How much is pain and suffering worth?

An estimation of compensatory damages for victims of assault

by Hilary P. Furness

Department of Economics, Queen's University

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Supervisor: Cherie Metcalf

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INTRODUCTION

Physical assault reduces victims' welfare. Whether the decline is due to foregone income or medical bills, the inability to participate in recreational activities, or bodily harm, the ramifications of assault are costly. Accordingly, the purpose of civil court awards (and the law of Torts) is to offset the specific losses of the victim and deter assaults more generally. Defendants may be ordered to compensate for the harm they caused by providing the claimant with money. Here, "… the objective of the compensation is to restore the victim to a position substantially equivalent in a pecuniary way to that which he would have occupied had no [damage] been committed" (Viscusi, 1988, p. 203).

When considering the damage sustained, the pricing of health expenses or missed work is relatively straightforward; the valuation of physical, emotional, or neurological suffering is not, however. Pain and suffering awards are "intended to give to the injured person some pecuniary return for what he has suffered or is likely to suffer" (Viscusi, 1988, p. 203). These damages are regarded as intangible and, to date, a preferred method of pricing does not exist.

The majority of those who study pain and suffering use Quality Adjusted Life Years (QALYs) or Willingness to Pay (WTP) measures. These methods are used to rank harm severity and are rarely employed for producing dollar appraisals. When harm is quantified, the focus is usually on very specific damage classifications. For instance, Karapanou and Visscher (2010) value spinal cord lesions, paralysis, the loss of an eye, and deafness. Similarly, in 1988 Viscusi estimated the compensation for those suffering from cancer, dermatitis, and quadriplegia.

In each case the goal is to create a framework for a dollar evaluation. What the figures are used for, however, is paper-dependent. For many, the estimates are used for comparative purposes. As is the case with Karapanou and Visscher (2010), the values for a specific nation are

studied relative to those awarded in other countries. For others, the objective is to provide policy analysts with a pricing schedule. One of the greatest concerns with pain and suffering damages is award unpredictability; by creating a framework, variability is thought to decline.

The purpose of this paper is to generate a dollar value for physical and emotional damages by using litigated civil court cases. Nearly 400 civil court cases are examined and coded for empirical analysis. All victims were physically assaulted and, furthermore, all sustained some form of bodily harm. The cases are used to assess the dollar value of assault-induced injuries and to provide a framework for estimating their worth. This quantitative work does not reproduce the more common pricing methods for pain and suffering and instead introduces a novel form.

Some of the more recent papers attach dollar figures to QALY severity ranks[1] whereas others average court awards from single-harm cases[2]. Here, I follow the lead of Leiter, Thoni, and Winner (2012) and use a simple OLS regression model. The regressand is the value of damages for pain and suffering while the regressors are indicators for the injuries sustained.

Overall, the results indicate that the average dollar award for pain and suffering is low. The typical victim will earn approximately $30,000, a number which amounts to $1/10^{th}$ of the maximum damage cap for pain and suffering imposed by the Supreme Court of Canada. Those who suffer injuries categorized as high in terms of severity will receive, on average, considerably more than those with minor wounds. Furthermore, the results indicate that the vast majority of the physical injuries sustained are located above the shoulders and both psychological and neurological impairments are frequent consequences.

An introduction to tort law

In the broadest of present-day senses, a Tort is a civil wrong and the law of Torts

[1] See Karapanou and Visscher (2010)
[2] See Leiter, Thoni, & Winner (2012)

involves cases where individuals have been harmed or incurred a loss (Horsey & Rackley, 2011). The focus of the law of torts is on "non-criminal" wrongs and the goal is to prescribe the injured party a remedy (Horsey & Rackley, 2011). In order to be considered a tort, the detriment, whether physical or not, must be caused by a breach of obligations (Soloman, McInnes, Chamberlain, & Pitel, 2011). Under Canadian civil law, everyone is expected to adhere to certain standards or levels of care.

Wrongs addressed by the Canadian legal system can be divided into two separate categories: public and private. According to Soloman et al. (2011), public wrongs are those that are handled by Criminal Law. Here, the plaintiff is the state and the defendant is the suspected injurer and the damage is said to have been caused by the violation of a publically-owed responsibility (Horsey & Rackley, 2011). In a situations where there is a finding of guilt, punishment generally ensues (Soloman et al., 2011).

Private wrongs consider circumstances where the "wrongdoer breached an obligation that was owed to an individual, rather than to society as a whole" (Soloman, et al., 2011, p. 1). In these cases, the plaintiff is the person harmed and the defendant is the one who is said to be held responsible. If the plaintiff wins the suit, he is most generally awarded monetary compensation. It is in these tort suits that plaintiffs can seek damages to compensate them for their physical, psychological, and neurological injuries.

Yet, it cannot be said that public and private wrongs are mutually exclusive. Situations do arise when two separate cases concerning the same incident are heard. One example is assault. In Canada, assaults are prohibited under Section 265 of the Canadian Criminal Code and are public wrongs. However, the injurees have also been privately wronged and can instigate a Tort suit. In this paper, the focus is on civil court suits initiated by those who were physical assaulted.

The purposes of Tort Law

For the purpose of this study, tort law has two main roles. Its first responsibility is *compensation* (Horsey & Rackley, 2011). One of the most cited functions of tort law is to repair the harm caused. This restoration almost always comes in the form of a transfer of money whereby the amount is case specific. By ordering specific sums to be paid, Tort Law attempts to reinstate corrective justice, or defendant-corrected-wrongs (Horsey & Rackley, 2011). This goal is accomplished by ruling that the defendant must pay the victim (Horsey & Rackley, 2011).

The second role is *deterrence* (Horsey & Rackley, 2011). Whereas punishment is backward looking and chastises the injurer for his wrong, deterrence is forward looking; its purpose is to dissuade people from engaging in certain activities. The theory of deterrence presumes that an individual knows that a particular action will lead to harm, is aware that he is capable of preventing it, and understands that if the action is performed, undesired consequences will follow (Soloman, et al., 2011). As will soon be discussed, deterrence often forms the root of economic theories of tort law[3].

Economic theory of Tort Law

The theory of tort liability states that, in order for an individual to pursue a claim, he must be able to answer the following three questions in the affirmative: was there *harm* caused?; were the actions or inactions of the defendant the *cause* of the harm?; and can the defendant's actions or inactions be classified as a *breach of duty*? (Cooter & Ulen, 2012; Emons, 1993).

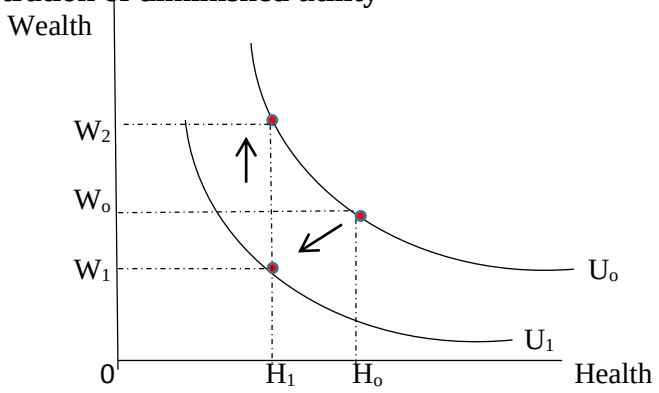
[3] The third goal of tort law is *punishment* (Horsey & Rackley, 2011). Depending on the nature of the actions and the degree of damage, punitive damages may be awarded. Punitive damages (also known as aggravated damages) are rarely deemed necessary, however. In order for the court to offer this sum, the actions of the injurer must be defined by the court as extreme; the actions must be extremely malicious (Swan, Bala, & Reiter, 2010).

1. Harm

From an economic perspective, harm is classified as quantifiable damages (Emons, 1993). More often than not, the impairment is understood to be physical, and damaged and lost property is frequently cited as being a precursor for a suit. However, intangible injuries, such as those affecting the victim's psyche or neurological capacity, can also be claimed (Emons, 1993). Although these injuries were not traditionally compensated, recent trends in tort suits have proven that the courts find them worthy of a monetary return (Emons, 1993). Thus, as long as the plaintiff can demonstrate a loss, harm is said to exist.

According to Cooter & Ulen (2012), victim harm can be understood in terms of basic micro-economic theory. From this perspective, any damage to the victim is associated with a decrease in their level of utility (Cooter & Ulen, 2012). Illustratively speaking, an injury or loss is associated with a downward shift in his utility function (**Figure 1**).

Figure 1: An illustration of diminished utility



Note: The source of this figure is Cooter & Ulen (2012, p. 191)

Prior to the incident occurring, the victim's utility is represented by U_o[4]. Although it is illustrated that he has H_o units of health and W_o units of wealth, any combination of the two

[4] All descriptions of Figure 1 are adopted from Cooter & Ulen (2012) unless specified otherwise.

variables along this curve will provide him with the same level of self-worth. After the defendant causes him harm, the victim's utility is decreased to U_1 - at point (W_1, H_1) for instance. In sum, he has lost H_o-H_1 units of health and W_o-W_1 units of wealth. An example of such an event may be a blow to the face resulting in a fractured nose and broken glasses.

In order for the victim to be restored to his original level of utility, he must regain enough units of health and/or wealth to place him back on U_o. Awards by the courts are almost certainly allocated in monetary terms[5] and thus an increase in W from W_1 to W_2 is completely remunerative. In this case, the authors regard the compensation as *perfect*. That is to say, the amount of money given to the claimant perfectly restores him to his original level of utility.

2. Cause

In addition to the harm sustained, the victim must demonstrate that the defendant caused him to suffer (Emons, 1993). However, in this paper I assume that each defendant is the cause of the damage and the victim has already proven their guilt.

3. The breach of a duty of care

In certain circumstances, the plaintiff must only prove that he was harmed and that the defendant caused the damage. Under such conditions, there is no need to confirm that a required level of care was breached (Polinsky & Shavell, 2007). According to this principle, known as *strict liability*, the injurer must always compensate the victim (Polinsky & Shavell, 2007)[6].

The purpose of this paper is to analyze the role of physical assaults on pain and suffering compensation. According to Canadian Tort Law, an assault - regardless of its severity - is an

[6] In other situations, however, the awarding of compensation is conditional on the violation of a legally imposed level of *due care* (Polinsky & Shavell, 2007). If the appropriate level of care is taken, the defendant avoids responsibility and, consequently, is not ordered to pay damages. This standard is known as the *negligence rule* (Polinsky & Shavell, 2007).

intentional tort (Horsey & Rackley, 2011). The implication of this is that, once the assault has begun, the injurer has breached the required duty of care and thus the strict rule of liability will always apply (Polinsky & Shavell, 2007).

Polinsky and Shavell (2007) introduce several economic interpretations of the duty of care. The one reproduced here is chosen to best fit the circumstances considered in the empirical portion of the paper. For instance, from this point forward it is assumed that the plaintiff always chooses a level of care that is equal to or greater than the optimum. This notion simplifies the model and rules out any issues that will arise from contributory negligence. Our quantitative analysis examines cases of assault only; none of the suits examined discuss the victim's degree of responsibility and therefore, we do not consider it here.

Polinsky and Shavell (2007) begin by assuming that x is the level of effort the injurers have spent on care and p(x) is the associated probability that harm will ensue [where $p'(x) > 0$ and $p''(x) < 0$]. Furthermore, x* is the optimal level of care and h is the degree of harm suffered. The assumption is that all individuals would like minimize the costs according to,

$$\min\{x + p(x)h\} \qquad \textbf{(Equation 1)}^{7}$$

Strict liability always requires the injurer to compensate the victim for the harm caused. For simplicity, it is assumed that perfect compensation is provided; that is to say, the injuree is awarded h (Polinsky & Shavell, 2007). In theory, all reasonable persons will minimize equation 1, and will choose x* (Polinsky & Shavell, 2007)[8]. As the simple pain and suffering model illustrates, damages play an important role in deterring undesirable conduct via tort liability.

[7] All information on strict liability and the negligence rule is adopted from Polinsky and Shavell (2007).
[8] Under the negligence rule, it is assumed that the government imposed optimal level of care (ẍ) is equal to x* (Polinsky & Shavell, 2007). If the defendant takes a level of precaution that is greater or equal to ẍ, they will not be held liable; consequently, this individual is not required to compensate for the harm caused. However, if the injurer selects an x that is less than ẍ, he is liable and pays h. If one is guilty of assault, the optimal level of care was not employed.

Tort law and pain and suffering damages awarded

The welfare of physical assault victims suffers. From physical injuries and psychological trauma to medical expenses and foregone productivity, the consequential effects of the attack are always negative. From a law and economics perspective, pain and suffering damages serve both the victim and the offender. On the one hand, they provide tangible compensation to the victims who have experienced non-pecuniary losses. On the other hand, potential liability helps deter dispute settlement by brute force (Viscusi, 1988).

In most common law nations, the injuries sustained need not be physical or made visible to the courts. Instead, pain and suffering damages cover a host of losses, ranging from broken limbs to traumatic psychosis and neurosis. It is most often the case that these awards are given as a lump sum (in dollars) and are inclusive of damages the courts trust the injuree is currently suffering from and will continue to experience in the future. In sum, pain and suffering damages are not intended to include the monies awarded whose purpose is to reimburse lost income or medical expenses (Avraham, 2006).

Despite the fact that legal and economic scholars have, for the most part, come to an agreement on the characterization of pain and suffering damages, their suitability and appropriate quantum is heavily debated (Avraham, 2006). In fact, Avraham (2006) indicates that opinions are very divided. Those who are in support of these non-pecuniary payments believe that the individuals responsible for the harm are subsequently accountable for reinstating the victim's lost welfare (Avraham, 2006). Such beliefs are viewed to be consistent with the goals of tort law – that is to say, deterrence and restitution. These adherents are of the opinion that non-pecuniary damages are worthy of tangible reparation and, furthermore, that the injurees' losses are very real (Avraham, 2006).

Those who deny the relevance of intangible awards reject its use for a number of reasons. Three of the most prevalent justifications are: the lack of a precise schedule for quantifying the damages; the distaste for the reimbursement of subjective harms; and the seemingly random and, at times, unbounded monetary offerings (Avraham, 2006; Viscusi, 1988; Croley & Hanson, 1995). Much of this contention originates from the belief that most people would be unwilling to purchase "pain and suffering coverage" and, as a result, opponents pushed for the reformation of the tort system and the limitation of damages (Avraham, 2006, p. 89; Geistfeld, 1995).

Canada and the introduction of the Damage Cap

The controversy surrounding the amount of monies being awarded influenced a stream of nations (including Canada) to implement damage caps. The purpose of these ceilings is to both reduce and control for the historic unpredictability of non-pecuniary awards and significantly lower the monies awarded (Avraham, 2006; Viscusi, 1988). Accordingly, these limits are viewed as legally imposed methods of award instruction; by setting a maximum threshold, lawyers are forced to work within a pre-set range and must therefore adjust the quantum accordingly (Avraham, 2006). In theory, damage caps should entice legal professionals to note the maximum and scale the desired amount downwards accordingly.

In 1978 a trilogy of Canadian cases [*Andrews v. Grand & Toy Alberta Ltd.*, [1978] 2 S.C.R. 229*; Arnold v. Teno*, [1978] 2 S.C.R. 287*; and Thornton v. School Dist. No. 57 (Prince George)*, [1978] 2 S.C.R. 267] persuaded the Supreme Court of Canada to introduce a maximum value for pain and suffering. In *Andrews v Grand & Toy Alberta Ltd*, Justice Dickson states,

> The sheer fact is that there is no objective yardstick for translating non-pecuniary losses, such as pain and suffering and loss of amenities, into monetary terms. This area is open to widely extravagant claims. It is in this area that awards in the United States have soared to dramatically high levels in recent years. Statistically, it is the area where the danger of excessive burden of expense is the greatest (para 88).

Dickson J went on to say,

> The amounts of such awards should not vary greatly from one part of the country to another. Everyone in Canada, wherever he may reside, is entitled to a more or less equal measure of compensation for similar non-pecuniary loss. Variation should be made for what a particular individual has lost in the way of amenities and enjoyment of life, and for what will function to make up for this loss, but variation should not be made merely for the province in which he happens to live. (para 93).

In 1978 the limit was set at $100,000 with the court allowing for inflation adjustments (*Andrews v. Grand & Toy Alberta Ltd.*, [1978] 2 S.C.R. 229). In 2013 dollars, this figure is approximately $340,000 (Bank of Canada, 2013).

Although the effect of the cap has been to eliminate large outlying figures, such limits are riddled with problems. Three of the most cited issues are presented here. First, Geistfeld (1995) notes that this process of award maximization fails to control for award capriciousness. The cap is merely a binding limit and, in all respects, it fails to serve as a guide for those whose injuries are worthy of a dollar figure less than existing ceiling (Geistfeld, 1995). Second, the cap is biased. There is a strong probability that victims suffering from the most severe injuries will receive less than satisfactory sums, yet those with minor claims will remain unaffected by the limit (Avraham, 2006). Third, damage caps decrease offender deterrence; caps may be viewed as limiting liability and consequently precaution levels may fall (Avraham, 2006).

The results of this study speak in favor of the second concern. In situations where a victim reports over ten injuries or has sustained three of the most severe injuries recorded, the dollar worth of the harm is more than the damage cap. For instance, if a victim sustains both brain damage and a diminished libido (which is later shown to be an effect of severe sexual assault), the dollar awards for these two harms amounts to nearly 3/4 of the allowable limit. If PTSD and anxiety are also claimed, the award is necessarily restricted.

Pain and suffering evaluation techniques

In situations where damage caps have been legislated, academics have explored various

quantitative means of building award schedules and matrices (Avraham, 2006). Here, their intent is straightforward – it is to minimize the presence of award arbitrariness and help ensure that like cases are treated alike (Geistfeld, 1995). To date, while there are numerous evaluation methods, the two most prominent are Willingness To Accept (WTA) and Quality Adjusted Life Years (QALY) (Hammit, p. 985). Both of these are preference based measures and are representative of the "social value of a change in health risk" (Hammit, 2002).

This paper offers an alternative method for pricing non-pecuniary damages. The reasons for its use are twofold. First, the types of information required to compute a QALY and a WTP are not available. In order to construct QALY, the duration of the injury (in days, weeks, or months for instance) and the age of the victim is required. The data sources used here do not consistently provide these facts. Second, the method employed allows one to not only price physical, neurological, and psychological injuries but create a severity index from the results.

From this point forward I take the stand that pain and suffering damages are a necessary component of Tort Law damage awards and are computable. In the paper a large dataset of assault based civil court claims is explored. This essay is similar to others in that civil court cases are used for the purpose of evaluating harm and the associated compensation[9]; it is different because the data is Canadian, all bodily locales are priced, and both neurological and psychological harms are considered.

DATA AND METHODOLOGY

From this point forward the focus of the paper rests on civil court cases for physical

[9] See Viscusi (1988); Karapanou and Visscher (2010); and Leiter, Thoni, & Winner (2012).

assault. Assaults are one of the most frequently reported categories of civil court claims and their associated case summaries are readily available. In the next few sections a thorough description of the empirical methodology, data and empirical results are provided.

Methodology

This study examines the dollar value of pain and suffering damages associated with physical-assault induced harms. It is assumed that such damages are a function of the location and severity of the harm caused. The methods employed are simple and are limited to OLS regression analyses. In all cases the dependent variable is pain and suffering and the regressors are representative of the harm sustained. Aside from pain and suffering, all variables are binary, where the value of one indicates that a specific harm was sustained and a zero indicates it was not. In all cases it is assumed that the damage valuations are determined according to[10],

$$y = \alpha + X'\beta + \varepsilon \qquad \textbf{(Equation 2)}$$

In this model, each of the coefficients are interpreted as the dollar worth of the specific harm. More specifically, they denote the average dollar value for a single injury. In **Equation 2**, y is always the (real) dollar value of pain and suffering, α is a constant, X is the matrix of regressors and ε is the error term.

To determine the predicted award valuations for harm x, the coefficient is combined with the constant term and the other controls are set to zero. As both positive and negative coefficients for the harms are plausible, amendments will necessarily be made. Because non-positive values for pain and suffering are empirically plausible but not theoretically sensible, negative predicted

[10] There are two reasons why a linear regression model is used. First, little theoretical or empirical evidence exists which can guide the appropriate use of interaction terms or other forms nonlinearity. When it comes to regression analyses, this topic has yet to be well explored. Second, the OLS coefficients are interpreted as average predicted values. The purpose of this paper is to explore the dollar worth of assault-induced harms and the OLS estimates provide exactly what is desired.

awards are interpreted as being equivalent to zero for individual injuries. One can assume that the courts are concerned with such injuries if and only if they exist in the presence of other harms.

The OLS estimates are consistent if and only if the errors are homoscedastic and serially uncorrelted and the independent variables show no signs of perfect multicollinearity and are exogenous (Kennedy, 2003). In turn, each of these properties are tested and the findings indicate that OLS is the appropriate method to be employed. Prior to analyzing the results, I discuss the sources from which I construct the data, along with the modifications required for estimation of the model.

Data sources

To estimate pain and suffering damages for victims of violent assault, 393 judge-decided civil court cases are examined (Westlaw, 2013; LexisNexis, 2013). Two-hundred and four are taken from the Westlaw Litigator's Personal Injury Quantum Search (WLPIQS) while the remaining 189 are adopted from the Carlson Personal Injury Database (CPID) (Westlaw, 2013; LexisNexis, 2013). Both databases contain summarized reports of personal injury claims for victims of violent assault.

These two collections of cases are assembled by random case selection processes (Westlaw, 2013; LexisNexis, 2013). In both instances, the claims are deemed to be representative of a true population of civil court hearings (Westlaw, 2013; LexisNexis, 2013). More specifically, the databases consist of cases where a judge has awarded the plaintiff pain and suffering damages. As a result, no data is gathered on the victims who are denied awards. Furthermore, the WLPIQS and CPID are comprised of claims that have gone to court and, as a consequence, the findings are not necessarily characteristic of those who choose to settle.

The WLPIQS and the CPID summarize the facts and findings of civil court cases and categorize the suits by injury topic. For the purpose of this study, assault and/or battery is the primary subject matter. To illustrate the type of information available, I set out an excerpt from a WLPIQS case summary in **Table 1**[11] below, and an excerpt from a CPID summary in **Table 2**[12].

Table 1: An excerpt from a WLPIQS case summary

General/non-pecuniary damages: $50,000.00
Aggravated damages: $5,000.00
Loss of future earning capacity/Loss of future earnings: $25,000.00
Future care costs: $7,325.00

Summary:
Plaintiff, age 30, was assaulted by a man who reported to him as foreman of an asphalt crew. The blow to the side of the head caused lacerations and immediate bleeding. Plaintiff fell to the pavement and struck the head and right shoulder. He sustained a basal skull fracture and was left with a scar on the right side of his head, total loss of the senses of taste and smell, a major hearing impairment in the right ear, and significant short and medium-term memory problems. The assault also triggered problems with an asymptomatic severe malocclusion and significantly retruded lower jaw. The shoulder injury caused plaintiff to give up playing fast ball and hockey. Emotional and psychological problems, such as loss of self-confidence and depression, were noted.

Table 2: An excerpt from a CPID case summary

Court	British Columbia Supreme Court
Date	2012/10/01
Damages	Non-pecuniary damages: $125,000
Duration	Ongoing
Gender	Male
Age	49 at time of trial
Cause of injury	C4A.75 Assault/battery (all types)
Injury topic number(s)	Depression
	Emotional/psychological symptoms
	Face – abrasions/lacerations
	Face – bruising
	Head – abrasions/lacerations
	Head – bruising
	Mouth/jaw – abrasions/lacerations
	Mouth/jaw – bruising
	Sleep – nightmares
	Stress/PTSD
	Teeth – chipped or fractured

[11] The information in **Table 1** is adopted from Westlaw (2013) *Coburn v. Fernandes*, [1993] B.C.J. No. 1303
[12] The information in **Table 2** is adopted from LexisNexis (2013) *Thornber v. Campbell*, [2012] BCJ No. 2024

All WLPIQS reports indicate the type and amount of damages awarded. According to the passage above, the victim received not only pain and suffering but aggravated damages, money for lost earnings and future care costs. Unfortunately the CPID does not provide the same level of detail in the information. However, it still does permit key variables to be identified.

For the purpose of collecting data on injury type and severity, the WLPIQS and the CPID are useful. They provide concise, consistently analyzed summaries of the most relevant details from civil court cases. The original cases can be lengthy and difficult to code consistently.

Data coding: The original structure

To construct my data, I begin with the combined set of cases from the WLPIQS and the CPID. Unfortunately, 87 of the 393 cases had to be dropped from the sample. The most common reasons for their exclusion are: case repetition; multiple plaintiffs or defendants; and insufficient information regarding the injuries sustained. In the instances when a single case is heard at both a Trial Court and a Court of Appeal, only the outcome from the Appeal Court is considered.

Aside from Prince Edward Island, all Provinces and Territories are represented in the remaining set of cases. The court levels range from Provincial Trial Divisions to the Federal Court of Appeal and the data covers the years 1990 to 2013. These dates are representative of the trial date rather than the point in which the injury was sustained and all monetary figures have been adjusted to (real) 2002 Canadian dollars. While the beginning time frame of the sample dates back well over a decade, all decisions are subject to the (1978) damage cap. Moreover, since the *Andrews v Grand & Toy Alberta Ltd* decision, there have been no additional amendments to the allowable size of non-pecuniary compensation (*Andrews v. Grand & Toy Alberta Ltd.*, [1978] 2 S.C.R. 229).

Table 3: The original variables

	Categories of variables	Variables included
1	Case information	Case name; date of trial; province; court
2	Damages (in $2002)	Pain and suffering; punitive; future earnings; other damages
3	Victim characteristics	Sex; age
4	Body injury location	Head; face; skull; eye; ear; nose; teeth; mouth; jaw; back; internal; ribs; core; genitals; arm; hand; leg; foot
5	Type of injury	Laceration; bruise; fracture; head fracture; scar
6	Psychological injuries	General emotional; sleep/nightmares; Post-Traumatic Stress Disorder; anxiety; depression; fear; inferiority/low self esteem
7	Obstructed senses	Breathing; vision; smell; taste; hearing
8	Neurological injuries	Brain; balance; neurosis; headaches; vertigo; nausea; concussion; memory complications; diminished libido
9	Health care necessities	Hospitalization; surgery; other procedures; stitches
10	Seriousness of injury	Weapon; disfigured; duration of injury; injury ongoing at trial; percent of disability permanent; permanent
11	Defendant characteristics	Acquaintance; partner/spouse; sports; bar or drinking; police/security/ambulance member; inmate
12	Impacts of injury	Recreation interference; work interference

In total, over seventy variables and descriptive statistics are collected from the case files and, for computational purposes, the majority have been coded numerically. **Table 3**[13] catalogues those originally coded and is included for reference purposes.

Row one of **Table 3** lists the types of general information gathered for each case. As the case name and the date of trial are for reference purposes only, they are left as categorical variables. Aside from pain and suffering (whose' unit is dollars), all other variables are binary, where the value of one is assigned if an injury, at a given location, exists. Row two indicates the types of damages the victim may have been awarded. In this study each injuree must have received a positive dollar sum for pain and suffering, yet the values for punitive, future earnings, and other damages may be zero. Finally, row three indicates the types of victim characteristics

[13] Not all of the variables included in Table 3 are used in the empirical analyses. Thus, the information in this table should be considered preliminary. Information surrounding the awarding of punitive sums, future earnings and other damages is reported inconsistently and the age of the victim is provided in less than 30% of the cases examined. Furthermore, while the WLPIQS frequently states the relationship between the victim and the offender and the impacts of the injury (such as lost recreational or work performance), the CPID does not. In theory, awards for pain and suffering and other damages should be independent; thus, the exclusion of this information should have little quantitative impact on the results that follow. The same logic can be applied to the age of the victim – this is to say, the age of the victim should have no impact on the sum(s) of money awarded. Yet, information surrounding the victim-offender relations and the effect of the assault on the victims' activities would be interesting to research; however the lack of data is prohibitive. From this point forward, these variables are no longer considered.

gathered; sex is a binary variable where males are allotted a one whereas plaintiff ages are measured in years.

Rows four through nine specify the nature of the injuries sustained. More specifically, row four distinguishes between nineteen internal and external body parts. All are constructed to allow for mutual exclusiveness; that is to say, if a foot is injured, one must not assume that any part of the leg will be harmed as well. Row five specifies the nature of the injury sustained (such as a laceration or a bruise) while row six itemizes the possible psychological trauma suffered. Rows seven and eight record the classes of bodily senses affected and the nature of the neurological trauma sustained, respectively. Lastly, row nine, lists the types of health care the victim required post-assault.

Finally, row ten lists six variables which help to decipher the seriousness of the harm whereas row eleven indicates whether the plaintiff and the defendant had, before the assault took place, been engaged in a prior relationship or activity. The variables in row twelve reveal whether the assault interfered with the plaintiffs' recreational or occupational participation. The variables in these three rows are also binary.

To provide an example of the data coding, I refer to the CPID excerpt presented above. Other than pain and suffering, all italicized variables included below are assigned a value of one and are representative of the injuries sustained. Those not mentioned are allotted a zero.

In this claim, the victim's *sex* is male and the case was heard in 2007 in *British Columbia*. He sustained four psychological harms (*depression, general emotional strain, sleep disturbances* and *PTSD*), *bruises* and *lacerations* to the *face, head* and *mouth/jaw* and fractured *teeth*. For the injuries incurred, the amount of *pain and suffering damages* awarded is $125,000 (which will be adjusted for inflation).

Data coding: Adjustments

1. Physical and psychological injuries

Prior to any empirical analysis, adjustments to the original data coding methodologies are made. When new variables are created, they too are binary. In all cases, a one indicates the presence of a particular harm while a zero specifies its absence. All amendments, and the reasons for them, are described as follows.

Several of the codes for bodily harm and psychological distress are combined. The purpose of these changes is to decrease variable specificity. Reporting discrepancies, strong positive correlations, and minimal observation variation are the primary reasons for these alterations.

Specifically, injuries surrounding the victims' head create serious coding difficulties. At times the harm description is precise enough to determine the exact location of the injury. Thus, distinguishing facial wounds from those located on the skull is feasible. In other cases, the precise nature of these distinctions cannot be determined. The report may state that injuries to the head have occurred, but the references are to the nose, eyes or other areas on the victims' face. In addition to the reporting inconsistencies, the variation in the joint presence of some of the head, skull, and face related injuries is very low. For instance, more than 65% of skull injuries are associated with damage to the head.

In order to measure these variables in a more consistent way, two new variables are created. The head is joined with the skull, and the face, mouth, teeth, are united with the jaw. In consideration of the eye, ear, and nose, there are relatively few injuries reported. As a result, these three variables are joined together to form a new one, and it is titled sensory organs.

Issues of reporting precision also necessitated the grouping of harm to the victims' extremities and psychological functioning. Thus, two additional amalgamations are created: the

leg, foot, arm, and hand; and anxiety and depression. In sum, 41.50% of the claimants reported at least one injury to an extremity while 22.88% of victims suffered either anxiety or depression. Furthermore, approximately 50% of all plaintiffs who claimed anxiety were also living with depression.

Finally, concern is given to the relatively small number of observations. When the data was originally collected, indicators for the location of the court were noted by coding the ten Provinces and three Territories. However, the inclusion of fourteen control variables in the regression analyses is unnecessarily precise. Consequently the Province and Territory codes are now: Western courts; Central courts; Atlantic courts; Northern courts; and Federal courts.

2. **Severity indicators**

It is nearly impossible to decipher and comment on the severity of the injury by noting only the physical location. Some notion can be gained from certain types of neurological damage, but very little from psychological problems. Because of this, two severity indicators are created from the data: low[14] and high. **Table 4** illustrates the sorting.

Table 4: The creation of the severity levels

Severity level	Variables included
Low	Bruise; laceration; fracture; scar; stiches
High	Head fracture; disfigured; ongoing effects; permanent effects; hospital stay; surgery; other procedure; weapon involved

An individual's injuries are classified as low on the severity scale if the claimant had or is continuing to suffer from at least one of the following issues: bruising; laceration(s); bone fractures; scarring; and stitches. Similarly, if one of the following eight categories are claimed, the victim is said to have endured a high degree of damage acuteness: head fracture;

[14] As the majority of those who report scaring say it is not permanent, scars are recorded as low on the severity scale. Similarly, fractures (to the arm or leg for example) caused no long term side effects. Although no medical knowledge guides this decision, bruises, lacerations and stitching are also considered relatively minor.

disfiguration; ongoing effects; permanent effects; required hospital stay; underwent surgery; underwent some other procedure; or if the defendant used a weapon during the assault.

Rather than grouping all claimants as either low or high, the possibility remains open for each of the victims to fall into both categories. This decision is based on the realization that some individuals do present themselves to the court with one or more issues in each of the two categories. In cases such as these, it is understood that the court would take all claims into consideration, and not just those deemed most severe. As one of the goals of this paper is to price pain and suffering, all of the victim's injuries must be accounted for. **Table 5** displays the distribution of the victims and their claims.

Table 5: A tabulation of the severity levels

Low severity	High Severity		
	0	1	Total
0	35	46	81
1	75	150	225
Total	110	196	306

RESULTS

Summary statistics

Of the 306 cases examined, seventy five (or 25%) of the plaintiffs are female and the remaining 231 (or 75%) are male. The largest share of the judgments are heard in Central Canada (45.1%), while those heard in the Western Regions make up the second largest proportion (42.8%). Cases from the Atlantic, Northern, and Federal courts represent 9.2%, 0.6%, and 2.3% of the total, respectively.

Table 6 displays the summary statistics for the (real) dollar awards for pain and suffering. According to the figures presented, the average assault-induced loss (evaluated by the courts) is $34,100 and the median sum is assessed at $16,300. The range of the values is sizeable; the minimum amount cited was $185 and the greatest was roughly $371,000.

Table 6: Summary statistics for the victim's pain and suffering awards

Variable	25%	50%	75%	99%	Mean	Min	Max
P&S	$5,575	$16,365	$36,186	$327,955	$34,138	$185	$370,825

In terms of damages claimed, bodily injuries are the primary harm recorded. Two-hundred and eighty three plaintiffs (or 92.48% of all complainants) claimed some form of physical impairment. **Table 7** summarizes the statistics. Column one lists the injury locales while columns two and three indicate the associated number and percent of claims made. Column three is interpreted relative to the number of individuals who actually suffered physical injuries rather than the number of cases heard.

Table 7: Summary statistics for bodily injuries

Variable	No. of claims	% of people physically injured
Head/skull	64	22.61%
Face/mouth/jaw/teeth	148	52.30%
Sensory	109	38.52%
Extremities	127	44.88%
Back	34	12.01%
Core	25	8.83%
Ribs	23	8.13%
Internal	13	4.59%
Genitals	11	3.89%
Total	490	195.76%

Notes: The total number of people who claimed physical injuries is 283.

According to the findings, the injuries reported most frequently are located above the shoulders. According to the **Table 7**, 257 of the 490 injuries (or 52.45%) are found on the head, skull, face, mouth, teeth, and facial sensory organs. While nearly one quarter of the harms are found on the victim's extremities, internal injuries and those located below the waist are the least prevalent. Only 8.13% of the injurees suffer harm to the ribs, 8.83% to the core, and 3.89% to the genital region. In sum, there are 490 bodily injuries associated with the 283 people physically harmed. These figures suggests that, on average, each of the plaintiffs who were hurt successfully claim approximately 1.73 physical injuries before the courts.

Recall that approximately 75% of all victims are male. In consideration of this fact and the location of the majority of the physical harms, the findings indicate that the typical assault

victim claiming pain and suffering in a court of a law is male and has received blows to the face. Very few, however, have sustained wounds to the lower body. This may suggest that very few of the aggressors attack the victims once they have hit the ground.

In addition to physical damages, claimants report various types of mental harm. The summary statistics for psychological trauma are quite stunning. One hundred and thirty four (or 43.79%) of the assault victims suffered some sort of mental distress and made 324 psychologically related claims to courts. The most predominant category is that of general emotional pain. This class affected 58.96% of those experiencing mental upset. Sleep disturbances and depression are ranked second and third while fear is the least likely type to be claimed. See **TABLE 8** for the result summaries.

Table 8: Summary statistics for psychological harm

Variable	No. of claims	% of people injured
Emotions (general)	79	58.96%
Sleep disturbances	57	42.54%
Depression	52	38.81%
PTSD	41	30.59%
Anxiety	37	27.61%
Inferiority	36	26.87%
Fear	22	16.42%
Total	324	241.80%

Neurological damage is defined as a disorder which impacts an individual's nervous system, including the brain (Metcalfe, 1998). In most cases, neurological damage is associated with trauma to the head or spine, but neither of these causes can be considered necessary or sufficient conditions (Metcalfe, 1998). For the purposes of this study, nine different categories of neurological damage have been recorded[15]. Their associated figures and proportions are shown

[15] These classifications are based upon what is seen to be a "best fit" rather than scientific based sorting. The unifying feature for all nine categories is the increased likelihood (or definite presence) of damage to the nervous system. To exemplify, both neurosis and decrease libido are often associated with head and brain damage (Metcalfe, 1998).

in **Table 9**. For reference purposes, 116 claimants (or 37.91%) reported having to live with at least one of the variables reported here.

Table 9: Summary statistics for neurological harm

Variable	No. of claims	% of people injured
Headache	62	53.44%
Concussion	31	26.72%
Neurosis	25	21.55%
Vertigo	19	16.38%
Memory	16	13.79%
Brain (general)	14	12.07%
Balance	7	6.03%
Nausea	7	6.03%
Libido	6	5.17%
Total	187	161.18

Regression analysis

In sum, four OLS regressions are run. The purpose of exploring Models 1 through 3 is to assess the degree of erraticism in the results when additional predictors are incorporated (Kennedy, 2003). More specifically, these three are used for diagnostic purposes only. Model 4, however, is used to price the injuries. For illustrative purposes, **Table 10** displays the format of the Models. An "x" indicates the inclusion of the particular variable.

In each case the estimates are interpreted as real 2002 Canadian dollars and Central Canada is the comparator group for court location. The cases heard in this province constitute the largest proportion of all claims analyzed and, consequently, Central Canada is termed the benchmark. Lastly, both severity level indicators are always included for control purposes.

Model 1 is construed as the base model. Here, all predictors classified as either psychological or neurological are collapsed into two mutually exclusive binary categories[16], while eight disparate physical injury categories are included independently. Model 2, however, allows for the division of psychological harm. In addition to the eight types of physical harm, the

[16] Where the value of one indicates the presence of a particular injury and a zero signifies its absence.

indicator for mental anguish is partitioned into seven categories while the dummy for neurological challenges is left unchanged. Like Models 1 and 2, Model 3 incorporates all physical body parts, but the all-encompassing psychological variable is unaltered and the indicator for neurological damage is divided nine distinct ways. Finally, Model 4 allows for the inclusion of all physical, psychological and neurological variables.

Table 10: Regression models

Variable	Model 1	Model 2	Model 3	Model 4
Constant	x	x	x	x
Sex	x	x	x	x
Head/skull	x	x	x	x
Face/mouth/jaw/teeth	x	x	x	x
Sensory organs	x	x	x	x
Internal	x	x	x	x
Ribs	x	x	x	x
Back	x	x	x	x
Extremities	x	x	x	x
Genitals	x	x	x	x
Neurological	x	x		
Psychological	x		x	
Psychological variable breakdown				
Emotional strain		x		x
Sleep disturbance		x		x
PTSD		x		x
Anxiety/depression		x		x
Fear		x		x
Inferiority		x		x
Neurological variable breakdown				
Brain			x	x
Balance			x	x
Neurosis			x	x
Headache			x	x
Vertigo			x	x
Nausia			x	x
Concussion			x	x
Memory loss			x	x
Decreased libido			x	x
Control variables				
Low severity level	x	x	x	x
High severity level	x	x	x	x
Western Canadian courts	x	x	x	x
Atlantic Canadian courts	x	x	x	x
Northern Canadian courts	x	x	x	x
Federal courts	x	x	x	x

For reference purposes, the bodily injuries are never clustered into a single binary variable. Approximately 93% of all claimants reported a physical impairment and thus the

inclusion of an indicator for the aggregation of bodily harm severely minimizes variation. As 44% and 38% of individuals make claims for psychological and neurological harm, respectively, the clustering of these variables will generate less of a concern for diminished variation.

Is OLS appropriate?

The least squares procedure will yield estimates that are both unbiased and consistent if four assumptions are satisfied (Wooldridge, 2013). Two of the assumptions are in regard to the error terms (heteroskedasticity and serial correlation[17]) while the other two deal with the independent variables (multicollinearity and exogeneity[18]) (Kennedy, 2003).

1. **Heteroskedasticity**

The presence of heteroskedasticity will not change the unbiased nature of the estimates but their standard errors will no longer be accurate (Wooldridge, 2013). Consequently, the results from hypothesis tests and the magnitudes of confidence intervals can no longer be trusted (Wooldridge, 2013). To test for the presence of heteroskedasticity, the White test (or the Langrange Multiplier test) is used after Models 1 through 4 (Kennedy, 2003). In this test, the null and alternative hypotheses are of the form,

$$H_o = \text{Homoskedasticity}$$

$$H_a = \text{Unrestricted heteroskedasticity}$$

For each of the four Models the White test will produce a Chi Squared value and a p-value; these statistics are used for rejection purposes (Kennedy, 2003).

The test results are shown in **Table 11**. Column one indicates the Model while

[17] A time variable is recorded. However, it is not used in the regressions as all pain and suffering figures have been converted to real dollars. The goal of this paper is to determine the dollar worth of assault induced injuries. As there is no reason to believe that the real value of injuries has changed significantly over time, the figures can be made real and no time variable is necessarily included. As a result, there should be no issue of serial correlation.

[18] In this paper it is assumed that the physical, psychological, and neurological injuries are independent of one another and are exclusively coded. As a result, all are believed to be geometrically orthogonal to each other. Because of this, each of the independent variables are presumed to be exogenous.

columns two through four display the associated Chi-squared values, the degrees of freedom, and the p-values, respectively.

Table 11: Heteroskedasticity test outputs

Model	Chi-squared value	Degrees of freedom	p-value
Model 1	120.94	119	0.43
Model 2	273.91	198	0.00
Model 3	142.03	175	0.97
Model 4	301.43	233	0.00

For Models 1 and 3, the null hypothesis cannot be rejected but for Models 2 and 4 it can be. From this point forward, White's robust estimator is used on Models 2 and 4. This method is will correct for the existence of heteroskedasticity. Models 1 and 3 do not require this adjustment.

2. Multicollinearity

It is likely that several of the independent variables will experience multicollinearity. If this is the case, the estimates are no longer consistent (Wooldridge, 2013). To test for its presence, Variance Inflation Factors (VIF) are computed post-regression for Models 1 through 4 (Kennedy, 2003).

As a rule of thumb, multicollinearity among the regressors will cause the standard errors of the coefficients to inflate; hence, the purpose of VIFs is to detect the degree (if any) of variance amplification (Kennedy, 2003). If the VIF has a value of one, multicollinearity does not exist; a value of four or greater is a cause for concern, however (Kennedy, 2003).

Table 12: Multicollinearity test outputs

Estimation	Mean VIF
Model 1	1.18
Model 2	1.28
Model 3	1.30
Model 4	1.38

The mean VIF statistics are presented in **Table 12**. The results indicate that the presence of multicollinearity is of no concern. In all cases, the values are extremely close to one.

a. Sensitivity analysis

The estimates from Models 1 through 3 are displayed in **Table 13** and the results suggest that the model is properly specified. In relation to the constant term, there are very few sizeable fluctuations in the estimates and the signs seldom change direction. Furthermore, the indicators for physical injury in Model 1 that are statistically significant remain as such in Models 2 and 3. Not surprisingly, the addition of variables causes the adjusted R^2 to increase. What is interesting is that the model is better explained through the disaggregation of neurological damages than that of psychological. In Model 3, the adjusted R^2 is 62.5% greater than that for Model 2[19].

In the Models the general control for neurological impairments is not significant, yet that for psychological is. When these two indicators are disaggregated in Models 2 and 3, it is discovered that several of their component variables are statistically valuable. For instance, dollar sums for general emotional strain, PTSD and anxiety/depression are significant at the 1% level. Similarly, damage to the brain, neurosis, and decreased libido are as well. Aside from fear and memory loss, none of the statistically significant explanatory variables have negative valuations.

The output for Models 1 through 3 first indicates that the severity of the injuries sustained is an important factor in the courts decision. In all three cases the higher the gravity the greater is the award of damages. Second, in Models 1 and 3 the location of the court does not statistically impact the determination of the dollar figure. The results from Model 2, however, indicate that the Northern and Federal courts award more and less damages than the typical Central Canadian court, respectively.

[19] Models 1 through 4 are considered nested models. F tests are used to determine whether the coefficients of variables added to Model 1 are jointly equal to zero. In all cases the null hypothesis that the variables should not be added is rejected.

Table 13: Sensitivity analysis output

Variable	Model 1	Model 2	Model 3
Constant	21,151**	15,439*	27,731***
Sex	-10,501	-2,894	-13,338
Head/skull	24,926***	17,075**	12,481*
Face/mouth/jaw/teeth	-40	1,086	619
Sensory organs	-2,886	-981	-2,968
Internal	28,960*	30,389	20,896*
Ribs	-10,161	-11,537	-2,968
Back	-5,175	-9,298	-9,571
Extremities	-4,019	-4,061	-3,881
Genitals	14,301	21,810	-3,134
Neurological	4,734	5,524	
Psychological	21,354***		22,480***
Psychological variable breakdown			
Emotional strain		15,703***	
Sleep disturbance		3,301	
PTSD		25,111***	
Anxiety/depression		25,975**	
Fear		-19,754*	
Inferiority		13,748	
Neurological variable breakdown			
Brain			110,234***
Balance			373
Neurosis			-25,440***
Headache			-1,553
Vertigo			-11,440
Nausia			1,997
Concussion			-10,269
Memory loss			-31,475**
Decreased libido			117,293***
Control variables			
Low severity level	-18,806**	-19,471***	-15,553***
High severity level	28,640***	23,670***	24,936***
Western Canadian courts	7,249	4,929	2,663
Atlantic Canadian courts	-6,432	-3,374	-5,543
Northern Canadian courts	17,881	20,468*	13,845
Federal courts	-13,216	-19,895*	-5,055
Adjusted R^2	0.22	0.32	0.52
No. of observations	303	303	303

b. Award determination

The output from the final regression (Model 4) is displayed in **Table 14**. In addition to the eight indicators for physical harm and the control variables for region and damage severity, the disaggregated psychological and neurological variables are included. Again, the coefficients must be interpreted in relation to the constant and the units of all values are real 2002 dollars.

The results in **Table 14** demonstrate that a considerable portion of the variation in the pain and suffering values can be explained by the independent variables. Given the large number of regressors and relatively small number of observations, an adjusted R^2 of 0.58 is exceptionally strong. Furthermore, the F-test reveals that, with a 0.01% level of significance, the coefficients are not jointly equivalent to zero. In Model 4, the F-statistic is 9.97.

Table 14: Regression output

Variable	Model 4
Constant	25,828***
Sex	-8,360
Head/skull	11,340*
Face/mouth/jaw/teeth	440
Sensory organs	88
Internal	23,834**
Ribs	-4,744
Back	-11,978*
Extremities	-4,990
Genitals	7,239
Emotional strain	5,076
Sleep disturbance	7,736
PTSD	20,339
Anxiety/depression	23,822**
Fear	-15,205*
Inferiority	15,081*
Brain	100,307***
Balance	-4,129
Neurosis	-25,272***
Headache	-2,064
Vertigo	-12,741
Nausea	5,597
Concussion	-9,853
Memory loss	-38,807**
Decreased libido	113,062**
Control variables	
Low severity level	-16,232***
High severity level	22,095***
Western Canadian courts	997
Atlantic Canadian courts	-3,357
Northern Canadian courts	14,265
Federal courts	-12,279
Adjusted R^2	0.58
No. of observations	303

The results indicate that there is no statistically significant disparity among the awards assigned to male and female victims. However, the p-value associated with the indicator for gender is 0.129. If the range of acceptable levels of significance is slightly extended, males (on

average) will earn $8,400 less pain and suffering compensation than females. This latter output signifies that judges may not hold a "genderless" view on what dollar amount is best deserved.

Not surprisingly, the statistical relevance of head injuries decreases with the inclusion of psychological and neurological impairments. As previously discussed, a substantial proportion of those who suffer emotional or neurological trauma have endured some type of head wound. Approximately 32% and 35% of those claiming psychological and neurological trauma also reported having sustained serious head damage, respectively. Moreover, despite the fact that the degrees of harm acuteness associated with the head are also quite broad, over 80% of them are coded as level 2 on the severity scale. Consequently, a large portion of the significance is likely captured by the severity index.

Interestingly, of all the physical harms recorded, back injuries are interpreted by the courts as being least valuable. There are four plausible rationales for this result: first, the variation in acuteness of back injuries is sizeable and the inclusion of a back-severity interaction term is statistically appropriate; second, there is a relationship between back injuries and some combination of other harms whereby a large portion of the reparation for back damage is being picked up elsewhere[20]; third, the type of back injuries that are caused by assaults are not worthy of large compensatory sums; fourth, back injuries are hard to diagnose and as a result those that are suffering from them are incapable of locating doctors or expert witness who will testify on their behalf. At this stage, the determination of which of the four justifications is most correct cannot be feasibly ascertained.

Of the six categories of psychological harm studied, Post Traumatic Stress Disorder and anxiety/depression are associated with the largest awards. As the remaining four classifications

[20] One example is the interaction between back and neurological injuries. As previously noted, neurological injuries are associated with damage to the spine, brain and other areas associated with the central nervous system.

are, relatively speaking, broader, this result does not come as a shock. PTSD and anxiety/depression are objectionably verifiable; both variables are included in the DSM-V as large-category disorders (American Psychiatric Association, 2012).

In the two datasets examined, emotional strain is considered a general category and sleep disturbances includes subjects from nightmares to insomnia. Furthermore, the cases examined rarely elaborate on the issue of assault-induced fear and, like sleep disruption, the range of issues included in the inferiority category is large; for instance, humiliation, the loss or lack of self-worth, and feelings of inadequacy are included. Despite the fact that claimants may be living with any one of these four categories, they may have a difficult time locating doctors who are able to provide a precise diagnosis or expert witnesses who can attest to their claims. If these scenarios are true, one would expect judges to be hesitant when awarding associated funds.

Furthermore, the range of the awards associated with the neurological damage typologies is great. Of all the harms analyzed, there are only two categories that are associated with compensatory sums greater than $100,000, and both are classified as neurological: brain damage and diminished libido.

Several of the claimants who reported brain damage are suffering acute, life altering, and permanent conditions. Some have lost a large degree (or all capability) of mental capacity and many are now wheelchair bound. It is often the case that these victims endured several additional serious injuries and are now completely incapable of self-sufficiency. Because of the seemingly strong negative relationship between brain damage and one's state of health, the associated indicator variable is undoubtedly capturing the upper bound of assault-induced harm and the associated large compensatory sums.

Similar to those with brain damage, the individuals who claim diminished libidos are most typically associated with extremely brutal attacks. According to the data, the average victim reports 5.9 injuries; those who experience reduced libidos state a mean of 14.7, which is nearly 150% greater than the standard claim. An additional piece of information separates this category of claimants from the others; nearly 50% were sexually assaulted. Although information regarding this experience is not provided, it is assumed that the nature of this group's physical assaults and their history with sexual misconduct elevates their awards.

As is the case with the three Models presented in **Table 13** both the low and high severity indices are significant at the 1% level and, as is expected, the relatively minor injuries are granted lower compensations than the grave. With regard to the location of the court judgment, no significant difference in the awards is found.

Compensation analysis

All final compensation estimates are displayed in **Table 15**[21]. Model 4 is of the form in **Equation 2** above and as is the case with Models 1 through 3, each of the regressors takes on a value of one if the specific injury has occurred and zero if it has not. According to **Table 15**, only a single instance arises where this sum is negative; here, the typical award is assumed to be equal to zero. In this case, the only way the specific harm is worthy of monetary damages is if it occurs in conjunction with any of the other damages included in Model 4.

[21] To determine these values, each of the coefficients from Model 4 are added to the regression constant. Here, all other indicator variables are set equal to zero. Furthermore, despite the fact that roughly half of the variables are statistically significant, all are included here and are therefore assigned a value. The decision to price every harm, regardless of statistical relevance, is attributable to the statistical properties of the OLS regression. It has already been proven that the four properties (heteroskedasticity, serial correlation, multicollinearity, and exogeneity) of the OLS regression hold. Because of this the OLS estimates are BLUE. Thus, it is assumed that each dollar value is the most empirically efficient estimate.

Table 15: Compensation determination

Variable	Model 4
Sex	17,468
Physical	
Head/skull	37,168
Face/mouth/jaw/teeth	26,268
Sensory organs	25,916
Internal	49,662
Ribs	21,084
Back	13,850
Extremities	20,838
Genitals	33,067
Average award	27,241
Psychological	
Emotional strain	30,904
Sleep disturbance	33,564
PTSD	46,167
Anxiety/depression	49,650
Fear	41,033
Inferiority	40,909
Average award	40,371
Neurological	
Brain	126,135
Balance	21,699
Neurosis	556
Headache	23,764
Vertigo	13,087
Nausia	31,425
Concussion	15,975
Memory loss	0
Decreased libido	138,890
Average award	41,281
Control variables	
Low severity level	9,596
High severity level	49,923
Western Canadian courts	26,825
Atlantic Canadian courts	22,471
Northern Canadian courts	40,093
Federal courts	13,549

In **Table 15** the values of pain and suffering range from $0 and $556 for memory loss and neurosis to $126,135 and $138,890 for brain damage and decreased libido. The mean award for a single claim is $36,592 and the median is $30,904. Interestingly, the average compensation for physical harm ($27,241[22]) is considerably less than that for both psychological ($40,371) and

[22] To determine the mean award for physical injuries, the eight coefficient estimates for the eight body locales are averaged.

neurological ($41,281). Furthermore, the figures for neurological problems indicate that the awards for brain damage and libido drive the typical value upwards. Once the outlying figures are removed[23], the typical award declines to $17,751.

Injuree compensation and the damage cap

The relationship between the injury-specific awards and the damage cap warrants further analysis. In particular, one would be interested in examining the magnitude of the harm values-to-damage cap ratios; such analyses determine whether the awards for specific damages, in terms of their severity levels, are appropriately awarded. Column 2 in **Table 16** lists the harm specific compensation-damage cap ratios in descending order. Column 3 restates the likelihood of the claim being made.

Of the top ten variables with the greatest ratios, 50% are categorized as psychological harm and 20% neurological. Internal injuries and damage to the head and genitals are the three physical harms whose dollar values comprise the largest shares of the cap. Furthermore, fifteen of the twenty-three variables are deemed worthy of less than or equal to $1/10^{th}$ the value of the damage cap and only two earn more than $1/3^{rd}$.

Interestingly, the likelihood of the injuries occurring is negatively correlated (-0.18) with the severity ratios. This result falls in line with the expectation that the greater the acuteness of the harm, the lower the probability of it happening. Here, however, the relationship between the two is not extremely strong. At this point it is reasonable to assume that the finding is caused by a sample selection bias; this is to say, the victims who present their case before the court are more likely have suffered more severe injuries than those who do not.

[23] As the award for memory loss is determined to be zero, it is also considered an outlying claim and is therefore omitted.

Table 16: Pain and suffering and the damage cap

Variable	Ratios	Likelihood (%)
Diminished libido	0.41	0.42
Brain	0.37	0.97
Internal	0.15	0.90
Anxiety/depression	0.15	4.85
PTSD	0.14	2.84
Fear	0.12	1.53
Inferiority	0.12	2.50
Head/skull	0.11	4.44
Sleep disturbance	0.10	3.95
Genitals	0.10	0.76
Nausea	0.09	0.49
Emotional strain	0.09	5.48
Face/mouth/jaw/teeth	0.08	10.26
Sensory organs	0.08	7.56
Headache	0.07	4.3
Balance	0.06	0.49
Ribs	0.06	1.60
Extremities	0.06	8.81
Concussion	0.05	2.15
Back	0.04	2.36
Vertigo	0.04	1.32
Neurosis	0.00	1.73
Memory loss	0.00	1.11
High severity level	0.15	13.59
Low severity level	0.03	15.60

One of the concerns raised by Geistfeld (1995) is that the introduction of the damage cap will have no effect on those with relatively minor injuries but will severely reduce the amount awarded to those whose harm is deemed severe. The results from this study appear to support his hypothesis. For instance, in **Table 16** the figures suggest that if an individual sustains a brain injury and a diminished libido and has also been classified as severely harmed, the associated awards for these three injuries will amount to 93% of the allowable compensation.

Minor injuries, however, are found to be worth only 3% of the damage cap. Even if the victim sustained all seven physical harms and was classified as having minor wounds, the cap would not be reached.

In 1988 Viscusi questioned whether compensation sums were awarded randomly. The results here suggest that, in regards to Canada, this is not the case. While variation in the awards

exists, the scaling appears to be sensible. For instance, injuries which are more severe are provided more compensation than those classified as minor. Furthermore, psychological injuries which are "medically diagnosable" receive greater sums than those which are not and permanent neurological injuries (especially those affecting the brain) receive the greatest compensation of all the injuries studied[24].

The typical injuree

Employing the dollar figures from **Table 15** above and the number of claims by injury type, it is possible to estimate a "typical" victim's compensatory award. The method employed is a weighted average and is of the form,

$$E = \sum_{i=1}^{n} w_i c_i \qquad \textbf{(Equation 3)}$$

In **Equation 3**, i is the index for the harm category; w is the harm-specific weights and is computed as the proportions of injury-specific damage to the total number of damage reported; and c is the injury compensation in dollars. The numbers and weights of the injury-specific claims are recorded in **Table 17**.

As was previously discussed, a large share of the claims made are associated with injuries located above the neck. Approximately 32% of all injuries reported are found on head and skull, face and mouth, and nose, ear, and eye. Furthermore, damage to the extremities represents almost 9% of all claims. It is very likely that these harms are sustained during self-defense.

The expected value of the victims' claims is $29,823 and the standard deviation is $1,401. If the sex of the plaintiff is considered, the compensation for males drops by $1,740 to $28,083. Either way, both these values are considerably less than the current $340,000 cap.

[24] Another reason for rejecting the idea of "random assignment" is made evident by the court location indicators. In **Table 14** none of the four variables for region are statistically significant and thus there is no apparent variation in pain and suffering awards by region.

Table 17: Injury claims and their associated weights

Variable	Claims	Weights (%)
Physical		
Head/skull	64	4.44
Face/mouth/jaw/teeth	148	10.26
Sensory organs	109	7.56
Internal	13	0.90
Ribs	23	1.60
Back	34	2.36
Extremities	127	8.81
Genitals	11	0.76
Psychological		
Emotional strain	79	5.48
Sleep disturbance	57	3.95
PTSD	41	2.84
Anxiety/depression	70	4.85
Fear	22	1.53
Inferiority	36	2.50
Neurological		
Brain	14	0.97
Balance	7	0.49
Neurosis	25	1.73
Headache	62	4.30
Vertigo	19	1.32
Nausea	7	0.49
Concussion	31	2.15
Memory loss	16	1.11
Decreased libido	6	0.42
Control variables		
Low severity level	225	15.60
High severity level	196	13.59
Total	1442	100

According to the economic theory of tort law, rational individuals will weigh the costs of assault with the benefits (Cooter & Ulen, 2012). If the potential injurer is reasonable, he will attack if and only if his welfare is increased (Cooter & Ulen, 2012). The evidence suggests that if a physical assault takes place, the typical injuree's injuries are worth nearly $30,000. Given the information available, is difficult to say whether or not this amount of money will help deter those who contemplate assaulting another[25]. What can be said, however, is that $30,000 is a non-

[25] What would help assess the deterrence capacity of tort liability is the study of all monetary damages awarded to the victims. As previously mentioned, data on punitive damages or income loss awards is rarely available.

trivial sum. In 2010 the median income for employed individuals in Canada was $29,250 (Statistics Canada, 2012).

CONCLUSION

The purpose of this paper is to explore the dollar value of pain and suffering as it is measured by courts in awarding tort damages. In particular, the magnitudes of bodily injuries and psychological and neurological damages are explored. To date, very few methods exist for examining the awards for pain and suffering and none have been used on Canadian judgments. In this paper, a new method of investigation is introduced and is used to expose this nation's typical valuations. All tests conducted indicate that the model is econometrically sound.

The results indicate that the majority of the injuries sustained receive relatively small dollar sums. The typical award is approximately $30,000 and only two injuries are deemed worthy of compensation over $100,000; a few are given approximately zero. While the majority of the physical damages are sustained to areas above the shoulders and neck, those suffering from psychological and neurological injuries tend to receive $10,000 more. Furthermore, the findings imply that the severity level of the harm sustained is important; those with relatively minor injuries are given approximately $1/5^{th}$ of what those who experience more grave harm.

In terms of the psychological harms, the categories which are more typically associated with medical diagnoses are granted higher amounts than those which are not. And, in consideration of neurological damage, the range of awards is quite large. However, once the outlying damages (such as brain damage and decreased libido) are removed, the mean dollar amount decreases to nearly half the original figure.

While it would be interesting to include and analyze a survey of the results from other studies, it is not feasible. The decision to exclude this information is twofold. First, the types of

injuries valued in other studies are not comparable to those priced here. For instance, Viscusi (1988) determines the dollar wroth of asphyxiation, cancer, electric shock and poisoning – none of which closely resemble the harms examined here. Second, the methods used by most other researchers prevent the use of comparative tactics. The more typical valuations of injuries are derived from QALYs and WTP measures; in both cases, the results do not provide dollar estimations nor is the output in a format that can be used to rank the harm via severity. In order to determine how Canadian awards are viewed relatively to the compensation figures granted in other nations, further research is required.

The findings of this study suggest that the compensatory damages for Canadian assault victims are not capricious. The results indicate that the awards for bodily harm and both psychological and neurological trauma are granted in terms of the plaintiffs' damage severity and are appropriately scaled. Furthermore, the dollar values appear to be scaled relative to the cap and the injuries required to arrive at the threshold are both severe and rare. In terms of Canadian assault victims, the compensatory goal of tort law awards appears to have been met. To determine whether the damages are successful in deterring inter-personal violence, additional research is required.

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