In-force value enhancement
Southeastern Actuaries Conference
Actuarial Club of Southwest

November 16 – 18, 2016
Presentation by: Mark Griffin
In-force value enhancement

- Scope includes all possible actions that meaningfully impact an insurer’s form and financial results.
- Recent publicized examples of in-force value enhancement include:

  - RGA announces embedded value securitization of $300M
  - John Hancock to Acquire New York Life’s Retirement Plan Services Business & Reinsure 60% of its In-Force Par Block
  - Effective Aug 1/15 Banner will implement a cost of insurance (COI) increase for select UL plans.
  - AIG bows to activist shareholder pressure...
  - MetLife announced spin off...

The Boards of Insurance Companies and market analysts expect an insurer to monitor the performance of its in force and to take action to optimize its value.
Most Insurers are taking actions on their in force
Willis Towers Watson’s recent CFO Survey indicates:

- In the past two years
  - 36% of respondents have increased annuity living benefit rider costs or stopped accepting or limited renewal premiums
  - 29% of respondents have increased COIs on life policies
- For capital raising/management

<table>
<thead>
<tr>
<th></th>
<th>Undertaken in the past two years</th>
<th>Highly likely or possibly will undertake in the next two years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third-party reinsurance</td>
<td>60%</td>
<td>77%</td>
</tr>
<tr>
<td>Repriced / redesigned / discontinued certain products</td>
<td>53%</td>
<td>86%</td>
</tr>
<tr>
<td>New securitization / LOC</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>Internal restructuring</td>
<td>27%</td>
<td>29%</td>
</tr>
</tbody>
</table>

- Numerous regulatory changes are expected to drive capital raising / management over the next two years, including:
  - 40% principles-based reserves
  - 20% global insurance capital standards
Central questions

- How, and by whom, is experience reviewed? As part of:
  - Periodic experience studies
  - Review of financial results
  - Financial planning / capital allocation process
  - Assumption governance

- Is there a
  - Mandate from the C-Suite?
  - Ability to prioritize resources, projects?
  - Understanding of systems, operations, legal and compliance implementation?
## In-force value enhancement levers

<table>
<thead>
<tr>
<th>Balance sheet</th>
<th>Income statement</th>
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</thead>
<tbody>
<tr>
<td>▪ Identify and free trapped capital</td>
<td>▪ Use analytics to examine:</td>
</tr>
<tr>
<td>▪ Sale of, or reinsurance of blocks</td>
<td>▪ Proactive customer retention, cross-selling and conversion programs</td>
</tr>
<tr>
<td>▪ Business reorganization</td>
<td>▪ Channel and agent efficiency</td>
</tr>
<tr>
<td>- Captives</td>
<td>▪ Examine non-guaranteed elements, including COIs</td>
</tr>
<tr>
<td>- Redomiciling</td>
<td>▪ Operational efficiencies</td>
</tr>
<tr>
<td>- Legal entity reorganization</td>
<td>▪ Outsourcing of:</td>
</tr>
<tr>
<td>- Run off</td>
<td>- Administrative systems</td>
</tr>
<tr>
<td>▪ Deploy capital efficiently</td>
<td>- Actuarial modelling</td>
</tr>
<tr>
<td>▪ Purchase blocks</td>
<td>▪ Review cost / benefit of marketing agreements</td>
</tr>
<tr>
<td>▪ Recapture</td>
<td></td>
</tr>
</tbody>
</table>

### Overall

| ▪ Capital volatility management                    |                                                                                   |
| ▪ Reinsurance                                      |                                                                                   |
|     - Co-insurance                                 |                                                                                   |
|     - Retention levels                             |                                                                                   |
|     - Counterparty risk                             |                                                                                   |
| ▪ Buy back programs                               |                                                                                   |
| ▪ Hedging financial risks                          |                                                                                   |
| ▪ Business diversification                         |                                                                                   |
| ▪ Examine financial / actuarial assumptions        |                                                                                   |
| ▪ Compare capital allocation to level of expected return and stressed return |                                                                                   |
How to approach in-force value enhancement

Step 1. Clarify objective and constraints

- Understand company’s financial objectives
  - Income
  - Capital
  - Volatility
  - Counterparty risk
- What is the objective?
- What are the constraints?
- Understand strategic, cultural, regulatory considerations and constraints

Step 2. Diagnostic

- Understand alternatives
- Understand return on any released capital
- With respect to the findings in Step 1, perform a high-level diagnostic to determine the actions of greatest impact
- What is needed now?
  - Are solutions likely to be available “as needed” over time?
How to approach in-force value enhancement (continued)

Step 3. Deep dives and business cases

- Perform ‘deep dive’ analysis of the most promising in-force value enhancement opportunities
- Conduct sensitivity testing and scenario analysis
- Develop draft business cases and implementation plans for the proposed in-force actions
  - Quick wins
  - Medium-term agenda and goals
- Recognize legal, regulatory and cultural considerations
- Present draft business cases and implementation plans to key stakeholders
How to approach in-force value enhancement (continued)

Step 4. Planning and implementation

- Agree on and document, prioritized business cases and gain approval from key stakeholders
- Carry out detailed implementation planning for each business case
- Move to implementation phase
- Finalize framework for implementation, including feedback cycles and performance monitoring
- Document detailed project plans

Step 5. Periodic reviews

- Monitor expected financial impact
- Update toolkit, terms, impact and return on released capital
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Appendix - Assumption Governance

- Internal and external auditors, and risk managers, are trying to design a “control environment” for financial reporting in insurance companies.
- Assumption Governance is part of that challenge.
- How can we ensure assumption resetting is done in a transparent and consistent way?
Assumption Governance (continued)

For calculation purposes, assume all assumptions are scientific facts

- Calculate expected period-by-period variability in terms of standard deviation
- Communicate results to lines of business and finance
  - Avoids the “was that random or do we have to change our assumption” question
Assumption Governance (continued)

- Implementing an assumption resetting process
  - Example
    - If variation is greater than one standard deviation but less than two, the assumptions will automatically be reviewed
    - If variation is greater than two standard deviations, the assumption will be changed
  - This can be applied consistently to any non-capital markets assumption, over any time period, to any size of data
  - It is objective and transparent
Appendix - Experience Studies

- Do we approach experience studies properly?
  - Are we looking for a quick confirmation of previous calculations?
  - Will we see new trends or interrelationships?
- Predictive analytics can avoid these pitfalls. For the best results:
  - Don’t limit the variables included to only those you think may be predictive
  - Include the type(s) of underwriting test used or even the underwriting results, if available, in the data
  - Include geo-demographic information
Experience Studies (continued)

- Predictive analytics
  - Objectively shows relationships between variables on an all-else-equal basis
  - Provides insight into the interaction of various factors that our naked eye may not catch
  - Doesn’t rely on the user to formulate a specific question
  - Used in the P&C industry for two decades

- Examples of conclusions
  - Variable annuities: Increased dynamic behavior of larger policies may more than offset expense savings
  - Life: Discounts for higher face amounts may be excessive
Predictive Analytics: Innovation and Insurance

Guizhou Hu, M.D., Ph.D.
Vice President,
Chief Decision Analytics Officer
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Agenda

• State of Art in Predictive Analytics
• Predictive Analytics and Insurance
• Practical Considerations in Building Predictive Models
“New technology will disrupt the insurance industry over the next 5 years,” reported 65% of insurance executives.

“Innovation distinguishes between a leader a follower”

-Steve Jobs

SOURCES: Insurance Innovation Survey (of insurance executives) by Ingenin, 2015.
The Technologies

Self-driving Google Car

Online Recommendation Engine

Smart Spam Classifiers

Machine Learning

Data Mining

PREDICTIVE ANALYTICS ARE THE CORE

Artificial Intelligence

Cognitive Computing

Natural Language Process

Big Data

Internet of Things (IoT)
**Analytic Maturity**

![Analytic Maturity Diagram](http://timoelliott.com/blog/2013/02/gartnerbi-emea-2013-part-1-analytics-moves-to-the-core.html)
Example of Prescriptive Analytics

Who Gets Starbucks Customer Deals: Not Loyal Customer

Google Free Taxi
Customer Life Value (CLV)

KOHL’S Individualized Marketing
Receive Coupon in Real Time While Shops
Capability Requirements

**DATA:**
Master Data Management (MDM)
- Processes and tools to manage data for quality, consistency and breadth

**TOOLS:**
High Performance Analytics Platform
- Rapidly analyze large volumes of data with in memory processing, grid computing and in-database analysis

**PEOPLE:**
Analytics Center of Excellence
- Analytics talent to plan, implement and interpret results
Predictive Analytics: Human vs. Machine

Traditional Predictive Analytics: Statistical Modeling

Scientists build prediction models to predict future outcomes that are not intuitive to our brain.

Predictive Analytics via Machine Learning: Artificial Intelligence

Predictive Analytics for Insurance

Agent Recruitment / Retention

Marketing Cross-sell / Upsell

Application Triage

Underwriting

In-force Management
- Proactive and reactive retention strategy

Claims Management
- Fraud detection
- Expedited adjudication
Key Players at Insurance Company

- Marketer
- Underwriter
- Actuary
- Claim Managers
Predictive Analytics Around Customer Cycle for Marketer

Acquisition:
Leads
• Predictive modeling-based contact and offer

On-board:
New Customers
• Customer segmentation

Engage & Grow:
Active Customers
• Score engagement, satisfaction, and loyalty

Retain:
At-risk Customers
• Survival propensity score, warning detection

Winback:
Lost Customers
• Reactivations model
Predictive Analytics for Underwriters

What Does Underwriter Do?

Risk Selection

Risk Classification

Improve It with Predictive Analytics
Predictive Analytics for Actuaries

What Does Actuary Do?

Pricing

Valuation

Experience Study with Predictive Analytics
Predictive Analytics for Claim Management

What Does Claim Manager Do?

- Process Claims
- Fraud Detection

Predictive Analytics: Text Mining and Network Analysis
Innovation: Continuous Underwriting

- Wearable (IoT)
- Geo-Demographic
Practical Considerations of Predictive Analytics

How accurate is the model the vendor built?

How to build and interpret a model?
IoT and Insurance
What does a day in the life of a model family look like?

The infographic on the following slides are created by Insurance Nexus.
http://events.insurancenexus.com/insuranceiotusa
The infographic is used for educational purpose only.
7.30am

Mrs. Jones gets into her connected car on her way to work. Her phone tells her about traffic congestion on the way in and lets her know about parking spaces available in the city. Her phone also tells her that her driving has been great this month and she is saving money on her insurance policy.

10.00am

Billy Jones takes the dog for a walk but he comes off of the leash. Using his connected collar Billy finds him at a neighbour’s house. Once home he finds out both of their health data based on their morning walk and an advert pops up asking him to buy health and pet insurance.

SOURCE: Insurance Nexus
12.30pm

Mr. Jones burns lunch and his smart smoke alarm picks up the scent. His service provider gives him a call immediately to determine whether he is at home and safe. He then admits what happened and they laugh. The operator asks him if he is happy with his home insurance policy and he is.

2.00pm

Mrs. Jones gets to her small business in the city and notices that an important shipment hasn’t yet been delivered. She logs on to her computer to track this and finds that it is on its way to her client. The shipping company notices her enquiry and gives her a call to ensure the shipment is moving safely and should it not arrive in two days that an automated claim will be issued.
4.30pm

Mr. Jones put his laundry on and goes outside. He adds too much detergent to the laundry and there is a flood in the machine. His smart water system recognizes a change in water pressure and alerts him immediately. He switches off the water supply from his phone and goes to check the washing machine immediately. His insurer calls to ask if he needs any support with repairs.

5.15pm

Mrs. Jones is going on a business trip. She takes a taxi to the airport and on her way she gets a notification on her phone that her plane is on time. On arrival at her destination she finds that her bag has been lost. An automatic claim is processed by her insurer so that she can go and purchase new clothes whilst on her trip.

SOURCE: Insurance Nexus
6pm

6.15pm

Mr. Jones goes for an evening walk with Billy Jones and their dog. They walk past Mr. Jones’ favourite store and an alert comes up on his phone indicating that a TV the family had wanted is now on sale and that also a pair of shoes that Mrs. Jones has been wanting are now in stock. The pop up also indicates the gadget insurance that can be bought with the new TV.

9.30pm

Billy Jones is brushing his teeth using a connected toothbrush, it signals to him that he has not brushed for long enough! This information is written on a report that will be sent to his mother about his monthly dental health and their insurance policy.

SOURCE: Insurance Nexus
Accuracy Metrics

• Discrimination (c-statistics, or ROC):
  - Individual with outcome (death) has higher predicted risk than individuals who either do not have outcome or have outcome at later time

• Calibration:
  - The closeness between observed and predicted outcome rates (A/E)
Discrimination vs. Calibration

- **Good discrimination**
  - Good calibration

- **Poor discrimination**
  - Good calibration

- **Good discrimination**
  - Poor calibration

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Outcome</th>
</tr>
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<tbody>
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<td></td>
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</table>
### Confusion Matrix vs. ROC

#### Confusion Matrix: Performance of a model at a given cut-off point

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Standard</td>
<td>Positive</td>
<td>TP</td>
</tr>
<tr>
<td>Negative</td>
<td>FP</td>
<td>TN</td>
</tr>
</tbody>
</table>

- **Sensitivity** = \( \frac{TP}{TP+FN} \)
- **Specificity** = \( \frac{TN}{FP+TN} \)

#### ROC: Performance of a model at all possible cut-off points

![ROC Curve]

- Sensitivity
- Specificity
Example: Build a Logistic Regression Model in SAS / R

Logit $Y = \alpha + \beta_1 X_1 + \beta_2 X_2$

**SAS CODE**
Proc logistic data=data1;
model $Y = X_1 \ X_2$;

**R CODE**
Model <- glm($Y \sim X_1 \ X_2$, family=binomial(link='logit'),data=data1)

<table>
<thead>
<tr>
<th>Response Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordered Value</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Fit Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion</td>
</tr>
<tr>
<td>AIC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysis of Maximum Likelihood Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>X1</td>
</tr>
<tr>
<td>X2</td>
</tr>
</tbody>
</table>
Example: Survival Analysis

```sas
proc lifereg data=ana;
model exposure*actual(0)=x1 x2 /d=exponential offset=expected;
```

<table>
<thead>
<tr>
<th>Model Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Set</td>
</tr>
<tr>
<td>Dependent Variable</td>
</tr>
<tr>
<td>Censoring Variable</td>
</tr>
<tr>
<td>Censoring Value(s)</td>
</tr>
<tr>
<td>Offset Variable</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
<tr>
<td>Noncensored Values</td>
</tr>
<tr>
<td>Right Censored Values</td>
</tr>
<tr>
<td>Number of Parameters</td>
</tr>
<tr>
<td>Name of Distribution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fit Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC (smaller is better)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysis of Maximum Likelihood Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>x1</td>
</tr>
<tr>
<td>x2</td>
</tr>
</tbody>
</table>
Validations to Prevent Over-Fitting

Separate Training and Test Data

5 Folds Cross-Validation
Machine Learning Techniques

1. General ML
   - Decision Tree, Random Forest
   - Gradient Boosting
   - Supporting Vector Machine

2. Special ML
   - Deep Learning
   - Natural Language Process
Boosting and Models Ensemble

DECISION SPACE

M1: Error
M2: Error
M3: Error
library(randomForest)
myrf <- randomForest(Y=X1+X2...+Xn, data=training)
predicted <- predict(myrf, newdata=test, "prob")
test$predicted <- predicted[,2]

library (pROC)
roc=(roc(test$Y, test$predicted) )
plot(roc)
Predictive Analytic Strategy

Data

Analytical Platform

Center of Excellence
Thank you

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Using Behavioral Economics in the Life and Health Insurance Market

Stacy Varney
Gen Re
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Agenda

- Basics of Behavioral Economics (BE)
- Gen Re Research
- Key Marketing Takeaways
Behavioral Economics Defined
What is Behavioral Economics?

Behavioral Economics - The study of psychology as it relates to the economic decision making processes of individuals and institutions.

*Source: Investopedia.com*

**Traditional Economics**
- Use all the resources available and time we need
- Make a calculation to determine how to maximize our utility/decision
- Know what’s best
- Rational

**Behavioral Economics**
- Bounded rationality – rely on heuristics and subject to biases
- We don’t know what’s best or what we want
- Interested in the *How? & Why?*
- Conduct experiments
“We usually think of ourselves as sitting in the driver’s seat, with ultimate control over the decisions we made and the direction our life takes; but, alas, this perception has more to do with our desires - with how we want to view ourselves - than with reality.”

-Dan Ariely, Author of Predictably Irrational

“As was the case with all of our other experiments, we found that people cheat when they have a chance to do so, but not by a whole lot.”

- Dan Ariely, Author of The Honest Truth About Dishonesty
Our ability to make rational decisions is limited and subject to influences.

Why is Behavioral Economics Important in Insurance?

Cognitive Challenges
• Choice Overload
• Limited Numeracy
• Health Literacy

Decision Influences
• Heuristics
• Cognitive Biases
• Other BE concepts

Bounded Rationality

Error of understanding “odds”
Error of determining “value”
Cognitive Issues

NUMERACY
The ability to understand and interpret numerical information

Percentage of Incorrect Answers Among U.S. Adults Ages 50+

Percentage Calculation
If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?

13.2%

Lottery Division
If 5 people all have the winning number in the lottery and the prize is 2 million dollars, how much will each of them get?

34.4%

Compound Interest
Let’s say you have 200 dollars in a savings account. The account earns 10 percent interest per year. How much would you have in the account at the end of two years?

78.5%

Source: US Health and Retirement Study, 2004
Bounded Rationality

How did you select your breakfast?

Amount of calories, protein, fat, etc.
Meals planned for the rest of the day
Amount of time to eat
Cost given the amount of food
Will I be sitting or standing during breakfast

Hmmm...that looks good!!!
Heuristics

**HEURISTICS**
Mental shortcut your brain uses to make a decision

- Familiarity
- Affect
- Satisficing
- Availability
- Base Rate
- Neglect
- Authority

*Thinking, Fast and Slow* by Daniel Kahneman
Availability Heuristic

Definition: Individuals judge the probability of events by how easily they come to mind.

You are planning to fly to London next week. How much would you pay for a flight insurance policy worth $100,000 of life insurance in case of death due to...

- Any act of terrorism: $14.12
- Any mechanical failure: $10.31
- Any reason: $12.03

Events that are easier to recall, are more vivid in our mind, lead us to assume they have a high probability of happening.

Availability Heuristic leads to an error in odds.

Source: Eric Johnson, 1993
Optimism Bias

Definition: Our tendency to overestimate the likelihood of good things happening to us.

Experiment:
What is your likelihood of suffering from cancer? (Open-ended question)

Then told the true likelihood is 30%.

A. 50% ➔ 35%
B. 10% ➔ 11%

Source: Sharot, Korn, Dolan, 2011
Loss Aversion

Definition: People have a stronger preference for avoiding losses than achieving a gain.

Experiment:
Each participant given $50 at start.

Group 1
A. Keep $30
B. Gamble with a 50/50 chance of keeping or losing the whole $50.

43% picked option B

Group 2
A. Losing $20
B. Gamble with a 50/50 chance of keeping or losing the whole $50.

61% picked option B
Using Behavioral Economics to Determine Consumers’ Honesty in Filing for Insurance Coverage
Application Honesty Project

Methodology

Objective:
To demonstrate that behavioral economics can be leveraged to increase disclosure rates; test the potential impact of several treatment designs.

Process:

1. Conduct an extensive review of applications being used
2. Determine treatments & create “dummy” app
3. Test with research panel members
4. Analyze and report the findings

Applications reviewed:
Individual App Research – Individual Life, Individual Disability, Group Life Evidence of Insurability
Senior App Research (age 65+) – Medicare Supplement

Southeastern Actuaries Conference/Actuarial Club of the Southwest - Nov. 16, 2016
Participants: Participants in the research were recruited using an online panel provider.

- Individual App Research - 2,064 U.S. residents, age 30-60
- Senior App Research - 2,066 U.S. residents, age 65-70

Incentives: Participants were provided an incentive by the panel company that was consistent with their standard research request. In an attempt to replicate the financial benefit an individual receives from being dishonest on an application, participants were told they would qualify for additional incentives if they were considered healthy.

Disclaimers:
- No weighting to mirror U.S. population.
- This is a test of the Treatments compared to the Control Group - not a test of whether the actual usage frequencies are representative of the larger population.
Two Forces at Play

Lack of Recall (Mistakes)

Benefit from Dishonesty (Limit Recall Effort)

Accuracy of the Information
Survey Sections

- Medical Conditions
- Tobacco Usage
- Alcohol Consumption
- Drug Usage
- Income
- BMI
Application Control Group

Summary of Results – Medical Conditions

**Control Group:**
Have you had or ever been diagnosed, treated, or received medical advice by a member of the medical profession for any of the following? Cancer, Diabetes, Heart disease, Asthma, Kidney disorder, Depression/Anxiety, Liver disorder, Back/Spine or neck pain, High blood pressure.

- Yes
- No

If yes, check all that apply and provide details such as date, duration, diagnosis, treatment, medication in the follow-up page.

- Cancer
- Diabetes
- Heart disease
- Asthma
- Kidney disorder
- Depression/anxiety
- Liver disorder
- Back/Spine or neck pain
- High blood pressure
Medical Conditions: Cancer

Results for T2 were found to be statistically significant.

Results for Cancer

Study %
The percentage of study participants reporting they have had, been diagnosed, treated, or received medical advice by a member of the medical profession for cancer.

- Control group: 3.9%
- Treatment 1: 3.8%
- Treatment 2: 7.0%

Study % Change:
- Control group: -3%
- Treatment 1: 0%
- Treatment 2: 79%

p value:
- T1 = .881
- T2 = .012

Test used: Chi square (univariate) and logistic regression (multivariate). P values shown are from logistic regression.
Control Group:

Have you used tobacco or nicotine delivery products in any form (e.g. cigars, cigarettes, vapor products, pipes, chewing tobacco, nicotine patches or nicotine gum) in the past 12 months? Yes  No

If yes, when was the last time? (Open field)

If no, have you used tobacco or nicotine delivery products in any form in the past 5 years?

- Yes
- No
Usage of Tobacco & Nicotine Delivery Products (Past 12 months)

Summary of Results – Tobacco & Nicotine

Results for Usage of Tobacco and/or Nicotine Delivery Products in the Past 12 Months

- **Control group**: 32%
- **Treatment 1**: 36%
- **Treatment 2**: 42% (31% change)

**Study %**
The percentage of study participants reporting they have used tobacco or nicotine delivery products in any form in the past 12 months.

**p value:**
- T1 = 0.068
- T2 = 0.000

T2 resulted in a higher disclosure rate than T1

*Test used: Chi square (univariate) and logistic regression (multivariate). P values shown are from logistic regression.*
Using Behavioral Economics to Influence Consumer Engagement
Why Consumer Engagement Research?

Rating of Perceived Need for Benefit

- Must Have
- Nice to Have
- Not Needed
- Not explained enough

- Life
- LTD
- STD
- HI
- CI
- Accident

Source: 2015 Voluntary Employee Pulse
Purchase Rate by Perceived Need

Percentage Purchasing the Benefit

- 75% Purchased Life
- 87% Purchased STD
- 84% Purchased LTD
- 76% Purchased Accident
- 72% Purchased CI
- 67% Purchased HI

Percentage Not Needed

- 19% Purchased Life
- 6% Purchased STD
- 8% Purchased LTD
- 2% Purchased Accident
- 1% Purchased CI
- 1% Purchased HI

Source: 2015 Voluntary Employee Pulse
People who do not consider a benefit to be necessary are less likely to pay any attention to it during the enrollment period.
Employee Engagement Study (Worksite Products)

Methodology

- Electronically surveyed 2,700 individuals who met the sample criteria
- Number of clicks on supporting plan documents and comprehension test scores used to determine success of the Treatment Groups
- Participants were randomly assigned to one of nine Treatment Groups
- Treatments were developed based on conversations with several U.S. worksite carriers
- Data was collected in May 2016 through SSI (a third party vendor)
Below is a list of insurance benefits being offered by your new employer.
To learn more about the insurance benefits and what you could receive, please click on each of the below.

<table>
<thead>
<tr>
<th>Insurance</th>
<th>Cost per Paycheck*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Dental</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Life</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Short Term Disability</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Long Term Disability</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Critical Illness</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Accident</td>
<td>$ Varied</td>
</tr>
<tr>
<td>Hospital Indemnity</td>
<td>$ Varied</td>
</tr>
</tbody>
</table>
Results for Number of Plan Documents Clicks

Sample Results

Change in the Number of Clicks on Plan Documents Compared to Control Group
(Ancillary Products Only – STD, LTD, CI, Accident, HI)

* Statistically Significant (p<.05)
Results for Comprehension Test Scores

Sample Results

Change in Test Scores Compared to Control Group

* Statistically Significant (p<.05)
Why the Number of Clicks Matter

Sample Results

Percentage of Individuals Intending to Purchase by Clicking Activity (Non-Owners Only)

- Clicked
- Did not Click

<table>
<thead>
<tr>
<th></th>
<th>STD*</th>
<th>LTD*</th>
<th>CI*</th>
<th>Accident</th>
<th>HI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicked</td>
<td>45.0%</td>
<td>50.0%</td>
<td>40.0%</td>
<td>35.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>Did not Click</td>
<td>35.0%</td>
<td>30.0%</td>
<td>45.0%</td>
<td>55.0%</td>
<td>30.0%</td>
</tr>
</tbody>
</table>
BE Evolution at
Gen Re Life/Health North America
The Three “T’s” of Behavioral Economics

Gen Re Model for BE in Research

Moving beyond theory - Applying BE

- Testing
- Training
- Teaching
Goal: Improve our understanding of BE concepts and how they can be used to “nudge” consumer behavior.

- BE and Market Research Online Course
- Yale BE Immersion Course
- Attendance at multiple online courses and in person presentations focusing on BE
- Study books and reports from leading academics highlighting results of their BE research as well as the implications
- Conduct research/experiments with the assistance of a behavioral scientist
Teaching

**Goal:** Share our knowledge and the relevance/importance of behavioral economics with clients; Gen Re is a source of expertise and insight to improve business results.

- Marcy Updike and Professor Sagara co-presented at Gen Re U.S. client event (2016) on Application Honesty Project
- Blog posts, interviews & client presentations
- Development of insights for client use
Goal: Apply BE to influence consumer behavior.

- **Application Honesty research** – tested treatments to determine which had the greatest increase in disclosure rates on key risk areas. (i.e. tobacco usage, alcohol consumption).

- **Employee Engagement for Worksite Products** – tested eight treatments to determine which will increase the likelihood that an employee will explore & consider ancillary benefits during the online enrollment process.

- **Next up** – study on agent/broker incentives.
Key Takeaways – Marketing Perspective

- Applying BE concepts in insurance marketing improves both the quality and quantity of business you write.
- Understanding consumers’ decision making process is key to new product development efforts & new product launches.
- As consumers are more empowered to make insurance purchasing decisions, it’s even more critical that we understand how they think.
- Even small changes to how you currently market your products can have a significant impact!

Gen Re can help...
Visit genre.com for more info.

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