make the adjustment to save the patient from severe and chronic pain, observing them carefully during future visits.

5. I am very skeptical about the dosage adjustment, but despite my worries I will do it nonetheless, and will hold this patient in high priority for follow-ups and routine assessments.

6. I am too skeptical regarding opioids to make the adjustment, and I am ready to deal with the patient's anger or repercussions from management as a result of any patient complaint.

7. I do not wish to make a decision regarding this dilemma.

Figure 4:

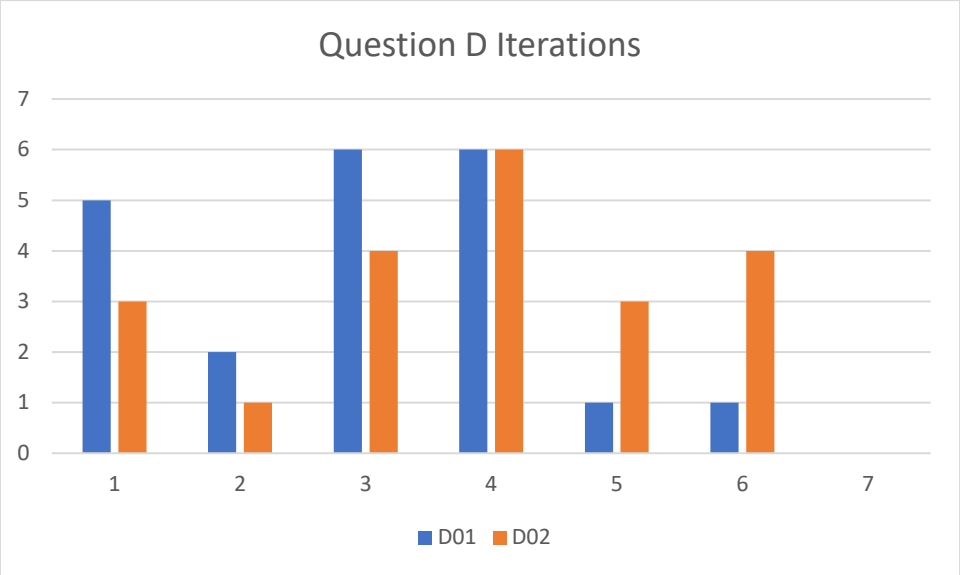

Figure 4 shows the data from table 4 graphed in the form of a histogram, with iteration 1 data in blue and iteration 2 data in orange.

When examining the data from the 2 iterations of question D01/D01, a few other aspects had to first be considered. To start, the answer choice system for questions D01/D02 and E01/E02 differed greatly from those used in A01/A02, B01/B02, and C01/C02. The answer choices for D01/D02 specifically were in the form of sentence-type answer choices, but still following the pattern of highest prescribing confidence to lowest. Because of this, the histogram in Figure 4 is a useful representation of the difference in data distribution between the question's 2 iterations. What was found in the data, was that D01 saw a higher concentration of high confidence prescribing answers for the opioid upward adjustment, in an unbiased context. However, in D02 containing the bias, answers were much more concentrated toward the low confidence end of the answer choices.

Unlike the previous 3 questions showing promise for an elicited bias, question D01/D02 showed the opposite, with an suggestion that participants were aware of the danger surrounding opioid medications specifically. This was somewhat separate from the incrementalism bias the researchers aimed to test, but is valuable information surrounding the state of the current opioid crisis. It was considered that it may be a form of ethical framing, based on a greater awareness of the harms present with narcotic medication. More research will have to be done in this area to assess the true awareness of the population regarding narcotics, to determine if the awareness surrounds incrementalism or specifically opioids.

E01 and E02-See Appendix B: (Euphemism-Based Bias)

E01: (No Bias)

A patient in their mid-twenties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over half a decade, they have been consuming vast quantities of cannabis products in order to quell symptoms of their GAD. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

E02: (Bias Present)

A patient in their forties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over 2 decades, they have been consuming vast quantities

of cannabis products in order to function in every day life. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

Table 6:

1-7 (see key below)	E01	E02
1	0	1
2	6	8
3	4	4
4	0	1
5	10	5
6	1	0
7	2	3

Table 5 shows the prescribing confidence data for both iterations of question D, concerning medical euphemism-based bias in a hypothetical drug withdrawal scenario.

Key:

1. I would prescribe benzodiazepines for withdrawal anxiety, as despite their known addiction potential, the duration of marijuana withdrawal is far shorter than the FDA's treatment window given for all benzodiazepines.

2. I would prescribe new-generation antidepressants as they are known to be less addictive than benzodiazepines, and are thought to help with dysphoria experienced by cannabis withdrawal patients, despite their lower effectiveness compared to benzodiazepines.

3. I would prescribe gabapentin, as despite its comparably higher chance of minor to moderate side effects, is more effective than antidepressants and less addictive than benzodiazepines in treating withdrawal.

4. I would consider any of the 3 medications as a treatment, as the patient is better off taking something medically prescribed than buying drugs off the street.

5. I would not prescribe any medication, and would instead suggest the patient go to a treatment center or a Cognitive Behavioral Therapy (CBT) Psychologist, in order to unravel the underlying trauma causing these issues, despite the patient's anger and potential backlash you may receive from the medical establishment regarding the addiction potential of cannabis.

6. I do not believe that cannabis is addictive or can cause dependance, and therefore would only suggest therapy for the underlying trauma, and would inform the patient kindly that their claims were unscientific.

7. I do not wish to make a decision regarding this dilemma.

Of all of the questions analyzed, questions E01/E02 was the most unique in its layout and answer system. It was designed to test euphemism bias in a case of drug withdrawal, where medical dogma is nuanced around the topic, and treatments opinions greatly differ. Instead of being a confidence interval like A01/A02 through C01/C02, or a similar layout like question D01/D02, question E01/E02 presented a number of different routes for treatment pertaining to a drug-withdrawing person. In the unbiased E01, the patient was young and had been addicted for a moderate period, whereas in E02 the patient was much older and far more severely addicted. One of the answer choices (option 5 above) involved foregoing any type of medicated treatment, instead opting for the addict to see a Cognitive Behavioral Therapy Psychologist. In the unbiased E01 with less severe addiction, 10 participants selected this option, whereas only 5 did who received E02. This was by far the greatest discrepancy in answer choice frequency across the 2 iterations of question E01/E02, and could indicate participants leaned more towards medications in the most severe case of addiction due to withdrawal severity.

In terms of general discussion of the overall study, there are several other key findings and potential implications to note. First are the limitations that were present throughout the course of the project. The largest of these was undoubtably that aside from an advisor, the study was designed by only one researcher. Second, was that due to the scheduling difficulties posed by the COVID-19 pandemic, data collection had to be split up across 2 terms, thus drastically extending the timeframe of the project. Within this, third and finally, was that the survey was not implemented specifically amongst medical professionals experienced with prescribing, so any indications are general in nature.

Aside from limitations, there was one other area of interest within the analysis of the data. The preliminary questions at the beginning of the survey, were designed to test participants' familiarity with their own medical treatment, as well as the professional field. Interestingly, there was an almost completely even split between participant who had involvement on an academic/professional level, and those that had not. Furthermore, it was found that almost every participant had very high confidence in the recommendations of their doctors. In the case of the survey's participants, this indicates that the pool as a whole had a great trust in their doctors' treatment recommendations. Further research would have to be done to determine if confidence in one's doctor influences bias in medical treatment.

Conclusion:

While every question of the 5 yielded some form of indicative data, this was most clear and homogenous in the case of questions A01/A02, B01/B02, and C01/C02. The Self-Serving Bias, Conformity Bias, and Obedience to Authority Bias respectively, appeared to be the most prevalent in being elicited, as shown in their histogram data. Question D01/D02 showed a bias

indication as well similarly, but in the opposite direction, with patients being reluctant to select high confidence answers for a large opioid dose increase. Lastly, the data from question E01/E02 was very interesting, in that participants were more inclined to select a non-medicated route of treatment, when their patient's addiction was less severe in withdrawal symptoms. More research would have to be done for this question, but this basic data indicated cognitive bias towards drug-based treatment when it is not absolutely required. In total, the study was considered a success in documenting the potential for bias in medical prescribing, and further research in this area could be done to more fully assess the occurrence of cognitive bias in medicine.

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References: (APA)

Sources for Behavioral Ethics Alone

Crouch, C. (2016). Ethics. In Barton J. (Ed.), *The Hebrew Bible: A Critical Companion* (pp. 338-355). PRINCETON; OXFORD: Princeton University Press. doi:10.2307/j.ctv7h0snt.18

Jones, O., & Goldsmith, T. (2005). Law and Behavioral Biology. *Columbia Law Review, 105*(2), 405-502. Retrieved July 5, 2020, from www.jstor.org/stable/4099315

Machery, E., & Cohen, K. (2012). An Evidence-Based Study of the Evolutionary Behavioral Sciences. *The British Journal for the Philosophy of Science, 63*(1), 177-226. Retrieved July 5, 2020, from www.jstor.org/stable/41410131

Prentice, R. A. (2015). Behavioral Ethics: Can It Help Lawyers (and Others) Be Their Best Selves. Notre Dame Journal of Law, Ethics & Public Policy, 29, 35-86.

SCHRAG, Z. (2016). Ethical Pluralism: Scholarly Societies and the Regulation of Research Ethics. In VAN DEN HOONAARD W. & HAMILTON A. (Eds.), *The Ethics Rupture: Exploring Alternatives to Formal Research-Ethics Review* (pp. 317-334). Toronto; Buffalo; London: University of Toronto Press. doi:10.3138/j.ctv1005czm.20

Young, M., & Strode, P. (2009). Evolution and Ethics. In *Why Evolution Works (and Creationism Fails)* (pp. 175-183). New Brunswick, New Jersey; London: Rutgers University Press. Retrieved July 5, 2020, from www.jstor.org/stable/j.ctt5hj59j.24

Holistic Medical Ethics

URDARDOTTIR, A., ARNADOTTIR, S., & GUNNARSDOTTIR, E. (2013). Socioeconomic status and differences in medication use among older people according to ATC categories and urban-rural residency. *Scandinavian Journal of Public Health, 41*(3), 311-317. Retrieved June 28, 2020, from www.jstor.org/stable/45150704

U'Ren, R. (1997). Psychiatry and Capitalism. *The Journal of Mind and Behavior, 18*(1), 1-11. Retrieved June 26, 2020, from www.jstor.org/stable/43853806

High Risk-Associated Medications in Widespread Current Use

Liégeois, A., & Eneman, M. (2008). Ethics of deliberation, consent and coercion in psychiatry. *Journal of Medical Ethics, 34*(2), 73-76. Retrieved June 26, 2020, from www.jstor.org/stable/27944556

Rogers, A., Pilgrim, D., Brennan, S., Sulaiman, I., Watson, G., & Chew-Graham, C. (2007). Prescribing benzodiazepines in general practice: A new view of an old

problem. *Health, 11*(2), 181-198. Retrieved June 26, 2020, from www.jstor.org/stable/26649670

Ethics of Medication Efficacy

Gold, A., & Lichtenberg, P. (2014). The moral case for the clinical placebo. *Journal of Medical Ethics, 40*(4), 219-224. Retrieved July 3, 2020, from www.jstor.org/stable/43282966

Kirsch I. (2014). Antidepressants and the Placebo Effect. *Zeitschrift fur Psychologie*, *222*(3), 128–134. https://doi.org/10.1027/2151-2604/a000176

Penn, E., & Tracy, D. K. (2012). The drugs don't work? antidepressants and the current and future pharmacological management of depression. *Therapeutic advances in psychopharmacology*, *2*(5), 179–188. https://doi.org/10.1177/2045125312445469

Ethics of Patient vs. Professional Opinion in Medicated Treatment

Schneider, P., & Bramstedt, K. (2006). When Psychiatry and Bioethics Disagree about Patient Decision Making Capacity (DMC). *Journal of Medical Ethics, 32*(2), 90-93. Retrieved June 28, 2020, from www.jstor.org/stable/27719569

Specific Medication Information for Potential Survey Use

Griffin, C. E., 3rd, Kaye, A. M., Bueno, F. R., & Kaye, A. D. (2013). Benzodiazepine pharmacology and central nervous system-mediated effects. *The Ochsner journal*, *13*(2), 214–223.

Wang, S. M., Kim, J. B., Sakong, J. K., Suh, H. S., Oh, K. S., Woo, J. M., Yoo, S. W., Lee, S. M., Lee, S. Y., Lim, S. W., Cho, S. J., Chee, I. S., Chae, J. H., Hong, J. P., & Lee, K. U. (2016). The Efficacy and Safety of Clonazepam in Patients with Anxiety Disorder Taking Newer Antidepressants: A Multicenter Naturalistic Study. *Clinical psychopharmacology and neuroscience : the official scientific journal of the Korean College of Neuropsychopharmacology*, *14*(2), 177–183. https://doi.org/10.9758/cpn.2016.14.2.177

Supplemental Sources

Blank, R. (2013). Neuroethics and Neuropolicy. In *Intervention in the Brain: Politics, Policy, and Ethics* (pp. 65-88). Cambridge, Massachusetts; London, England: The MIT Press. doi:10.2307/j.ctt5vjqwq.6

Double, D. (2002). The Limits Of Psychiatry. *BMJ: British Medical Journal, 324*(7342), 900-904. Retrieved June 26, 2020, from www.jstor.org/stable/25228007

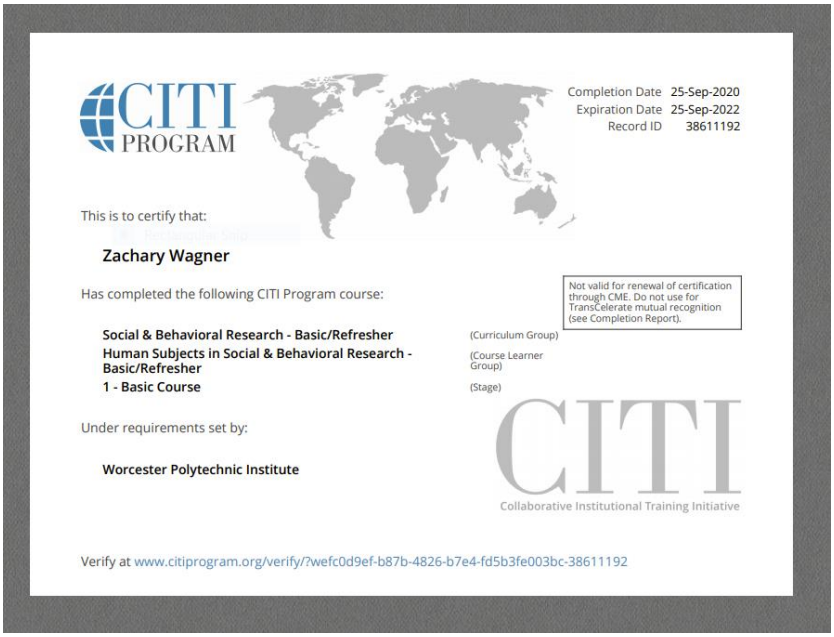
Hofmann, S., Wu, J., Boettcher, H., & Sturm, J. (2014). Effect of pharmacotherapy for anxiety disorders on quality of life: A meta-analysis. *Quality of Life Research, 23*(4), 1141-1153. Retrieved June 26, 2020, from www.jstor.org/stable/24726414

VIJAYAN, R. (2010). Ethics in Pain Medicine. In TSUI S., CHEN P., & NG K. (Eds.), *Pain Medicine: A Multidisciplinary Approach*(pp. 81-92). Hong Kong University Press. Retrieved June 28, 2020, from www.jstor.org/stable/j.ctt1xwd0n.12

APPENDIX A: (HSR Course Certificate)

Professor Harold Walker: (Advisor)

Zachary Wagner: (Student Investigator)



APPENDIX B:

Consent Statement:

My name is Zachary Wagner (zwagner@wpi.edu) and I am conducting an IQP with my advisor, Professor Harold Walker (hwwalker@wpi.edu), that includes this survey to analyze medication prescribing scenarios, in the context of psychoactive controlled substances. Please answer the questions to the best of your ability, paying attention to the nuances of each question's scenario in your decision-making. The survey should only require 30-60 minutes of your time to complete.

Your participation is voluntary, and the risks of participating in this study are minimal. However, the survey questions due contain scenarios depicting severe mental illness symptoms, as well as cases of drug addiction. We understand that these topics may be sensitive for some, and it is your right to withdraw from the survey at any time. However, we encourage you to participate, as the survey will be used to make indications about prescribing doctors. All responses to the survey are anonymous, and your answers will never be associated with your identity at any time. If you have questions about this study or IQP project, you can contact us at the email addresses above.

Survey iterations 1 with bias potential removed, to be given to half of the participant pool

1. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **short-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

2. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **long-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

3. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **antidepressant** medications?

1-7 gradient:

4. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **anxiety** medications?

1-7 gradient:

5. On a scale from 1 to 7, with 1 being not at all and 7 being completely, how much do you trust your **doctor's expertise** in prescribing controlled substances?

1-7 gradient:

6. On a scale from 1 to 7, with 1 being none and 7 being professional level, how much do you about health/medicine, relating to prescribing medications/knowledge of controlled substances?

A01: (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's new antidepressant and the many other, more proven drugs available.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

B01. (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. There are a variety of medications used to treat anxiety. Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam) have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for treating anxiety, these off-label medications may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

C01: (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

D01: (No Bias)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and have been doing so for 5 years at 20mg per day, with none of the common side effects usually encountered with opiates. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 30mg, thus slightly increasing tolerance and addiction potential, but still well within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

a. I will make the dosage adjustment, as it is small and I consider it fully acceptable for the patient's current treatment timeframe and FDA prescribing guidelines.

b. I will make the dosage adjustment, because my worries around receptor dependency are not prevalent enough to cause concern in this dosage range.

c. I may make the dosage adjustment as I am not hugely worried about receptor dependency, but would like to establish a closer look at this patient going forward in all future appointments.

d. I am somewhat skeptical about the dosage adjustment given the stigma around opioids, but would make the adjustment to save the patient from severe and chronic pain, observing them carefully during future visits.

e. I am very skeptical about the dosage adjustment, but despite my worries I will do it nonetheless, and will hold this patient in high priority for follow-ups and routine assessments.

f. I am too skeptical regarding opioids to make the adjustment, and I am ready to deal with the patient's anger or repercussions from management as a result of any patient complaint.

g. I do not wish to make a decision regarding this dilemma.

E01: (No Bias)

A patient in their mid-twenties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over half a decade, they have been consuming vast quantities of cannabis products in order to quell symptoms of their GAD. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

a. I would prescribe benzodiazepines for withdrawal anxiety, as despite their known addiction potential, the duration of marijuana withdrawal is far shorter than the FDA's treatment window given for all benzodiazepines.

b. I would prescribe new-generation antidepressants as they are known to be less addictive than benzodiazepines, and are thought to help with dysphoria experienced by cannabis withdrawal patients, despite their lower effectiveness compared to benzodiazepines.

c. I would prescribe gabapentin, as despite its comparably higher chance of minor to moderate side effects, is more effective than antidepressants and less addictive than benzodiazepines in treating withdrawal.

d. I would consider any of the 3 medications as a treatment, as the patient is better off taking something medically prescribed than buying drugs off the street.

e. I would not prescribe any medication, and would instead suggest the patient go to a treatment center or a Cognitive Behavioral Therapy (CBT) Psychologist, in order to unravel the underlying trauma causing these issues, despite the patient's anger and potential backlash you may receive from the medical establishment regarding the addiction potential of cannabis.

f. I do not believe that cannabis is addictive or can cause dependance, and therefore would only suggest therapy for the underlying trauma, and would inform the patient kindly that their claims were unscientific.

g. I do not wish to make a decision regarding this dilemma.

Survey iterations 2 with bias potential included, to be given to half of the participant pool

1. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **short-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

2. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **long-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

3. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **antidepressant** medications?

1-7 gradient:

4. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **anxiety** medications?

1-7 gradient:

5. On a scale from 1 to 7, with 1 being not at all and 7 being completely, how much do you trust your **doctor's expertise** in prescribing controlled substances?

1-7 gradient:

6. On a scale from 1 to 7, with 1 being none and 7 being professional level, how much do you about health/medicine, relating to prescribing medications/knowledge of controlled substances?

A02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's antidepressant and the many other, more proven drugs available. Because of the difficulty in

penetrating this already crowded market of drugs, the pharmaceutical company offers financial incentives to doctors that meet certain prescription targets.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

B02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. While there are a variety of medications used to treat anxiety, your medical group most commonly prescribes Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam). These medications have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for treating anxiety, these drugs may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety. Furthermore, your peers adhere to the medical group's preferred medications in most cases.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

C02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical foundation/organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. Generally, you have found that your workplace administrators and superiors greatly prefer that doctors in the foundation prescribe from company data, with these decisions appearing in annual employee reviews. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

D02: (Bias Present)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and

have been doing so for 5 years, starting at 20 mg but are now taking 40mg per day, with none of the common side effects usually encountered with opiates. The medical records indicate that the patient has had 2, 10mg dosage adjustments as tolerance built gradually over time, thus resulting in the current dose of 40mg. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 50mg, thus slightly increasing tolerance and addiction potential, but still within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

a. I will make the dosage adjustment, as it is small and I consider it fully acceptable for the patient's current treatment timeframe and FDA prescribing guidelines.

b. I will make the dosage adjustment, because my worries around receptor dependency are not prevalent enough to cause concern in this dosage range.

c. I may make the dosage adjustment as I am not hugely worried about receptor dependency, but would like to establish a closer look at this patient going forward in all future appointments.

d. I am somewhat skeptical about the dosage adjustment given the stigma around opioids, but would make the adjustment to save the patient from severe and chronic pain, observing them carefully during future visits.

e. I am very skeptical about the dosage adjustment, but despite my worries I will do it nonetheless, and will hold this patient in high priority for follow-ups and routine assessments.

f. I am too skeptical regarding opioids to make the adjustment, and I am ready to deal with the patient's anger or repercussions from management as a result of any patient complaint.

g. I do not wish to make a decision regarding this dilemma.

E02: (Bias Present)

A patient in their forties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over 2 decades, they have been consuming vast quantities of cannabis products in order to function in every day life. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are

treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

a. I would prescribe benzodiazepines for withdrawal anxiety, as despite their known addiction potential, the duration of marijuana withdrawal is far shorter than the FDA's treatment window given for all benzodiazepines.

b. I would prescribe new-generation antidepressants as they are known to be less addictive than benzodiazepines, and are thought to help with dysphoria experienced by cannabis withdrawal patients, despite their lower effectiveness compared to benzodiazepines.

c. I would prescribe gabapentin, as despite its comparably higher chance of minor to moderate side effects, is more effective than antidepressants and less addictive than benzodiazepines in treating withdrawal.

d. I would consider any of the 3 medications as a treatment, as the patient is better off taking something medically prescribed than buying drugs off the street.

e. I would not prescribe any medication, and would instead suggest the patient go to a treatment center or a Cognitive Behavioral Therapy (CBT) Psychologist, in order to unravel the underlying trauma causing these issues, despite the patient's anger and potential backlash you may receive from the medical establishment regarding the addiction potential of cannabis.

f. I do not believe that cannabis is addictive or can cause dependance, and therefore would only suggest therapy for the underlying trauma, and would inform the patient kindly that their claims were unscientific.

g. I do not wish to make a decision regarding this dilemma.

Exit Statement:

Thank you very much for completing our IQP survey today on medication prescribing. If after completing the survey you are experiencing any anxiety or discomfort due to the drug related topic and would like support, we would encourage you to contact the WPI Student Development and Counseling Center, (SDCC) on 16 Einhorn Road, Worcester MA, 01609 (https://www.wpi.edu/offices/student-development-counseling-center). You can also reach

them by phone at (508)-831-5540, or by email at sdcc@wpi.edu. Again, we greatly appreciate your participation in our survey, and feel free to reach out to us if you have any questions.

Thank you,

Zachary Wagner

Advisor/PI: Professor Harold Walker (hwwalker@wpi.edu)

Student Investigator: Zachary Wagner (zwagner@wpi.edu)

APPENDIX C: Include a copy of the survey revised after the pretest, with changes highlighted.

Consent Statement:

My name is Zachary Wagner (zwagner@wpi.edu) and I am conducting an IQP with my advisor, Professor Harold Walker (hwwalker@wpi.edu), that includes this survey to analyze medication prescribing scenarios, in the context of psychoactive controlled substances. Please answer the questions to the best of your ability, paying attention to the nuances of each question's scenario in your decision-making. The survey should only require 30-60 minutes of your time to complete.

Your participation is voluntary, and the risks of participating in this study are minimal. However, the survey questions due contain scenarios depicting severe mental illness symptoms, as well as cases of drug addiction. We understand that these topics may be sensitive for some, and it is your right to withdraw from the survey at any time. However, we encourage you to participate, as the survey will be used to make indications about prescribing doctors. All responses to the survey are anonymous, and your answers will never be associated with your identity at any time. If you have questions about this study or IQP project, you can contact us at the email addresses above.

Survey iterations 1 with bias potential removed, to be given to half of the participant pool

7. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **short-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

8. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **long-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

9. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **antidepressant** medications?

1-7 gradient:

10. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **anxiety** medications?

1-7 gradient:

11. On a scale from 1 to 7, with 1 being not at all and 7 being completely, how much do you trust your **doctor's expertise** in prescribing controlled substances?

1-7 gradient:

12. On a scale from 1 to 7, with 1 being none and 7 being professional level, how much do you about health/medicine, relating to prescribing medications/knowledge of controlled substances?

1-7 gradient:

13. Are you currently enrolled in a medicine-focused program? (medical school, pre-med, pharmacology, etc.)

a. Yes

b. No

c. Past involvement (change of Major or other)

A01: (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's new antidepressant and the many other, more proven drugs available.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

B01. (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. There are a variety of medications used to treat anxiety. Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam) have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for treating anxiety, these off-label medications may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

C01: (No Bias)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

D01: (No Bias)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and have been doing so for 5 years at 20mg per day, with none of the common side effects usually encountered with opiates. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 30mg, thus slightly increasing tolerance and addiction potential, but still well within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

a. I will make the dosage adjustment, as it is small and I consider it fully acceptable for the patient's current treatment timeframe and FDA prescribing guidelines.

b. I will make the dosage adjustment, because my worries around receptor dependency are not prevalent enough to cause concern in this dosage range.

c. I may make the dosage adjustment as I am not hugely worried about receptor dependency, but would like to establish a closer look at this patient going forward in all future appointments.

d. I am somewhat skeptical about the dosage adjustment given the stigma around opioids, but would make the adjustment to save the patient from severe and chronic pain, observing them carefully during future visits.

e. I am very skeptical about the dosage adjustment, but despite my worries I will do it nonetheless, and will hold this patient in high priority for follow-ups and routine assessments.

f. I am too skeptical regarding opioids to make the adjustment, and I am ready to deal with the patient's anger or repercussions from management as a result of any patient complaint.

g. I do not wish to make a decision regarding this dilemma.

E01: (No Bias)

A patient in their mid-twenties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over half a decade, they have been consuming vast quantities of cannabis products in order to quell symptoms of their GAD. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

a. I would prescribe benzodiazepines for withdrawal anxiety, as despite their known addiction potential, the duration of marijuana withdrawal is far shorter than the FDA's treatment window given for all benzodiazepines.

b. I would prescribe new-generation antidepressants as they are known to be less addictive than benzodiazepines, and are thought to help with dysphoria experienced by cannabis withdrawal patients, despite their lower effectiveness compared to benzodiazepines.

c. I would prescribe gabapentin, as despite its comparably higher chance of minor to moderate side effects, is more effective than antidepressants and less addictive than benzodiazepines in treating withdrawal.

d. I would consider any of the 3 medications as a treatment, as the patient is better off taking something medically prescribed than buying drugs off the street.

e. I would not prescribe any medication, and would instead suggest the patient go to a treatment center or a Cognitive Behavioral Therapy (CBT) Psychologist, in order to unravel the underlying trauma causing these issues, despite the patient's anger and potential backlash you may receive from the medical establishment regarding the addiction potential of cannabis.

f. I do not believe that cannabis is addictive or can cause dependance, and therefore would only suggest therapy for the underlying trauma, and would inform the patient kindly that their claims were unscientific.

g. I do not wish to make a decision regarding this dilemma.

Survey iterations 2 with bias potential included, to be given to half of the participant pool

7. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **short-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

8. On a scale from 1 to 7, with 1 being most negatively and 7 being most positively, how do you perceive the **long-term** use of psychoactive substances in the treatment of mental health conditions?

1-7 gradient:

9. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **antidepressant** medications?

1-7 gradient:

10. On a scale from 1 to 7, with 1 being never effective and 7 being always effective, how do you perceive the effectiveness of **anxiety** medications?

1-7 gradient:

11. On a scale from 1 to 7, with 1 being not at all and 7 being completely, how much do you trust your **doctor's expertise** in prescribing controlled substances?

1-7 gradient:

12. On a scale from 1 to 7, with 1 being none and 7 being professional level, how much do you about health/medicine, relating to prescribing medications/knowledge of controlled substances?

1-7 gradient:

13. Are you currently enrolled in a medicine-focused program? (medical school, pre-med, pharmacology, etc.)

a. Yes

b. No

c. Past involvement (change of Major or other)

A02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, a pharmaceutical company working with the medical organization where you are employed has released a new antidepressant medication and is promoting its benefits. Initial studies have shown roughly equivalent or slightly better efficacy between the pharmaceutical company's antidepressant and the many other, more proven drugs available. Because of the difficulty in penetrating this already crowded market of drugs, the pharmaceutical company offers financial incentives to doctors that meet certain prescription targets.

How likely are you to prescribe the branded medication to those who come to you for the treatment of depression?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

B02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an anxiety medication. While there are a variety of medications used to treat anxiety, your medical group most commonly prescribes Ativan (lorazepam), Xanax (alprazolam), and Klonopin (clonazepam). These medications have shown to be effective for anxiety disorders. They are all chemical derivatives of the basic benzodiazepine Lewis Structure. Studies indicate them to have a significant risk of abuse and/or addiction. In addition to these benzodiazepines, there are many off-label medications that do not carry such a significant risk of addiction such as Atarax (hydroxyzine), Neurontin (gabapentin), and Silenor (doxepin). While potentially effective for treating anxiety, these drugs may have minor to moderate side effects that have not been as extensively studied when used off-label to treat anxiety. Furthermore, your peers adhere to the medical group's preferred medications in most cases.

How likely are you to prescribe only on-label, FDA approved anxiety medications?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

C02: (Bias Present)

A patient with no history of chronic illness or drug abuse has come to you looking for an antidepressant medication. While there are a variety of medications used to treat depression, the medical foundation/organization where you are employed has a list of the top ranked antidepressants from internal, organizational studies. Generally, you have found that your workplace administrators and superiors greatly prefer that doctors in the foundation prescribe from company data, with these decisions appearing in annual employee reviews. This data is available to you, but your medical foundation employer also provides doctors access to most peer-reviewed medical sites.

How likely are you to consult your organization's peer-reviewed studies over other peer-revied medical studies?

1-7 gradient: Extremely Unlikely/Never-(1*)(2*)(3*)(4*)(5*)(6*)(7*)-Extremely Likely/Always

D02: (Bias Present)

An elderly patient with a history of chronic back pain has come to you looking for help with pain management. The patient expresses that they are currently taking an opioid medication and have been doing so for 5 years, starting at 20 mg but are now taking 40mg per day, with none of the common side effects usually encountered with opiates. The medical records indicate that the patient has had 2, 10mg dosage adjustments as tolerance built gradually over time, thus resulting in the current dose of 40mg. The patient likes the medication but has found that after 5 years, it has lost some of its effectiveness and would like the dose increased. Following general medical knowledge, the dose would be increased to 50mg, thus slightly increasing tolerance and addiction potential, but still within FDA prescribing guidelines.

Which of the following answers **best** describes your thought process around the patient?

a. I will make the dosage adjustment, as it is small and I consider it fully acceptable for the patient's current treatment timeframe and FDA prescribing guidelines.

b. I will make the dosage adjustment, because my worries around receptor dependency are not prevalent enough to cause concern in this dosage range.

c. I may make the dosage adjustment as I am not hugely worried about receptor dependency, but would like to establish a closer look at this patient going forward in all future appointments.

d. I am somewhat skeptical about the dosage adjustment given the stigma around opioids, but would make the adjustment to save the patient from severe and chronic pain, observing them carefully during future visits.

e. I am very skeptical about the dosage adjustment, but despite my worries I will do it nonetheless, and will hold this patient in high priority for follow-ups and routine assessments.

f. I am too skeptical regarding opioids to make the adjustment, and I am ready to deal with the patient's anger or repercussions from management as a result of any patient complaint.

g. I do not wish to make a decision regarding this dilemma.

E02: (Bias Present)

A patient in their forties has come to you looking for relief from their chronic, and medically diagnosed Generalized Anxiety Disorder (GAD), as well as a resulting substance abuse disorder. The patient states that for over 2 decades, they have been consuming vast quantities of cannabis products in order to function in every day life. In addition, the patient expresses a history of emotional and physical abuse during childhood, that they believe is the primary reason behind both their GAD and substance abuse disorder. You are also told by the patient that the cannabis has increasingly had a negative impact on their quality of life, and would like to quit if it weren't for the "crippling withdrawal," cited by the patient as their current reason for being unable to quit. Unfortunately, official medical research surrounding the legitimacy of cannabis addiction/withdrawal is greatly lacking in concrete dogma, leaving doctors who are treating the alleged condition to make subjective judgements on medication-based solutions. Some of the more prevalent treatment routes for cannabis-addicted patients have been using benzodiazepines, new-generation antidepressants, or gabapentin to make the alleged withdrawals manageable.

Please choose the treatment option that **best** describes how you would navigate the patient's conditions and claims.

a. I would prescribe benzodiazepines for withdrawal anxiety, as despite their known addiction potential, the duration of marijuana withdrawal is far shorter than the FDA's treatment window given for all benzodiazepines.

b. I would prescribe new-generation antidepressants as they are known to be less addictive than benzodiazepines, and are thought to help with dysphoria experienced by cannabis withdrawal patients, despite their lower effectiveness compared to benzodiazepines.

c. I would prescribe gabapentin, as despite its comparably higher chance of minor to moderate side effects, is more effective than antidepressants and less addictive than benzodiazepines in treating withdrawal.

d. I would consider any of the 3 medications as a treatment, as the patient is better off taking something medically prescribed than buying drugs off the street.

e. I would not prescribe any medication, and would instead suggest the patient go to a treatment center or a Cognitive Behavioral Therapy (CBT) Psychologist, in order to unravel the underlying trauma causing these issues, despite the patient's anger and potential backlash you may receive from the medical establishment regarding the addiction potential of cannabis.

f. I do not believe that cannabis is addictive or can cause dependance, and therefore would only suggest therapy for the underlying trauma, and would inform the patient kindly that their claims were unscientific.

g. I do not wish to make a decision regarding this dilemma.

Exit Statement:

Thank you very much for completing our IQP survey today on medication prescribing. If after completing the survey you are experiencing any anxiety or discomfort due to the drug related topic and would like support, we would encourage you to contact the WPI Student Development and Counseling Center, (SDCC) on 16 Einhorn Road, Worcester MA, 01609 (https://www.wpi.edu/offices/student-development-counseling-center). You can also reach them by phone at (508)-831-5540, or by email at sdcc@wpi.edu. Again, we greatly appreciate your participation in our survey, and feel free to reach out to us if you have any questions.

Thank you,

Zachary Wagner

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