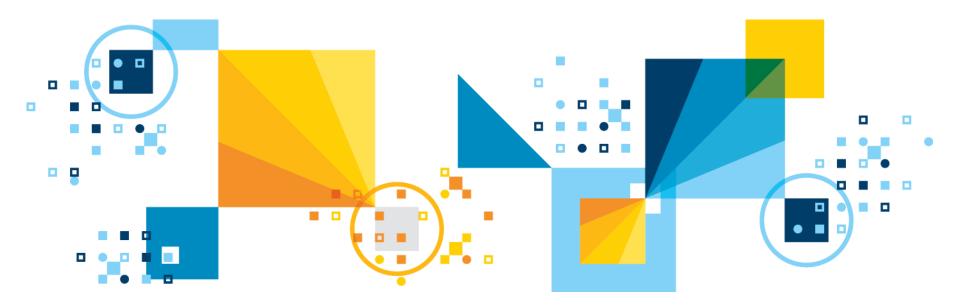
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The Road to Successful Program Evaluation is Just Ahead

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STRENGTHENING SOCIAL AND EMOTIONAL HEALTH





Agenda

- Introductions
- Our point of view of Predictive Analytics
- Understanding your future
- Analytics and Michigan State
- SPSS Modeler
- Q&A



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Today's presenters

Alexander Oftelie @aoftelie



Guillermo Montes



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Current



Former

GALLUP CONSULTING[®]



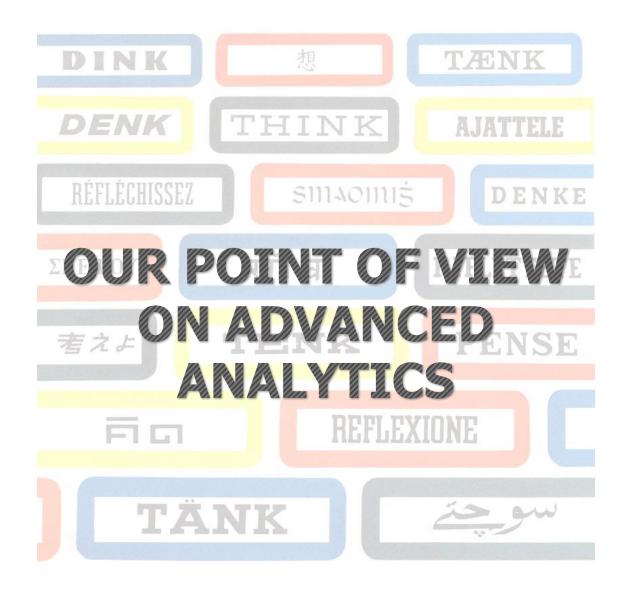






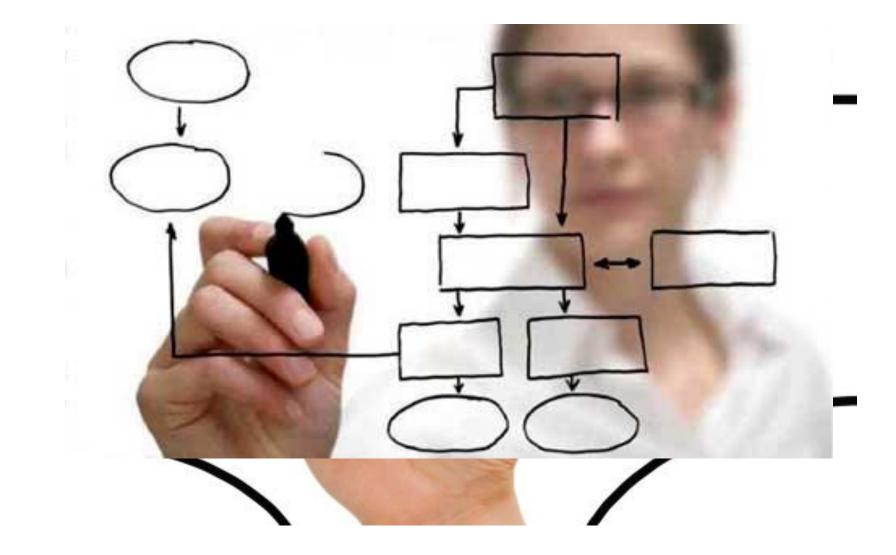
Will have a poll question in here.





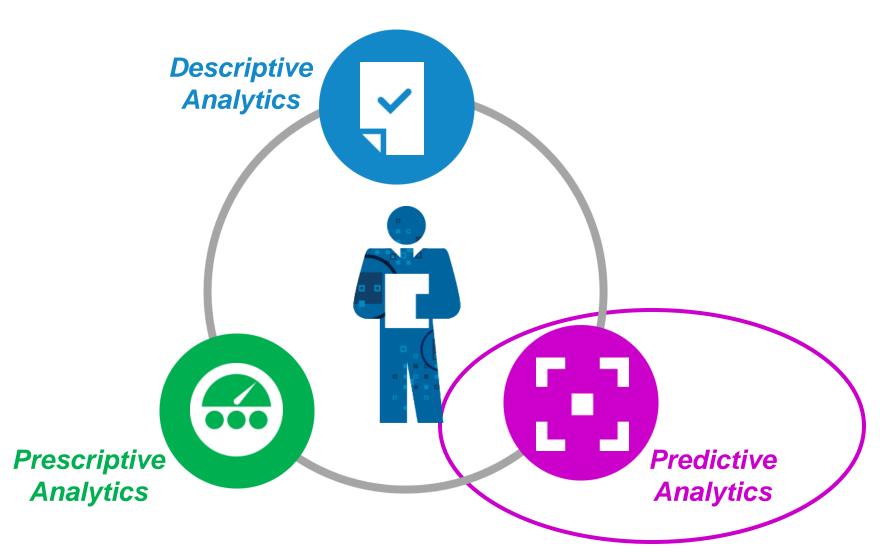


Our objective



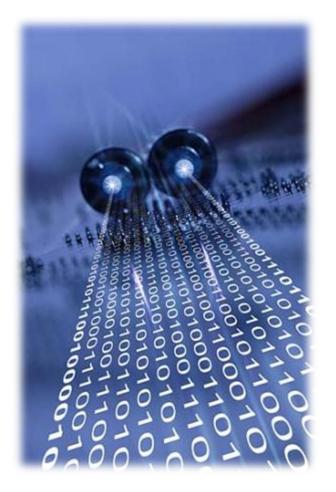


Countless Non Profits are leveraging their data



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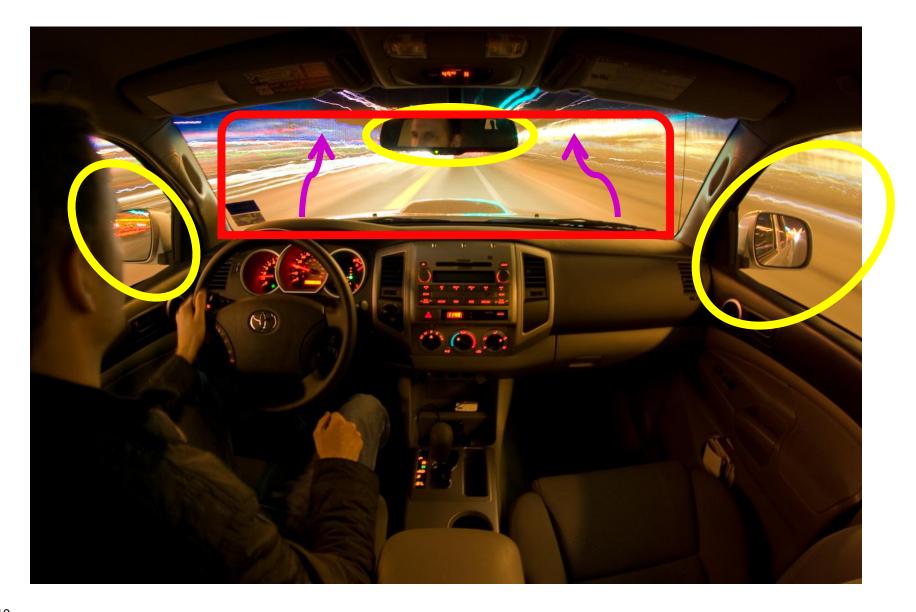
What is Predictive Analytics?



Predictive Analytics helps connect data to effective action by drawing reliable conclusions about current conditions and future events

Gareth Herschel, Research Director, Gartner Group





The Predictive Modeling Approach is Different, but very useful

Statistics approach

The statistics approach involves:

- Forming a theory about a possible relationship
- Converting it to a hypothesis
- Testing that hypothesis using statistical methods

It is a manual, user-driven, topdown approach to data analysis.

Modeling approach

The modeling approach involves:

- Interrogating the data
- Determining data by the method and goal, rather than by the user

It is a data-driven, selforganizing, bottom-up approach to data analysis that works on very large data sets. Predictive Analytics allows you to blend "art" with "science" to transform Program Evaluation









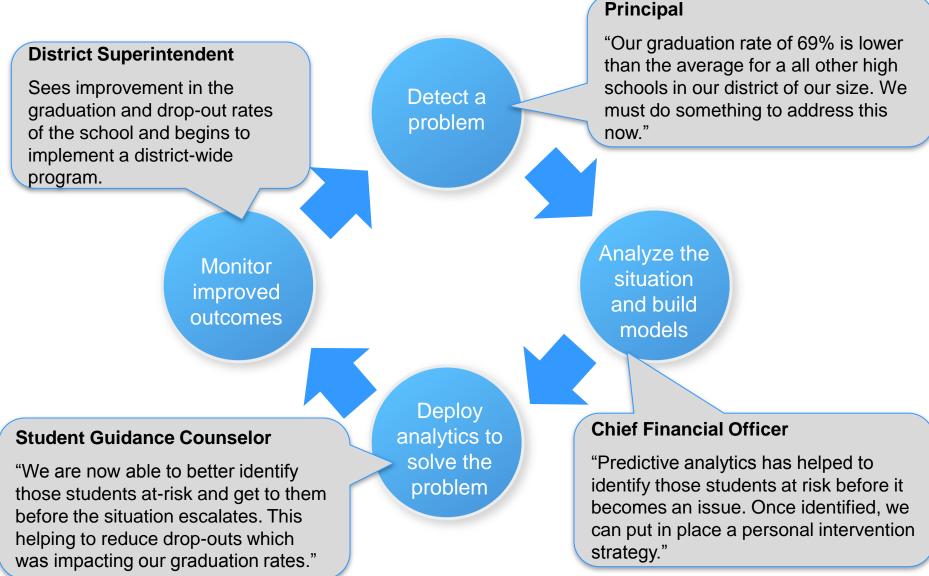
Where to start for Predictive Program Evaluation

- Who Will Succeed? Will be at risk of set back? Will thrive in 6 months? 12 months?
- **How** Much will they improve?
- **When** *Will they need additional support?*
- Why Do they stay engaged Did our program succeed

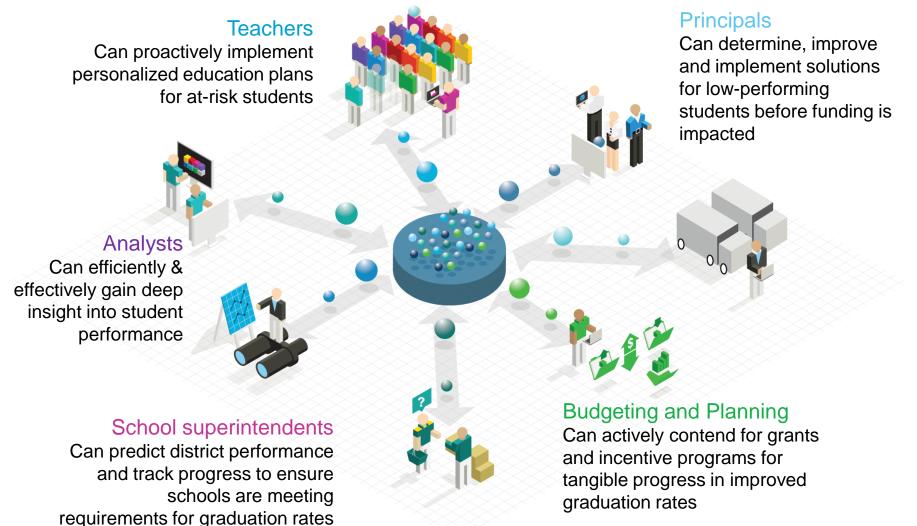


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Business scenario: Lower graduation rates



IBM SPSS Predictive Analytics for Student Performance: Empowering decision-makers



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The mission of Children's Institute is to equip and support those who work with children to ensure the success of every child.

STRENGTHENING SOCIAL AND EMOTIONAL HEALTH

Those who work with children are increasingly collecting <u>vast amounts of data</u>, but the field lacks tools to translate data into information.

Predictive analytics are a possible tool....



Predictive Analytics at the Children's Institute

The use of advanced statistical methods to find patterns in historical data and make predictions for salient outcomes on new data.

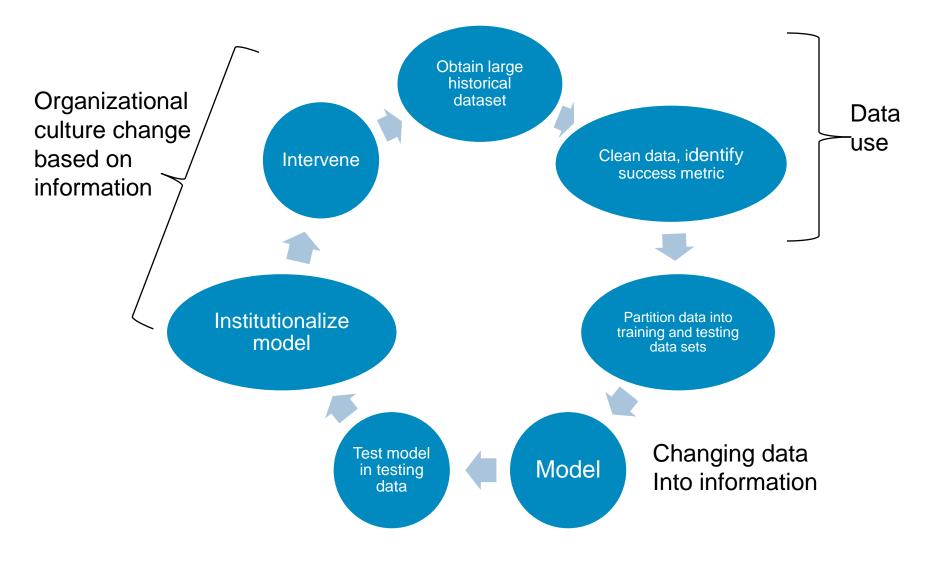
Educational Approaches

- · Identify students at risk of failure early
- Identify students best served by a program
- · Identify students that are unlikely to benefit from a program



We are working with school-based programs, early childhood programs and also out of school time programs.

Predictive Analytics Approach



What are our goals?

- To identify students at-risk or students likely to benefit or not benefit from a program.
- We are not shooting for perfect prediction, good enough will make substantial improvements.
- Once predictions are made, work with programs and school districts to institutionalize the changes.
 - What to do with the information we provide?
 - How to best use it?
 - How do we know if we did it right?

Example 1: Typical School Data

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Example 1: Typical School Data

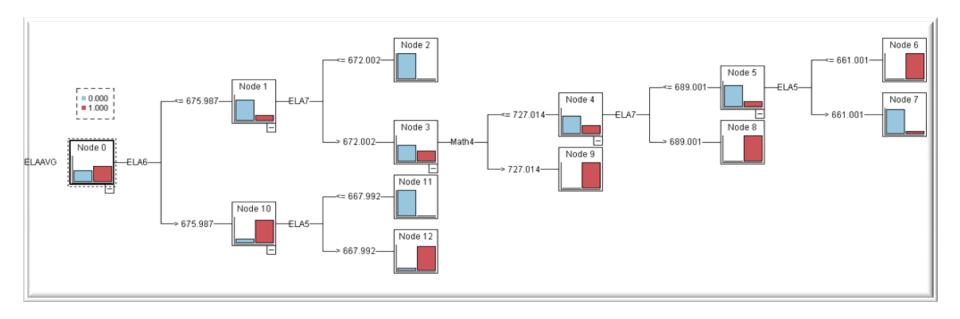
- Data is simulated, but the simulation is very realistic of what we find when we do this type of approach on school data.
- Predicting average or above average performance in 8th grade ELA based on prior testing data starting in 3rd grade.
- Can be done with relatively small samples.

Predicting Above Average 8th ELA Performance

Testing Data	Predict Failure	Predict Success		
Failure	33	13		
Success	5	34		

Overall Correct Prediction Rate: 78.82%

Sample Model



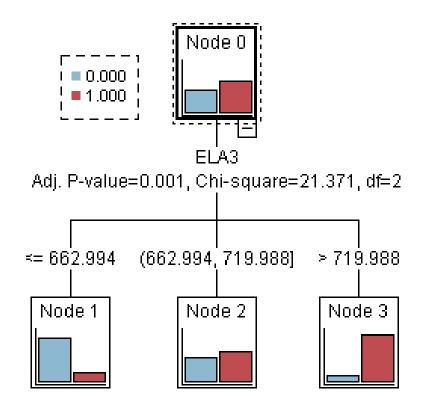


Model Predicting 8th Grade from 3rd Grade Data

Pretty easy:

Divide kids in 3 groups

based on ELA 3rd grade



ELAAVG



Could We Predict 8th Grade with 3rd Grade Data?

Testing Data	Predict Failure	Predict Success		
Failure	35	11		
Success	10	29		

Overall Correct Prediction Rate: 75.29%

Conclusions:

- We can predict school performance pretty well.
- We can predict early, with years ahead for intervention.
- Use tests that are stable year to year (national tests).
- We can use test information at the item level.
- Additional non-cognitive variables (SEL) may improve models.

Example 2: Rochester Early Childhood Assessment Partnership

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Example 2: RECAP

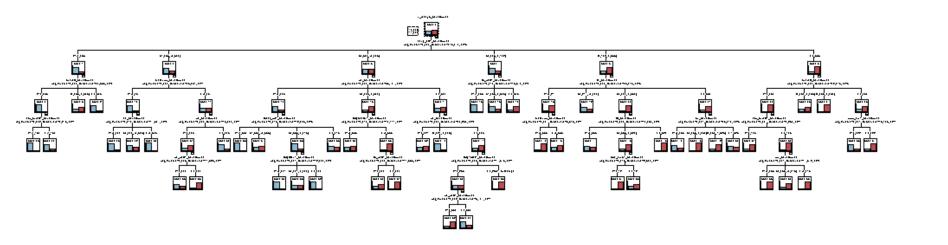
Predict Kindergarten readiness (based on COR advantage) at the end of preschool year using:

- Assessment of the child at time 1
 - Cor advantage
 - Brigance
 - Teacher-Child Rating Scale (T-CRS)
 - Gender
- Assessment of instruction
 - CLASS
- Data: 1,640 Pre-K Children, RECAP





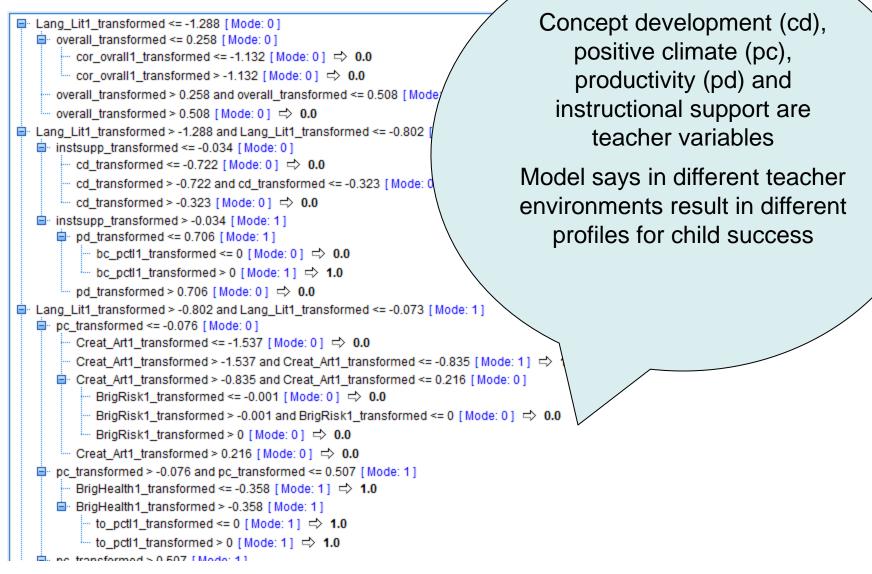
The Whole Tree...



Big Data & Analytics

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Sample Rules



Predictive Power of the Model

Testing Data	Predict Failure	Predict Success		
Failure	182	76		
Success	57	204		

Overall Correct Prediction Rate: 74.37%

Conclusions:

•Instructional variables matter.

- •Early identification is possible.
- •This model suggests ways to understand teacher-child fit.

Example 3: Primary Project

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Primary Project

Primary project is a national evidence-based program that helps children in pre-K trough third grade adjust to school, gain confidence, social skills, and focus on learning.

Question: Can we identify a pattern in the pre data that predicts which children will be successful in project?

Data: Thousands of pre-post measurements with the 32 item Teacher-Child Rating Scale

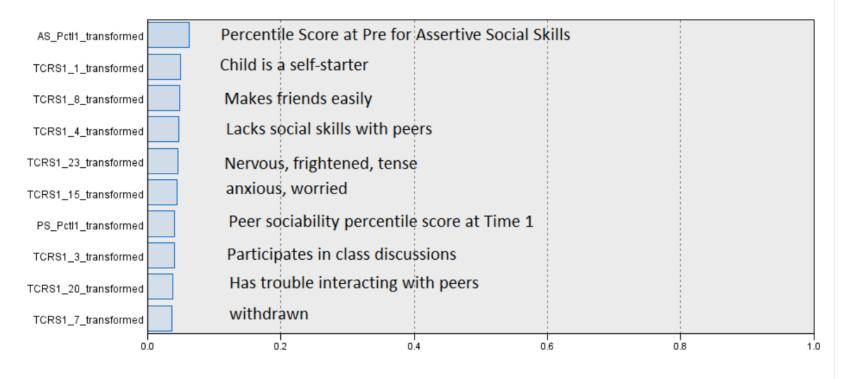
- Assertive social skills
- Behavior Control
- Task orientation
- Peer Sociability

K-2nd grade Children who participate in Project over the years.\Success Measure: Growth in any TCRS subscale.

Sample Model

Predictor Importance

Target: GROWTHany Growth in any TCRS subscale



Overall Correct Prediction Rate: 81.36%

Lessons Learned so far...

- Many educators and nonprofit providers need help clearly defining success and metrics for success.
- We can identify successful and at-risk children and youth years in advance of critical outcomes.
- We can identify who are the best candidates for educational or behavioral programs.
- We can inform about the fit between the child and his or her environment (including teaching practices).

Some of the Larger Issues

- Issues are similar:
 - How do we define and measure success (or failure)?
 - How do we integrate the algorithms with web-based systems (e.g. COMET) to provide real-time information for clients?
- How do we help assist in leading change in organizations once the predictions are made?
 - What interventions will be used?
 - How do we know if they are the right interventions?



Thanks To...



Children's Success Fund

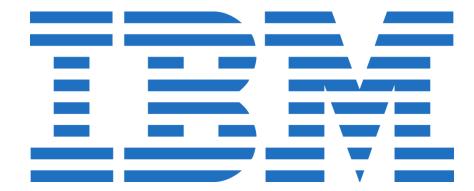


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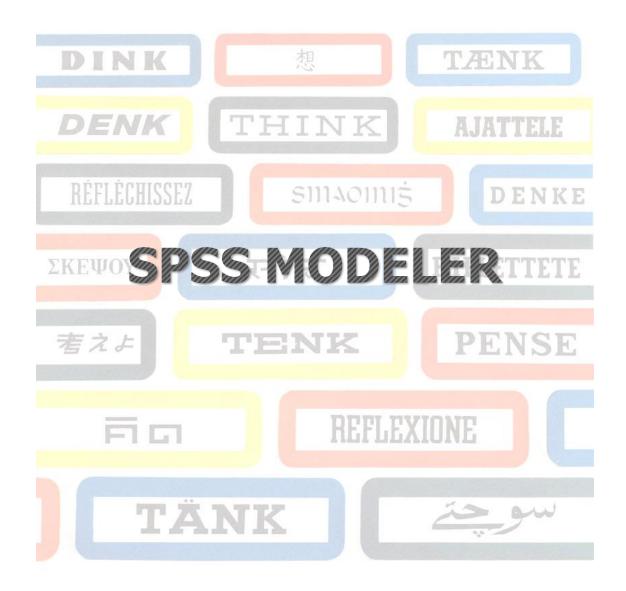
Thanks To...

SPSS Modeler licenses were donated to Children's Institute in support of this work through **IBM's Impact Grant Program.**

Nonprofits and Educators can learn more about IBM's Impact Grants at ibm.com/ibm/responsibility or contact Martin Laird at <u>lairdmar@us.ibm.com</u>







IBM SPSS Modeler Overview

 IBM SPSS Modeler is a high-performance data mining and text analytics workbench that quickly delivers positive ROI by giving power of predictive intelligence to <u>business users</u>.

Easy to Learn / Intuitive Visual Interface

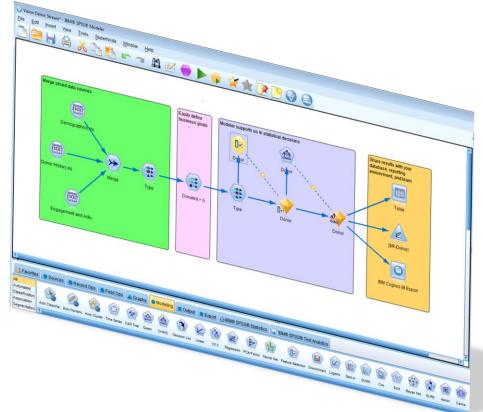
- Visual approach no programming
- Align siloed sources across your org
- Comprehensive range of data mining functions

Supportive Analytics

- Automated nodes help with model decision making
- Predictor Importance helps target whats important
- Data Transformation made easy

Powerful Automation

- Automated data preparation
- Multi-model creation & evaluation
- Integrated analysis of text, web, & survey data



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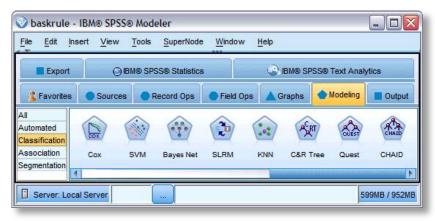
IBM SPSS Modeler's Functionality Requires no Programming and is Easily Accessible through Drag-and-Drop Menus



SPSS Modeler provides a wide variety of output formats

Output	Export	t OIBM® SPSS® Statistics			IBM® SPSS® Text Analytics			
S Favorites	Sou		Record On xporting dat	1.15	ld Ops	Graphs	◆ Modeling	
	Im					*		2
Graphboard	Plot	Distribution	Histogram	Collection	Multiple	at Web	Time Plot	Eva
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Server: Loc	al Server						482MB / 960M	ИB

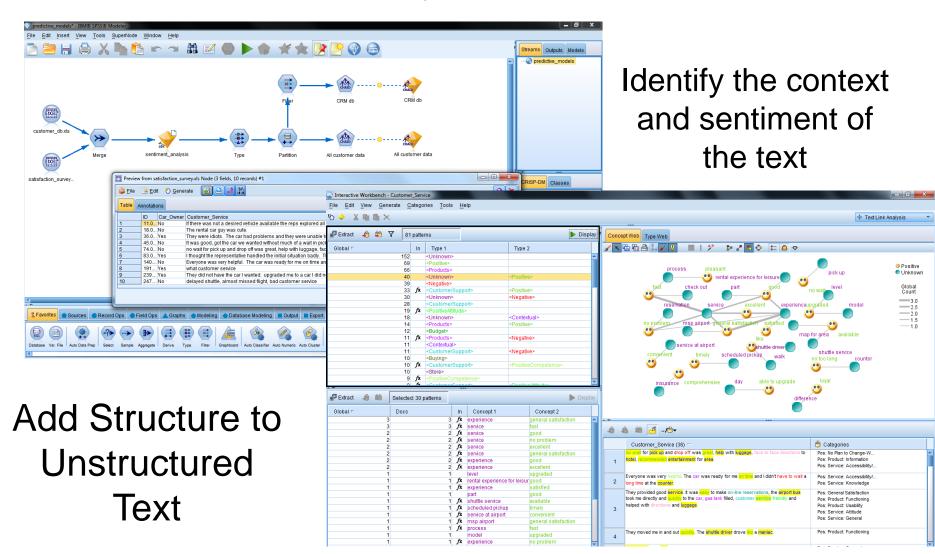
File input types include flat files, Excel, Statistics, SAS, XML and others



Modeling includes Classification, Segmentation, and Association

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IBM SPSS Modeler Text Analytics



IBM SPSS Modeler Compatibility with R

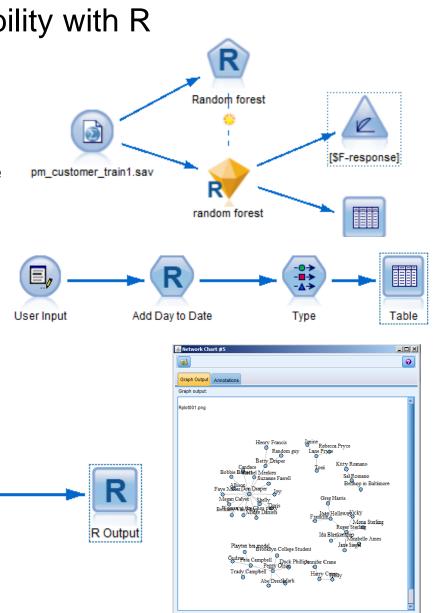
- Build and score R models through the Modeler GUI
- Use R functions for data preparation

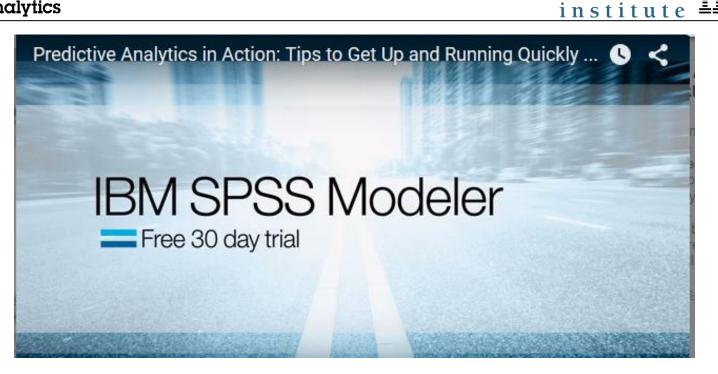
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Generate R Charts and Outputs





Download free IBM SPSS Modeler Trial at:

ibm.biz/ModelerTrialDownload

Video with tips to get started quickly with Modeler Trial: ibm.biz/ModelerTips

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Recap

Important ideas from today



Proactive dynamic strategy, not reactive design



Create what you want, not what looks available



Focus on Organization not just Constituents



Scale is <u>not</u> a barrier



Next steps

- 1. Start Today!
- 2. Modeler Trial
- 3. I wish we knew ____?
- 4. NFP Resource Center
- 5. Leverage the community





THANK YOU!



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Questions

