

# The Education Revolution

A personal perspective

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# Revolution?

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A dramatic and wide-reaching change in conditions, attitudes, or operation.

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Is this occurring? For me, it has been a personal journey: medicine (UWA); psychiatry (RANZCP); business (HBS); behavioural economics (LSE) and now Phd in Accounting (USYD).

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So where is the revolution? yes, we live in a time of big data and big machines, but the deep problems require philosophical clarity and specification (e.g. NESARCIII predictors of PTSD); Technology has the potential to send an able-bodied runner very far in the wrong direction. We spend too much time 'doing' and not enough 'thinking'.

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For me, **the primary purpose of education is to better understand the world.** This requires the right balance between qualitative and quantitative insights.

Who moved my cheese? I moved your cheese.  
Life is more than a daily hunt for cheese.  
Paradoxically, when we understand the world better, we find more cheese.

Being more disciplined about both the questions and the answers has a profound spill-over impact on our usual operations

Scholar.google.com and look up the big issues that face insurance. We are big on opinions, standard practices e.g. loadings and generally reactive, but until recently deficient in research.

The absence of reliable knowledge makes us vulnerable: to shareholders, regulators, customers and competitors. It leads us into poor policy formulation, product deficiencies and poor processes.

It enhances your brand as having integrity, being progressive and evidence-based in your approach. This approach will ultimately triumph the current trend of virtue signaling.

# Why Research?

## Behavioural Economics

- Increased honesty at underwriting
- Impact of advisors on the honesty of customers
- Increasing customer retention

The impact of legislative change on the CTP scheme.

The impact of mental health underwriting in travel insurance

Building a reliable, real-time quantitative model for mental health underwriting

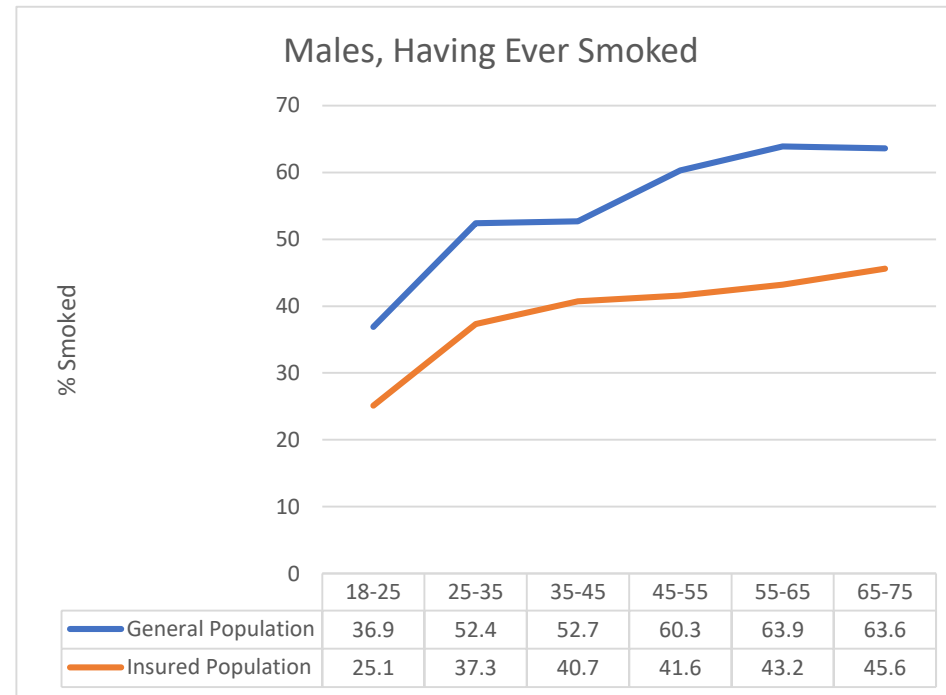
The quantification and modelling of personality as a predictive risk factor for insurance products

For me, there are few pleasures that rival the discovery of knowledge. I'm now dividing my time between research and income producing activities.

# My research foci

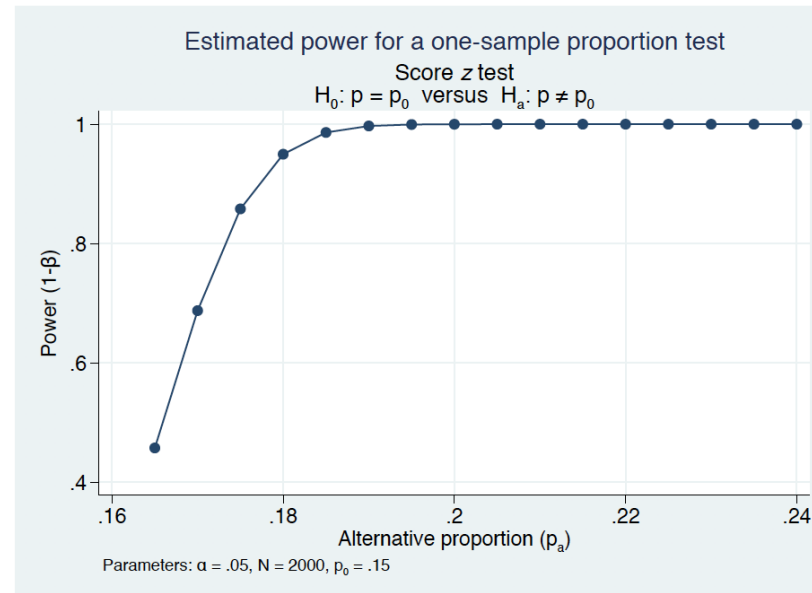
# Behavioural Economics and Underwriting

- The first problem was to quantify the extent of the problem. To what extent are customers engaging in FNSD and FPSD? Do we know what is going on with customers who do not claim? How can we triangulate the data?



# BE at underwriting ctd

- That first step was critical: without a clear understanding of the honesty gap, cannot do a power analysis and sample size estimation to generate valid results



# BE at Underwriting Ctd

	Control	Social Norms	Loss Aversion	Moral Priming	Average
Male	0.15	0%	7%+	7%+	0%
Female	0.06	67%+	150%+	50%+	50%+
Total	0.12	8.3%+	33%+	8.3%+	8.3%+

		Control	Social Norms	Loss Aversion	Moral Priming	Total
Weight						
	Male mean (SD)	87.1 (13.2)	3%+	1.2%+	1.3%+	1%+
	Female mean (SD)	70.7(16.5)	0%	1.9%-	0%	0%
Height						
	Male mean (SD)	178.8 (7.6)	0%	0%	0%	0%
	Female mean (SD)	165.6 (8)	0.7%-	0%	0.7%-	0%
Mental Health Disclosures						
	Male (%)	20.72	7.1%+	8.1%+	17%-	0%
	Female (%)	28.8	27%+	6.25%+	22%+	13.5%+
Illicit Substance Use Disclosures						
	Male (%)	15.8	16.5%+	18.4%+	16.5%+	8.2%+
	Female (%)	7.4	56.7%+	24.3%+	14.9%+	21.6%
Alcohol (total)						
	Male (units p.a.)	44.8	20%+	13%-	0%	0%
	Female (units p.a.)	26.8	14%-	29.5%+	10%+	7.5%-

Impact of this  
3 months  
experiment?

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Increased revenue?

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Increased market share?

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Combination?

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Low cost

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Low operational disruption

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No complaints

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High reward



# Building a Better Mental Health Underwriting Engine

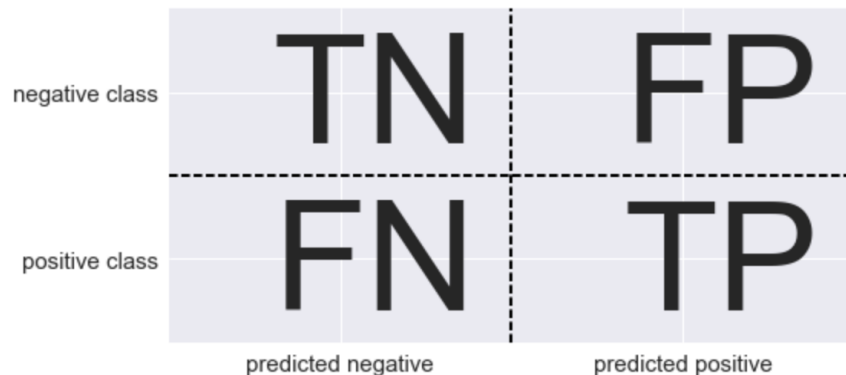
## Confusion Matrix

```
In [41]: import mglearn
from sklearn.metrics import confusion_matrix
pred_model = model.predict(X_train)
confusion = confusion_matrix(Y_train, pred_model)

print("Confusion matrix:\n{}".format(confusion))
```

```
Confusion matrix:
[[25720   57]
 [   68 3202]]
```

```
In [35]: mglearn.plots.plot_binary_confusion_matrix()
```



```
#sklearn.metrics.f1_score(y_true, y_pred, labels=None, pos_label=1, aver
print(results.mean())
```

```
0.990002434821
CPU times: user 1h 15min 44s, sys: 37.5 s, total: 1h 16min 21s
Wall time: 1h 16min 25s
```

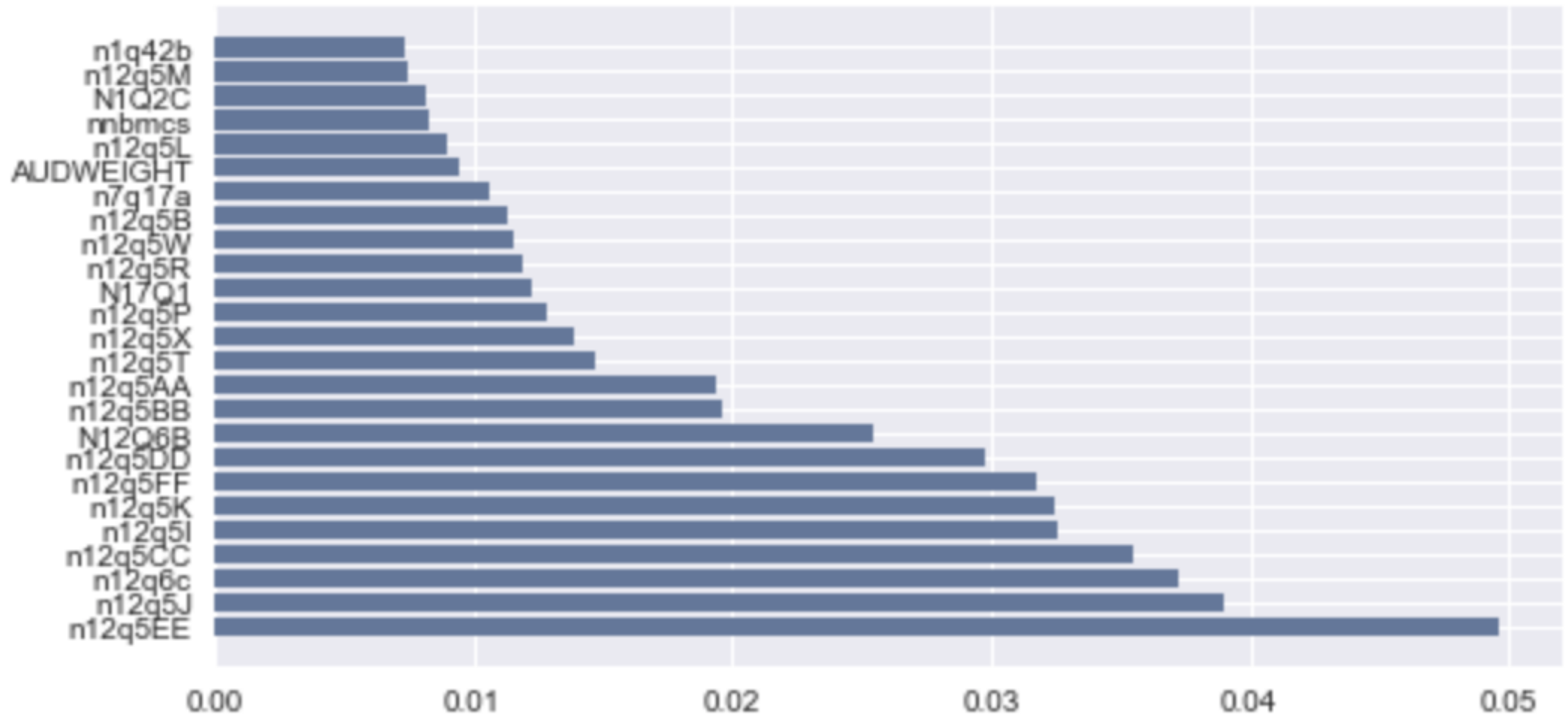


## Model Validation

```
In [40]: model.fit(X_train, Y_train)
model.score(X_validation, Y_validation)
```

```
Out[40]: 0.98967226659322505
```

## Why you have to understand the data



# | Personality and risk

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The holy grail of risk. Loads of ethical and philosophical issues: e.g. determinism; stability of personality over time; fairness issues.

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Considerable evidence to support this (please check out my short literature review on attached to my LinkedIn profile)

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The opportunity: to more precisely classify risk.

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A new model will incorporate quantification of features along with other bio-social features to model outcomes and make predictions.

# How to Engage

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The IP, confidentiality and ethical issues are all easily resolved

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The estimated cost of producing one paper in a high impact journal?

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Doctoral students (usually) the youngest and brightest in the country

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Industry sponsorship requires a commitment of 15-30k p.a. for 3 years. For each young person you sponsor, they are backed by the resources of the business school.

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Ask your hardest questions and embrace the answers: e.g. Are we facing market collapse in retail disability insurance? Will personality profiles allow us to disaggregate risk? Predict the likelihood of a successful or an unsuccessful claim? What is the real level of fraud in our products?

## | Further discussions

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