



Better Recovery through Neuroscience: Addressing Legislative and Regulatory Design, Injury Management and Resilience

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Presented to the Actuaries Institute
Injury Schemes Seminar
8 – 10 November 2015
Adelaide

*This paper has been prepared for the Actuaries Institute 2015 Injury Schemes Seminar.
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Abstract

A conceptual model is presented that utilises recent understandings in neuroplasticity to create an understanding of the mechanism by which some injured or ill people fall into disability whilst others with similar injuries recover uneventfully. The model explains existing research on factors correlated with good and bad outcomes in treatment of work injuries and illnesses. A critique and suggestions with regard to current legislative and regulatory practices and claims management follows, along with a new definition of individual resilience based upon neuroplastic principles.

Keywords: Disability, workers' compensation, neuroplasticity, individual resilience

Why aren't our workers' compensation systems doing as well as we'd like?

Workers' compensation has been historically premised on some common underlying principles. Fix what ails the worker, if and only if the employer is responsible for the harm. When he or she is fixed, expect the worker to re-enter the workforce without delay. Provide economic incentives and disincentives to channel the behaviour of injured people, pushing them to return to the same job and the same employer as soon as possible. These systems are largely based upon bio-mechanical and behavioural economics principles.

This approach has resulted in the proliferation of attempts to further control the behaviour of injured workers and the service providers that make their living from the system. The principal underlying most systems is distrust – we must control the behaviour of those for whom the system presents potential for economic gain. Efforts are sometimes adjusted around the observation that many people seem to recover unremarkably, but attempts to control the remainder have not been notably successful. Increasing trends of claims severity amongst those who do not thrive in the system have driven cost blow-outs and sometimes reform legislation that throws the injured into other societal safety nets. Perhaps it is time to look for a different strategy.

In medicine, the realisation has grown over the last twenty years or so that sometimes the interaction between the patient and the medical system has the unintended consequence of making the patient more unwell. A growing awareness of "iatrogenic" (system –caused) illness¹ has led to a variety of new practices. They range from profoundly simple exercises like using a marker to clearly indicate the limb upon which the surgeon is to operate to complex protocols concerning hospital contagion control. In an age where antibiotic resistant diseases are a constant threat, hospitals have been recognised for what they can be - fairly dangerous

places for a person to be. In workers' compensation systems we observe an increasing trend in secondary psychological injury acquired in the process of treatment and compensation for the original injury.ⁱⁱ If hospitals have become dangerous places for some to go, then so have our workers' compensation systemsⁱⁱⁱ.

Still, progress is possible. We used to view "what takes place inside our head"^{iv} as being in a "black box". We knew that something important was happening in there, but had no ability to penetrate or understand the inner workings of the container. When someone had a stroke or traumatic brain injury we used to warehouse them, understanding that there was nothing we could do to reverse the damage and therefore no way to return them to function. Over the last two decades advances in neuroscience have led to a greater understanding of how it is possible to utilise undamaged portions of the brain to recreate the ability to function. For example, stroke victims can be taught to walk or talk again in many cases. This paper suggests that the advances that medicine has achieved by addressing iatrogenic illness and the growing understanding of neuroplasticity as a mechanism to regain function can be applied to our apparent inability to successfully prevent some injured workers from becoming needlessly disabled.

A neuroplasticity-based model for understanding needless disability

Our brains are vastly complex parallel processors, accepting immense quantities of input during virtually all of our waking hours, attending to some, ignoring others, and allocating resources of attention and focus to where they are most needed at the time. This happens "in the background" without our conscious intervention. When it fails we give it a name – distraction.

The inputs accepted for this processing are not just what our senses bring to us from the outside world. We experience memories, physical sensations, and emotions, and we add our own thoughts about what is happening. The brain accepts these inputs and tells us what to attend to and what to ignore. It is a common experience to have had the experience of finding a bruise or cut after the fact and having no recollection of when or how the injury occurred. The nervous system certainly sent a signal to the brain at the time of the insult; we just had better things to do at the time than to pay attention to that particular signal.

To perform this complex work, the brain cells that carry information must connect with each other, albeit temporarily. The important concept here is that the neural connections between stimuli are temporal, rather than causal. Attribution of causation is a secondary process. Causation is an interpretation of events and something that we have learned (albeit through the same mechanisms). Input from perception of the external world, internally perceived sensations, thoughts, and emotions that are presented at the same time connect to each other, whether or not there is a logical or causal relationship.^v

When the combination of stimuli is maintained or repeated over time, the connections between neurons change in nature, with the buildup of deposits that allow the synaptic connection to fire faster, more automatically, and with less conscious intervention. This leads to the First Law of Neuroplasticity: "Neurons that fire together wire together".^{vi}

You can see this in your everyday life when you start out driving along a familiar route and end up heading where you usually go instead of where you intended. The creation of habits of thought and behaviors occurs through this mechanism. This practice effect is the basis of the adage "practice makes perfect" and explains the ability to develop the very quick and nearly automatic reactions that occur when we play a musical instrument, participate in sports, avoid an auto accident by braking or swerving the car, or any number of other behaviors. It is also the way we learn our social skills, and much of what we know about how to act within our perceived identity.^{vii}

On a different level, we learn to associate and recall information in this way as well. Most of us have a song, an image, or a scent that brings to mind another place and time, often with associated feelings, memories, and associations. The triggering stimulus brings back memories of associated details and we re-experience many of them, further reinforcing the association. This "facilitated neural network" has literally changed the nature of our reality by changing what we perceive when subjected to a particular stimulus.

The thoughts, emotions, and sensations associated in a facilitated neural network have a particular characteristic. As they are still connected, the stimulation of one part of the network has the power to trigger the other sensations, emotions, and thoughts associated with it. When we hear the song associated with first love, emotions and physical reactions are likely to be recalled along with the thoughts of the person associated with that time.

Neuroplasticity and the experience of injury

What does the person who has become ill or injured experience in the real world? The most pervasive experience associated with injury or illness is a sense of loss of personal control over the circumstances of their everyday life^{viii}. The body does not act as expected. People are expected to place control of their current state and future prospects in the hands of doctors, lawyers and insurance claims managers they may not currently know. There are appointments and forms, treatments, procedures and therapy, doctor's instructions to be obeyed, and interactions with insurance personnel, employers, family, friends, and others, all of whom may place demands or expectations on the recovering individual^{ix}.

There may be the pain or discomfort of the dysfunctional body part.^x Often there is anxiety: Will I be able to go back to work? Take care of my child? Enjoy my favorite activities? Earn a living and pay my bills? These present at the same time and may link into a facilitated neural network if they persist long enough to have the necessary repetition to change the neural connections.^{xi}

If the injury or illness resolves unremarkably, there will likely be no long-term consequences. The brain is wonderfully efficient and will recycle unneeded capacity when circumstances present that require that processing capacity. This is the basis of the Second Law of Neuroplasticity: use it or lose it.^{xii} This applies to any insufficiently solidified neural network, as the tourist desperately trying to remember their school-years language skills can attest.

The Power of "Self-Talk" in the Process

Unfortunately, the injured or ill person is often presented with additional stimuli arising from interaction with the claims environment and the culture in which the claims activity occurs. Often these interactions are not particularly repetitive; however, the person experiencing them repeats his or her story to service providers, employer, friends, and family. The story "must" be repeated verbatim – otherwise the "inconsistencies" may become a focal point of distrust and systemic friction. With repetition, the story of the onset of the injury becomes a script, the belief in the diagnosis becomes fixed and the stage is set for a poor outcome.

However, most of the repetition is not so public. A significant portion of the repetition goes on in the privacy of the individual's mind. A particularly disturbing message may only be uttered once, but the power of the mind to repeat it at the speed of thought is substantial. The thought that keeps going through one's mind when one is trying to fall asleep at night is repeated over and over; because the thought continues to be associated with the physical sensations, sense of externalization of locus of control, and the anxiety associated with illness or injury these things are "wired in" and this repetition leads to a facilitated neural network associating these experiences.

This self-talk, or mental repetition, is highly effective. Research among elite athletes^{xiii} demonstrates that mental rehearsal is highly effective for improving physical performance. Many athletes try to visualize the intended outcome of their efforts for exactly that reason. The nature of our self-talk mediates how much repetition we get of messages that are good or bad for us and, ultimately, for our habits of thought and belief. We can use self-talk to make ourselves much less able than necessary or to get the most out of what our bodies will allow.

Occam's Razor: Using the conceptual model to understand the research

Occam's Razor is the principle that, other things equal, an explanation that does not require the multiplication of explanatory constructs is regarded as more helpful and reliable than one that does not explain all of the relevant data without additional help.^{xiv} It is a way of judging a conceptual model, such as is presented above. Generally the model that explains all of the available data is regarded as having utility and we are justified in placing confidence in it until data comes along that doesn't fit.

To have confidence in a neuroplastic approach to disability, the observed correlates of good and bad outcomes should easily fit within the model. Some of the data describing the common experience of injured and ill people^{xv} are discussed in the following paragraphs.

Sleeplessness

If you combine discomfort with anxiety, sleeplessness often results.^{xvi} Perhaps the most significant impact on the injured person arises from what happens during periods of sleeplessness. People often think about the messages and associations that are of greatest perceived importance or threat in the situation that is causing the anxiety and discomfort. The repetition of the messages of the day often occurs in a sort of focused mental feedback loop, reinforcing the patterns of association. A comment made to a recovering person from a doctor, lawyer, or claims manager that may have been isolated or innocent may now be repeated over and over while that person tries to fall asleep, incorporating it into the facilitated neural network that surrounds the injury experience.

Loss of work identity

During the week, most of our waking hours are devoted to work. Many of our social relationships exist or start at work. Much of the comforting routine in daily life is connected with work. A common gambit between strangers is the trading of information about work. To a surprising degree, our identity and self-image in Western culture are tied to with the workplace and our as productive individuals.

When the connection with the workplace is cut off, this primary basis of our personal identity may be taken away. People who experience prolonged disruption of their work identity endure profound impacts across multiple areas of their lives. Social

circles typically contract for those who are ill or injured. People who are “workless” have decreased life expectancy and increased instances of comorbidity.^{xvii} It has been argued that the need for personal identity is so fundamental that people cannot survive without it.^{xviii}

The experience of lost work identity affects relationships both inside and outside of the workplace. It becomes associated with other experiences of injury and illness through both external interactions and internal dialogue and quickly becomes “wired” into the networked experience of injury or illness. Because of the central role of identity in our personality organization, the loss of this component of stability is often experienced as a loss of control.

Economic pressure

When the ability to earn a steady income is disrupted or threatened, most of us feel some concern. This phenomenon is implicitly or intentionally used by many compensation systems and claims processing organizations to create motivation for an individual to return to work. Compensation systems generally do not compensate fully for lost income, and often have “step-down” provisions that are intended to create economic pressure to return to work.^{xix} Such economic pressure may adversely impact the social and familial support systems and may change the dynamics between the recovering person and his or her family and friends.

Repetition creates a link between the economic challenges of illness or injury and the other things being experienced at the same time. Behavior associated with economic impact is quickly wired into the growing neural network of the illness or injury. Indeed, this may help explain the focus of some claimants on the monetary outcome of the claim.

One thing is sure: worries about money, and the resulting disruption of social systems of support, impact more than just those issues. As these concerns become part of the recovering person's growing experience, he or she may have other features of the growing neural network stimulated by thoughts about economic circumstances. For instance, the person may have an argument with their partner or claims manager that arose from monetary stress and literally feel the pain of his or her physical condition more intensely as a direct result.^{xx} Indeed, others have offered this as an explanation for the experience of pain for which there is no present organic cause.^{xxi}

Psychosocial factors

We have seen voluminous academic research that correlates poor recovery outcomes with adverse childhood events, poor familial relationships, perceived injustice and a host of other factors in the general psychosocial environment of the injured or ill person. Attempts have been made to use these correlates to predict poor outcomes. The efforts have met with some success, and the development of a cottage market for the promulgation of "flag systems" to predict what claims are most at risk. The practical use of such information has been more elusive. The development of interventions to respond to "high risk claims" has so far failed to show impact sufficient to discriminate the effects of the intervention from simply giving more individualized attention^{xxii}.

There are 2 ways in which psychosocial factors impact the facilitated neural network of the experience of injury or illness: creation of repeated instances of association with other symptoms and alterations in self-talk.

When the injured or ill person experiences tension in their home environment (perhaps because of economic pressure, change in principal location during the day because of loss of work identity, or changes in mood accompanying pain and sleeplessness), the tension is not quickly or easily resolved. It repeats, often in direct association with other stimuli associated with the illness or injury. With repetition, it becomes wired into the network, and subsequent repetitions trigger other features of the network, further facilitating the neural network. This accounts for the commonly observed phenomenon of a claimant having a "flair-up" in his or her symptoms when family issues or other concerns arise.

More importantly, psychosocial factors may have a profound impact on the nature of the self-talk, which is the principal mechanism for repetition of the various messages and experiences of the recovering person. Individuals who had early childhood experiences that taught them they were personally worthless or dependent on outside sources of control may carry that perceptual filter into their interpretation of their experiences and opportunities during recovery. The interpretation of events creates the content of self-talk, and "perception is reality in the mind of the perceiver". In these ways, psychosocial factors can become quite powerful in mediating the outcome of recovery, even though they are not directly causing those outcomes.

Specific negative messages

Doctors, lawyers, and claims adjuster/claims manager personnel provide highly technical information to ill and injured people. Although it is communicated without the intent to cause harm, it may be taken out of context, interpreted too literally, or give rise to catastrophic thinking. When a doctor casually remarks that a person has reached "maximum medical improvement", the message may be taken literally, repeated, and wired into the facilitated neural network as an irrevocable life

sentence. The pronouncement may also legitimately have legal effect, further magnifying its importance.

When a lawyer tells claimants that they cannot return to work because it will ruin their case^{xxiii} (or present the consequences of return to work in a manner that clearly communicates that message), it not only extends the period of lost work identity but also focuses claimants on the employer as perpetrator of their suffering and on an economic award as the desired outcome.

Claims management personnel can send the message that the individual's claim and recovery are not important with as little as a failure to return a phone call in a reasonable time or a careless failure to complete a promised processing task. The case manager has many files – the claimant has only one person's claims to worry about, and the difference in focus is often misperceived by the injured person.

These messages are important because the injured or ill person has been required to shift his or her locus of control from their own internal resources to those of external authorities because of the circumstances of making a claim for benefits. These unintended messages are often sufficiently internalized through self-talk to become part of the facilitated neural network and therefore have the power, when recalled or encountered, to stimulate all of the other sensations, memories, thoughts, and emotions associated with it.

Emotional reactions to the loss of control

At some point, reactions to the claims experience itself become part of the experience. Loss of perceived internal control is often accompanied by frustration and anger, catastrophic thinking, perceived injustice and grief. Reminders of that externalization of control may bring about overreactions, such as those experienced by claims personnel who innocently touch on the loss of work identity or economic stressors and are confronted by expressions of anger.

These reactions become associated with other stimuli through the familiar repetitive processes but also generate their own additional consequences. The reaction of an injured person to the case manager will likely have a subtle impact on the future relationship between them. Depression and adjustment disorders are commonly reported in Australia as sequelae to illness or injury.

Overwhelming loss of control and the impact of environmental messages

A pervasive sense of loss of control is not a separate symptom, but the cumulative impact of the inputs discussed briefly above. It is, however, a central aspect of the experience of an injured person.^{xxiv} As the pressure of loss of an internal sense of control builds, some people will adopt a new identity that is consistent with their experience and therefore less difficult to maintain. In most instances, the adoption of a persona as a disabled person is not something that is consciously sought but rather an adaptation to the pressure of losing work identity. These changes can happen quickly, particularly when the person is focused on them.^{xxv} This is likely why the probability of return to work after 12–16 weeks of worklessness dramatically diminishes.^{xxvi} The person suffering an overwhelming sense of loss of control will often react in one of three commonly recognisable patterns: They may disengage from the perceived source of the loss of control.^{xxvii} They may develop secondary psychological symptoms. They may also take the cue of popular society^{xxviii} and adopt a *persona* that is more consistent with their experience, thereby making the world seem predictable therefore more in control once again. Out of an abundance of compassion and the desire to de-stigmatise, Western society has offered the *persona* of a disabled person as the alternative to recovery.

Figure 1 is a visual representation of a common facilitated neural network experienced by an injured or ill worker in compensation systems.

The “Web of Disability”

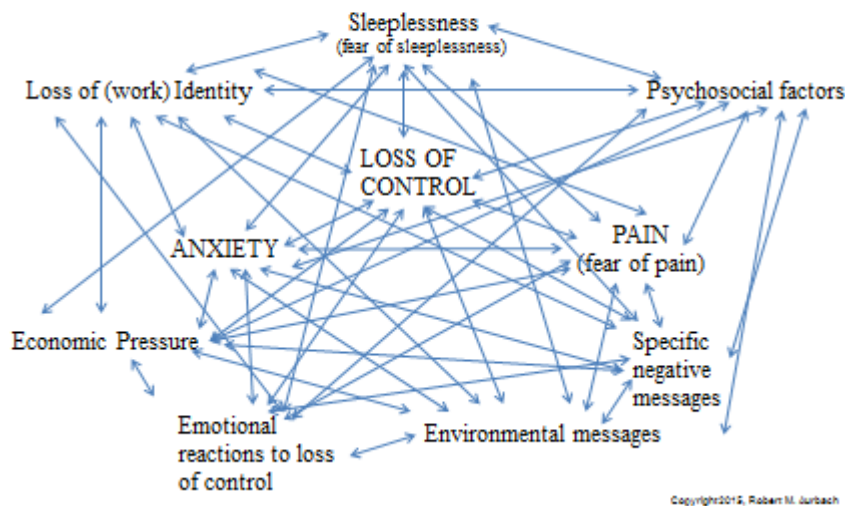


Figure 1.

Understanding phenomena associated with good outcomes

There is a substantial literature linking good outcomes and early intervention or quick return to work.^{xxix} The reasons are easy to see in this context. Early interventions

maintain the connection to the workplace that is crucial to preservation of the identity as a worker. They cut down on the amount of time available for repetition by cutting down both time away from a normal routine and beneficially impacting the anxiety that helps create the occasion for repetition of negative self-talk. The instance of negative specific messages is cut down, because people who are being attended to feel less need to subject themselves to lawyers and others who may inadvertently provide such messages.^{xxx}

Similarly, return to work impacts directly on the loss of work identity. It also appears to have beneficial impact on psychosocial factors, economic concerns. The resumption of routine creates a comforting sense of normalcy and emotional reactions to the sense of loss of control are also diminished.

The author has yet to encounter reliable data associating identified phenomena with good or bad outcomes in workers' compensation systems that is not easily and reasonably explained by the conceptual model outlined above. Occam's Razor therefore suggests this model's utility in understanding the impact of compensation systems, and therefore in making systemic alterations that are predicted to have beneficial impact.

Using the model to design better legislative and regulatory systems

As discussed above, repetition and negative self-talk are the primary mechanisms by which harm created through participation in compensation systems occurs. Can we design our regulatory and legislative systems better to cut down on the unnecessary harm and associated secondary psychological injury and disability? Obviously, the answer is at least a qualified "yes".

Early intervention and return to work are obvious targets for legislative/regulatory intervention. The question is not whether they should be encouraged, but how the interventions should be handled.

Early intervention

Timing is everything. There is a substantial research literature demonstrating that if a worker does not return to work within 12 -16 weeks, the probability of eventual return is reduced to 50% or less.^{xxxi}

Early intervention means *early*, not after the claims management team has had the chance to determine causal connection between the alleged injurious accident/exposure and the alleged injury. Of necessity that limits choices to system

designs that allow for limited provision of treatment and services without determination of liability, or provision of treatment and services without consideration of fault. While the latter appears to replicate the conceptual design of the New Zealand Accident Compensation Commission, it is not necessarily so limited. Provision of services by the employer to support the injured or ill worker do not require expenditures of a magnitude to require the wholesale revision of the system. Such services, whether provided directly or through a service provider should be aimed at maintaining the connection between the worker and the work place. Periodic contact, starting at the earliest reasonable opportunity and designed to reinforce the employer's perception that the worker is valued may be enough. A sincere expression of the desire to have the worker return and the willingness to assist in the process add additional benefit.

Such interventions should be paired with comprehensive information, presented in terms understandable to the average worker about their rights and obligations. Such information should be a core task for the regulator. In the absence of this information, the natural tendency is to look for an external authority to provide such information. The legal profession is not shy in raising their collective hand for the role. Unfortunately, the legal profession has a long tradition of substituting the proxy of a monetary payout for the real needs of people in stress or dispute.^{xxxii}

Return to Work

The most common legislative standard for "return to work" emphasizes that return to the same employer at the same wages as the primary goal. In most cases that describes exactly what happens, such that the mandate seems superficially reasonable. The utility of the goal becomes questionable when the circumstances of the injury are considered.

Where there is continuing impairment of physical ability is present, insistence on return to the same work carries with it the fear of re-injury, concerns about the reaction of supervisors and co-workers, and the capacity to resume the job at the level of performance necessary for personal satisfaction and/or employer expectations. While each of these fears can be addressed, absent skilled intervention currently rarely available they can become the unspoken causes of resistance.

If the injury is psychological the desire to return the worker to the same job may invoke the emotional reactions associated with the loss of control. The worker may anticipate being thrown back into the situation that originally cause the harm or may fear retaliation. Catastrophic thinking, perceived injustice, anger, frustration and grief may be invoked, causing negative reactions from the workplace, further entrenching the belief that they cannot return to that workplace.^{xxxiii}

It may be better to structure the recovery of the worker around a discussion about what he or she wishes to recover to. Few people will look at an injury as the end of their productive life at the early stages of recovery. Most can be assisted in making rational and informed choices about what their future work life might look like.^{xxxiv} In the presence of such a goal, the worker feels a return of the sense of control, and evidence from medicine^{xxxv} strongly suggests that better outcomes can be anticipated. Development of "recovery plans" that are intended to share some control of the rehabilitation process is being considered by the Department of Veteran's Affairs (where return to the same job is *ipso facto* not possible) and high performing private claims organisations. Such plans are contractual in nature, and provide for mutual commitments toward the achievement of a goal for rehabilitation agreed to by the relevant parties.

Dispute resolution

Dispute resolution is a fruitful ground for rethinking scheme design. As noted above, the involvement of the legal profession in a claim is a strong predictor for a poor outcome. Lawyers may inadvertently or intentionally provide specific negative messages and work in a system that is inherently technical and obscure, requiring transference of personal control from the injured person to their representative. There are three possible mechanisms for avoiding this result without denying vulnerable people their right to recover under the law.

First, where the law is seen as complex, it is possible to simplify it to make the rights and obligations of all parties clear to all but the most vulnerable or compromised workers. Most legislative systems grow without a plan resulting in legislation that is complex, that requires reference to multiple acts and amendments, or that is couched in legal terminology that is not understandable without translation into common usage.^{xxxvi} One possible reaction to this complexity is to assume that lawyers are necessary in the system^{xxxvii}. Another possibility is the conscious reform of the system to improve the usability by the average citizen without additional help (or to provide that assistance as a publically funded benefit)^{xxxviii}. The benefit of this approach is that many "disputes" that are caused primarily by misunderstanding or misinformation can be avoided or resolved informally.^{xxxix}

Second, it is possible to make the process of dispute resolution simpler and more responsive to the real needs of the disputants. The genuine need of people to pay their bills whilst recovering often becomes secondary to the desire to "get justice" through an economic award. This secondary motivation can be addressed meaningfully in ways that diminish the motivation for disputation. Most people need an opportunity to be heard, to be acknowledged personally and compassionately and to get a fair resolution that they understand. Apology, when sincerely offered is often valued.^{xl} That's what we wanted when we were injured on the playground, and our needs have not changed substantially except for the additional of the need for support whilst we recover. Monetary awards beyond wage replacement

whilst healing are a proxy for these real human needs, and one that directs injured people into a system that delays their recovery, allowing for further entrenchment of the disability behaviour that they must demonstrate to receive the award.

Alternative dispute resolution has seen high levels of success in the US as a mechanism for reducing the complexity and increasing access to justice. The State of New Mexico routinely experiences a pre-trial resolution rate of over 90% with a mandatory mediation system that is a gatekeeper to formal litigation.^{xii} The Navajo Nation (the largest indigenous tribal grouping in the US) utilises a multi-level alternative dispute resolution mechanism that has an astoundingly high rate of resolution, has virtually eliminated formal litigation and has resulted in premium surpluses whilst achieving higher levels of return to work and more generous medical treatment and rehabilitation benefits than the majority of other systems in the US.^{xiii} The key to these sorts of success is taking the desire to reduce complexity and the involvement of lawyers in the process seriously. Western Australia has also had excellent experience with informal dispute resolution.

Finally, it is possible to provide assistance to the vulnerable without subjecting them to the economic incentives created by the traditional legal system. Where remuneration for the attorney is linked to the outcome of the case, then bad things can happen. Benefits may be channelled from their intended recipients; an economic incentive for pursuit of dubious claims for their settlement value may be created; and workers with meritorious claims that have limited monetary value but substantial value to the claimant (i.e. medical treatment) may have trouble finding representation. The legislative creation of free legal assistance in such cases allows salaried specialist lawyers to develop expertise and apply it to large and small cases without impacting the benefits awarded to the claimant has been successful in addressing the needs of vulnerable people, although resourcing for the function has not always been optimal.^{xiii}

The unintended consequences of using economic incentives to channel worker behaviour

Most current Australian systems utilise economic incentives of various kinds to encourage desired behaviour. Given the understanding of the development of disability behaviour, there is reason to question this approach. Studies by Rand Corporation^{xiv} and others demonstrate that the lifetime financial condition of a worker is never fully compensated under workers compensation. If people were rational economic creatures that reliably respond to such incentives, then the mere knowledge that they will always come out better by returning to productivity should control behaviour. Since it does not, there must be something else happening.

The use of economic incentives creates perceived economic pressure and worry, disrupts the familial unit resulting in psychosocial stress and exacerbates the

perceived loss of control. Such incentives probably work best on those who are driven to desperation by the removal or threat of removal of benefits, but that same desperation may overwhelm the resistance to negative messages necessary to prevent secondary harm or the adoption of the identity of a disabled person. Moreover, the arbitrariness of such incentives (which are not generally designed to discriminate on the basis of the seriousness of the underlying injury) stimulates emotional reactions related to the loss of control, such as perceived injustice and anger.

Better approaches to incentives have been trialled successfully. Return to work "signing bonus" provisions are features that create an incentive for the worker, remove some of the economic pressure of bills that may have accumulated during recovery and act as a partial payout of the claim, reducing subsequent administration costs. Return to work "accommodation grants" for employers help overcome resistance to reemployment based upon the costs of accommodation. Similarly, subsequent injury funds have been used to protect the employer from the fear that the worker may be re-injured upon return to the workplace. Both are used to overcome employer resistance to cooperation with the return to work process.

Perhaps most exciting incentives are the "recovery plans" in use to a greater or lesser degree in some North American and Australian jurisdictions. They are designed to create a mutual commitment between the worker, the authority responsible for compensation/rehabilitation and the treating doctor. The *quid pro quo* nature of such agreements means that pursuit (or re-negotiation, where necessary) of them acts as an incentive for pursuit of the agreed outcome. They also increase the sense of reliance on self that is the keystone to maintenance of a healthy sense of internal control.

The benefit of incentives is increased predictability in underwriting and claims reserving. The unintended negative impact on the injured has to be weighed against the economic and societal costs of increasing the complexity of those tasks.

Rethinking rehabilitation

Legislative treatment of rehabilitation does not suggest a role that impacts positively on the injured person. Setting of expectations has proven to be a strong predictor of future outcomes^{xlv}. Expectations guide self-talk and self-talk is the primary mechanism for the repetition necessary to develop facilitated neural networks supporting return to work or the opposite. At the same time, legislative and regulatory restrictions in many states prohibit rehabilitation professionals from engaging in meaningful activities such as counselling the injured person and negotiating recovery plans.^{xlvi}

The purpose of rehabilitation is to help the injured person "change their story". As noted above, the constant rote repetition of the details of the claim creates a script that is repeated until the underlying neural network is facilitated. After a time the story becomes the claimant's reality. The purpose of rehabilitation is to open up the possibilities of a different outcome than that which fits the script. Rehabilitation professionals that work with the Department of Veteran's Affairs are not as closely regulated, and are expected to discuss future life paths with people for whom further military service is not possible due to injury.^{xlvii} This model may serve the needs of a compensation system that sees increasing instance of secondary psychological overlay by addressing the root causes of failure to recover as anticipated.

Education

There is little room to doubt the health benefits of healthy work^{xlviii} and the negative health impact of worklessness. Few workers and surprisingly few General Practitioners are aware of these concerns and it seems likely that either or both groups would respond well to public education. Despite the fact that the information has been available for several years, health benefits of work public education lags, with most regulators "developing" information for public distribution, or expecting the public to come to their website and look for it. Even where efforts are being made^{xlix} the fact that worklessness is associated with significant co-morbidities including the diminution of life expectancy is not frontally addressed, as it is with smoking and other acknowledged health concerns.

The environment in which the injured person exists is full of lawyer advertising and subtle cultural suggestions encouraging disability. Knowledge is power and supports a strong sense of personal identity and control. The positive impact of well-funded and well-conceived public information programs on outcomes in injury compensation including the health benefits of work, clear information on the rights and obligations of the parties to the system and other resources that return the power of information to the injured person has not been fully tapped.

Using the model to organise more effective claims management

The impact of language used by claims managers

The same model of how people learn to be needlessly disabled informs the manner in which we can practice enlightened claims management. Most of the repetition that causes changes in the way that neurons connect occurs in the form of self-talk. Self-talk comes partly from our upbringing and childhood experiences but there is still a strong influence arising from what is happening and what is said to us during the experience of recovery. With language, one can set positive expectations (as in the

use of the phrase experience of recovery "in the last sentence) or focus a person on the bleakness of his or her prospects. We can talk about "when the worker is ready to resume his or her life" instead of "if the worker returns to work".

Language can affect the perception of pain.ⁱ Language can communicate distrust, unimportance, lack of care or messages of respect and hope. Language can become a label that helps establish the identity of the person before us as a "worker", an "injured worker", a "claimant", a "patient", a "client", a "recovering person" or something else.

Perhaps nowhere else is language so important than in talking about the medical condition of the person in the compensation system. The diagnosis becomes a label to the doctor ("the low back sprain in Room 3") the claims manager or even the worker.ⁱⁱ While an accurate diagnosis is treated as a necessity for many purposes in compensation systems, the danger with the words we say is that they may become an unchanging label. The patient's diagnosis should change quite quickly with the application of efficacious treatment and the failure of the diagnosis to change over time should be taken as an occasion to trigger a review of the intervention. Yet we often treat the worker's diagnosis as fixed at the moment of announcement. This message is communicated by our language and can become a positive expectation or a blocker to change. A *current* diagnosis has benefit - an historical diagnosis may be a life sentence.

Is light touch the right touch?

A current trend in claims management is to assess the "risk" associated with the claim and allocate claims management resources accordingly. The observation is that most claims resolve unremarkably, so that lower skilled and experienced claims managers can be utilised on "low risk" (often medical only) claims and more experienced staff with much smaller claims portfolios can be used for "high risk" and more complex claims.

There are several problems with this approach, notwithstanding the efficiencies that it promises to claims organisations.

First, the problem with assessing and labelling people as to the level of risk associated with their claim may create a "self-fulfilling prophecy". This textbook psychological phenomenonⁱⁱⁱ works by altering the perceptions of the person that hears the label. If a person is labelled "high risk" then the observer interprets the behaviour of the person accordingly and acts in subtle ways to reinforce that expectation. Since this will impact the messages perceived by the labelled person, his or her experience is changed accordingly, and the common result is for the

labelled person to perform to expectations even if that was unlikely to happen otherwise.^{liii} It is entirely possible that "high risk" claimants will fulfil the expectations concerning the difficulty of their claims.

With "low risk" claimants the opposite problem occurs. In the absence of sophisticated, event-based triggers for escalation of the claims it is entirely too easy to ignore the onset of significant problems until they are sufficiently entrenched to be nearly intractable. The "low risk" patient that is overwhelmed by the experience surrounding the injury and develops secondary psychological overlay is likely to be missed until the new condition has been recognised and diagnosed as an additional issue. In some cases, the worker simply fails to thrive, and stays on the books, inexplicably failing to heal as expected.

Some will say that they have deal with that concern is dealt with by periodic file reviews. The approach lacks sufficient applicability and precisions to be helpful. A review at 26 weeks will be too late to disclose problems in the healing of a simple fracture that has a physiological healing time of 7-8 weeks. It will be too soon for recovery from many invasive surgeries. More concerning is that the repetition to facilitate a neural network takes about 12 weeks, which is also the period of time necessary to reduce the likelihood of return to work to less than 50-50. Inherently, periodic reviews are blunt instruments that presume regularities in claimant behaviour that are not based in evidence.

Distrust and positive expectations

A reasonable interpretation of the regulatory prescriptiveness often found in Australian workers' compensation systems (and the single minded focus on cost control in American workers' compensation generally) is that the systems are designed around a perceived need to control claimants and service providers. To that extent, it seems fair to say that our compensation systems are based in distrust. This message is communicated to claimants in a variety of subtle and unsubtle ways. The normal human condition is to respond to distrust in kind, and the cycle of distrust is amplified as the behaviour of claimants verifies the assumptions of claims managers. Reciprocated distrust establishes an "us against them" internal dialogue in injured people creating perceptual filters that reinforce the distrust, cause emotional reactions to the loss of control and creates an atmosphere where the claimant's very fabric of reality is challenged.^{liiv}

The opposite of distrust in claims situations is respect. If the claims organisation respects the individual, who is going through a very challenging period of their life, then the respect is also likely to be reciprocated. The assumption that an injured person is capable of making decisions about the course of this or her recovery, if they are provided with the appropriate information, is likely to be verified either through the surprising competence of most people to manage their lives or at least through

self-fulfilling prophesy. Setting positive expectations establishes the claims manager as a helpful person in the recovery process rather than impediment to be out-manoeuvred. The feeling of being reasonably in control of the recovery is a tonic of significant value in preventing secondary psychological overlay.

Dealing with those whose sense of control is already compromised – long-tail claims

Long tail claims are the least likely to have a positive or satisfying resolution. Once a facilitated neural network is established then it is reinforced both by claimant behaviour that reinforces the way others perceive and deal with the person and by the perceptual filters utilised by the person to judge the actions of the rest of the world.

These facilitated neural networks are as hard to break as any other well-established habit. The best intentions of someone committed to breaking the pattern are sometimes ineffective and the awareness that there is a maladaptive pattern at work is often lacking.

The breaking of established patterns requires exposure of critical connections between thoughts, emotions, beliefs and sometimes physical sensations. As in the breaking of habits, the process of breaking the old neural network must be accompanied by something to replace it. A new paradigm must be introduced and reinforced sufficiently to recycle the old neural connections into the new pattern. Techniques that have been shown effective include cognitive behavioural therapy^{lv} and hypnosis^{lvi}. It is significantly easier to prevent the harm before it becomes entrenched in a facilitated neural network.

The opposite of needless disability

"Resilience" is a word for the opposite of disability. It has been characterised as the ability to avoid the effects of the experiences of injury in a way that allows the injured person to "bounce back". The trouble is that the word has not been well-defined and no operational mechanism for resilience or the behavioural differences between resilient people^{lvii} has been identified.

Although it goes beyond the scope of this paper, the author has elsewhere suggested that the mechanism for resilience is the ability to change, modulate or quiet self-talk that would otherwise cause repetition leading to the formation of an adverse facilitated neural network.^{lviii} The various "styles" of resilience correspond to the different observed behaviour patterns and describe discreet skill sets. It is possible to quantify an individual's resilience skills, identify the primary or preferred

style and build up skills supporting other styles for utilisation when the primary style is overwhelmed. In that manner, a neuroplastic theory of disability not only subsumes the available research on predictors of good and bad outcomes, but also yields a new understanding of human behaviour allowing meaningful intervention.

Conclusion

We have a choice. We can continue to run compensation systems on a set of assumptions that does not account for observed behaviour, or we can shift to a new paradigm. The old view has failed to account for, or deal effectively with, psychological injury, unexplained failure to recover as expected, secondary psychological injury or the unnecessary adoption of the *persona* of a disabled person.

The new view, based upon how we learn and process information, subsumes the available research on outcome prediction, offers practical guidance to legislative, regulatory and injury management strategies and offers an entirely new and more useful way of understanding an important observed human behaviour.

The toll on injured people, some of whom are unnecessarily thrown onto the scrapheap of life, demands that we consider our choice carefully.

ⁱ See, e.g., G. Null, et al., (2003)

ⁱⁱ While the data points to measure secondary psychological overlay to original injury have not been adequately described (much less collected in a manner that allows quantification) the anecdotal observation of many senior claims managers is that secondary psychological overlay is involved in many, and perhaps most, of the long-tail claims currently experienced. See, Aurbach, R (2015a)

ⁱⁱⁱ Psychological injury is extensive and costly. See e.g. Psychological Injury at Work, SafeWork Australia. The extent of secondary psychological injury has not been fully measured to date, but is reasonably expected to be a factor in the 20% of claims that account for 80% of costs.

^{iv} The issue of "mind" versus "brain" raises philosophical and psychological distinctions that are beyond the scope of this paper. I'm taking the expeditious path of writing around the problem with this turn of phrase, whilst acknowledging that it is a significant line of enquiry.

^v In this manner we learn "connections" between things that are not causally connected but occur at the same time. We call these connections "superstitions". See Skinner, (1948).

^{vi} Attributed to Carla Schultz by Norman Doidge

^{vii} "Neuroplastic research has shown us that every sustained activity ever mapped—including physical activities, sensory activities, learning, thinking and imagining—changes the brain as well as changing the mind." From Doidge (2007).

^{viii} Gatchel, (2002)

^{ix} For a fuller treatment of the various mechanisms of interference in the life of the injured person, see Lipple, K. et al (1999) and Guthrie and Monterosso, (2009).

- x Pain is often accompanied by fear of pain, leading to guarded or avoidance behaviour.
- xi There is a direct neurological connection between anxiety and pain as well. See Linden (2015).
- xii Doidge, (2007).
- xiii Brouziyne, et al (2005); Isaac A., et al, (1992); Martin KA, et al,(1995).
- xiv Or when you have two competing theories that make exactly the same predictions, the simpler one is the better
- xv For more detail, see Aurbach R., (2014) and Aurbach R., (2013)
- xvi Sleeplessness is also often accompanied by a corresponding fear and by self-medication efforts that may exacerbate other symptoms. Common experience tells us that it also makes people grumpier, more pain focused and less able to process complex information. See, e.g. Naitoh P, (1990); Cricco M.,(2011); Kaaria S, (2012); Katz D, (2002).
- xvii Aylward M, (2005).
- xviii Frankl V.,(1997).
- xix Purse, (2003).
- xx Copeland M. (2009)
- xxi Butler D, (2003)
- xxii While there is substantial literature showing the correlation between various indicators of psychosocial stress and poor outcomes, there is no peer-reviewed published study available that is sufficiently controlled to demonstrate that interventions after identification of psychosocial factors are more effective than merely giving greater individualized attention to the subject.
- xxiii Lawyers often insist that they do not communicate this message. Claims managers, allied health practitioners and rehabilitation professionals insist with equal fervour that they do. The actual communication is not really relevant – the question is whether claimants come away from interaction with lawyers with that message, which may equally result from explicit words or activity primarily focused on maximisation of the award.
- xxiv R. McKenzie-Ferguson(2012),
- xxv Doidge, (2007)*supra*.
- xxvi Aylward M, et. al.,2005, *supra*.; Fayad F(2004); Jellema P, et.al. (2006); Bruns D, Disorbio, (2009)*supra*; Jin RL, et. al. (1995); McKee-Ryan F, et. al., (2005); Mathers CD, Schofield DJ., (1998); Stewart JM. (2001).
- xxvii Since the process of neuroplastic response to stress obviously occurs outside the context of workers' compensation, it may be useful to understand "presenteeism" as a reaction to the perception of powerlessness and loss of control that people may experience in work that is not fulfilling their needs
- xxviii One has only to watch the morning news shows to see the pervasive message that people are victims and need to be looked after when bad things happen to them. Lawyer advertising exacerbates the message by confusing economic recovery for culturally shared values, as in "We fight for fair" is used as a tagline.
- xxix See, e.g. Iles RA, et. al. (2012)
- xxx See, e.g. Cotti, T. et. al. (2004).
- xxxi Benyahya,R. et al (2004);Bouter, LM., et al (2006); Bruns, D & Disorbrio, JM (2009); Hay,E et al (2008); Kinicki,AJ et al (2005); Main, CJ et al (2007); Stewart, JM, (2001)
- xxxii R. Aurbach (2013), *supra*.

xxxiii In either case, there is a marked tendency of General Practitioners siding with a fearful worker in anticipating difficulties and extending time out of work through medical certificates.

xxxiv Of the possible candidates for this role, rehabilitation professionals are not often authorised to conduct this sort of "counselling" work and case managers seldom have sufficient control over claim portfolio size to take the time. Legislative or regulatory changes in this regard might be considered.

xxxv There is a strong literature on the beneficial outcome of having an informed patient participate in decisions about their health care. See, e.g. WS Suh and CK Lee, (2010).

xxxvi See, e.g. P. Hanks, (2012).

xxxvii Public discussion suggests that this is to be the direction taken in NSW with regard to proposed reforms to the 2012 benefit legislation.

xxxviii See, eg, The Cain Review of Comcare Cases, Senate Estimates Briefing 24-27 May 2014.

xxxix Several U.S jurisdictions have services that are designed to resolve disputes before litigation is begun. New Mexico and Texas are examples. In such systems, resolution rates of over 60% have been routinely achieved, by recognising that the bulk of disputes are the result of correctable miscommunication or misinformation. The WorkCover Independent Review Office in NSW provides a similar service, with similar results.

xi Carroll (2013).

xii New Mexico Workers' Compensation Administration 2014 Annual Report, p 45.

xiii Testimony before the Navajo Tribal Council, January 2013.

xiiii Examples include the State of Nevada and WorkCover Independent Review Office

xliv See, e.g. R. Reville, et al(2001).

xlv See, e.g. R Iles, et al(2009).

lxvi The Australian Department of Veteran's Affairs Psychosocial Rehabilitation program is a notable exception.

lxvii Workshop discussions occurring on 29-30 May, 2015, Brisbane.

lxviii Australasian Faculty of Occupational and Environmental Medicine, Realising the Health Benefits of Work, October 2011, <http://www.maic.qld.gov.au/forms-publications-stats/pdfs/realising-the-health-benefits-of-work-position-statement.pdf>

lxix For instance, the Victorian WorkCover Authority has occasional advertisements encouraging return to work.

i A Khoula, et al, (2010)

ii I once had the confronting experience of introducing myself to a worker who responded by giving me his diagnosis instead of a name.

iii Tauber R, (1997)

iiii In a classic experiment, a teacher was told that some of his equal performing students were gifted while others were challenged. By the end of the term, the students performed to their labels despite (or perhaps because of) the teacher's desire to give them what they needed by way of help.

liv McKenzie-Ferguson, *supra*.

lv M Copeland(2009), *supra*.

lvi M Ellner and Aurbach, R (2009)

lvii The entrepreneur who can always make another fortune doesn't look like the single mum studying whilst holding down two jobs. Neither looks like the eternal optimist or the Zen master.

lviii R. Aurbach, (2015b).

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