

# Analyzing Survey Data Using Decision Trees

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# Rationale for the Study

- Teaching evaluation data for a 3-year period were available to allow a comparison of two different sets of items (UCF/BOR).
- Responding to faculty interest, the UCF Faculty Senate requested that an evaluation of the Student Evaluation of Instruction measures be performed. (FS 1995-96-11)

# The Instrument: UCF Items

- Feedback on your performance in this course
- The instructor's interest in your learning
- Use of class time
- The instructor's overall organization of the course
- Continuity from one class meeting to the next
- The pace of the course
- The instructor's assessment of your progress
- The text and supplemental learning materials used

# The Instrument:

## Board of Regent Items

- Description of course objectives and assignments
- Communication of ideas and information
- Expression of expectations for performance
- Availability to assist students In or outside of class
- Respect and concern for students
- Stimulation and interest in the course
- Facilitation of learning
- Overall assessment of instructor

# The Study Layout

Approximately 450,000 student responses

## Five Colleges:

- Arts and Sciences
- Business Administration
- Education
- Engineering
- Health and Public Affairs

## Three Levels:

- Lower Undergraduate
- Upper Undergraduate
- Graduate

## Three Years:

- 1996-97
- 1997-98
- 1998-99

# Findings Summary

- Correlations among the 16 items are high -- median is approximately .70
- Correlation between UCF and BOR forms = .92
- Reliabilities of UCF & BOR forms are high
- There is only one factor
- Overall rating of the instructor is most strongly related to other items.
- The items have a characteristic distribution

# Squared multiple correlations from each item with the remaining ones

<u>Item</u>	<u>W</u>	<u>F2F</u>
1	.75	.69
2	.77	.74
3	.74	.69
4	.72	.76
5	.75	.71
6	.64	.66
7	.77	.75
8	.50	.49

<u>Item</u>	<u>W</u>	<u>F2F</u>
9	.72	.71
10	.80	.78
11	.78	.76
12	.70	.63
13	.78	.72
14	.79	.75
15	.82	.76
16	.88	.85

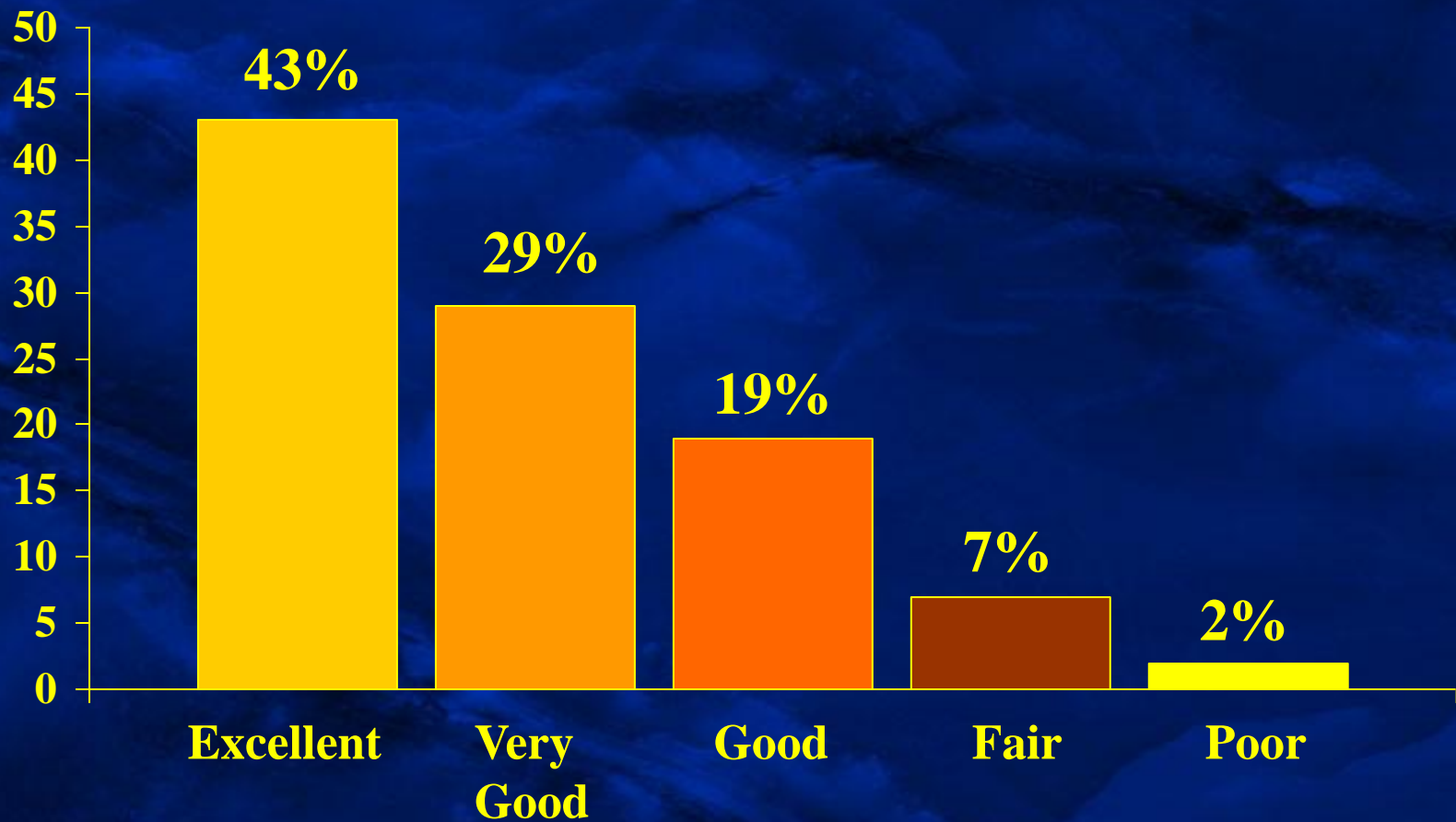
# Variance components (Generalizability Theory) for the UCF items

	<u>W</u>		<u>F2F</u>	
	Variance		Variance	
	<u>Component</u>	<u>%</u>	<u>Component</u>	<u>%</u>
Students	.726	67.85	.728	65.23
Items	.005	00.47	.002	00.19
Error	.339	31.68	.386	34.58

# Variance components (Generalizability Theory) for the BOR items

	<u>W</u>		<u>F2F</u>	
	Variance		Variance	
	<u>Component</u>	<u>%</u>	<u>Component</u>	<u>%</u>
Students	.799	75.66	.855	71.96
Items	.005	00.48	.008	.0069
Error	.252	23.86	.325	27.35

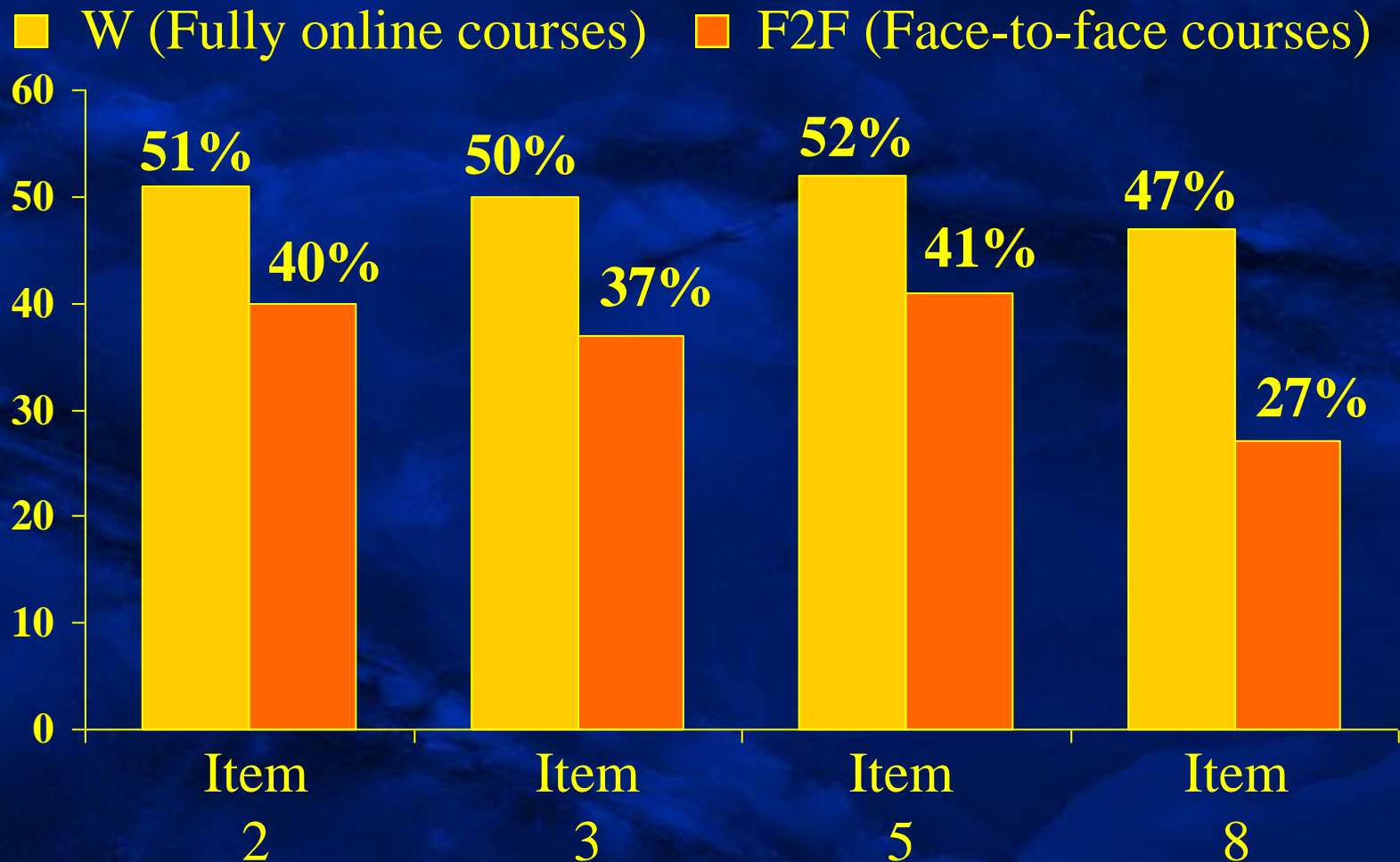
# Overall Rating of the Instructor (N=444,017)



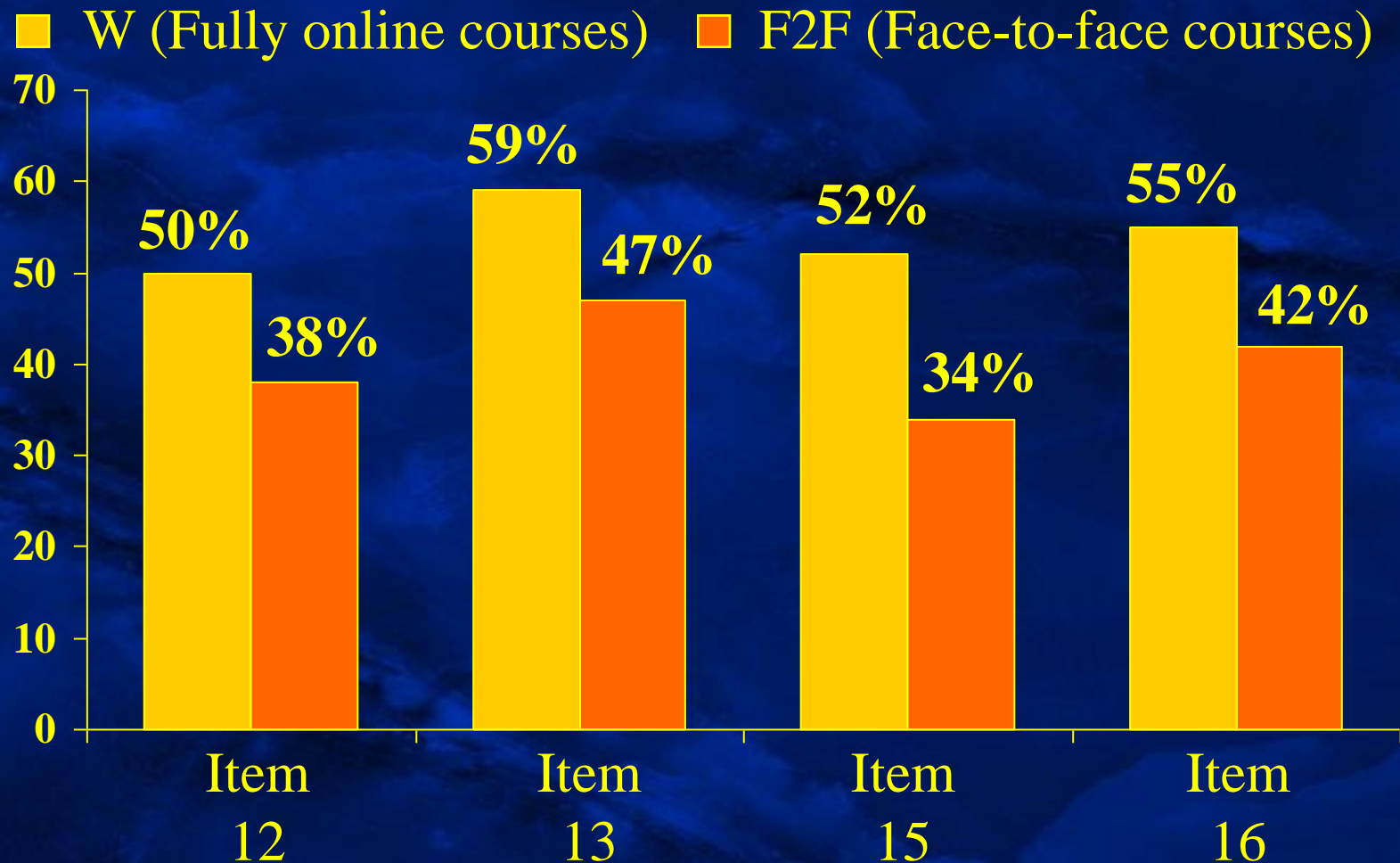
# Student Ratings by Modality

<u>Modality</u>	<u>Excellent</u>	<u>Very Good</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
F2F (N=628,623)	42.00	29.50	19.00	7.20	2.40
E (N=6,632)	44.00	29.10	17.40	6.90	2.60
M (N=11,450)	40.60	28.60	20.60	7.70	2.40
W (N=5,435)	55.40	25.20	12.10	4.90	2.50
ITV (N=3,218)	20.90	26.20	30.50	16.50	5.90

# A comparison of W and F2F percentage of “excellent” ratings on UCF items



# A Comparison of W and F2F percentage of “excellent” ratings on BOR items



# Overall Rating of the Instructor



Binary Decision Tree  
SAS Enterprise Miner

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Predictors

Remaining  
15 Items

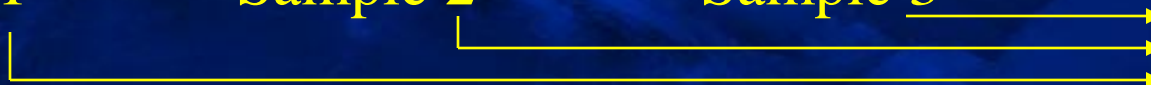
- Level
- Year
- College

Developmental  
Sample 1

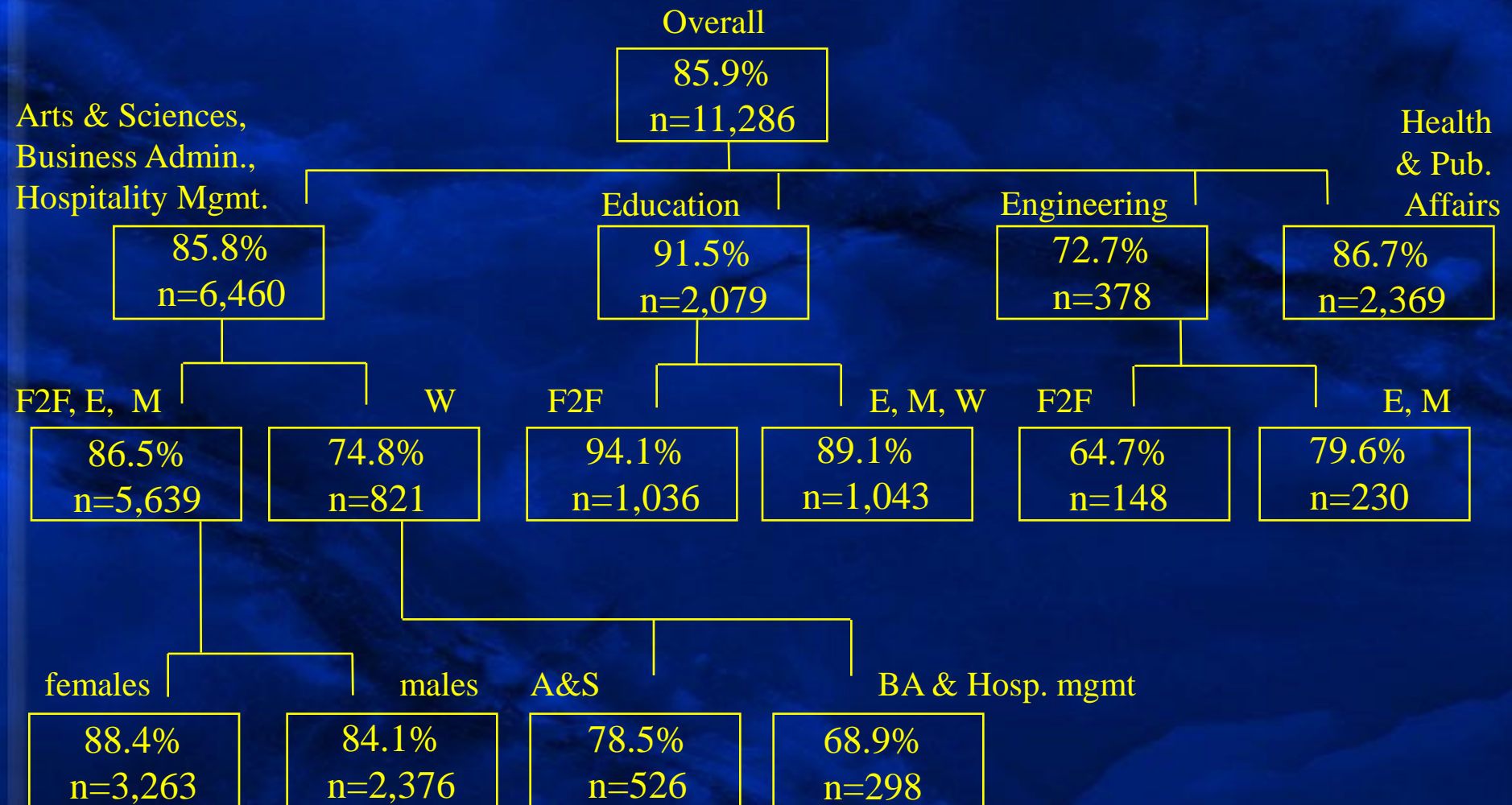
Developmental  
Sample 2

Developmental  
Sample 3

Validation  
Sample



# Decision Tree Example



## Rule #1: If...

	Excellent	Very Good	Good	Fair	Poor
Facilitation of learning	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

&

Communication of ideas	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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## Then...

The probability of an overall rating of *Excellent* = .93

&

The probability of an overall rating of *Fair* or *Poor* = .00

A comparison of excellent ratings by college  
unadjusted and adjusted for instructors  
satisfying Rule 1

<u>College</u>	<u>Unadjusted %</u>	<u>Adjusted %</u>
Arts & Sciences	41.6	92.4
Business	34.9	90.9
Education	56.8	94.8
Engineering	36.2	91.3
H&PA	46.1	93.9

(N=441,758)    (N=147,544)

A comparison of excellent ratings by course  
modality--unadjusted and adjusted for  
instructors satisfying Rule 1

**Course**

<b><u>Modality</u></b>	<b><u>Unadjusted %</u></b>	<b><u>Adjusted %</u></b>
F2F	42.0	92.2
E	44.0	92.3
M	40.6	92.0
W	55.4	92.7
ITV	20.9	86.7
<hr/>	N=709,285	N=235,745

## Rule #2: If...

	Excellent	Very Good	Good	Fair	Poor
Instructor is interested in your learning	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organization of the course	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Respect & concern for students	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication of ideas	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitation of learning	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

## Then...

The probability of an overall rating of *Excellent* = .84

&

The probability of an overall rating of *Fair* or *Poor* = .00

A comparison of excellent ratings by college  
unadjusted and adjusted for instructors  
satisfying Rule 2

<u>College</u>	<u>Unadjusted %</u>	<u>Adjusted %</u>
Arts & Sciences	41.6	86.8
Business	34.9	81.6
Education	56.8	81.9
Engineering	36.2	84.4
H&PA	46.1	84.5
	N=441,758	N=15,207

A comparison of excellent ratings by course  
modality--unadjusted and adjusted for  
instructors satisfying Rule 2

**Course**

<b><u>Modality</u></b>	<b><u>Unadjusted %</u></b>	<b><u>Adjusted %</u></b>
F2F	42.0	84.3
E	44.0	84.6
M	40.6	85.6
W	55.4	87.5
ITV	20.9	71.6
<hr/>	N=709,285	N=235,745

## Rule #3: If...

	Excellent	Very Good	Good	Fair	Poor
Instructor is interested in your learning	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Respect and concern for students	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expresses expectations for student performance	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication of ideas	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organization of the course	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitation of learning	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Use of class time	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Then...

The probability of an overall rating of *Excellent* = .78

&

The probability of an overall rating of *Fair* or *Poor* = .00

A comparison of excellent ratings by college  
unadjusted and adjusted for instructors  
satisfying Rule 3

<u>College</u>	<u>Unadjusted %</u>	<u>Adjusted %</u>
Arts & Sciences	41.6	81.6
Business	34.9	78.0
Education	56.8	74.5
Engineering	36.2	80.0
H&PA	46.1	77.6

N=441,758

N=15,060

A comparison of excellent ratings by course  
modality--unadjusted and adjusted for  
instructors satisfying Rule 3

**Course**

<b><u>Modality</u></b>	<b><u>Unadjusted</u></b>	<b><u>Adjusted</u></b>
F2F	42.0	83.9
E	44.0	86.5
M	40.6	84.0
W	55.4	88.4
ITV	20.9	81.1
<hr/>	N=709,285	N=235,745

A conceptual path diagram for an instructor receiving an overall rating of Excellent at UCF

