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Craig Jones

Micah B. Rankin

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Craig E Jones & Micah B Rankin

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Abstract:

There are few areas of law that grant judges as much discretion as the sentencing of criminal offenders. This discretion necessarily leads to concerns about the influence of biases, including those that result from subconscious processes associated with human cognition; that is to say, “heuristics”. In this article, the authors explore one heuristic – “number preference” – through an examination of all reported second degree murder parole ineligibility decisions between 1990 and 2012. Number preference leads individuals to predictably “round off” measurements to certain favoured numbers. The authors identify a tendency for parole ineligibility decisions to “cluster” around even numbers and multiples of five, without any obvious, legally-justifiable reason for such “rounding.” The authors propose that the phenomenon should cause concern not least because it suggests that other, less easily measurable but no less powerful heuristics may also be at work in judicial decisions.

Keywords:

Heuristics, parole ineligibility, murder, sentencing, bias, judicial decision-making

Author(s):

Craig E Jones
Thompson Rivers University
E: Cjones@tru.ca

Micah B Rankin
Thompson Rivers University
E: Mrankin@tru.ca

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Evidence of Subconscious Bias in Second-Degree Murder Sentences in Canada
Craig E. Jones and Micah B. Rankin¹

1. Introduction

It is commonly said by judges that sentencing criminal offenders is more of an art than a science.² What they seem to mean is that crafting a sentence involves the exercise of a broad discretion to apply criteria which are not readily definable. The sentencing judge's relative freedom is not only codified in the guidelines for sentencing set out in the *Criminal Code*,³ but is also assiduously fostered through deference shown to sentencing decisions by appellate courts.⁴ Indeed, while most would agree that virtually all legal decisions permit the judge at least some latitude, sentencing decisions must surely rank among the most discretionary made in the Canadian criminal justice system.

The presence of such a broad discretion necessarily leads to concerns over bias: the more legal latitude a judge has, the more room he or she has to take into account considerations other than those which might legitimately inform a judge's reasons. Most of the concern over the "biased" exercise of judicial judgment in Canada has focused on social, cultural, or political predispositions toward members of a group, or to the predispositions of individual judges.⁵ This is the type of "bias" that has fixated legal scholars since the heyday of Legal Realism in the early part of the 20th century.⁶

¹ Both authors are of the Faculty of Law, Thompson Rivers University. The authors would like to thank Kristen Knudskov for her invaluable assistance in applying statistical methodology to the data described in this article. We are also grateful for the work of Ashleigh McTavish-Wisden for compiling the data on parole ineligibility decisions in Canada, and Savannah Hamilton for her research and editorial assistance. Finally, we are very grateful to the three anonymous reviewers who reviewed the draft of this article for their helpful and insightful comments.

² See *e.g.*, *R v Arganda* (JR), 2011 MBCA 54 at para. 38; *R v Sharpe* (KD), 2009 MBCA 50 at para. 49; *R v Biln*, 1999 BCCA 369 at para. 17; *R v Crowell*, 1992 CanLII 2506 (NS CA).

³ See *Criminal Code*, RSC 1985, c C-46, sections 718 and 718.1 [*"Criminal Code"*].

⁴ *R v Shropshire*, 1995 4 SCR 227[*Shropshire*] at; *R v M (C.A.)*, 1996 1 SCR 500 at para. 90; *R v Ipeelee*, 2012 SCC 13 para. 38.

⁵ See *eg.* James Stribopolous and Moin Yahya, "Does a Judge's Party of Appointment or Gender Matter to Case Outcomes? An Empirical Study of the Court of Appeal for Ontario" (2007) 45 Osgoode Hall LJ 315 (arguing that the political party of that appointed the judge and gender are statistically significant in explaining outcomes in legal proceedings); Sean Rehaag, "The Luck of the Draw? Judicial Review of Refugee Determinations in the Federal Court of Canada (2005-2010)" (2012) 8(3) Osgoode CLPE Research Paper Series (noting that outcomes in judicial review applications in Canada's Federal Court show that they turn more on the judge assigned to application than on its merits).

⁶ Legal Realists such as Llewellyn and Frank argued that legal maxims could be invoked to support almost any desired outcome, and that therefore a judge's predilections – political, social, moral, religious, racial – would be the invisible forces that could decide individual cases: see generally Frederick Schauer, *Thinking Like a Lawyer: A New Introduction to Legal Reasoning* (Cambridge MA: Harvard University Press, 2008) at 129-135.

But a question that has received much less attention until recently is the extent to which judicial decisions may be *systematically* influenced by subconscious processes associated with human cognition; that is to say, biases that result from innate cognitive functions known as “heuristics”.⁷ If it is true that opportunities for the exercise of bias increase with the amount of discretion involved in any given decision, the relatively higher level of discretion enjoyed by sentencing judges should make their decisions a valuable source of data in which these heuristics and the resulting biases might be detected and explored.

To date, there has been relatively little research done on heuristics and biases in the context of sentencing.⁸ One reason for this may be that it is difficult to gain access to judges in order to perform experiments, either because of the time commitment involved or out of reluctant to assist with experiments proving the presence of sub-rational decision-making in the exercise of judicial discretion.⁹ However, if a heuristic produces a systemic bias favouring a particular outcome, it might be possible to glean from the public records a pattern of decisions revealing that bias. While this type of study does not have the rigour of a laboratory setting with control groups,¹⁰ it can help identify systemic patterns within the matrix of decisions and offer insights that may prompt further study and experimental inquiry.¹¹

⁷ Deborah W. Denno, “Neuroscience, Cognitive Psychology, and the Criminal Justice System: Introduction” (2010) *Ohio State Journal of Criminal Law* at 1 - 6. For an overview of research into heuristics in the courtroom setting, see Craig E. Jones, “The Troubling New Science of Legal Persuasion: Heuristics and Biases in Judicial Decision Making” (2013) 12 *Advocates' Quarterly*, and The Hon. Mr. Justice Todd L. Archibald and Shannon S.W. O'Connor, “Cognitive Psychology in the Courtroom: The Art and Science of Persuasion” (2012) *Ann. Rev. Civ. Litigation*)

⁸ Chris Guthrie, Jeffrey Rachlinski and Andrew Wistrich, “Inside the Judicial Mind” (2001) 86 *Cornell LR* 777 781 at 782 (noting paucity of research in the area) [Guthrie et al]. While there has been some research on judges and heuristics, and indeed some discussion even by judges themselves (Guthrie’s frequent collaborator Andrew Wistrich, cited above, is himself a judge, as is Archibald, cited in the previous footnote) most of this work has been done in the context of lab studies with hypotheticals. This paper attempts to use real world data to test whether and how a heuristic may be influencing judicial decisions.

⁹ Typically, cognitive neuroscience tests subjects using short scenarios, but more realistic experiments involve “experimental games” in which two or more persons are brought together to take part in elaborate simulations: see for example John M. Darley, “Citizens. Assignments of Punishments for Moral Transgressions: A Case Study in the Psychology of Punishment” (2010) 8 *Ohio State Journal of Criminal Law* 101 at 106, 116 at 102 – 103.

¹⁰ Courts have generally been reluctant to accept that statistical indicators are sufficient to prove bias in judicial decisions, at least in the traditional sense of “prejudice”: see e.g.: *Es-Sayyid v Canada (Minister of Public Safety and Emergency Preparedness)*, 2012 FCA 59, 432 NR 261. The difficulty in addressing the effects of bias in the context of highly discretionary decisions is that the bias, and its source, will be completely invisible in any particular case and observable only when a large number of similar cases are observed in the aggregate.

¹¹ As with a famous recent study of the Israeli parole court system, which revealed that a prisoner’s chance for parole depended heavily on the time of day at which he appeared before the decision-maker, the fact that one’s chance of parole went from 70% first thing in the morning to less than 10% at the end of the day (with a spike after lunch) was posited to be an indication of a known heuristic called “decision fatigue”, which tends to make our decisions more conservative and status quo-biased as a busy day wears on: Shai Danziger, Jonathan Levav and Liora Avnaim-Pesso, “Extraneous factors in judicial decisions” (2011) 108 *Proc Natl Acad Sci* 6889 [Danziger et al].

It is just such an analysis we advance in this article. Here, we examine whether one heuristic – “number preference”¹² – can be observed from reported decisions concerning parole ineligibility for persons convicted of second degree murder. Number preference is a human tendency to select favoured numbers; it leads us to systemically and predictably “round off” measurements to the nearest such number, sacrificing accuracy in the service of conserving mental energy and cognitive space. Could judges imposing sentences fall prey to this tendency?

Based on a review of substantially all of the reported second degree murder sentencing decisions between 1990 and 2012, we have identified a clear tendency for judicial decisions to “cluster” around certain numbers without any apparent legal reason.¹³ It is perhaps not surprising that judges may be “rounding” periods of parole ineligibility to the nearest whole number (2 or 3 instead of 2-1/4 or 3.5);¹⁴ however, our examination of the data suggests that parole ineligibility periods are also strongly influenced by a preference for multiples of five (10, 15, 20, 25) and, perhaps most striking of all, for even numbers over odd. If the “rounding” effect is real, it means that many months, and in some cases years, are being added to (or subtracted from) sentences for no reason other than unacknowledged (and, in all likelihood, subconscious) preference for certain numbers over others.

We suggest that there is no obvious, legally-justifiable reason for the “rounding” that is apparent in the data, and we propose that the phenomenon should cause concern both in its own right (because we argue that accuracy in judicial decisions is inherently valuable), and also because it suggests that other, less easily measurable but no less powerful heuristics may also be at work in such decisions. In the United States, it has been observed that sentencing rules do not “account for the effects of cognitive biases when establishing sentencing procedures.”¹⁵ The same is true in Canada. We propose that judges and policy-makers should become aware of these sub-rational influences and attempt to counter them through more rigorous and objective analysis of individual cases.

¹² It might be debated the extent to which number preferences are true ‘heuristics’, and indeed there is little agreement on what the term includes. We are not suggesting here that a preference for a particular number (such as five or eight) is itself biologically evolved (though we do not rule that out, either). Whether the source of a preference for a given number is innate or learned, however, one thing seems clear: we do have a *shared* tendency to deviate toward preferred numbers, however it is imprinted on our minds.

¹³ The database – of almost five hundred decisions over those 22 years – had been assembled with another purpose in mind: an examination of the effect of changes in the sentencing law for second-degree murder cases. The “clustering” of the numbers it revealed, and the strength of the effect, were a surprise.

¹⁴ This may simply be a function of kind of “mental accounting”; that is to say, the shorthand process that people use at a sub-rational level to code, categorize or evaluate numerical outcomes: see R H Thaler “Mental Accounting Matters” (1999) 12 J Behav Dec Making 183 at 185.

¹⁵ Daniel Isaacs, “Baseline Framing in Sentencing” (2011) 121 Yale LJ 426 at 426 [Isaacs].

2. Heuristics and Biases in Decision-Making

a. Heuristic Decision-Making

Cognitive neuroscience has firmly established the existence of “heuristics”; that is, decision-making shortcuts that are used as “fast and frugal” alternatives to deliberative and rational processes.¹⁶ The term “heuristic” was first coined in the 1950s and originally referred to a technique of using mathematical shortcuts to produce sufficiently accurate results for a given purpose.¹⁷ Such mathematical heuristics were frequently used to allow the cruder and more limited computers of the day to apply rules which are right enough, enough of the time, to make the rules worth applying instead of more laborious, resource intensive algorithms which may produce greater accuracy but which also come at a greater cost in terms of speed and resource consumption.

In the 1970s, the concept of a “heuristic” was adapted and extended to the field of psychology by Daniel Kahneman and Amos Tversky.¹⁸ Kahneman and Tversky’s theory was that in conditions of uncertainty, the human brain relies extensively upon simple cognitive processes that permit it to make rough-and-ready decisions which, in general, work out sufficiently well to be a positive adaptation.¹⁹ In effect, people employ heuristics to “reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations.”²⁰ However, as Mark Kelman explains, “[c]ognitive capacities that served us well, or well enough, in most of the circumstances we confronted in the hunter-gatherer environment in which they evolved may serve us more poorly in modern life where environmental conditions may differ.”²¹

To understand the significance of Kahneman and Tversky’s work, something more should be said about the neuroscience’s model of judgment and decision-making more generally. Most cognitive neuroscientists divide human decision-making processes into two systems: the intuitive system (often called System 1) and the deliberative system (System 2).²² The intuitive system is characterized by rapid decision-making processes that involve a high degree of automaticity, and low degrees of effort, awareness and conscious control. Heuristics are an important part of this System 1. The deliberative System 2, on the other hand, is characterized

¹⁶ The present state of research into the effects of heuristics on judicial decisions is comprehensively described in Craig Jones, “The Troubling New Science of Legal Persuasion: Heuristics and Biases in Judicial Decision-Making” (2013) 41 Adv Q 48.

¹⁷ George Polya, *How to Solve It (2d)* (Princeton, NJ: Princeton Univ Press, 1957). Heuristic in fact derives from the greek verb *heuriskein* (*euriskein*) which means “to find”.

¹⁸ Amos Tversky and Daniel Kahneman, “Judgment under Uncertainty: Heuristics and Biases” (1974) 185 Science 4157 at 1124-1 131 [Tversky et al].

¹⁹ *Ibid* at 1124.

²⁰ *Ibid* at 1124.

²¹ Mark Kelman, *The Heuristics Debate* (London: Oxford University Press, 2011) at 13.

²² Steven Sloman, “The Empirical Case for Two Systems of Reasoning” (1996) 119 Psych Bull 3 at 6.

by the opposite qualities; that is to say, it is relatively slower, less-rule based and involves a higher degree of conscious awareness. Since approximately 95% percent of brain activity is subconscious, many of our day-to-day decisions still rely upon our System 1. However, especially for present purposes, it is important to emphasize that the deliberative System 2 is able to override decisions made by the instinctive system, where it recognizes System 1's errors and where it is motivated to correct them.²³

b. Previous Evidence of Biases in Judicial Decisions on Quantity

There are many heuristics that have been measured in human subjects. One of the earliest documented is the so-called “anchoring” effect, first postulated by Kahneman and Tversky in 1974.²⁴ Anchoring means that subjects who are asked to choose a number will tend to be influenced by a number previously shown them, even if the two are (or should be) clearly unrelated. “Priming” a subject in this way has been shown to significantly affect estimates of everything from the age at which Mahatma Ghandi died to the price of real estate.²⁵ The effect of anchoring is so profound that individuals who have seen an anchoring number for only three milliseconds have been shown to be influenced when making subsequent estimates of the average temperature in Germany, or the price of a used car.²⁶

Studies conducted in the legal context have shown in a stark way the influence of anchoring. In early research on juries, it was demonstrated that personal injury verdicts could be influenced by previous numbers presented as high demands by plaintiffs (even if outlandish, jurors' verdicts were pulled toward the demand),²⁷ and also, ironically, by the provision of information regarding a cap on damages (telling jurors of a cap predictably pulled lower awards upwards toward the cap).²⁸

²³ Daniel Gilbert, “Inferential Correction” in *Heuristics and Biases: The Psychology of Intuitive Judgment* (Cambridge: Cambridge Univ Press, 2002) at 167 (“[O]ne of psychology’s fundamental insights is that judgments are generally the products of nonconscious systems that operate quickly, on the basis of scant evidence, and in a routine manner, and then pass their hurried approximations to consciousness, which slowly and deliberately adjusts them.”) Gilbert’s “inferential correction” approach was applied in the judicial context by Guthrie and his colleagues in their proposal of an “intuitive-override model of judging”: Chris Guthrie, Jeffrey Rachlinski and Andrew Wistrich, “Blinking on the Bench: How Judges Decide Cases” (2007) 91 Cornell LR 1 at 9.

²⁴ Tversky et al, *supra* note 17 at 1124.

²⁵ Fritz Strack and Thomas Mussweiler, "Explaining the Enigmatic Anchoring Effect: Mechanisms of Selective Accessibility" (1997) 73:3 J Person & Soc Psych 437.

²⁶ Thomas Mussweiler and Birte Englich, “Subliminal Anchoring: Judgmental Consequences and Underlying Mechanisms” (2005) 98 Org Behavior & Human Dec Proc 133.

²⁷ John Malouff and Nicola Schutte, “Shaping Juror Attitudes: Effects of Requesting Different Damage Amounts in Personal Injury Trial” (1999) 129:4 J Soc Psych 491.

²⁸ So, for instance, in a case where damages will be less than \$1 million, a jury told that damages are capped at that amount will return a verdict closer to \$1 million than a jury who is not told of a cap: JK Robbennolt and CA

Judges have also been shown to be susceptible to anchors. In one study, US Federal Court judges were asked to estimate damages based on a fact pattern in a personal injury case. Subjects who were told that the plaintiff had demanded \$10 million dollars at a pre-trial settlement conference assessed a mean award of \$1.2 million; those presented with identical facts but who were “unaware” of the settlement offer awarded an average of only \$808,000.²⁹ The effect also has been shown to work in the other direction, in an experiment where damage awards were pulled downward from \$1.2 million to just \$882,000 by the clearly spurious suggestion by the defendant that the potential award did not meet the minimum federal jurisdictional threshold of \$75,000.³⁰

In the criminal context, a fascinating series of experiments in Germany has shown the extent to which judges’ sentencing decisions can be influenced by numbers provided by prosecutors³¹ or by media reporters, and even those shouted out by members of the gallery.³² But one of the most intriguing studies of the influence of subconscious bias on judges in the criminal context is a widely publicized study of Israel’s Parole Court by Danziger *et al.* The study examined 1,112 rulings from eight Israeli judges over a ten month time period. The study’s authors discovered that about 65 percent of parole applicants were successful at the beginning of the court session (*ie*, when court began, after the morning break and after lunch); however, the applicants’ rate of success declined with each decision after breaks. The result was that judges had a bias toward the status quo (*ie*, continued detention) based upon their fatigue. While the Danziger study has been criticized for overlooking certain variables that might have accounted for part of the downward trend,³³ the study nevertheless demonstrated that “extraneous variables can influence judicial decisions, which bolsters the growing body of evidence that points to the susceptibility of experienced judges to psychological biases.”³⁴

Studebaker, “Anchoring in the Courtroom: The Effects of Caps on Punitive Damages” (1999) 23:3 Law and Human Behavior 353.

²⁹ Andrew Wistrich, Chris Guthrie and Jeffrey Rachlinski “Can Judges Ignore Inadmissible Information? The Difficulty of Deliberately Disregarding” (2005) 153 U Penn LR 1251.

³⁰ Guthrie *et al*, *supra* note 8.

³¹ Birte English, Thomas Mussweiler and Fritz Strack, “The Last Word in Court - A Hidden Disadvantage for the Defense” (2005) 29 Law and Human Behavior 705.

³² Birte English, Thomas Mussweiler and Fritz Strack, “Playing Dice with Criminal Sentences: The Influence of Irrelevant Anchors on Experts’ Judicial Decision Making” (2006) 32 Personal & Soc Psych Bull 188. Birte English, “Blind or Biased? Justitia’s Susceptibility to Anchoring Effects in the Courtroom Based on Given Numerical Representations” (2006) 28 Law & Policy 497 [Birte]; Robert A. Prentice and Jonathan J. Koehler, “A Normality Bias in Legal Decision Making” (2003) 88 Cornell LR 583 at 638-39.

³³ Karen Weinshall-Margrel & J Shappard, “Overlooked Factors in the Analysis of Parole Decisions” (2011) 108 Proc Nat’l Acad Sci (Letters, online only) available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3198355/>. The variables included that the cases were not necessarily heard in a non-random order and that the board tried to complete cases from each institution before it takes a break, and that unrepresented applicants went last.

³⁴ Danziger *et al supra* note 11.

Anchoring is only one of a number of cognitive weaknesses that might be at work in sentencing decisions: a phenomenon called “baseline framing” has been suggested as skewing judgments of appropriate sentences,³⁵ and other research has demonstrated that judges’ decisions regarding conditional or interim release can be influenced by sub-rational factors as diverse as the order of presentation of proposed sentences,³⁶ the time of day,³⁷ and even whether the judge had recently contemplated his or her own death.³⁸

c. Number Preference as a Heuristic or Bias

The focus of this paper is on one specific heuristic: number preference. Number preference, end-digit preference, or simply digit preference, has been defined as “a preference for certain numbers that leads to rounding off measurements. Rounding off may be to the nearest whole number, even number, [or] multiple of 5 or 10[.]”³⁹ Number preference is revealed when a particular digit occurs more frequently than statistics would suggest it should. For example, a preference may be in play when more than 20% of numbers that should be randomly distributed end with 0 or 5, or when more than half end with an even number. When number preference produces “clusters” of preferred numbers in reported data, it is sometimes referred to as “heaping”.

The phenomenon has been measured in a number of contexts. As one might expect, it has been of particular concern in the medical field, where inaccuracies in self-reported numbers such as gestational age or weight can lead to misdiagnosis and poor treatment outcomes, and in demographics, when it can skew policy decisions that rely on reported ages.⁴⁰ It is not certain the extent to which preferences for *particular* numbers are innate, because the strength of the

³⁵ Daniel Isaacs, “Baseline Framing in Sentencing” (2011) 121 Yale LJ 426.

³⁶ Birte, *supra* note 31. Birte English, Thomas Mussweiler and Fritz Strack, “Playing Dice with Criminal Sentences: The Influence of Irrelevant Anchors on Experts’ Judicial Decision Making” (2006) 32 Personal Soc Psych Bull 188.

³⁷ Danziger *et al*, *supra* note 11.

³⁸ Abram Rosenblatt, Jeff Greenberg, Sheldon Solomon, Tom Pyszczynski and Deborah Lyon, “Evidence For Terror Management Theory: I. The Effects of Mortality Salience on Reactions to Those Who Violate or Uphold Cultural Values” (1989) 57:4 J Personal & Soc Psych 681.

³⁹ J M Last (ed), *A dictionary of epidemiology* (3rd ed) (New York: Oxford University Press, 1995).

⁴⁰ A L Stewart, “The Reliability and Validity of Self-Reported Weight and Height” (1982) 35(4) J Chronic Dis 295-309. M L Rowland, “Self-reported Weight and Height” (1990) 52(6) Am J Clin Nutr 1125-1133; T L Visscher, A L Viet, I H Kroesbergen and J C Seidell, “Underreporting of BMI in Adults and its Effect on Obesity Prevalence Estimations in the Period 1998 to 2001” (2006) 14(11) Obesity (Silver Spring) 2054-2063; L A Schieve, G S Perry, M E Cogswell, K S Scanion, D Rosenberg, S Carmichael and C Ferre, “Validity of Self-reported Pregnancy Delivery Weight: An Analysis of the 1988 National Maternal and Infant Health Survey. NMIHS Collaborative Working Group” (1999) 150 Am J Epidemiol 947-956; S de Lusignan, J Belsey, N Hague and B Dzregah, “End-digit Preference in Blood Pressure Recordings of Patients with Ischaemic Heart disease in Primary care” (2004) 18(4) J Hum Hypertens 261-265; A J Coale and S Li, “The Effect of Age Misreporting in China on the Calculation of Mortality Rates at Very High Ages” (1991) 28 Demography 293-301; L Edouard and A Senthilselvan, “Observer Error and Birthweight: Digit Preference in Recording” (1997) 111 Public Health 77-9.

effect does appear to vary among countries, and among speakers of different languages, suggesting a significant cultural component to the selection of the favoured digits.⁴¹

3. The Sentencing Regime for Second-Degree Murder

a. The Origin and Structure of the Parole Ineligibility Regime

The sentencing regime for second-degree murder in Canada is noteworthy because it combines a mandatory minimum sentence (life imprisonment) with a partially discretionary period of parole ineligibility of between 10 and 25 years.⁴² In its combination of mandatory sentencing with minimum parole ineligibility, it is unique in Canadian law.

The current provisions of the *Criminal Code* on parole ineligibility date from 1976. In that year, Parliament eliminated the classification of murder as either “capital” or “non-capital”, eliminated the death penalty, and established the present categories of first and second degree murder.⁴³ Both forms of murder were subject to a mandatory minimum sentence of life imprisonment. However, offenders convicted of first degree murder would be subject to a 25 year period of parole ineligibility, whereas those convicted of second degree murder would be given a period of parole ineligibility of between 10 – 25 years, subject to the so-called “faint hope clause”, which permitted a reduction in the parole ineligibility period after an offender had served a period of incarceration of 15 years.

Although the provisions of the *Criminal Code* do not confer an unfettered discretion on a sentencing judge, the open textured language of the section plainly grants significant discretion. The section provides:

745.4 Subject to section 745.5, at the time of the sentencing under section 745 of an offender who is convicted of second degree murder, the judge who presided at the trial of the offender or, if that judge is unable to do so, any judge of the same court may, having regard to the character of the offender, the nature of the offence and the circumstances surrounding its commission, and to the recommendation, if any, made pursuant to section 745.2, by order, substitute for ten years a number of years of imprisonment (being more than ten but not more than twenty-five) without eligibility for parole, as the judge deems fit in the circumstances.

⁴¹ Matthias Bopp and David Faeh, “End-digits Preference for Self-reported Height Depends on Language” (2008) 8 BMC Public Health 342. This is not to say that the heuristic itself is a cultural artefact, only that its manifestation may vary among different societies.

⁴² *Criminal Code*, *supra* note 3 at s 745(c). By contrast, convictions for first degree murder lead to a mandatory parole ineligibility period of 25 years: *Criminal Code*, *supra* note 3 at s 745(a).

⁴³ *Criminal Law Amendment (Capital Punishment) Act*, SC 1973-74, C 38, s 3. Until the 1960s, murder was a capital offence with the only punishment being death: *Criminal Code*, SC 1953-54, C 51, s 206, s 656. In 1961, Parliament introduced amendments to the Criminal Code that led to a distinction being made between capital and non-capital murder: *Act to amend the Criminal Code (Capital Murder)*, SC 1960-61, C 44, s 206.

The discretion conferred on sentencing judges by the *Code* has been jealously guarded in the case law. For example, notwithstanding that a jury recommendation is listed in s. 745.4 as among the factors that a judge must consider, appellate courts have held that that a sentencing judge can depart from it without any reason.⁴⁴ In keeping with this posture of deference, higher courts have given relatively little guidance with respect to appropriate ranges: although certain provincial courts once held that the *Code* established a rebuttable legal presumption of 10 years parole ineligibility,⁴⁵ the Supreme Court of Canada has rejected this interpretation as an unnecessary restriction on judicial discretion.⁴⁶

It is not surprising, therefore, that the case law is relatively unspecific in terms of the factors that would generate a sentence in excess of 10 years. The *Code* itself says only that the Court must consider (aside from the jury's recommendation, if any) "the character of the offender, the nature of the offence and the circumstances surrounding its commission". One province's appellate court has vaguely suggested that there are two main groupings of cases that reflect orders of magnitude of moral blameworthiness and/or dangerousness; namely, 10 – 15 years or 15 – 20 years.⁴⁷ Factors that frequently appear in the cases in support of longer parole ineligibility periods include things such as: the presence of multiple murder victims;⁴⁸ the exploitation of vulnerability (e.g., husband / wife, killing of a child or the elderly);⁴⁹ facts suggesting pre-meditation or planning;⁵⁰ evidence of an unsavoury motive (e.g., sexual gratification profit or obstructing justice);⁵¹ brutality of killing (e.g., prolongation of harmful act, torture, etc.);⁵² an accused's history of dangerousness;⁵³ or a lengthy parole ineligibility

⁴⁴ *R v Mafi*, 2000 BCCA 135, 142 CCC (3d) 449; *R v Cruz*, 1998 BCJ No 811, 1999 1 WWR 322 [*Cruz*] at 44-48; *R v Hoang*, 2002 BCCA 430, 167 CCC (3d) 218 at 11-12; *R v Cerra*, 2004 BCCA 594 [*Cerra*].

⁴⁵ *R v Brown*, 1993 BCJ No 1469, 31 BCAC 59 and *R v Gourgon*, 1981 BCJ No 485, 58 CCC (2d) 193, but compare with *R v Doyle*, 1991 108 NSR (2d) 1 at 5; *R v Wenarchuk*, 1982 67 CCC (2d) 169, 3 WWR 643.

⁴⁶ *Shropshire*, *supra* note 4. At the same time, the Supreme Court maintained that "it may well be that, in the median number of cases, a period of 10 years might still be awarded" (at para. 27).

⁴⁷ *Cerra*, *supra* note 41.

⁴⁸ *R v JJA*, 1994 BCJ No 2640 (CA); *R v JMC*, 2011 BCJ No 1644; *R v Turcotte*, 2006 BCSC 2087; *R v Stewner*, 1996 113 Man R (2d) 78 (CA).

⁴⁹ *Cruz*, *supra* note 41; *R v Perkin*, 1997 BCJ No 2672 (CA); *R v Van Osselaer*, 2004 BCCA 3, 181 CCC (3d) 322; *Cerra*, *supra* note 41; *R v Guignard*, 2008 AJ No 52 [*Guignard*]; *R v Macki*, 2001 BCSC 417, 199 DLR (4th) 178.

⁵⁰ *R v Nash*, 2009 NBCA 7; *R v Atwal*, 2006 BCCA 493.

⁵¹ *R v Smysnuik*, 1994 OJ No 2145; *R v Michelle*, 1998 BCJ No 1631 (CA.)

⁵² *R v Tsyganov*, 1998 NSJ No 495; *R v Yaeck*, 1991 68 CCC (3d) 545 (Ont CA); *R. v. Muise*, 1994 94 CCC (3d) 119 (NSCA).

⁵³ *R v Bennight*, 2012 BCJ No 2546.

recommendation by a jury.⁵⁴ As might be expected, there are relatively fewer cases in the highest end of the range, that is, in excess of 20 years.⁵⁵

We have found nothing in the cases on parole ineligibility, however, to suggest any legitimate reason (and by “legitimate” we mean one that might form part of a reasoned judgment) for preferring a parole ineligibility period expressed in multiples of 5, or in even numbers, or numbers rounded to the nearest whole number. No court has suggested, for instance, that 15 years was chosen because it is more effective as denunciation or deterrence than would be 14 or 16 years.

b. Methodology and Data Gathering

The data used in this article represents substantially all of the reported English language, second degree murder cases available on Quicklaw between January 1990 and December 31, 2012.⁵⁶ Cases were found by performing open-ended key word searches of “murder” or “parole ineligibility”. The results were then examined with duplicate and irrelevant cases being removed. The data was further refined by remove cases that had been overturned or altered on appeal, in which case the appeal decision was substituted for that of the sentencing judge.⁵⁷ In cases with more than one accused, the co-accuseds’ sentences were treated separately. The total sample resulted in 477 decisions. While this does not include every decision in Canada,⁵⁸ it is considered large for statistical purposes and is in any event more likely to be representative of unreported decisions than might be the case with respect to lesser crimes.⁵⁹ Thus, we have reason to believe that the cases we have found and included represent a significant body of the relevant decisions.

⁵⁴ *Guignard*, *supra* note 46; *R v McInnis*, 1999, 44 OR (3d) 772 (CA); *R v Cousins*, 2000 NJ No 215; *R v Price*, 1999 BCJ No. 812.

⁵⁵ The authors have found 66 out of 477 reported decisions since 1990 in which a parole ineligibility period of 20 years has been imposed.

⁵⁶ The data only includes English language decisions other than from Quebec. Our experience in searching Westlaw and Canlii was that Quicklaw captured all of the same available case law.

⁵⁷ Only a very small number of appeals led to any variation in the sentencing, but it was important to our analysis that it considered the actual outcomes of cases, not simply the trial judges’ decisions: it is important to understand that the problem is not being ameliorated through the appeal process.

⁵⁸ Reported decisions tend to be those that follow a contested trial for murder. A large number of murder cases settle without a trial; in those cases, the parole ineligibility decision is generally not reported. As a consequence many, and possibly most, second degree murder sentences are unreported in Quicklaw.

⁵⁹ Given the nature of the consequence for a murder conviction, there tends to be a larger number of contested sentencing hearings and, consequently, a larger number of reported decisions. In addition, unlike most sentencing decisions, offenders have a statutory right of appeal against parole ineligibility decisions (per section 675(2) of the *Criminal Code*) and appellate decisions are always reported.

We are aware of no basis to believe that our dataset is non-representative of parole ineligibility decisions generally.⁶⁰ And of course, even if unreported decisions showed a different trend (or no trend at all) with respect to number preference, this would no way assuage the concerns expressed in this article, but would instead only add another level of mystery. That is to say, if it turned out that unreported decisions did *not* show a bias for, for instance, even numbers, then the question might be what is it about the process leading to, or the prospect of, reporting that brings the preference to the fore?

In fact, the process by which unreported decisions are usually made – joint submissions following a guilty plea – could shed some further light on the operation of number preference. Do Crown counsel’s and defence lawyers’ joint proposals show the same biases as the database we have studied? Judges are generally not permitted to depart from a joint recommendation unless the proposed sentence is contrary to the public interest and would bring the administration of justice into disrepute.⁶¹ In those rare cases where judges do depart from the recommendations, might they do so disproportionately when the proposal is not a “preferred” number? It might, therefore, be a useful future study if a database could be built (perhaps from Crown records) indicating the numbers proposed in joint submissions and implemented by the Court.

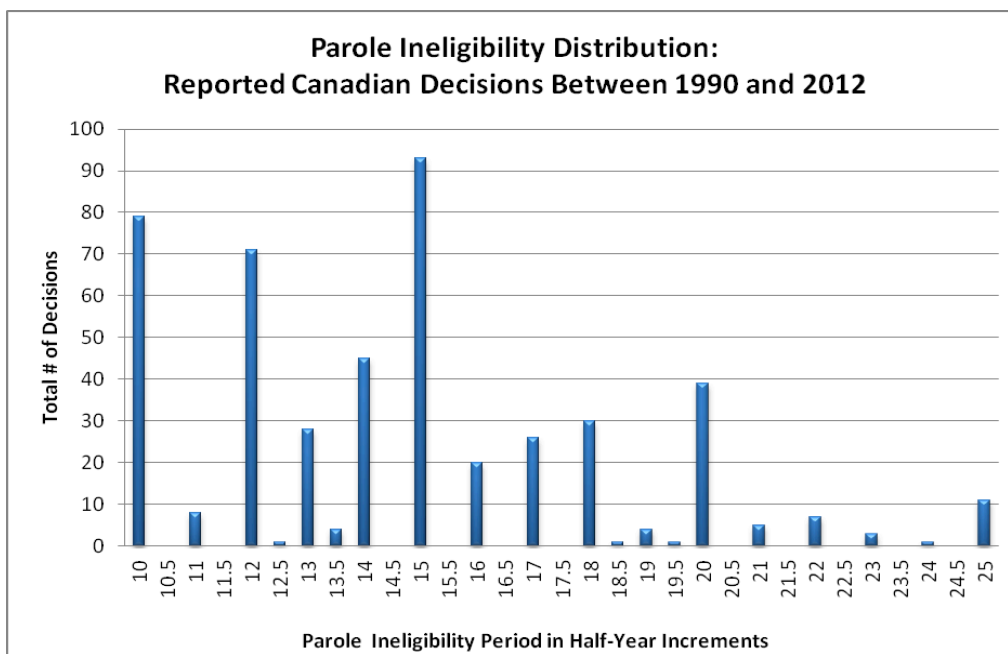
c. Clustering of Parole Ineligibility Decisions

In examining the data, we looked for three numerical preferences found in the literature: (i) the preference for numbers involve multiples of five (5) and ten (10) (ii) a preference for even versus odd numbers; and (iii) a preference for whole numbers. We also observed a striking fourth preference for the number 12. The results will be discussed, each in turn, in the subsections below. The following chart provides a graphic illustration of the overall data:⁶²

⁶⁰ That is to say, we have no reason to believe that judges might be more swayed by number bias effects in cases that are more likely to be reported than in those which are not.

⁶¹ *R. v. Dorsey* (1999), 123 O.A.C. 342; *R. v. Bezdán* (2001), 154 B.C.A.C. 122; *R. v. Fuller*, 2007 BCCA 353 at para. 17. We note that there is some controversy as to the exact test in British Columbia; see *R. v. Roadhouse*, 2012 BCCA 495 at paras. 47-53. Nevertheless, judges are loathe to depart from joint submissions.

⁶² We examined the data over 5 year periods (1990 – 1994, 1995 -1999, 2000 – 2004, 2004 – 2009) and observed substantially identical clustering around 10, 12, 15 and 20 years in each period. One notable change has been an increased clustering around the 10 – year mandatory minimum in the years between 1990 – 1994. We suggest that the pronounced change is likely attributable to *Shropshire*, *supra* note 4, which had the effect of over-ruling lower court decisions that established a soft legal presumption in favour of 10 year parole ineligibility periods.



d. Anticipated Rational Distribution of Parole Ineligibility

Before saying more about the apparent “clustering”⁶³ of parole ineligibility observable in the data, we want to say something about our implicit premise that the distribution of parole ineligibility periods would appear different in the absence of numerical bias. Of course, we did not begin our examination of the data with the notion that a distribution of parole ineligibility periods would be evenly spread from 10 through to 25 year periods. Indeed, the case law itself suggests, albeit weakly, that 10 year parole ineligibility periods should be more common than other periods.⁶⁴ Also, since courts have held that periods in excess of 20 years are, and should be, relatively rare, it should come as no surprise that such sentences are less frequent. Overall, we would expect the graph to be generally downward-sloping as the ineligibility period increased. The difficulty in the data is not that periods of 20 years are less frequent than 12, 14 or 15. The question, then, is why a 20 year parole ineligibility period is so much more common than a 19 or 21 year period.

⁶³ “Clustering” can be defined as the grouping together or congestion of items: see *e.g.*, Jason Mitchell, “Clustering and Psychological Barriers: The Importance of Numbers” (2001) 21 *Journal of Futures Markets* 395–428.

⁶⁴ *Shropshire*, *supra* note 4. This, of course, is not borne out by the evidence from the reported cases.

e. Distribution in the Data

i. A Preference for Multiples of Five and Ten

One of the first observable trends in the data is an apparent preference for numbers involving multiples of 5 or 10, a phenomenon that is well-established in the literature.⁶⁵ Of the 477 reported decisions nationwide, fully 222 – almost half – involved parole ineligibility periods ending with either 0 or 5 (79 x 10, 93 x 15, 39 x 20, 11 x 25). Expected frequency of such numbers if the distribution were random would be 4/16 of the time (.25); yet the actual frequency is almost twice that: .465.

This suggests that as many as half of decisions ending in 5 may have resulted in the rounding off of a number as opposed to a rational application of the statutory criteria for parole ineligibility. Even assuming judges will round down as much as they will round up, this means that one quarter of those sentenced to, for instance, 15 years, would have received substantially lower sentences, in some cases years lower, absent the number bias.

We should return again at this point to the question to which we earlier averted: why should we expect a random distribution across the range? Apart from a direction from the Supreme Court of Canada's statement that 10 years would be the most common sentence,⁶⁶ there is nothing in the legal criteria in s. 745.4 of *the Criminal Code* that would provide a reason for favouring of 0 and 5 digits, except that two of these numbers, 10 and 25, represent a "floor" and "ceiling" of the range, and thus might be preferred as including those cases that might otherwise fall above or below it.

So what if we assume that there is a good explanation for "clustering" or "heaping" at 10 years and 25 years, and exclude those numbers from the analysis? We are then left with a dataset of 387 decisions in the remaining 14 whole digits. If the decisions were free of digit preference, we would expect around 55 decisions to fall on 15 or 20 years (2/14 or .143); instead we see that 132 do (.340): what should be one in seven is one in three. And of course, a quick glance at the chart shows that the preference for these numbers cannot be explained simply because they are in a particularly appropriate range: if that were so, we would expect 14 and 16

⁶⁵ C. G. Camarda, P. H. C. Eilers, and J. Gampe "Modelling General Patterns of Digit Preference" (2008) 8 *Statistical Modelling* 385–401 [Camarda et al] ("a commonly found effect is that certain preferred in the digits are reported substantially more often than the general pattern of distribution suggests. These digits are typically multiples of 5 and 10, possibly combined with tendencies to avoid certain unpleasant numbers like, e.g. 13."). The authors note that this leads to "heapings" at the preferred digits. See also: Wen SW, Kramer MS, Hoey J and Hanley JA et al, "Terminal Digit Preference, Random Error, and Bias in Routine Clinical Measurement of Blood Pressure" (1993) 46 *Journal of Clinical Epidemiology* 1187–93; R J Myers, "Errors and Bias in the Reporting of Ages in Census Data" (1940) 41 *Transactions of the Actuarial Society of America* 395–415; P Das Gupta, "A General Method of Correction for Age Misreporting in Census Populations" (1975) 12 *Demography* 303; D F Heitjan and D B Rubin, "Inference from Coarse Data via Multiple Imputation with Application to Age Heaping" (1990) 85 *Journal of the American Statistical Association* 304; M L Rowland "Self-reported Weight and Height" (1990) 52 *The American Journal of Clinical Nutrition* 1125.

⁶⁶ *Shropshire*, *supra* note 4.

to also be significantly favoured. Instead, those numbers together occur only two thirds as often as does 15. We would suggest, in this regard, that if 15 really were the most legally-appropriate number in a greater number of cases, and not simply a preferred digit, the next most legally-appropriate numbers should be those closest to it.⁶⁷

ii. A Preference for Even Numbers

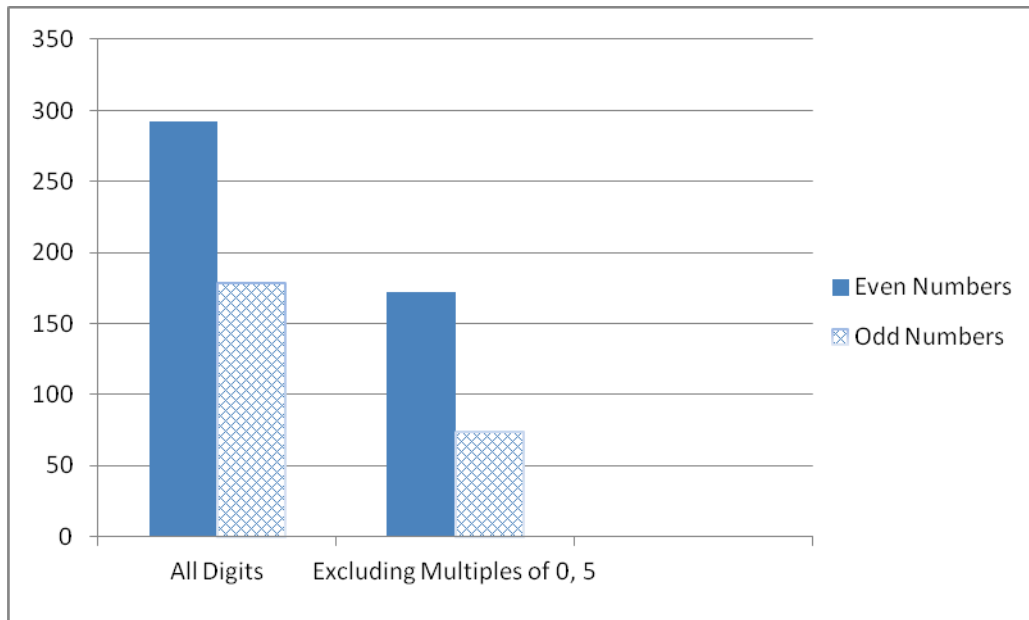
As discussed above, the psychological literature indicates that, in addition to preferring numbers ending with 0 and 5, humans (at least Western humans) also tend to prefer even numbers over odd.⁶⁸ So a second review of the data can be performed to see if this preference is exhibited in the parole ineligibility context. If sub-rational thought processes are influencing judges' decisions, this should be apparent in a disproportionately high number of even numbered periods versus odd.

And this is exactly what we observed in the 477 decisions recorded in our data. We can first look at all the parole ineligibility periods between 10 and 25 years, which yields a total of 470 decisions (excluding the seven decisions that fall between whole numbers) consisting of eight even (10, 12, 14, 16, 18, 20, 22, 24) and eight odd-numbered ineligibility periods (11, 13, 15, 17, 19, 21, 23, 25) between 10 and 25.

One might expect that the decisions, if premised solely on the legal criteria, should be split roughly 50 - 50 between even and odd. However, we do not observe anything like an equal split. In fact, 292 decisions, or 62% of the sampled cases, involve a period of parole ineligibility with an even numbered year. Moreover, if we exclude years ending in 0 or 5 in order to eliminate the spikes at 10 and 25 (the floor and ceiling) and 15 and 20 (which may be the result of a separate rounding process), the results are even more stark: there are 174 decisions (70%) with parole ineligibility periods using even numbers and only 74 decisions with odd numbers. In other words, it appears that judges who do not impose a sentence in multiples of five are over twice as likely to impose even-numbered ineligibility periods as odd ones.

⁶⁷ Focusing on the range around 15 years (say, 13 to 17) where a total of 208 of the decisions fall, we would expect each year to be imposed one fifth of the time (.20); in other words, 41 to 42 decisions. Instead, of the digits in that range, only 14 occurs an average amount of the time; the others are about half of the expected frequency, where 15 remains over twice that.

⁶⁸ T M Hines, "An Odd effect: Lengthened Reaction Times for Judgments about Odd Digits" (1990) 18 *Memory and Cognition* 40-46 (Hines found that an even response was systematically faster than an odd response, a difference that he attributed to the linguistic markedness of the odd concept"; See also Y Nishiyama, "A Study of Odd- and Even-Number Cultures" (2006) 26(6) *Bulletin of Science, Technology and Society* 479 - 484.



iii. A Preference for Whole Numbers

A less surprising result from the data is the apparent judicial preference to impose parole ineligibility periods on whole numbered years. It is difficult to conceive of any legal reason why judges should prefer custodial terms of imprisonment of an entire year versus lesser increments. Indeed, such lesser increments are used frequently by judges when imposing sentences in respect of other offences.⁶⁹

We see from the data that at least some judges (seven, in fact) have imposed terms of 12.5, 13.5, 18.5 or 19.5 years.⁷⁰ The rest, however, appear to restrict themselves to ineligibility periods in one year increments. It is striking that out of 477 reported decisions there are only seven reported decisions in which a judge ordered a parole ineligibility period with an increment between two whole numbered years.

It is important not to make too much of this level of “rounding”. There may be reasons other than a heuristic preference for whole numbers over fractional years. It might be, for instance, that a period of 13.5 rather than 13 or 14 would require a more exacting analysis on the part of the sentencing judge in order to make the implied precision appear justified, and such an exercise might appear artificial in a decision that is, as we suggested earlier, more an art than a science. But while this might explain the phenomenon, it still should cause at least some unease,

⁶⁹ A good example is manslaughter, where a small sample reveals that half-year sentence increments are relatively common: *R v SDC*, 2013 AJ No 78 (7.5 year sentence); *R v Brian*, 1998 MJ No 590 (CA) (10.5 reduced to 7.5 years); *R v. St-Cyr*, 2012 OJ No 1956 (7.5 years); *R v Abel*, 2008 BCJ No 2460 (8.5 years); *R v AB*, 2003 BCJ No 3120 (8.5 years); *R v Dingwell*, 2012 PEIJ No 12 (5.5 years); *R v Gilling*, 2001 OJ No 2300 (Ont CA) (5.5 years); *R v Hathway*, 2008 SJ No. 745 (11.5 years); *R v Ma*, 2010 OJ No. 3685 (9.5 years).

⁷⁰ *R v Nichols*, 2006 OJ No 2868; *R v Feeley*, 2001 OJ No 3359; *R v JRG*, 2002 OJ No 5687; *R v Kakegamic*, 2005 OJ No 3834; *R v Ward*, 2011 NSJ No 481; *R v Assoun*, 1999 NSJ No 479.

as we remind ourselves that, if rounding is taking place in these circumstances, those murderers whose periods are not being rounded to the nearest five or two might still be serving up to six months too long, or up to six months too little. When weighed against a life sentence, this might appear trivial; however, if one imagines spending six months in a penitentiary, the gravity is more apparent.

iv. Preference for the Number 12

One other artefact apparent from the chart is a strong preference for the number 12. We found in reviewing the data that the spike at 12 years is apparent province-by-province, and also when it is viewed over time. 12 is usually the third most popular number (after 15 and 10), but is sometimes second after 15 (in the period 2001-2005), and indeed in the most recent period, was the single most popular number nationally.⁷¹ This was borne out in a statistical analysis as well. On a purely random basis, a 12 year period would be expected to appear in 6.7% of cases. However, the sample shows that more than 12% of cases result in a 12 year parole ineligibility period ($p = 0.0182$).

Preference for particular numbers has been measured in other contexts.⁷² And certain numbers were historically, and in many societies, imbued with cultural significance and symbolism, which might affect preference.⁷³ In this case, the strength of the apparent preference for 12 requires that we at least speculate as to its cause, or, perhaps more likely, causes. Twelve has the twin advantages of being an even number, and one at the lower end of the range where most of the decisions occur. It is close to 10, the baseline, and therefore may also benefit from the “baseline anchoring effect”, whereby sentences will skew toward a number given as the starting point for the analysis.⁷⁴ It is also arguably an independently pleasing and “available” number, and like 10 is a frequent counting multiple (an even dozen). Furthermore, it may be that it provides a convenient “middle of the range” between 10 and 15 which avoids the number 13, with its attendant negative cultural symbolism. In our view, the preference for 12 may be explained by some combination of these and, perhaps, other factors.

⁷¹ Preference for 12 does not, on its own, account for the overall preference for even numbers, which remains even when 12 is removed from the calculation. If we only examine the decisions imposing periods of 13 years and longer, and exclude again 15, 20, and 25, we are left with five even and five odd numbers. In these data, even numbers outnumber odd 103 to 66.

⁷² For instance, it has long been demonstrated that 30% of people – at least in Europe and America – asked to produce a random number between 0 and 9 will choose 7: W E Simon “Number and Colour Responses of Some College Students: Preliminary Evidence for a “Blue and Seven” phenomenon” (1971) 33 *Perceptual and Motor Skills* 373-374; M Kubovy and J Psofka, “The Predominance of Seven and the Apparent Spontaneity of Numerical Choices” (1976) 2 *Journal of Experimental Psychology: Human Perception and Performance* 291-294.

⁷³ For example, as Camarda et al, *supra* note 60, numerical preferences for numbers such as 0 and 5 may be “combined with tendencies to avoid certain unpleasant numbers” such as 13: Camarda et al, *supra* note 60; J Mitchell, “Clustering and Psychological Barriers: the Importance of Numbers” 21 *Journal of Futures Markets* 395–428.

⁷⁴ See generally Isaacs, *supra* note 14.

Whatever the explanation, it does not appear to us to be the result of a rational and reasoned application of criteria in section 745(c) of the *Criminal Code*. As with 15, if it were the product of a rational or reasoned process we would expect a greater number of sentences in the adjacent numbers (in this case 11 and 13), which is not present. It appears that, therefore, that many judges are subconsciously “rounding” to 12 in the same way others are rounding to 15 or to the nearest even number.

v. Statistical Analyses

As part of the process of preparing this article, we enlisted the assistance of a graduate student to subject our data to a number of common statistical tests in order to evaluate whether the observed distribution could be explained by random chance.⁷⁵ Using a “Normal Distribution Goodness of Fit Test”, with an expected frequency for each 10% interval of the data, the hypothesis that the data was normally distributed was rejected ($p < 0.005$), meaning that there is only a 0.5% change that the results observed could be explained by chance. The data was also tested using the Poisson Distribution Goodness of Fit Test. The results indicated that the data did not have a Poisson distribution and that there was is only a 0.5% change that the results observed could be explained by chance.

In addition to the broad distribution tests, the data was subject to a number of population proportion hypothesis tests. No matter what method was employed, there appeared to be little prospect that the results were simply chance. Indeed, each confirmed that there was some factor at play influencing the selection of particular numbers over others, inexplicable by reference to the legal factors enumerated in the *Criminal Code* or suggested in the judgments themselves.

In sum, using a purely statistical method, the data set supported our conclusion that judges have a hidden tendency to choose parole ineligibility terms that are even numbered, involve full years, or a multiple of five years. Given the size of the sample, we also consider that it is possible to extrapolate that second degree murder trials outside of this sample would result in the same trends.

vi. Alternative Explanations for the Clustering Effect

As discussed above, it may be possible to explain certain preferences because they represent the floor and ceiling of the range and therefore might include sentences that would have been lower or higher, respectively, but for the legislative mandates. We have also suggested, though, that this does not explain the preference for 20 or, most particularly, the strong, indeed dominant, clustering at 15.

⁷⁵ The level of significance used for all tests was $\alpha = 0.05$.

One possibility that has occurred to us is that judges might favour 15 years because, until 2011, that number represented the “faint hope clause” threshold.⁷⁶ That is, for the period of the data, persons convicted of second-degree murder who had been sentenced to periods of parole ineligibility greater than 15 years could, after 15 years, apply to have the ineligibility period reduced. So a judge sentencing a murderer could, arguably, have rationally rounded down a sentence of marginally more than 15 years to that number, to avert the social costs associated with a hearing and determination of ‘faint hope’. It is also possible, that the ‘faint hope’ threshold of 15 years exerted another type of influence, that of providing a heuristic “anchor” and triggering a biased result.⁷⁷

While these might provide an explanation that does not involve a sub-rational preference for numbers rounded to the nearest 5, they are no less unsatisfactory from a legal point of view. This is so because the faint hope threshold was never among the factors that the courts could legitimately have considered in assessing parole ineligibility (which included only “the character of the offender, the nature of the offence and the circumstances surrounding its commission, and to the recommendation, if any, made pursuant to section 745.2”), and we are aware of no decision where a court imposing a 15-year period justified any preference for that number on any basis except the accepted legal criteria as applied to the facts of the case.

Moreover, there appears to be no similar explanation for the clear preference the data show with respect to even numbers, or whole numbers, or for the number 12. As we have conceded, rounding to the nearest whole number might be excused because, after all, there can never be perfect precision in sentencing and there has to be *some* basic gradient. But given the availability of ½ year increments (demonstrated by the fact that at least seven judges chose them), and given the high importance assigned by society to even brief periods of incarceration, it is surprising that they were utilized in just over one percent of cases.

Although this article suggests that the phenomenon we have identified arises from the preferences and biases of sentencing judges, it must be admitted that other system participants’ preferences may also be having an influence. For instance, it is reasonable to assume that counsel would share the judges’ biases, and so their submissions to the court regarding the appropriate period of ineligibility would similarly favour “rounded” numbers. Indeed, such submissions may have considerable influence on the judges, through the operation of the “anchoring” heuristic described earlier. And, if it is true that some numbers seem intuitively

⁷⁶ The “faint hope” clause refers to what was formerly s. 745.6 of the *Criminal Code*, *supra* note 3. It was brought into force in 1976 as part of the abolition of capital murder and creation of first and second degree murder. On December 2, 2011, the *Protecting Canadians by Ending Sentence Discounts for Multiple Murders Act* (Bill C-48) came into force and abolished the faint hope clause. Persons convicted of murder must now serve their entire period of parole ineligibility before applying for parole.

⁷⁷ “Anchoring” is the phenomenon discussed at greater length earlier in this article, by which an unrelated number can exert a strong influence over quantitative choice. As we noted above, it has been exhaustively studied, and persuasively demonstrated in the judicial context.

more satisfying due to the preference heuristic, then it could also be postulated that sentences “rounded” to those numbers are more likely to be accepted and less likely to be appealed, and if appealed they would be more likely to be upheld.

Another explanation for the clustering effect that has been suggested to us is that lawyers and judges are relying upon precedent.⁷⁸ Because past sentences have been 10, 12, 15 or 20 years, or disproportionately favouring even numbers, it is suggested, subsequent decisions may be simply reinforcing an established pattern. An adherence to precedent numbers may indeed be a factor in sentencing, but it provides no comfort to those concerned that the numbers themselves are not rationally-derived. Why was the pattern established in the first place? Even if precedent influenced a continuing pattern—which it likely does—there must have been some reason for the initial the clustering around certain numbers. Indeed, it would be doubly concerning if preferences that were initially established through heuristic mechanisms were continued through the addition of blind adherence to what is likely a recurrent bias (there is no reason to suppose that whatever biases caused the initial pattern to be established would have somehow disappeared in the meantime, with only their precedential ‘shadows’ remaining).

The explanation of preference as a manifestation of adherence to precedent is also difficult to accept in light of how little emphasis is placed in the jurisprudence on precedent numbers. Appellate courts have been reluctant to establish fixed ranges for second degree murder sentences, let alone particular numbers.⁷⁹ Indeed, in *R v Shropshire*, the Supreme Court of Canada expressly rejected the notion that there should be a rebuttable presumption in favour of the 10 year minimum parole ineligibility.⁸⁰ To our knowledge, only the British Columbia Court of Appeal has posited the notion that there are groupings of case 10 – 15 years or 15 – 20 years, but even that Court has not identified any particular favoured numbers within that range.⁸¹ And in any event, the clustering of parole ineligibility decisions in British Columbia follows the same pattern that is visible in other provinces.

A further explanation that might be offered to explain the clustering observed in our data turns on how judges may normatively characterize the relative heinousness of a murder.⁸² This explanation rests, in part, on a rejection of the assumption that there would be an expected distribution that would evenly spread sentences from 10 – 25 years in the absence of any number

⁷⁸ We thank the anonymous reviewer of this piece for suggesting this explanation.

⁷⁹ The courts’ posture is somewhat anomalous when compared to sentencing for other offences. Although sentencing judges are not strictly bound by the ranges that emerge from the case law, the Supreme Court of Canada has often emphasized that a sentencing judge’s discretion has limits and that it is “fettered in part by the case law that has set down, in some circumstances, general ranges of sentences for particular offences”: *R v Nasogaluak*, [2010] 1 SCR 206 at para. 44. According to the Court, the effect of this is “to encourage greater consistency between sentencing decisions in accordance with the principle of parity enshrined in the Code.” (*ibid*)

⁸⁰ *Shropshire*, *supra* note 4.

⁸¹ *Cerra*, *supra* note 41.

⁸² We again thank one of the three anonymous reviewers of this piece for suggesting this alternative explanation.

bias. Instead, this explanation posits that judges have tacitly adopted sentencing categories, perhaps differentiating between offenders who are more or less dangerous, more or less morally culpable, and then placing those offenders on the high, moderate or low end of those variables. If this were so, then there would be a clustering around five or six numbers, and not the 30 categories that our expected distribution assumes. As with precedent, there may be something to this explanation (but also as with precedent, it provides little comfort in that it replaces one non-rational, or sub-rational, explanation with another). However, we would clarify that it is not our contention that in the absence of any number preference there would be no clustering whatsoever, or that there would necessarily be an even distribution from 10 to 25 years. Our purpose is not to suggest that there is a departure from an expected distribution, but rather, to explain why the clustering occurs at certain numerical intervals and not others. Indeed, even if there were fewer possible variations in sentence, this still does not explain why the clustering occurs at 10, 12, 15 or 20 years, and not, for instance, 10.5 year, 11, 16 or 19 years. Thus, while it may be true (and likely is to some extent) that there are a limited number of variables that influence a judge's perception of the offender, this does not explain why the clustering occurs where it does. Our claim is only that the clustering around certain numbers arises because of a subconscious bias in favour of those numbers (shared as a common tendency among judges), and not that the expected distribution would be evenly spread in the absence of this bias.

4. The Normative Implications of Sub-Rational Bias in Setting-Parole Ineligibility

The question that arises from our conclusions is this: if we accept this judicial rounding is taking place, “Does it matter?” The answer to this question, in our view, depends to a large extent on one's understanding of the nature and purposes of adjudication and punishment. As we discussed above, the Canadian sentencing regime, as principally articulated in sections 718 and 718.1 of the *Criminal Code*, sets out a number of principles and objectives, including denunciation, deterrence, separation, restoration, reparation and rehabilitation.⁸³ These more specific sentencing objectives must be considered in the context of our more general commitments to adjudicative decision-making as a form of social ordering.

On one argument, a cognitive preference for rounding may be justifiable on its own terms: if rounded or even numbers are more intuitively satisfying to the sentencing judge, they are presumably also more satisfying to members of the public. Perhaps then, a parole ineligibility period of 12 or 15 years actually better fulfills some of the social objectives of sentencing (such as denunciation and the satisfaction of retributive and punitive impulses) than would 13 or 17, precisely because the citizenry shares the same heuristic as judges. The public mind, on this argument, would be “jarred” by unpleasing numbers, and so making such decisions more “accurate” does not necessarily improve them. A variation on this argument might suggest that because system participants – lawyers and offenders as well as judges – are more satisfied with “preferred number” sentences, such sentences are less likely to be appealed, and less likely

⁸³ *Criminal Code*, *supra* note 3 at ss. 718 and 718.1.

to succeed on appeal. Again, this explanation provides a plausible mechanism for the reinforcement, and perhaps even magnification, of the number preference effect, but it does nothing to assuage the central concern that the sentences are not being derived from a rational application of judgment to the facts of each case.

The combination of the impact on individual liberty and the increased social costs produced by judgments must weigh more heavily than any advantage gained by pandering to instinctive and irrational biases. As we described above, the parole ineligibility provisions of the *Criminal Code* are an anomalous feature of the Canadian criminal justice system. More particularly, they tilt decidedly in favour of denunciation over the restorative and rehabilitative aims of “ordinary” criminal sentencing. Given that the sentence in all murders is life imprisonment,⁸⁴ an extended period of parole ineligibility imposed in advance by a court can have only one meaningful effect: it keeps a person in prison who would otherwise, under the ordinary rules, be released. That is to say, an offender must remain in prison even where a person would not “present an undue risk to society” and even where his release “will contribute to the protection of society by facilitating the reintegration of the offender into society as a law-abiding citizen.”⁸⁵ Although it sometimes suggested that parole ineligibility (to the extent that it provides for incarceration beyond the time when an offender would otherwise have been released) serves the interests of victims’ families⁸⁶ or acts as some additional deterrence,⁸⁷ it seems to us that parole ineligibility is, largely if not completely, punishment for the sake of punishment, directed at satisfying a real or perceived social desire for denunciation and/or the separation of an offender from society. If parole ineligibility is, as it appears, based on such a dubious, or at least highly contestable, penological theory,⁸⁸ we maintain that special vigilance is justified to ensure that the decisions are being made in through the reasoned application of the statutory criteria to the facts of each case. A careful and restrained approach also sits more easily

⁸⁴ *Criminal Code*, *supra* note 3 at s. 745.

⁸⁵ See *e.g.*, ss. 102, *Corrections and Conditional Release Act*, SC 1992, c 2 [CCRA].

⁸⁶ The argument here is that a minimum period of parole ineligibility relieves victims’ families of appearing at hearings to oppose release, and provides them with a set and certain period of peace and recovery: See for instance the Conservative Party of Canada’s April 25, 2013 News Release, “Supporting Victims’ Rights” (endorsing increases in parole ineligibility for certain crimes because “victims and their families still must attend unnecessary parole hearings that force them to relive their experiences” : <http://www.conservative.ca/?p=2965>).

⁸⁷ It is now so widely acknowledged that deterrence is largely unaffected by the availability of a sentence that it is hard to imagine a deterrent effect. Indeed, this is doubly so when the offence in question is already subject to mandatory minimum sentence of life imprisonment: Daniel S. Nagin, “Criminal Deterrence Research at the Outset of the Twenty-First Century” in *Crime and Justice: A Review of Research* edited by Michael Tonry (Chicago: University of Chicago Press, 1998); P. H. Robinson and John M. Darley, “Does Criminal Law Deter? A Behavioural Science Investigation” (2004) 24 *Oxford Journal of Legal Studies* 173; Kevin C. Kennedy, “A Critical Appraisal of Criminal Deterrence Theory” (1983-1984) 88 *Dick LR* 1.

⁸⁸ R. A. Duff, “Responsibility, Restoration and Retribution” in M. Tonry (ed.) *Retributivism Has a Past: Has it a Future?* (Oxford: Oxford University Press, 2011).

with the value placed upon liberty and the idea of restraint in punishment that finds voice in many of the rights enshrined in the *Charter of Rights and Freedoms*.⁸⁹

This is even more important given that each day, week, month or year of a parole ineligibility period represents an actual deprivation of liberty for that full period. For other criminal offences, an offender becomes eligible for parole after he has served a period of ineligibility of the lesser of one third of the sentence and seven years.⁹⁰ Consequently, with most offences, especially more serious ones, an additional month or year of *sentence* may not actually involve a significant increase in actual imprisonment. It follows, then, that assessments of parole ineligibility should be, if anything, more rigorous than for sentencing of other crimes.

There are other reasons to err in favour of more rational and measured parole ineligibility decisions, perhaps not least of which is the very real direct financial costs associated with longer periods of incarceration. According to corrections Canada, the “annual average cost of keeping a federal inmate behind bars has increased from \$88,000 in 2005-06 to over \$113,000 in 2009-10.”⁹¹ It costs approximately \$300 a day for to maintain a male inmate. This costs rises to “\$578 per day to incarcerate a federally sentenced woman inmate.”⁹² By contrast, “the annual average cost to keep an offender in the community is about \$29,500.”⁹³

It is true, of course, that “rounding” may also save costs – that is, a court may be just as likely to “round down” as it is to “round up”. Indeed, the data that we have examined could be interpreted as suggesting that “rounding down” might be somewhat more prevalent than

⁸⁹ *Canadian Charter of Rights and Freedoms*, s 2, Part I of the Constitution Act, 1982, being Schedule B to the Canada Act 1982 (UK), 1982, c 11. This is most obviously protected by the prohibition in section 12 on “cruel and unusual treatment or punishment.” However, principles of restraint in punishment are also provided by sections 11(g) which protects against retroactive punishment and section 11(i) which requires that an individual be given the benefit of the less of two potential punishments when there has been a variation between the time of the commission of the offence and sentencing. However, section 7 of the *Charter* also protects hearing a number of hearing rights in the context of sentencing: see *e.g.*, *R v Lyons*, 1987 2 SCR 309 at para 85.

⁹⁰ *CCRA*, *supra* note 75 at s. 120. The system of parole eligibility is somewhat byzantine and varies for certain offences. However, this represents the general rule.

⁹¹ Annual Report of the Office of the Correctional Investigator 2011-2012, <http://www.oci-bec.gc.ca/rpt/annrpt/annrpt20112012-eng.aspx>

⁹² *Ibid.*

⁹³ *Ibid.* We refrain from tendering an opinion on whether costs of incarceration are costs worth bearing. Our point here is that, if they are worth bearing, it must be for some better reason than a judge’s sub-rational bias in favour of a particular number. As this suggests, our purpose is not so much to advocate for reduced parole ineligibility – indeed, the data may theoretically be interpreted as suggesting the need for *higher* periods of parole ineligibly—but to point to the need for more careful exercise of discretion. Although the Supreme Court of Canada has found it to be inappropriate for sentencing judges to engage in a “cost/benefit budgetary analysis” when setting parole ineligibility (*Shropshire*, *supra* note 4), we maintain that judges should be concerned about permitting subconscious preferences to lead them to impose sentences that result in the unnecessary expenditure of tax dollars.

“rounding up”, at least with respect to the clusters around 15 and 20.⁹⁴ Assuming that a criminal defendant faces an equal prospect of a sentence that is either too high or too low, it might be argued that he or she is probabilistically no worse off from the inaccuracy: the offender is equally likely to benefit from the rounding, and be released “earlier” than he should, as to suffer the deprivation of additional months or years in prison. On this probabilistic argument, the harm is a “wash”. But assuming that there is *some* purpose to the period of parole ineligibility – be it denunciation, deterrence, the protection of society from reoffence⁹⁵ – then an irrationally low ineligibility period may be imposing social costs and creating risks no less than is an irrationally high one.

Moreover, even in these circumstances of equal probability of “too high” and “too low”, we would argue that there is an inherent unfairness in sentences that are based on sub-rational reasoning processes that do not depend upon the statutory criteria for assessing ineligibility periods. It is a well-accepted principle in our system of criminal law that over-incarceration involves more social costs than under-incarceration, a principle that is echoed in Blackstone’s famous maxim that it is “better that ten guilty persons escape, than that one innocent suffer”.⁹⁶ This notion is central to Western moral philosophy⁹⁷ and has also been defended on economic grounds.⁹⁸ In differentiating these social costs, contemporary scholars have drawn a distinction between Type I errors (which occur when an innocent person is convicted) and Type II errors (which occur when a guilty person is set free). Although the matter is not without controversy,⁹⁹ the general consensus seems to be that the costs of Type I errors (the injustice of wrongful

⁹⁴ One can observe, for instance, that there are considerably more decisions in the 13-14 year range than in the 16-17 range, although this may be partially or fully explained by the general slope of the graph (with lower sentences generally more common than higher).

⁹⁵ Although this factor is not explicit in the *Criminal Code*, *supra* note 3, we consider it to be somewhat implied in the direction that the court consider “the character of the offender, the nature of the offence and the circumstances surrounding its commission, and to the recommendation, if any, made pursuant to section 745.2”.

⁹⁶ William Blackstone, *Commentaries on the Law of England (Vol. 4)* (New Jersey: The Lawbook Exchange, 2003) at 352.

⁹⁷ Isaacs, *supra* note 14 at 455-56 quotes a number of variations of Blackstone’s maxim, including the Biblical story of Sodom, where God agreed to allow the sinners of the city to go unpunished if destroying Sodom would mean that even 10 innocents were killed.

⁹⁸ Richard A. Posner, *Frontiers of Legal Theory* (Cambridge, MA: Harvard University Press, 2001) at 366.

⁹⁹ Indeed Louis Kaplow has suggested that “fixat[ing]” on the Blackstone formulation is itself the result of cognitive errors including framing effects: Louis Kaplow, “Burden of Proof” (2012) 121 Yale LJ 738 at 803 n. 112. Kaplow’s argument is based on work by Larry Laudan, who suggested that the “Blackstone ratio” takes insufficient account of the harm avoided by incarceration, because the chances of being a victim of violent crime are “orders of magnitude higher than the likelihood of being falsely convicted”. See Larry Laudan, *The Rules of Trial, Political Morality, and the Costs of Error: Or, Is Proof Beyond a Reasonable Doubt Doing More Harm than Good?*, in 1 Oxford Studies In Philosophy Of Law 195, 199-200 (Leslie Green & Brian Leiter eds., 2011).

conviction) are so great as to outweigh by several times the costs associated with Type II errors (the risk borne by society of permitting a guilty party to escape punishment).¹⁰⁰

In our case, a defendant facing an irrationally-long sentence is not “innocent” – he is still as much a criminal after the ineligibility period has expired as before: the sentence is, after all, for *life*. So it may be that we are willing to tolerate the further imprisonment of guilty people for sub-rational reasons more so than we would tolerate the even brief incarceration of the factually innocent. In other words, we may not have any equivalent Blackstonian principle saying that “it is better that 10 murderers receive sentences too short than that one receive a sentence too long”. But even if this were so, it would be disappointing if the rounding phenomenon we have identified were considered irrelevant – if we as a society were equally untroubled by a rehabilitated prisoner remaining in prison too long as we were by an un-rehabilitated prisoner remaining there for a period that was too short.

There is one final dimension to our normative analysis that warrants comment, and this is the implication of heuristic decision-making for the legitimacy of adjudication more generally, as a form of social ordering. Lon Fuller has described adjudication as specially authoritative precisely because it purports to be a reasoned and rational process. As Fuller describes it, adjudication is “a device which gives formal and institutional expression to the influence of reasoned argument in human affairs. As such it assumes a burden of rationality not borne by any other form of social ordering...”¹⁰¹ Indeed, the Privy Council once considered judgments made under the authority of a Tasmanian statute which explicitly permitted judges to disregard rules of law and equity when reaching certain decisions to not be judicial decisions at all, and hence unconstitutional.¹⁰² On this view, heuristic decision-making should be anathema to adjudication precisely because it is at odds with the very notion that judges must engage in a deliberative and rational process when rendering a decision. Needless to say, if courts’ decisions are demonstrably not rational, or at least are not reasoned, public confidence in the judicial system, already unsteady, cannot help but be diminished.

5. Conclusions

This study suggests that there is a realistic possibility that judges are imposing sentences influenced by a heuristic that leads them to select periods of parole ineligibility based only upon sub-rational preferences for certain numbers: even numbers, multiples of 5, and the number 12. While an alternative explanation is possible, the clustering effect itself is plain. And because the clear preference for the “clustering” numbers appears to be entirely unrelated to the enumerated

¹⁰⁰ The various iterations of the Blackstone ratio are traced and compared in Alexander Volokh, “*Guilty Men*” (1997) 146 U PA LR 173.

¹⁰¹ Fuller’s view is that “[we] demand of an adjudicative decision a kind of rationality ... This higher responsibility toward rationality is at once the strength and the weakness of adjudication as a form of social ordering”: Lon L. Fuller, “The Forms and Limits of Adjudication” (1978) 92 Harv LR 353 at 366-67.

¹⁰² *Moses v. Parker* [1896] A.C. 245.

criteria in the *Criminal Code*, it is difficult to conceive of an alternative explanation for the data that would prove satisfying.

Our findings support the growing body of research demonstrating the stubborn strength of heuristics in the judicial context. Stubborn, but not immutable: as we observed earlier in this paper, it is generally thought possible for our deliberative cognitive processes to over-ride our intuitive brain. In 1930, the great American judge Jerome Frank wrote reflectively of subconscious biases in the judicial decision making process. Frank described judgments as proceeding from subconsciously-biased “hunch” to disingenuous rationalization, a progression which could resemble “judicial somnambulism”. According to Frank, rigorous self-awareness was required to improve decisions:

Unfortunately, most judges... are not even aware that they are not aware. Judges Holmes, Cardozo, Hand, Hutcheson, Lehman and a few others have attained the enlightened state of awareness of their unawareness. A handful of legal thinkers off the bench have likewise come to the point of noting the ignorance of all of us as to just how decisions judicial or otherwise, are reached. Until many more lawyers and judges become willing to admit that ignorance which is the beginning of wisdom and from that beginning work forward painstakingly and consciously, we shall get little real enlightenment on that subject.

Our research was limited to parole ineligibility decisions, a uniquely quantifiable, comparable and readily-available dataset. Whether the number-preference heuristic is more broadly at work in the sentencing system is uncertain, but it seems reasonable to suppose that the considerable discretion conferred upon sentencing judges might make “ordinary” sentencing at least as susceptible to the influence of sub-rational preferences for certain numbers, and perhaps more so.¹⁰³ But the significance of our demonstration, and the other studies highlighting the influence of subconscious biases, is broader still. Taken together, the burgeoning literature represents an invitation, particularly to judges, to become more aware of the influence that heuristics may have on the adjudicative process, to develop what Frank called and “awareness of their unawareness” in the interest of more accurate – and more just – judgments.

¹⁰³ This should not, however, be taken as a recommendation in favour of legislated sentencing guidelines. There is, after all, no reason to suppose that legislators’ sentences would be any more accurate than judges’, and all the reason in the world to suppose that they would be less so, given that legislators act entirely in the absence of the adjudicative facts of a given case.