Justice as a Rounding Error?: Evidence of Subconscious Bias in Second-Degree Murder Sentences in Canada

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Abstract

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Keywords

Sentences (Criminal procedure); Judicial discretion--Psychological aspects; Canada

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Justice as a Rounding Error?
Evidence of Subconscious Bias in Second-Degree Murder Sentences in Canada

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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.

Peu de secteurs juridiques donnent aux juges autant de latitude pour exprimer leur pouvoir discrétionnaire que la condamnation des criminels. Ce pouvoir discrétionnaire entraîne nécessairement des inquiétudes relativement à l'influence de préjugés, y compris ceux qui découlent des mécanismes subconscients associés aux processus cognitifs, autrement dit l'heuristique. Les auteurs de cet article étudient un processus heuristique partic-ulier—la préférence pour des chiffres particuliers—en analysant tous les verdicts connus d'inadmissibilité à la libération sur parole de coupables de meurtre au second degré entre

1990 et 2012. La préférence pour des chiffres particuliers porte des personnes à arrondir de manière prévisible des montants à certaines valeurs privilégiées. Les auteurs ont remarqué une tendance à arrondir, sans raison évidente juridiquement justifiable, à des nombres pairs et des multiples de cinq la durée des périodes d'inadmissibilité à la libération sur parole. Les auteurs signalent que ce phénomène devrait susciter des inquiétudes, en particulier parce qu'il permet de croire que d'autres processus heuristiques, moins facilement mesurables mais tout aussi puissants, pourraient influencer des décisions judiciaires.

JUDGES COMMONLY SAY THAT SENTENCING CRIMINAL OFFENDERS is more of an art than a science.[1] What they seem to mean is that crafting a sentence involves the exercise of a broad discretion to apply criteria that 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* (*Code*),[2] but also assiduously fostered through deference shown to sentencing decisions by appellate courts.[3] 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.

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1.   See *e.g. R v Arganda (JR)*, 2011 MBCA 54 at para 38, 268 Man R (2d) 194; *R v Sharpe (KD)*, 2009 MBCA 50 at para 49, 240 Man R (2d) 52; *R v Biln*, 1999 BCCA 369 at para 17, 125 BCAC 254; *R v Crowell* (1992), 114 NSR (2d) 355, 1992 CanLII 2506 (CA).
2.   RSC 1985, c C-46, ss 718, 718.1 [*Criminal Code*].
3.   *R v Shropshire*, [1995] 4 SCR 227, 129 DLR (4th) 657 [*Shropshire*]; *R v M (CA)*, [1996] 1 SCR 500 at para 90, 182 AR 30; *R v Ipeelee*, 2012 SCC 13 at para 38, [2012] 1 SCR 433.

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 towards members of a group, or to the predispositions of individual judges.[4] This is the type of bias that has fixated legal scholars since the heyday of Legal Realism in the early part of the twentieth century.[5]

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."[6] 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.

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4. See *e.g.* James Stribopoulos & Moin A 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) 45:2 Osgoode Hall LJ 315 (arguing that the political party that appointed the judge and the judge's gender are statistically significant variables 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 Working Paper No 9/2012, online: <http://ssrn.com/abstract=2027517> (noting that outcomes in judicial review applications in Canada's Federal Court show that they turn more on the judge assigned to an application than on its merits).

5. Legal Realists such as Karl Llewellyn and Jerome 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, and 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, Mass: Harvard University Press, 2009) at 129-35.

6. Deborah W Denno, "Neuroscience, Cognitive Psychology, and the Criminal Justice System: Introduction" (2010) 8:1 Ohio St J Crim L 1 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) 41 Adv Q 49; The Honourable Mr Justice Todd L Archibald & Shannon SW O'Connor, "Cognitive Psychology in the Courtroom: The Art and Science of Persuasion – Chapter II" (2012) Ann Rev Civ Litigation.

To date, there has been relatively little research done on heuristics and biases in the context of sentencing.[7] 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 because judges are reluctant to assist with experiments proving the presence of sub-rational decision-making in the exercise of judicial discretion.[8] 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,[9] it can help identify systemic patterns within the matrix of decisions and offer insights that may prompt further study and experimental inquiry.[10]

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7. Chris Guthrie, Jeffrey J Rachlinski & Andrew J Wistrich, "Inside the Judicial Mind" (2001) 86:4 Cornell L Rev 777 at 781-82 (noting a paucity of research in this area). While there has been some research on judges and heuristics, and indeed some discussion of bias in judicial decision-making even by judges themselves (Guthrie's frequent collaborator Andrew Wistrich is himself a judge, as is Todd Archibald, cited in *supra* note 6), most of this work has been done in the context of lab studies with hypotheticals. This article attempts to use real-world data to test whether and how a heuristic may be influencing judicial decisions.

8. 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 situations. See *e.g.* John M Darley, "Citizens' Assignments of Punishments for Moral Transgressions: A Case Study in the Psychology of Punishment" (2010) 8:1 Ohio St J Crim L 101 at 106, 116, 102-103.

9. 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, [2012] 4 FCR 3. 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.

10. 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 nearly 65 per cent first thing in the morning to less than 10 per cent 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. See Shai Danziger, Jonathan Levav & Loira Avnaim-Pesso, "Extraneous Factors in Judicial Decisions" (2011) 108:17 Proceedings of the National Academy of Sciences 6889.

We advance just such an analysis in this article. We examine whether one heuristic—"number preference"[11]—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.[12] It is perhaps not surprising that judges may be rounding periods of parole ineligibility to the nearest whole number (2 or 3 instead of 2.25 or 3.5).[13] 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, and 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

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11. 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 towards preferred numbers, however it is imprinted on our minds.

12. The database—of almost five hundred decisions over those twenty-two years—had been assembled with another purpose in mind: to examine 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.

13. See Richard H Thaler, "Mental Accounting Matters" (1999) 12 J Behav Dec Making 183 at 185. Thaler asserts that this rounding to whole numbers may simply be a function of a 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.

procedures."[14] 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.

I.   HEURISTICS AND BIASES IN DECISION MAKING

A.   HEURISTIC DECISION-MAKING

Cognitive neuroscience has firmly established the existence of "heuristics": decision-making shortcuts that are used as fast and frugal alternatives to delibera-tive and rational processes.[15] 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.[16] 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.[17] 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.[18] In effect, people employ heuristics to "reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations."[19] 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."[20]

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14.   Daniel M Isaacs, "Baseline Framing in Sentencing" (2011) 121:2 Yale LJ 426 at 428.

15.   For a comprehensive description of the present state of research into the effects of heuristics on judicial decisions, see Jones, *supra* note 6.

16.   George Polya, *How To Solve It: A New Aspect of Mathematical Method*, 2d ed (Princeton, NJ: Princeton University Press, 1957). The word "heuristic" in fact derives from the Greek verb *heuriskein* (*euriskein*), which means "to find."

17.   Amos Tversky & Daniel Kahneman, "Judgement Under Uncertainty: Heuristics and Biases" (1974) 185:4157 Science 1124 at 1124-1131.

18.   *Ibid* at 1124.

19.   *Ibid*.

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

To understand the significance of Kahneman and Tversky's work, something more should be said about 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).[21] 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 by the opposite qualities: It is relatively slower, less rule-based, and involves a higher degree of conscious awareness. Since approximately 95 per cent 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 institutive system, where it recognizes System 1's errors and where it is motivated to correct them.[22]

B.   PREVIOUS EVIDENCE OF BIASES IN JUDICIAL DECISIONS ON QUANTITY

Many heuristics 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.[23] 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.[24] The effect of anchoring is so profound that individuals who have seen an anchoring number for only

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21.   Steven A Sloman, "The Empirical Case for Two Systems of Reasoning" (1996) 119:1 Psychological Bulletin 3 at 6.
22.   Daniel T Gilbert, "Inferential Correction" in Thomas Gilovich, Dale Griffin & Daniel Kahneman, eds, *Heuristics and Biases: The Psychology of Intuitive Judgement* (Cambridge, UK: Cambridge University Press, 2002) 167 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." See Chris Guthrie, Jeffrey J Rachlinski & Andrew J Wistrich, "Blinking on the Bench: How Judges Decide Cases" (2007) 93:1 Cornell L Rev 1 at 9.
23.   Tversky & Kahneman, *supra* note 17 at 1124.
24.   Fritz Strack & Thomas Mussweiler, "Explaining the Enigmatic Anchoring Effect: Mechanisms of Selective Accessibility" (1997) 73:3 J Personality & Social Psychology 437.

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.[25]

Studies conducted in the legal context have shown the influence of anchoring in a stark way. Early research on juries demonstrated that personal injury verdicts could be influenced by previous numbers presented as high demands by plaintiffs (even if outlandish, jurors' verdicts were pulled towards the demand),[26] and also, ironically, by the provision of information regarding a cap on damages (telling jurors of a cap predictably pulled lower awards upwards towards the cap).[27]

Judges have also been shown to be susceptible to anchors. In one study, United States 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 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.[28] 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 defendant's clearly spurious suggestion that the potential award did not meet the minimum federal jurisdictional threshold of $75,000.[29]

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 prosecutors[30] or by media reporters, and even those

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25. Thomas Mussweiler & Birte Englich, "Subliminal Anchoring: Judgmental Consequences and Underlying Mechanisms" (2005) 98 Organizational Behaviour & Human Decision Processes 133.
26. John Malouff & Nicola S Schutte, "Shaping Juror Attitudes: Effects of Requesting Different Damage Amounts in Personal Injury Trials" (1989) 129:4 J Social Psychology 491.
27. 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 that a jury who is not told of the cap. See Jennifer K Robbennolt & Christina A Studebaker, "Anchoring in the Courtroom: The Effects of Caps on Punitive Damages" (1999) 23:3 Law & Hum Behav 353.
28. Andrew J Wistrich, Chris Guthrie & Jeffrey J Rachlinski, "Can Judges Ignore Inadmissible Information? The Difficulty of Deliberately Disregarding" (2005) 153:4 U Pa L Rev 1251.
29. Guthrie, Rachlinski & Wistrich, *supra* note 7.
30. Birte Englich, Thomas Mussweiler & Fritz Strack, "The Last Word in Court – A Hidden Disadvantage for the Defense" (2005) 29:6 Law & Hum Behav 705.

shouted out by members of the gallery.[31] 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 Shai Danziger, Jonathan Levav, and Loira Avnaim-Pesso. The study examined 1,112 rulings from eight Israeli judges over a ten-month period. The study's authors discovered that about 65 per cent of parole applicants were successful at the beginning of the court session (*i.e.*, 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 towards the status quo (*i.e.*, 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,[32] 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."[33]

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,[34] 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,[35] the time of day,[36] and even whether the judge had recently contemplated his or her own death.[37]

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31. Birte Englich, Thomas Mussweiler & Fritz Strack, "Playing Dice With Criminal Sentences: The Influence of Irrelevant Anchors on Experts' Judicial Decision Making" (2006) 32:2 Personality & Social Psychology Bull 188 [Englich, Mussweiler & Strack, "Playing Dice"]; Birte Englich, "Blind or Biased? Justitia's Susceptibility to Anchoring Effects in the Courtroom Based on Given Numerical Representations" (2006) 28:4 Law & Pol'y 497; Robert A Prentice & Jonathan J Koehler, "A Normality Bias in Legal Decision Making" (2003) 88:3 Cornell L Rev 583 at 638-39.

32. Karen Weinshall-Margel & John Shapard, "Overlooked Powers in the Analysis of Parole Decisions" (2011) 108:42 Proceedings of the National Academy of Sciences E833. The variables overlooked in the Danziger study included that the cases were not necessarily heard in a non-random order, that the board tried to complete cases from each institution before it took a break, and that unrepresented applicants went last.

33. Danziger, Levav & Avnaim-Pesso, *supra* note 10 at 6892.

34. Isaacs, *supra* note 14 at 426.

35. Englich, *supra* note 31; Englich, Mussweiler & Strack, "Playing Dice," *supra* note 31.

36. Danziger, Levav & Avnaim-Pesso, *supra* note 10.

37. Adam Rosenblatt et al, "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 Personality & Social Psychology 681.

C.   NUMBER PREFERENCE AS A HEURISTIC OR BIAS

This article focuses 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… ."[38] 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 per cent 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 number preference phenomenon has been measured in various 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.[39] The extent to which preferences for *particular* numbers are innate is uncertain, because the strength of the effect appears to vary among countries and among speakers of different languages, suggesting a significant cultural component to the selection of the favoured digits.[40]

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38.   John M Last, ed, *A Dictionary of Epidemiology*, 3d ed (New York: Oxford University Press, 1995) at 47.

39.   Anita L Stewart, "The Reliability and Validity of Self-Reported Weight and Height" (1982) 35:4 J Chron Dis 295; Michael L Rowland, "Self-reported weight and height" (1990) 52:6 Am J Clin Nutr 1125; Tommy LS Visscher et al, "Underreporting of BMI in Adults and Its Effect on Obesity Prevalence Estimations in the Period 1998 to 2001" (2006) 14:11 Obesity 2054; Laura A Schieve et al, "Validity of Self-reported Pregnancy Delivery Weight: An Analysis of the 1988 National Maternal and Infant Health Survey" (1999) 150:9 Am J Epidemiol 947; S de Lusignan et al, "End-digit preference in blood pressure recordings of patients with ischaemic heart disease in primary care" (2004) 18:4 J Human Hypertension 261; Ansley J Coale & Shaomin Li, "The Effect of Age Misreporting in China on the Calculation of Mortality Rates at Very High Ages" (1991) 28:2 Demography 293; L Edouard & A Senthilselvan, "Observer error and birthweight: digit preference in recording" (1997) 111 Public Health 77.

40.   Matthias Bopp & 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.

II. 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 ten and twenty-five years.[41] It is unique in Canadian law in its combination of mandatory sentencing with minimum parole ineligibility.

The current provisions of the *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.[42] 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 twenty-five-year period of parole ineligibility, whereas those convicted of second-degree murder would be given a period of parole ineligibility of between ten and twenty-five years, subject to the so-called "faint hope clause."[43] This clause permitted a reduction in the parole ineligibility period after an offender had served a period of incarceration of fifteen years.

Although the provisions of the *Code* do not confer an unfettered discretion on a sentencing judge, the open-textured language of section 745.4 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

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41. By contrast, convictions for first-degree murder lead to a mandatory parole ineligibility period of 25 years. See *Criminal Code*, *supra* note 2, s 745(a).

42. *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. See *Criminal Code*, SC 1953-54, c 51, ss 206, 656. In 1961, Parliament introduced amendments to the *Criminal Code* that led to a distinction being made between capital and non-capital murder. See *An Act to amend the Criminal Code (Capital Murder)*, SC 1960-61, c 44, s 2.

43. The "faint hope" clause refers to what was formerly s 745.6 of the *Criminal Code*. It was brought into force in 1976 as part of the abolition of capital murder and creation of first- and second-degree murder. See *Criminal Law Amendment Act (No 2),* 1976, SC 1974-76, c 105.

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.[44]

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 section 745.4 as among the factors that a judge must consider, appellate courts have held that a sentencing judge can depart from it without any reason.[45] 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 ten years' parole ineligibility,[46] the Supreme Court of Canada (SCC) has rejected this interpretation as an unnecessary restriction on judicial discretion.[47]

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 ten 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."[48] 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: cases resulting in sentences of ten to fifteen years or fifteen to twenty years.[49] Factors that frequently appear in the cases in support of longer parole ineligibility periods include things such as: the presence of multiple murder victims,[50] the exploi-

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44.   *Criminal Code, supra* note 2, s 745.4.
45.   *R v Mafi,* 2000 BCCA 135, 142 CCC (3d) 449; *R v Cruz,* [1998] BCJ no 811 (QL) at paras 44-48, [1999] 1 WWR 322 (CA) [*Cruz*]; *R v Hoang,* 2002 BCCA 430 at paras 11-12, 167 CCC (3d) 218; *R v Cerra,* 2004 BCCA 594, 192 CCC (3d) 78 [*Cerra*].
46.   *R v Brown* (1993), 31 BCAC 59, 83 CCC (3d) 394; *R v Gourgon* (1981), 21 CR (3d) 384, 58 CCC (2d) 193 (BCCA). Compare *R v Doyle* (1991), 108 NSR (2d) 1 at 5, 294 APR 1 (CA); *R v Wenarchuk* (1982), 67 CCC (2d) 169, 3 WWR 643 (Sask CA).
47.   At the same time, in *Shropshire,* the SCC maintained that "it may well be that, in the median number of cases, a period of 10 years might still be awarded." See *Shropshire, supra* note 3 at para 27.
48.   *Criminal Code, supra* note 2, s 745.4.
49.   *Cerra, supra* note 45.
50.   *R v Arneil*, [1994] BCJ no 2640 (QL), (*sub nom R v JJA*) 52 BCAC 291; *R v Cliff,* 2011 BCSC 1177, 88 CR (6th) 175; *R v Turcotte,* 2006 BCSC 2087, 79 WCB (2d) 305; *R v Stewner* (1996), 113 Man R (2d) 78, MJ no 444 (QL) (CA).

tation of vulnerability (*e.g.*, husband/wife, killing of a child or the elderly),[51] facts suggesting pre-meditation or planning,[52] evidence of an unsavoury motive (*e.g.*, sexual gratification, profit, or obstructing justice),[53] brutality of killing (*e.g.*, prolongation of harmful act, torture, et cetera),[54] an accused's history of dangerousness,[55] or a lengthy parole ineligibility recommendation by a jury.[56] As might be expected, there are relatively fewer cases in the highest end of the range, that is, in excess of twenty years.[57]

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 five, or in even numbers, or numbers rounded to the nearest whole number. No court has suggested, for instance, that fifteen years was chosen because it would be more effective as denunciation or deterrence than would be fourteen or sixteen years.

B.   METHODOLOGY AND DATA GATHERING

The data used in this article represent substantially all of the reported English-language second-degree murder cases available on Quicklaw between January 1990 and 31 December 2012.[58] Cases were found by performing open-ended keyword searches of "murder" or "parole ineligibility." The results were then examined with duplicate and irrelevant cases being removed. The data were further refined by removing cases that had been overturned or altered on appeal, in which case the

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51.   *Cruz, supra* note 45; *R v Perkin* (1997), 98 BCAC 236, 161 WAC 236; *R v Van Osselaer*, 2004 BCCA 3, 190 BCAC 313; *Cerra, supra* note 45; *R v Guignard*, 2008 ABQB 283, 447 AR 376 [*Guignard*]; *R v Macki*, 2001 BCSC 417, 199 DLR (4th) 178.
52.   *R v Nash*, 2009 NBCA 7, 340 NBR (2d) 320; *R v Atwal*, 2006 BCCA 493, 232 BCAC 64.
53.   *R v Faulds* (1994), 20 OR (3d) 13, 79 OAC 313; *R v Michelle* (1998), BCJ no 1631 (QL), CarswellBC 1609 (CA).
54.   *R v Tsyganov* (1998), 172 NSR (2d) 43, 42 WCB (2d) 197 (CA); *R v Yaeck* (1991), 6 OR (3d) 293, 50 OAC 29; *R v Muise* (1994), 135 NSR (2d) 81, 94 CCC (3d) 119 (CA).
55.   *R v Bennight,* 2012 BCCA 190, 543 WAC 195.
56.   *Guignard, supra* note 51; *R v McInnis* (1999), 44 OR (3d) 772, 134 CCC (3d) 515 (CA); *R v Cousins* (2000), 195 Nfld & PEIR 169, 47 WCB (2d) 94 (Nfld Sup Ct - TD); *R v Price* (1999), 42 WCB (2d) 106, [1999] BCJ no 812 (QL) (SC).
57.   The authors found 66 out of 477 reported decisions since 1990 in which a parole ineligibility period of 20 years has been imposed.
58.   The data only include English-language decisions outside of Quebec. The authors' experience in searching Westlaw and CanLII was that QuickLaw captured all of the same available case law.

appeal decision was substituted for that of the sentencing judge.[59] In cases with more than one accused, the co-accuseds' sentences were treated separately. The total sample resulted in 477 decisions. While this sample does not include every decision in Canada,[60] 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.[61] Thus, we have reason to believe that the cases we have found and included represent a significant body of the relevant decisions.

We are aware of no basis to believe that our dataset is non-representative of parole ineligibility decisions generally.[62] And of course, even if unreported decisions showed a different trend (or no trend at all) with respect to number preference, this would in 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 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

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59. 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.

60. 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.

61. 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, and appellate decisions are always reported. See *Criminal Code, supra* note 2, s 675(2).

62. That is to say, the authors 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.

into disrepute.[63] 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) a preference for multiples five and ten, (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 twelve. The results will be discussed, each in turn, in Part II(E), below. Figure 1 provides a graphic illustration of the overall data.[64]

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63.   *R v Dorsey* (1999), 123 OAC 342, 43 WCB (2d) 273; *R v Bezdan*, 2001 BCCA 215, 49 WCB (2d) 604; *R v Fuller*, 2007 BCCA 353 at para 17, 403 WAC 158. We note that there is some controversy as to the exact test permitting judges to depart from joint recommendations in British Columbia. See *R v Roadhouse*, 2012 BCCA 495 at paras 47-53, 104 WCB (2d) 984. Nevertheless, judges are loathe to depart from joint submissions.

64.   We examined the data over five-year periods (1990-1994, 1995-1999, 2000-2004, and 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 and 1994. We suggest that the pronounced change is likely attributable to the effect of the overruling of lower court decisions that established a soft legal presumption in favour of 10-year parole ineligibility periods. See *Shropshire, supra* note 3.

FIGURE 1: PAROLE INELIGIBILITY DISTRIBUTION OF REPORTED CANADIAN
DECISIONS BETWEEN 1990 AND 2012 (TOTAL NUMBER OF DECISIONS)

Parole Ineligibility Period in Half-Year Increments
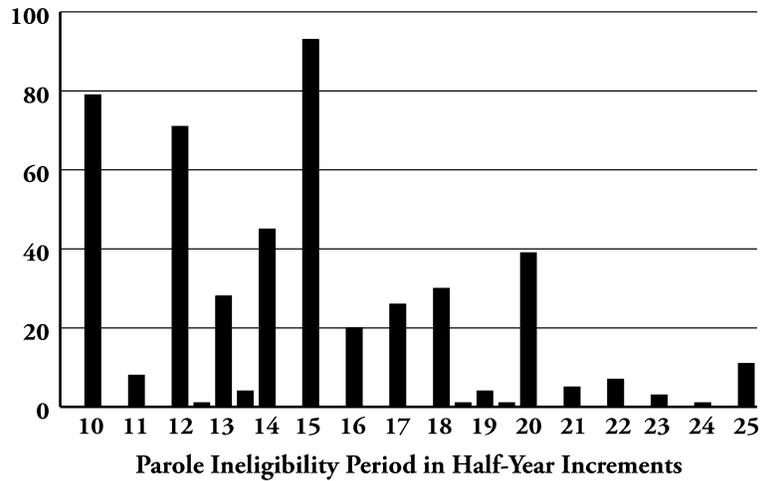
D.   ANTICIPATED RATIONAL DISTRIBUTION OF PAROLE INELIGIBILITY

Before saying more about the apparent "clustering"[65] 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.[66] 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-year

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65. "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 J
Futures Markets 395.

66. *Shropshire, supra* note 3. That 10-year parole ineligibility periods should be more common
than other periods, of course, is not borne out by the evidence from the reported cases.

periods. The question, then, is why a 20-year parole ineligibility period is so much more common than a 19- or 21-year period.

E. DISTRIBUTION IN THE DATA

1. A PREFERENCE FOR MULTIPLES OF FIVE AND TEN

One of the first observable trends in the data presented in Figure 1 is an apparent preference for numbers involving multiples of 5 or 10, a phenomenon that is well-established in the literature.[67] Of the 477 reported decisions nationwide, 222—almost half—involved parole ineligibility periods ending with either 0 or 5 (79 x 10, 93 x 15, 39 x 20, and 11 x 25). If the distribution were random, the expected frequency of such numbers would be one quarter or .25, yet the actual frequency is almost twice that: .465.

This observed frequency suggests that as many as half of parole eligibility period 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 adverted: why should we expect a random distribution across the range? Apart from a direction from the SCC's statement that 10 years would be the most common sentence,[68] there is nothing in the legal criteria in section 745.4 of the *Code* that would provide a reason for favouring digits ending in 0 and 5, except that two of these numbers, 10 and 25, represent a "floor" and "ceiling" of the

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67.   See Carlo G Camarda, Paul HC Eilers & Jutta Gampe, "Modelling general patterns of digit preference" (2008) 8:4 Statistical Modelling 385 (stating, "[A] commonly found effect is that certain preferred end-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 Shi Wu Wen et al, "Terminal Digit Preference, Random Error, and Bias in Routine Clinical Measurement of Blood Pressure" (1993) 46:10 J Clin Epidemiol 1187; Robert J Myers, "Errors and Bias in the Reporting of Ages in Census Data" (1940) 41 Transactions – Actuarial Society of America 395; Prithwis das Gupta, "A General Method of Correction for Age Misreporting in Census Populations" (1975) 12:2 Demography 303; Daniel F Heitjan & Donald B Rubin, "Inference from Coarse Data Via Multiple Imputation with Application to Age Heaping" (1990) 85:410 J Am Statistical Assoc 304; See Rowland, *supra* note 39.

68.   *Shropshire*, *supra* note 3.

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 (.143); instead we see that 132 do (.340). What should be a frequency of 1/7 is 1/3. And, of course, a quick glance at Figure 1, above, 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 also to 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.[69]

2.   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.[70] 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-numbered (10, 12, 14, 16, 18,

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69. Focusing on the range around 15 years (*e.g.*, 13-17) where a total of 208 of the decisions fall, we would expect each year to be imposed one fifth of the time (*i.e.*, .20)—in other words, in 41 to 42 decisions. Instead, of the digits in that range, only 14 occurs an average amount of the time. The others occur at about half of the expected frequency, where 15 occurs over twice that.

70. Terence M Hines, "An odd effect: Lengthened reaction times for judgments about odd digits" (1990) 18:1 Memory & Cognition 40. 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 Yutaka Nishiyama, "A Study of Odd- and Even-Number Cultures" (2006) 26:6 Bulletin of Science, Technology & Society 479.

20, 22, and 24) and eight odd-numbered ineligibility periods (11, 13, 15, 17, 19, 21, 23, and 25) between 10 and 25.

One might expect that the decisions, if premised solely on the legal criteria, should be split more or less equally between even and odd. However, as Figure 2, below, demonstrates, we do not observe anything like an equal split. In fact, 292 decisions, or 62 per cent 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 at 15 and 20 (which may be the result of a separate rounding process), the results are even more stark: there are 174 decisions (70 per cent) 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.

FIGURE 2: EVEN VERSUS ODD NUMBERED PAROLE INELIGIBILITY DECISIONS BETWEEN 1990 AND 2012 (TOTAL NUMBER OF REPORTED CANADIAN DECISIONS)
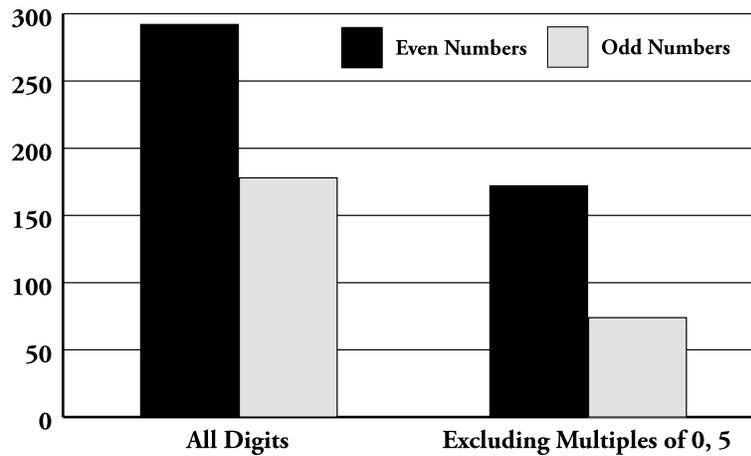
3.   A PREFERENCE FOR WHOLE NUMBERS

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.[71]

We see from the data that at least some judges (six, in fact) have imposed terms of 12.5, 13.5, 18.5, or 19.5 years.[72] The rest, however, appear to have restricted themselves to ineligibility periods in one-year increments. It is striking that out of 477 reported decisions there are only six 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 years rather than 13 or 14 years 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 reason might explain the phenomenon, it should still cause at least some unease as we remind ourselves that, if rounding is taking place in these circumstances, those murderers whose periods are not being rounded to the nearest 5 or 2 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.

4.   A PREFERENCE FOR THE NUMBER TWELVE

One other fact apparent from Figure 1 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 over time. Twelve is usually the third most popular number

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71. A good example is manslaughter, where a small sample reveals that half-year sentence increments are relatively common. See *R v C(SD)*, 2013 ABCA 46, 556 AR 27 (7.5 years); *R v Brian* (1998), 131 Man R (2d) 149, 40 WCB (2d) 374 (CA) (10.5 reduced to 7.5 years); *R v St-Cyr*, 2012 ONSC 887, [2012] OJ no 1956 (QL) (7.5 years); *R v Abel*, 2008 BCSC 1731, 81 WCB (2d) 99 (8.5 years); *R v Bakker*, 2003 BCSC 982, 62 WCB (2d) 317 (8.5 years); *R v Dingwell*, 2012 PESC 13, 321 Nfld & PEIR 263 (5.5 years); *R v Gilling*, [2001] OJ no 2300 (QL) (Ont CA) (5.5 years); *R v Hathway*, 2008 SKQB 480, 80 WCB (2d) 189 (11.5 years); *R v Ma*, 2010 ONSC 4803, 89 WCB (2d) 699 (9.5 years).

72. *R v Nichols*, [2006] OJ no 2868 (QL) (Ont Sup Ct J); *R v Feeley* (2001), 55 OR (3d) 481, 156 CCC (3d) 449 (CA); *R v JRG*, [2002] OJ no 5687 (QL) (Ont Sup Ct J); *R v Knott*, [2005] OJ no 3834 (QL) (where trial judge observed that more culpable co-accused Kakegamic received a parole ineligibility period of 13.5 years whereas Knott received a parole ineligibility period of 11 years); *R v Ward*, 2011 NSCA 78, 307 NSR (2d) 216; *R v Assoun* (1999), 182 NSR (2d) 344, [1999] NSJ no 479 (QL) (SC).

(after 15 and 10), but is sometimes second after 15 (in the period 2001–2005). And, indeed, in the most recent period, 12 was the single most popular number nationally.[73] 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 per cent of cases. However, the sample shows that more than 12 per cent of cases result in a 12-year parole ineligibility period (p = .0182).

Preference for particular numbers has been measured in other contexts.[74] Also, certain numbers were in many societies historically imbued with cultural significance and symbolism, which might affect preference.[75] 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 dual advantage 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 towards a number given as the starting point for the analysis.[76] Twelve 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 12 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.

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 *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

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73.   A preference for 12 does not, on its own, account for the overall preference for even numbers, which remains 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 ones 103 to 66.

74.   For instance, it has long been demonstrated that about 30 per cent of people—at least in Europe and America—asked to produce a random number between 0 and 9 will choose 7. See William E Simon, "Number and Color Responses of Some College Students: Preliminary Evidence for a "Blue Seven Phenomenon" (1971) 33 Perceptual & Motor Skills 373; Michael Kubovy & Joseph Psotka, "The Predominance of Seven and the Apparent Spontaneity of Numerical Choices" (1976) 2:2 J Experimental Psychology: Human Perception & Performance 291.

75.   See *e.g.* Camarda, Eilers & Gampe, *supra* note 65. They note that numerical preferences for numbers such as 0 and 5 may be "combined with tendencies to avoid certain unpleasant numbers" such as 13. See also Mitchell, *supra* note 65.

76.   See generally Isaacs, *supra* note 14.

11 and 13), which is not present. It appears, therefore, that many judges are subconsciously rounding to 12 in the same way others are rounding to 15 or to the nearest even number.

5.   STATISTICAL ANALYSES

We subjected our data to a number of common statistical tests in order to evaluate whether the observed distribution could be explained by random chance.[77] Using a Normal Distribution Goodness of Fit Test with an expected frequency for each 10 per cent interval of the data, the hypothesis that the data was normally distributed was rejected ($p < .005$), meaning that there is only a 0.5 per cent likelihood that the results observed could be explained by chance. The data were 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 only a 0.5 per cent likelihood that the results observed could be explained by chance.

In addition to the broad distribution tests, the data were 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 test 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 *Code* or suggested in the judgments themselves.

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

6.   ALTERNATIVE EXPLANATIONS FOR THE CLUSTERING EFFECT

As discussed in Part II(E)(1)-(2), 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. However, we have also suggested that this does not explain the preference for 20 or, most particularly, the strong, indeed dominant, clustering at 15.

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77.   The level of significance used for all tests was $p = .05$.

One possibility is that judges might favour 15 years because, until 2011, that number represented the "faint hope clause" threshold.[78] That is, for the period covered by 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. A judge sentencing a convicted 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 "faint hope" hearing and determination. 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.[79]

While these observations 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"[80]). In addition, we are aware of no decision in which 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, 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 half-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 per cent of cases.

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78. On 2 December 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. See *Protecting Canadians by Ending Sentence Discounts for Multiple Murders Act,* SC 2011, c 5.

79. "Anchoring" is the phenomenon, discussed at greater length in Part I(B), above, by which an unrelated number can exert a strong influence over a quantitative choice. As the authors noted, anchoring has been studied exhaustively, and persuasively demonstrated in the judicial context.

80. *Criminal Code*, *supra* note 2, s 745.4.

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 have 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 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.[81] Because past sentences have been 10, 12, 15, or 20 years, or have disproportionately favoured even numbers, subsequent decisions may be simply reinforcing an established pattern. An adhesion 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 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 number 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

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81.   The authors would like to thank one of the anonymous reviewers of this piece for suggesting this explanation.

particular numbers.[82] Indeed, in *R v Shropshire*, the Court expressly rejected the notion that there should be a rebuttable presumption in favour of the 10-year minimum for parole ineligibility.[83] To our knowledge, only the British Columbia Court of Appeal has posited the notion that there are groupings of cases by 10–15 years or 15–20 years, but even that court has not identified any particular favoured numbers within that range.[84] 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.[85] 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 to 25 years in the absence of any number bias. Instead, this explanation posits that judges have tacitly adopted sentencing categories, perhaps differentiating between offenders who are more or less dangerous or 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 only five or six numbers, not the thirty 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 sentences, this still does not explain why the clustering occurs at 10, 12, 15, or

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82. The courts' posture is somewhat anomalous when compared with sentencing for other offences. Although sentencing judges are not strictly bound by the ranges that emerge from the case law, the SCC 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… ." 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*." See *R v Nasogaluak*, 2010 SCC 6 at para 44, [2010] 1 SCR 206.

83. *Shropshire*, *supra* note 3.

84. *Cerra, supra* note 46.

85. The authors would again like to thank one of the three anonymous reviewers of this piece for suggesting this alternative explanation.

20 years, and not, for instance, 10.5, 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), not that the expected distribution would be evenly spread in the absence of this bias.

III. THE NORMATIVE IMPLICATIONS OF SUB-RATIONAL BIAS IN SETTING PAROLE INELIGIBILITY

If we accept that this judicial rounding is taking place, the question that arises from our conclusions is: 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 *Code*, sets out a number of principles and objectives, including denunciation, deterrence, separation, restoration, reparation, and rehabilitation.[86] 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 to be overturned 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.

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86.   *Criminal Code, supra* note 2, ss 718, 718.1.

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 *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 for all murders is life imprisonment,[87] 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."[88]

Although it is 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' families[89] or acts as some additional deterrence,[90] 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 or for separating an offender from society. If parole ineligibility is, as it appears to be, based on such a dubious, or at least highly contestable, penological theory,[91] we maintain that special

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87.   *Criminal Code, supra* note 2, s 745.

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

89.   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 *e.g.* Conservative Party of Canada, News Release, *Supporting Victims' Rights* (25 April 2013), online: <http://www.conservative.ca/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").

90.   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 a mandatory minimum sentence of life imprisonment. See Daniel S Nagin, "Criminal Deterrence Research at the Outset of the Twenty-First Century" in Michael Tonry, ed, *Crime and Justice: A Review of Research* (Chicago: University of Chicago Press, 1998); PH Robinson & John M Darley, "Does Criminal Law Deter? A Behavioural Science Investigation" (2004) 24:2 Oxford J Legal Stud 173; Kevin C Kennedy, "A Critical Appraisal of Criminal Deterrence Theory" (1983-1984) 88 Dick L Rev 1.

91.   RA Duff, "Responsibility, Restoration and Retribution" in Michael Tonry, ed, *Retributivism Has a Past: Has it a Future?* (Oxford: Oxford University Press, 2011).

vigilance is justified to ensure that the decisions are being made through the reasoned application of the statutory criteria to the facts of each case. A careful and restrained approach also sits more easily with the value placed upon liberty and the idea of restraint in punishment that finds voice in many of the rights enshrined in the *Canadian Charter of Rights and Freedoms*.[92]

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.[93] 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."[94] It costs approximately $300 a day to maintain a male inmate. This cost rises to "$578 per

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92. Part I of the *Constitution Act, 1982, being Schedule* B to the *Canada Act 1982* (UK), 1982, c 11 [*Charter*]. This is most obviously protected by the prohibition in s 12 of the *Charter* on "cruel and unusual treatment or punishment." However, principles of restraint in punishment are also provided by s 11(g), which protects against retroactive punishment, and s 11(i), which requires that an individual be given the benefit of the lesser of two potential punishments when there has been a variation between the time of the commission of the offence and sentencing. However, s 7 of the *Charter* also protects a number of hearing rights in the context of sentencing. See *e.g. R v Lyons,* [1987] 2 SCR 309 at para 85, 44 DLR (4th) 193.

93. *CCRA, supra* note 88, s 120. The system of parole eligibility is somewhat byzantine and varies for certain offences. However, this represents the general rule.

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

day to incarcerate a federally sentenced woman inmate."[95] By contrast, "the annual average cost to keep an offender in the community is about $29,500."[96]

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 rounding up, at least with respect to the clusters around 15 and 20.[97] 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, or protection of society from re-offence[98]—then an irrationally low ineligibility period might impose social costs and create risks no less than might an irrationally high one.

Moreover, even in these circumstances of equal probability of "too high" and "too low" periods, 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 William Blackstone's famous maxim that it is "better that ten guilty persons escape, than

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95. *Ibid.*

96. *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 article 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 a more careful exercise of discretion. Although the SCC has found it to be inappropriate for sentencing judges to engage in a "cost/benefit budgetary analysis" when setting parole ineligibility, 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. See *e.g. Shropshire*, *supra* note 3 at 20.

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

98. Although this factor is not explicit in the *Code*, 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." See *Criminal Code*, *supra* note 2 s 745.4.

that one innocent suffer."[99] This notion is central to Western moral philosophy[100] and has also been defended on economic grounds.[101] 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,[102] the general consensus seems to be that the costs of Type I errors (the injustice of wrongful 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).[103]

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 be willing to 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

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99. *Commentaries on the Law of England*, vol 4 (New Jersey: The Lawbook Exchange, 2003) at 352.

100. Isaacs 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. See Isaacs, *supra* note 14 at 455-56.

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

102. Indeed Louis Kaplow has suggested that "fixat[ing]" on the Blackstone formulation is itself the result of cognitive errors including framing effects. See Louis Kaplow, "Burden of Proof" (2012) 121:4 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 Leslie Green & Brian Leiter, eds, *Oxford Studies in Philosophy of Law*, vol 1 (Oxford: Oxford University Press, 2011) 195 at 199-200.

103. Alexander Volokh, "Guilty Men" (1997) 146:2 U Pa L Rev 173 (comparing various iterations of the Blackstone ratio).

legitimacy of adjudication more generally, as a form of social ordering. Lon Fuller has described adjudication as especially authoritative precisely because it purports to be a reasoned and rational process. As Fuller explains, 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… ."[104] 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.[105] 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.

IV. 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 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 clustering numbers appears to be entirely unrelated to the enumerated criteria in the *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 article, it is generally thought possible for our deliberative cognitive processes to override 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

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104. 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." See Lon L Fuller & Kenneth I Winston, "*The Forms and Limits of Adjudication*" (1978) 92:2 Harv L Rev 353 at 366-67 [emphasis in original].
105. *Moses v Parker*, [1896] AC 245, 65 LJPC 18.

proceeding from subconsciously-biased "hunch" to disingenuous rationalization, a progression which could resemble "judicial somnambulism."[106] According to Frank, rigorous self-awareness was required to improve decisions:[107]

> 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 quanti-fiable, 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.[108] 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 an "awareness of their unawareness" in the interest of more accurate—and more just—judgments.

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106. Jerome Frank, *Law and the Modern Mind* (NewYork: *Doubleday*,1930) at 157.

107. *Ibid* at 164.

108. 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.