

Southern Association of Student
Financial Aid Administrators

**Transforming Data into Information:
Real Life Examples of Financial Aid Research**

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Outline

- Need for Research
- A Model of Transforming Fin Aid Data into Information
- Research Foibles
- Examples of Financial Aid Research
 - Simple Research: Aid Recipients Profiles
 - New Program Development Research: VT's PSI Access Program
 - Advanced Research: Application of Paired T-tests in Financial Aid Quality Assurance Program

Why do Research?

- Strategic Planning
- Fund Utilization
- Grant Applications
- Knowing Your Student Body
- Evaluation
- Compliance
- Institutional Quality Assurance Program
- Others?

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Is There Time for Research?

Reports are research

- FISAP
- State Reports
- Institutional Reports
- Common Data Set (CDS)
- U S News and World Reports
- National Postsecondary Student Aid Study (NPSAS)
- Others?

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Data Sources

- Institution's Administrative System
- EDE Express Suite
- External Databases
 - Regional
 - State
 - National
 - IPEDS
 - CPS Quarterly Sample
- Surveys
- Others?

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Research and Data Resources

HOME PROGRAMS STATES ABOUT US NEWS RESOURCES SEARCH

WICHE Western Interstate Commission for Higher Education

RESOURCES

- WICHE PUBLICATIONS
- MEETINGS CALENDAR
- HIGHER ED LINKS
- PAPERS AND PRESENTATIONS

HIGHER EDUCATION LINKS AND ACRONYMS

AACC	American Association of Community Colleges	hpcnet.org
AACTE	American Association of Colleges for Teacher Education	aacte.org
AAC&U	Association of American Colleges and Universities	aacu-edu.org
AASCU	American Association of State Colleges and Universities	aascu.org
AASHE	Association for the Advancement of Sustainability in Higher Education	aashe.org
AAU	Association of American Universities	aau.edu
ACE	American Council on Education	acenet.edu
ACT	(college admission testing program)	act.org
ACUTA	Association of College & University Telecommunications Administrators	acuta.org
ACD	Academy for Educational Development	acd.org
AERA	American Educational Research Association	aera.net
AGB	Association of Governing Boards of Universities and Colleges	agb.org
	Center for Public Higher Education Trusteeship & Governance	agb.org

http://www.wiche.edu/resources/links.asp

A Model of Transforming Data into Information

“Statistics never lie, they just tell different truths. You can find statistics to support almost any position. Use data to your advantage!” (NASFAA Presentation, 2005)

“There are three kinds of lies: lies, damned lies, and statistics.” (B. Disraeli, Former UK Prime Minister)

“There are two kinds of statistics, the kind you look up and the kind you make up.” (Rex Stout, *Death of a Doxy*)

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A Model of Transforming Data into Information

The Process of Delivering Meaningful Information:

- 80% Data Related

Access

Assembling

Cleaning

Transform

Manage

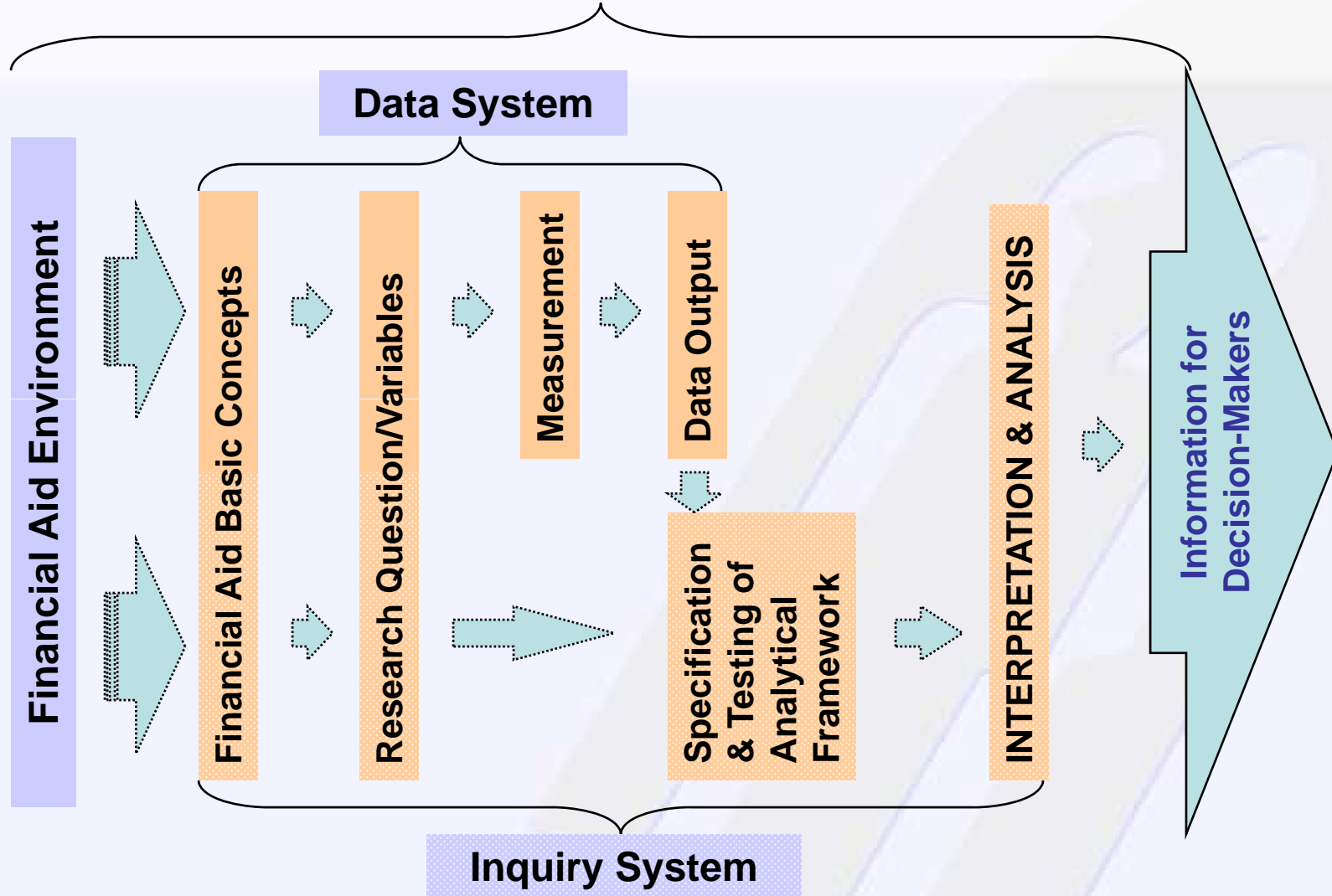
Store & Retrieve

- 20% Analysis

The validity of any statistical analysis is only as good as its individual components.

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A Model for Transforming Financial Aid Data into Information



Transforming Data into Information...

Data System Components:

- Conceptualization
- Defining Research Questions/Variables
- Measurement

Quality of Data:

- Conceptual Reliability
- Measurement Reliability
- Consistency

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Transforming Data into Information...

Model Implications:

- Decisions are based on information and not on data
- Data and information are never theory free or value free
- The Empirical Side (data system) and the Analytical Side of any Inquiry must have the same conceptual and definitional base

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Research Foibles

- Understanding of data
 - Data is data, not information, needs context
 - Compare and contrast appropriately
 - If items not well defined, develop your own definition and state it
- Application of Analysis
 - Use the correct measure/statistic
 - Don't confuse association with causation
 - Basis of data...define variables

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Research Foibles: Affordability Nationwide

From: *Higher Education Access and Affordability in Virginia Amid the 2008 Credit Crisis: A Cursory Look*, Barry W. Simmons Sr. in testimony 12/4/2008 before the Virginia Senate Finance Committee Education Subcommittee

Improvements in State Investment - state investment in need-based financial aid as a percentage of the federal investment

- Nevada 2% to 48%
- North Carolina 3% to 70%
- **Virginia 6% to 50%**
- Montana 1% to 9%
- Utah 1% to 8%
- Washington 24% to 108%
- Texas 7% to 32%
- Delaware 13% to 49%
- Missouri 8% to 29%
- West Virginia 12% to 43%

Needs further protocol explanation

Source: *Measuring Up 2008*

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Research Foibles: Affordability Nationwide

From: *Higher Education Access and Affordability in Virginia Amid the 2008 Credit Crisis: A Cursory Look*, Barry W. Simmons Sr. in testimony 12/4/2008 before the Virginia Senate Finance Committee Education Subcommittee

State Tax Funds Appropriated for Higher Ed Operating Expenses Per \$1,000 Personal Income FY07

Virginia \$6.53

National \$7.08

North Carolina \$12.52

Example of Good Use!!!

Virginia Change from FY1980 to FY2007

(\$3.94)

National Change from FY1980 to FY2007

(\$3.39)

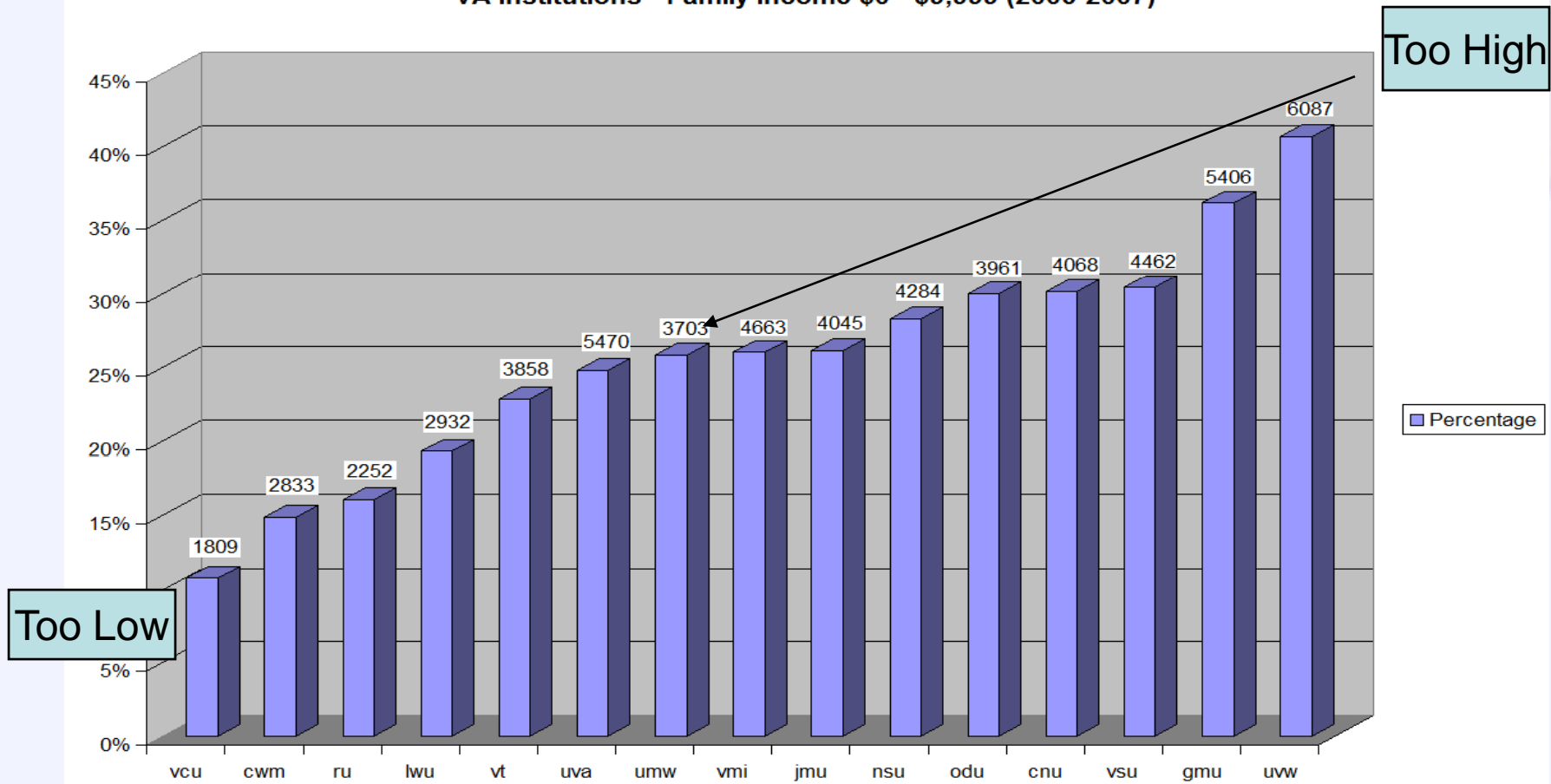
Source: *Postsecondary Education Opportunity*, January 2007

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Research Foibles: Affordability Nationwide

From: *Higher Education Access and Affordability in Virginia Amid the 2008 Credit Crisis: A Cursory Look*, Barry W. Simmons Sr. in testimony 12/4/2008 before the Virginia Senate Finance Committee Education Subcommittee

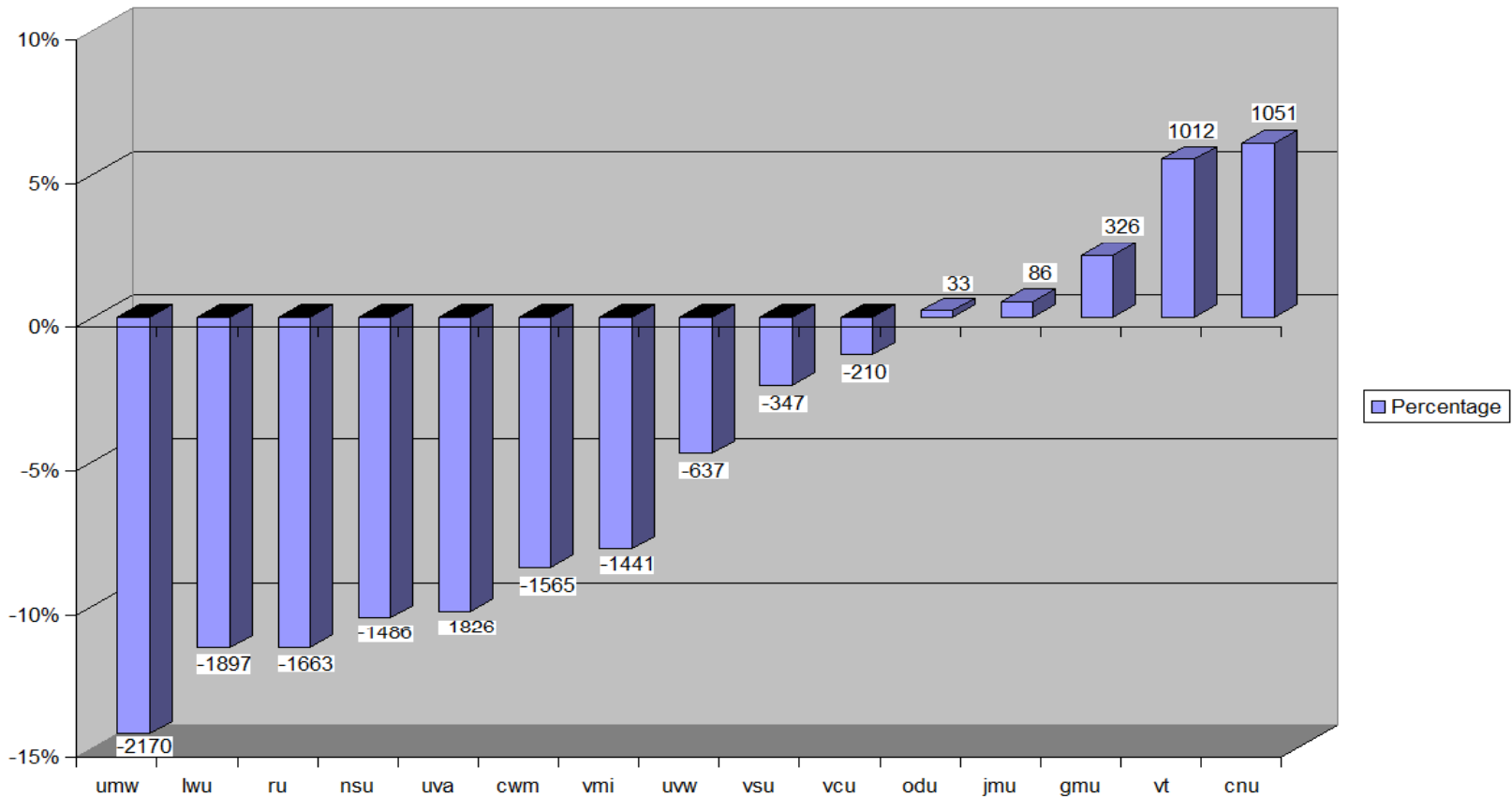
Shortfall between Cost of Attendance and Family and Financial Aid Resources for Selected VA Institutions - Family Income \$0 - \$9,999 (2006-2007)



Research Foibles: Affordability Nationwide

From: *Higher Education Access and Affordability in Virginia Amid the 2008 Credit Crisis: A Cursory Look*, Barry W. Simmons Sr. in testimony 12/4/2008 before the Virginia Senate Finance Committee Education Subcommittee

Shortfall between Cost of Attendance and Family and Financial Aid Resources for Selected VA Institutions - Family Income \$60,000 - \$69,999 (2006-2007)



Research Foibles

Others?



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Examples of Simple Financial Aid Research

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Examples of Simple Financial Aid Research

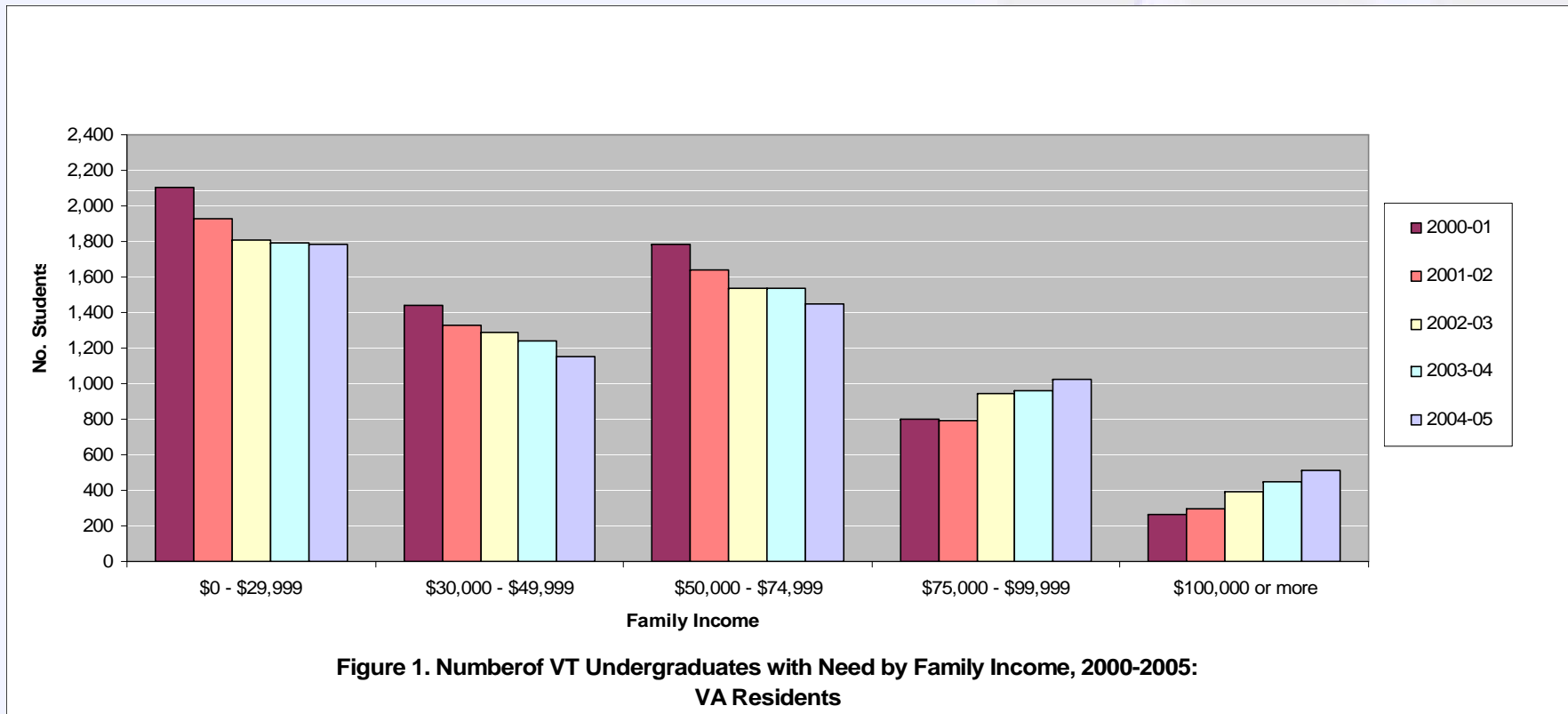
Number of the VT PELL Undergraduate Recipients : 1995-2008



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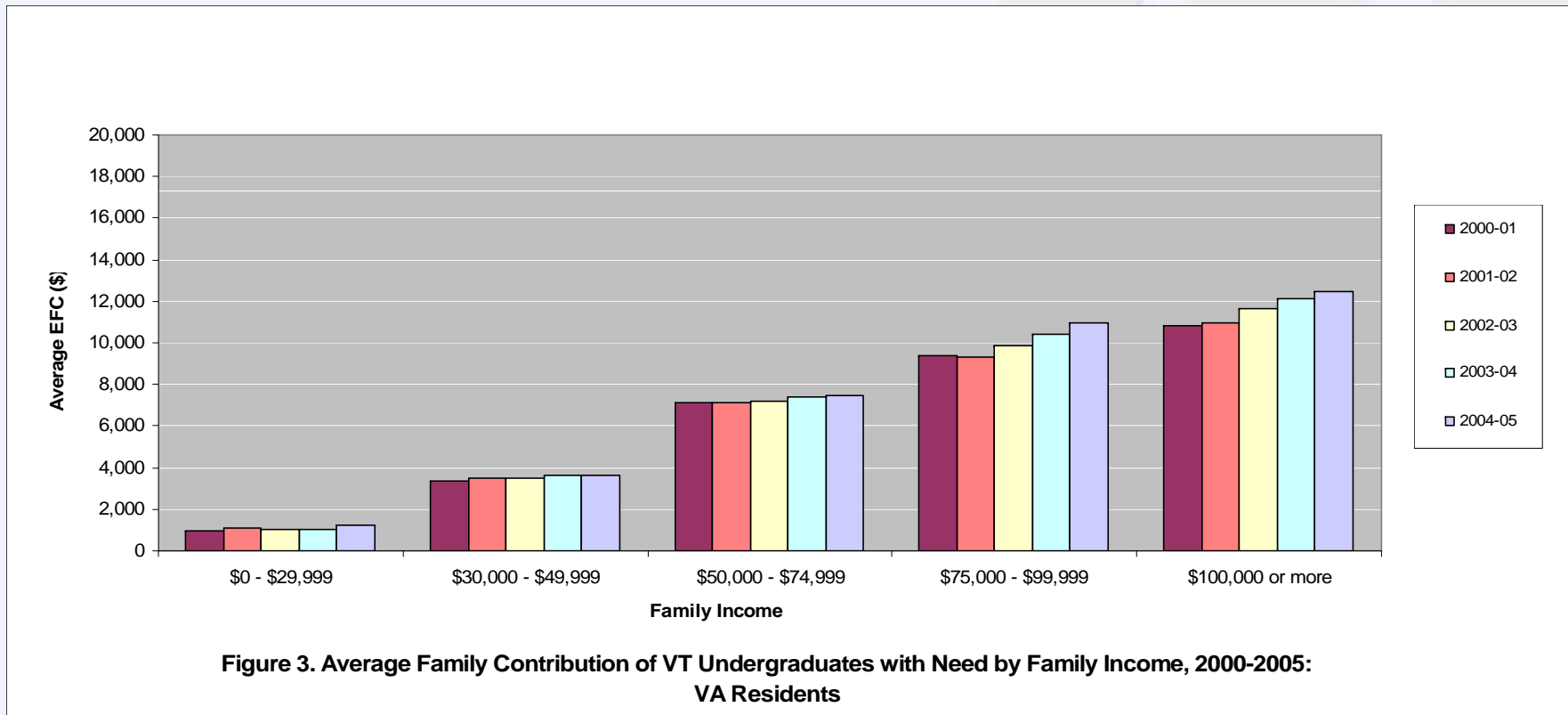
Examples of Simple Financial Aid Research...

No. of Undergraduates with Need: In-State



Examples of Simple Financial Aid Research...

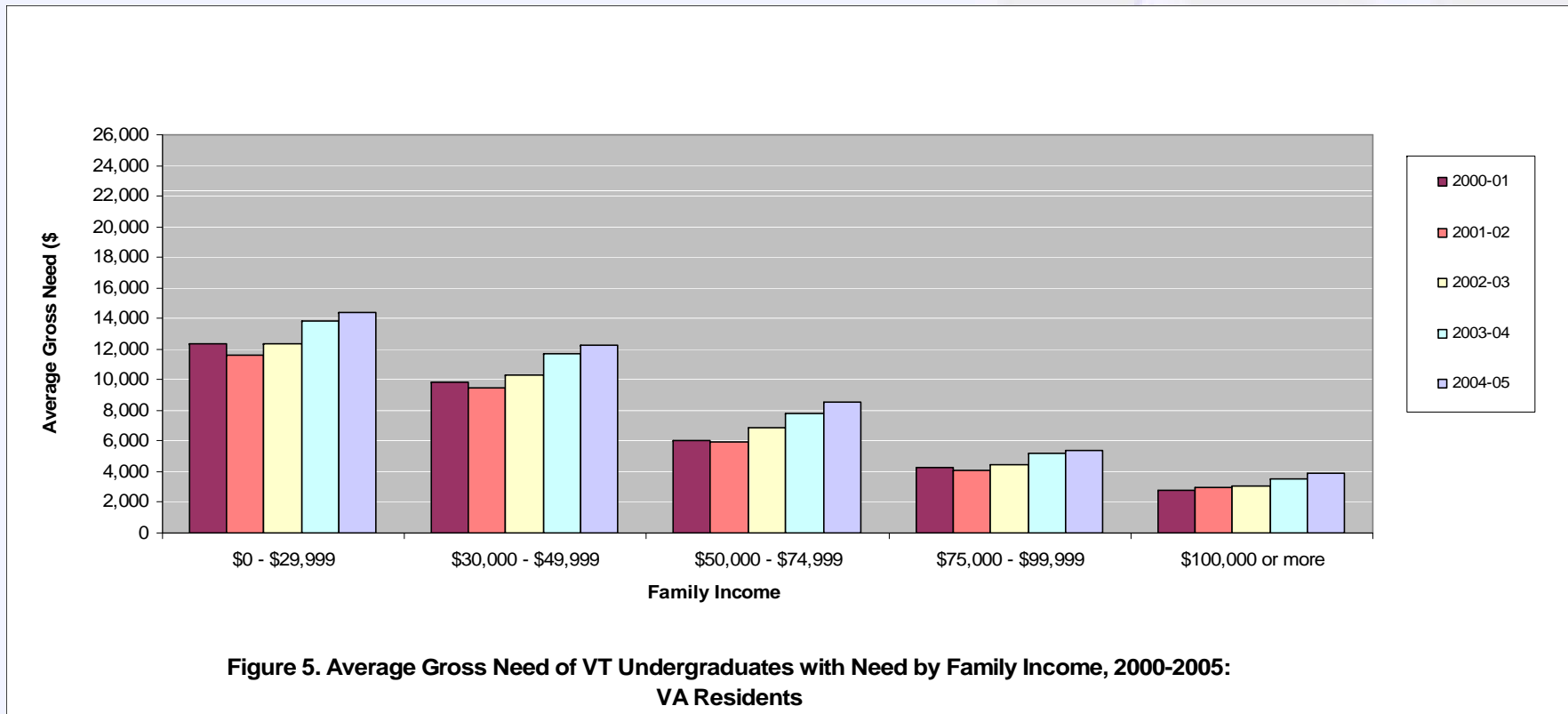
Average Family Contribution: In-State



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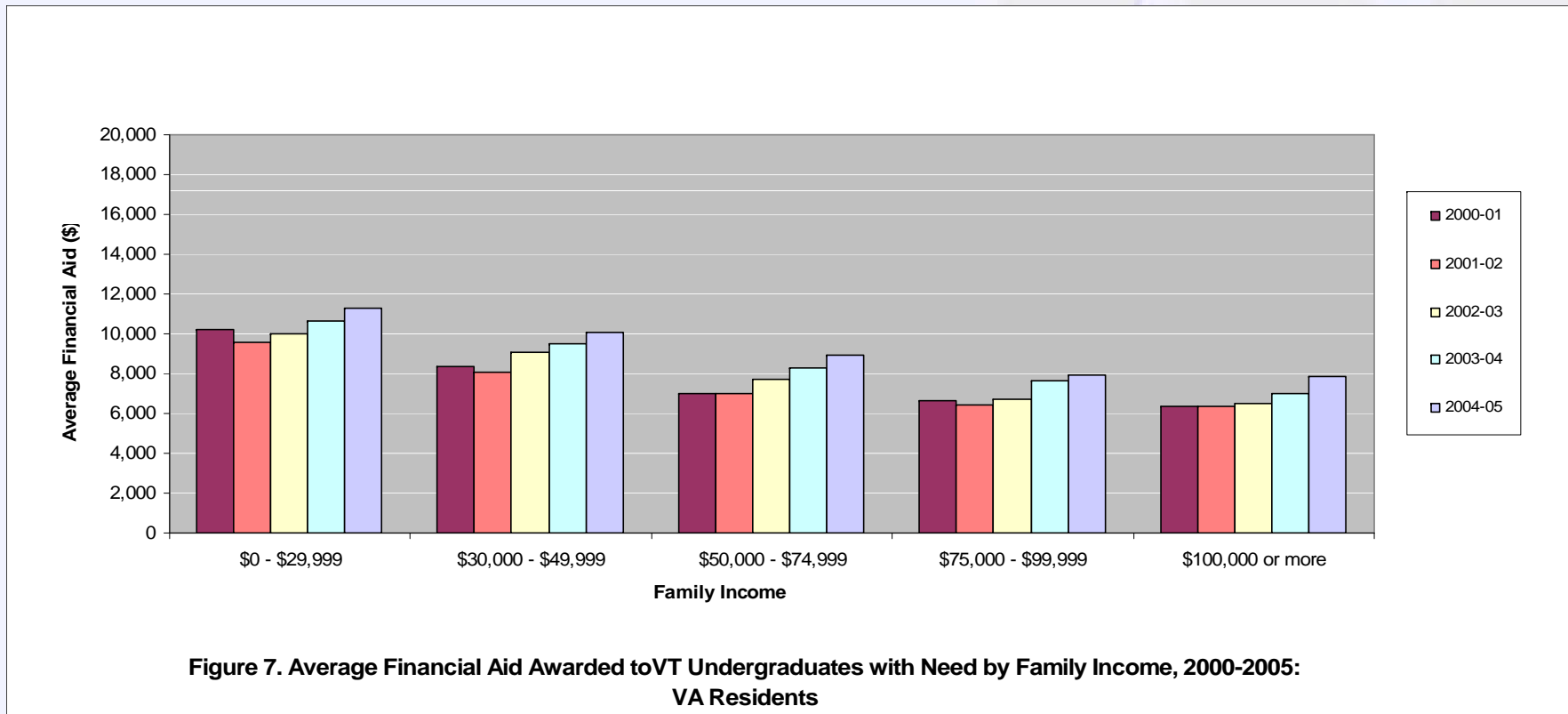
Examples of Simple Financial Aid Research...

Average Gross Need: In-State



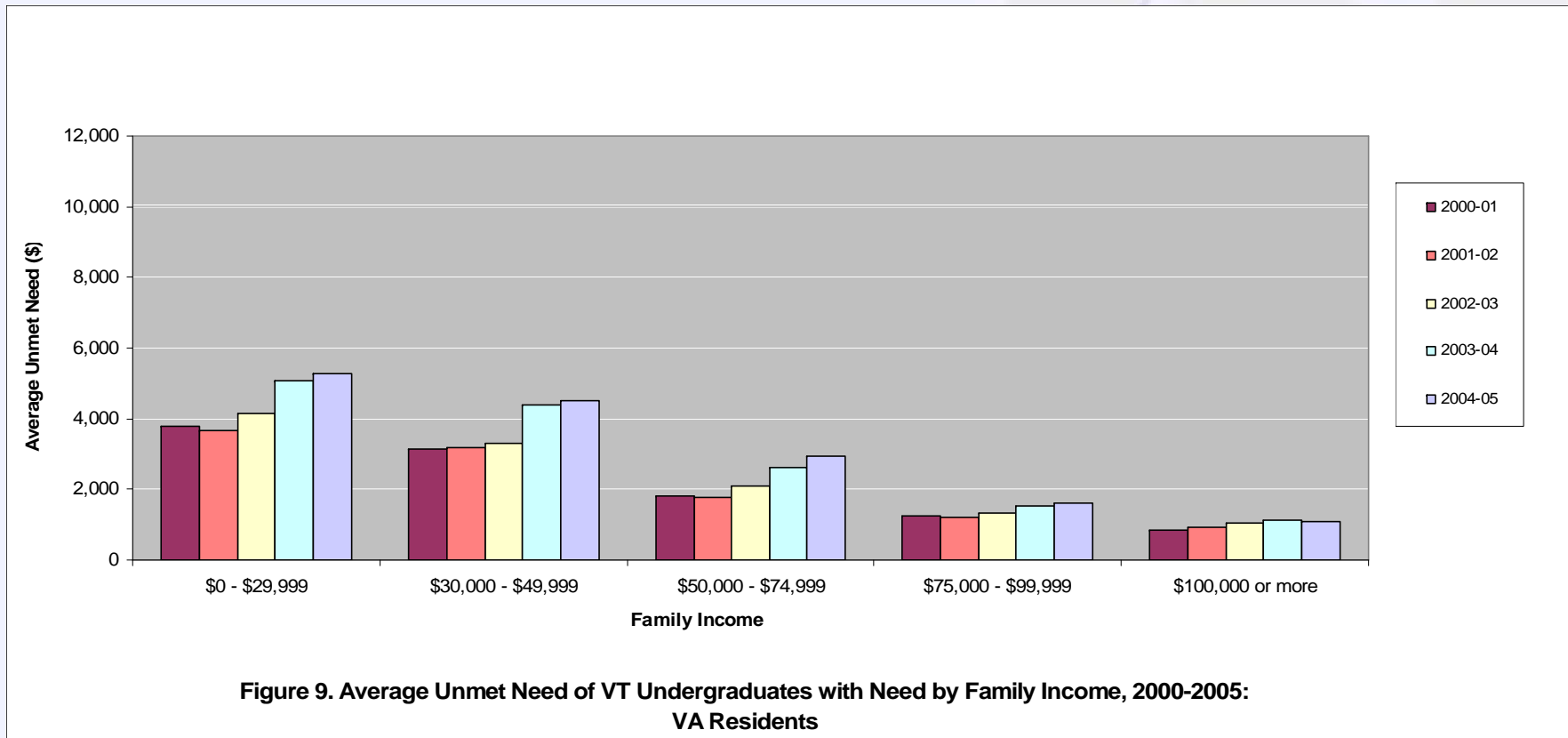
Examples of Simple Financial Aid Research...

Average Financial Aid: In-State



Examples of Simple Financial Aid Research...

Average Unmet Need: In-State



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Examples of Simple Financial Aid Research...

VT College Level Summary

Residency	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
In-State	1,342	12,228	3,372	27.58%
Out-of-state	411	17,745	5,938	33.47%
LAHS College Total	1,753	13,522	3,974	29.39%

Level	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
UG	1,280	16,080	5,023	31.24%
GR	473	12,576	3,586	28.52%
LAHS College Total	1,753	13,522	3,974	29.39%

CLASS	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
Freshman	247	13,303	4,770	35.86%
Sophomore	298	12,293	3,537	28.77%
Junior	350	12,978	3,331	25.66%
Senior	385	11,964	3,097	25.89%
Masters	416	16,644	5,407	32.48%
Doctoral	46	12,938	2,589	20.01%
Educational Specialist	11	7,886	688	8.72%
LAHS College Total	1,753	13,522	3,974	29.39%

Examples of Simple Financial Aid Research...

VT College Level Summary...

Gender	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
Female	1,063	13,515	3,993	29.54%
Male	690	13,532	3,945	29.15%
LAHS College Total	1,753	13,522	3,974	29.39%

Ethnicity	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
American Indian/Alaska Native	11	15,117	3,834	25.36%
Asian/Pacific Islander	81	12,847	3,897	30.33%
Black	204	15,778	2,940	18.64%
Caucasian	1,281	13,224	4,124	31.19%
Hispanic	68	14,702	4,587	31.20%
Unknown	108	12,395	3,834	30.93%
LAHS College Total	1,753	13,522	3,974	29.39%

Parent Marital Status	No. of Students with Need	Average Financial Need	Average Unmet Need	% of Unmet Need
Married	878	10,963	3,380	30.83%
Single	39	18,181	3,287	18.08%
Divorced	269	16,117	4,533	28.12%
Widowed	37	17,280	4,837	27.99%
Unknown	530	15,839	4,665	29.45%
LAHS College Total	1,753	13,522	3,974	29.39%

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Policy Research Example

Designing New Access Program:

The VT Presidential Scholarship Initiative (PSI) New Access Program

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The VT Presidential Scholarship Initiative (PSI)

VT Short Narrative on Presidential Scholarship Initiative (PSI) New Access Program

The funding model for the PSI utilizes existing aid programs with the addition of Virginia Tech funds to equal the direct cost of in-state tuition, required fees and on-campus room and board for each recipient. For 2008-09 that direct cost would be \$13,674. Since the focus of the PSI is to assist low income, Pell Grant eligible students, those eligible will qualify for other in-place programs of need-based financial aid at the federal, state and institutional levels. This approach enables Virginia Tech to help the neediest students understand how tuition, fees, room and board can be addressed loan-free. The funding model estimates, on the average, that PSI participants' direct costs will be covered by 28% federal grants, 41% state grants and 16% institutional grants and scholarships from a variety of sources including general and departmental endowed monies, unfunded scholarships and other miscellaneous sources. The remaining 15% of monies needed to meet the direct cost of each student will be covered with additional expenditures from unfunded scholarships. The bundling of multiple financial aid programs under one umbrella is designed to simplify the complexity of higher education financial aid programs thereby helping individuals more easily understand and access higher education at Virginia Tech.

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The VT Presidential Scholarship Initiative (PSI)

VT Presidential Scholarship Initiative (PSI) (Summary of Model Simulations)

I. Projected Tuition & Fees and Room & Board

	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Total T & F plus R & B	\$13,674	\$14,823	\$16,069	\$17,421	\$18,887	\$20,478	\$22,203	\$24,075	\$26,106
Tuition & Fees (T&F)	\$8,198								
Room & Board (R&B): On-Campus	\$5,476								

II. Projected Number of Students

Total Number of Students	50	95	138	180	180	180	180	180

III. TOTAL PROJECTED COST OF THE PROGRAM

Total Cost	\$741,150	\$1,526,555	\$2,404,098	\$3,399,660	\$3,686,040	\$3,996,540	\$4,333,500	\$4,699,080
Incremental Total Cost	\$741,150	\$785,405	\$877,543	\$995,562	\$286,380	\$310,500	\$336,960	\$365,580

IV. TOTAL PROJECTED GIFT AID FROM USFA FUNDS

Total Gift Aid	\$630,650	\$1,197,270	\$1,770,646	\$2,517,513	\$2,562,774	\$2,610,512	\$2,661,159	\$2,714,890
Incremental Gift Aid	\$630,650	\$566,620	\$573,376	\$746,867	\$45,261	\$47,738	\$50,647	\$53,731

V. UNIVERSITY FUNDING REQUEST (III - IV)

Total University Funding Request (Unfunded Scholarships)	\$110,500	\$329,285	\$633,452	\$882,147	\$1,123,266	\$1,386,028	\$1,672,341	\$1,984,190
Incremental Funding Request	\$110,500	\$218,785	\$304,167	\$248,695	\$241,119	\$262,762	\$286,313	\$311,849

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The VT Presidential Scholarship Initiative (PSI)...

VT Presidential Scholarship Initiative (PSI): Total Cost & Funding Request Projections (Detailed Simulations)

I. Projected Tuition & Fees and Room & Board									
	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Total T & F plus R & B	\$13,674	\$14,823	\$16,069	\$17,421	\$18,887	\$20,478	\$22,203	\$24,075	\$26,106
Tuition & Fees (T&F)	\$8,198								
Room & Board (R&B): On-Campus	\$5,476								
Projected T& F Increase Rate									
Projected R&B Increase Rate		On-campus increase rate based on the VT's 6-Year Plan							
Projected Retention Rate			0.9	0.95	0.975				
Projected VSAP Fund Increase Rate	1.03	Based on the 2008-2009 increase rate							

II. Projected Number of Students									
Cohort 1		50	45	43	42				
Cohort 2			50	45	43	42			
Cohort 3				50	45	43	42		
Cohort 4					50	45	43	42	
Cohort 5						50	45	43	42
Cohort 6							50	45	43
Cohort 7								50	45
Cohort 8									50
Total Number of Students		50	95	138	180	180	180	180	180

NOTE: The following retention rates are used: 2nd Year - 90%, 3rd Year - 95%, and 4th Year - 97.5%

The VT Presidential Scholarship Initiative (PSI)...

III. TOTAL PROJECTED COST OF THE PROGRAM									
Cohort 1		\$741,150	\$723,105	\$749,103	\$793,254				
Cohort 2			\$803,450	\$783,945	\$812,141	\$860,076			
Cohort 3				\$871,050	\$849,915	\$880,554	\$932,526		
Cohort 4					\$944,350	\$921,510	\$954,729	\$1,011,150	
Cohort 5						\$1,023,900	\$999,135	\$1,035,225	\$1,096,452
Cohort 6							\$1,110,150	\$1,083,375	\$1,122,558
Cohort 7								\$1,203,750	\$1,174,770
Cohort 8									\$1,305,300
Total Cost		\$741,150	\$1,526,555	\$2,404,098	\$3,399,660	\$3,686,040	\$3,996,540	\$4,333,500	\$4,699,080

IV. TOTAL PROJECTED GIFT AID FROM USFA FUNDS (A+B+C)									
Cohort 1		\$630,650	\$586,170	\$589,186	\$643,902				
Cohort 2			\$611,100	\$580,410	\$624,661	\$659,568			
Cohort 3				\$601,050	\$614,250	\$637,561	\$676,242		
Cohort 4					\$634,700	\$624,195	\$651,235	\$694,092	
Cohort 5						\$641,450	\$634,635	\$665,812	\$713,202
Cohort 6							\$648,400	\$645,705	\$681,378
Cohort 7								\$655,550	\$657,360
Cohort 8									\$662,950
Total Gift Aid		\$630,650	\$1,197,270	\$1,770,646	\$2,517,513	\$2,562,774	\$2,610,512	\$2,661,159	\$2,714,890

The VT Presidential Scholarship Initiative (PSI)...

Per Student Gift Aid (A+B+C)

Cohort 1		\$12,613	\$13,026	\$13,702	\$15,331				
Cohort 2			\$12,222	\$12,898	\$14,527	\$15,704			
Cohort 3				\$12,021	\$13,650	\$14,827	\$16,101		
Cohort 4					\$12,694	\$13,871	\$15,145	\$16,526	
Cohort 5						\$12,829	\$14,103	\$15,484	\$16,981
Cohort 6							\$12,968	\$14,349	\$15,846
Cohort 7								\$13,111	\$14,608
Cohort 8									\$13,259

A. Per Student Gift Aid	\$10,493	\$10,613	\$11,169	\$11,296	\$12,138	\$12,273	\$12,412	\$12,555	\$12,703
Estimated PELL	\$3,293	\$3,293	\$3,725	\$3,725	\$4,436	\$4,436	\$4,436	\$4,436	\$4,436
Estimated VGAP or CMWL	\$4,000	\$4,120	\$4,244	\$4,371	\$4,502	\$4,637	\$4,776	\$4,919	\$5,067
Estimated ACG & SMART	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Estimated SEOG	\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$300
Estimated Safety Net	\$700	\$700	\$700	\$700	\$700	\$700	\$700	\$700	\$700
Other Gift Aid	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700
B. Gift Aid from CSAP Grant	\$100,000	\$2,000	\$1,053	\$725	\$556	\$556	\$556	\$556	\$556

NOTE: College Scholarship Assistance Program (CSAP) is a state grant partially funded by Federal government. The current funding for this fund is \$307,500. Out of this amount, \$100,000 will be set aside each year to be awarded to students eligible under this new program. The \$100,000 annual allocation is proportionally distributed to all eligible students for a given year. For example, under "50 students" option, students will receive \$2,000 each in the first year. Once the program reaches the steady state, the average per student award from this fund will be reduced to \$556 assuming the same level of funding.

The VT Presidential Scholarship Initiative (PSI)...

C. Gift Aid from "Funds for the Future": Continuing Students - Group A - 100% protection from future tuition and fees increases									
Cohort 1		\$0	\$804	\$1,681	\$2,637				
Cohort 2			\$0	\$877	\$1,833	\$2,875			
Cohort 3				\$0	\$956	\$1,998	\$3,133		
Cohort 4					\$0	\$1,042	\$2,177	\$3,415	
Cohort 5						\$0	\$1,135	\$2,373	\$3,722
Cohort 6							\$0	\$1,238	\$2,587
Cohort 7								\$0	\$1,349
Cohort 8									\$0

NOTE: It is assumed that discovery leaders scholarship recipients fall into the first income group of the Funds for the Future (FFF), [adjusted gross income between \$0 and \$29,999]. Based on the FFF model, continuing students of each cohort receive 100% protection from tuition and fee increase while enrolled at Virginia Tech. For example, referring to cohort 1, amount \$2,637 for award year 2012-2013 is computed as a difference of tuition and fees in 2012-2013 (\$11,573) and tuition and fees in 2009-2010 (\$8,936). This implies that the cohort 1's senior class of 2012-2013 receives protection from tuition and fee increases for the past three years (excluding freshman year).

V. UNIVERSITY FUNDING REQUEST

Cohort 1		\$110,500	\$136,935	\$159,917	\$149,352				
Cohort 2			\$192,350	\$203,535	\$187,480	\$200,508			
Cohort 3				\$270,000	\$235,665	\$242,993	\$256,284		
Cohort 4					\$309,650	\$297,315	\$303,494	\$317,058	
Cohort 5						\$382,450	\$364,500	\$369,413	\$383,250
Cohort 6							\$461,750	\$437,670	\$441,180
Cohort 7								\$548,200	\$517,410
Cohort 8									\$642,350
Total University Funding Request		\$110,500	\$329,285	\$633,452	\$882,147	\$1,123,266	\$1,386,028	\$1,672,341	\$1,984,190
Unfunded (Waivers)		\$110,500	\$329,285	\$633,452	\$882,147	\$1,123,266	\$1,386,028	\$1,672,341	\$1,984,190
Incremental Funding Request		\$110,500	\$218,785	\$304,167	\$248,695	\$241,119	\$262,762	\$286,313	\$311,849
Total Cost (Tuition & Fees only)		\$446,800	\$925,300	\$1,465,146	\$2,083,140	\$2,270,700	\$2,475,000	\$2,697,840	\$2,940,660
Funding Request Amt plus FFF and Safety Net		\$145,500	\$431,965	\$841,800	\$1,240,740	\$1,502,820	\$1,788,300	\$2,099,520	\$2,438,460

The VT Presidential Scholarship Initiative (PSI)...

The University Funding Request: Unfunded vs. Hard Money (An Illustration)

	<u>Scenario A</u>	<u>Scenario B</u>
1st Cohort - Continuing Student	2010-2011	2010-2011
I. Total Cost of the Program	\$16,069	\$16,069
Tuition & Fees (T&F)	\$9,740	\$9,740
Room & Board (R&B): On-Campus	\$6,329	\$6,329
II. Total Gift Aid from Current Resources	\$13,026	\$13,026
(1) Green Hard Money	\$11,522	\$7,326 arbitrary figure
(2) Existing Unfunded Scholarships	\$1,504	\$5,700 arbitrary figure
III. University Funding Request (I - II)	\$3,043	\$3,043

Calculation of Unfunded versus Hard Money:

A. Tuition and Fees (Unfunded Cap)	\$9,740	\$9,740
B. Unfunded awarded from current resources	\$1,504	\$5,700
C. University funding request	\$3,043	\$3,043 (b)
D. Remaining T&F Cap (A - B - C)	\$5,193	\$997 (d)

Funding Allocation:

\$3,043	\$3,043
\$3,043	\$2,046 <i>Unfunded: (b) - (d)</i>
<i>all unfunded</i>	\$997 Hard money

Scenario A refers to student figures for the 2010-2011 year of the model where all additional funding comes from unfunded. **Scenario B** is an illustration of the same year where the sum of additional funding and unfunded scholarships a student receives from current resources exceeds the total tuition and fees, and therefore the difference should come from green hard money.

Decision Rule:

1. If unfunded amount awarded from current resources (B) plus university funding request (C) does not exceed total tuition and fees cap (A), then all university funding request should be unfunded (Scenario A).

2. If unfunded amount awarded from current resources (B) plus university funding request (C) exceeds total tuition and fees cap (A), then the difference should come from green hard money (Scenario B).

Example of Advanced Research

Application of Paired T-tests in Financial Aid Quality Assurance Program

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Quality Assurance Program

- As participants in the Quality Assurance Program, schools develop systems for verifying applicant data.
- Robust verification procedures increase the efficiency of managing financial aid funds preventing overawards and/or underawards.
- Goal:
 - Identify the error-prone FAFSA applicant population
 - Determine the impact those errors had on EFC and Pell Grant eligibility
 - Use of paired t-test results and ISIR tool data to identify tracking groups

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Paired t-test

- Used in conjunction with the IA Tool reports to narrow down and define the fields and the connections between various fields and income/EFC ranges.
- A method for testing whether the difference between two measurements on the same subject is significantly different from zero.
 - Initial (pre-verification) ISIR transaction of an ISIR field.
 - “Paid-on” (post verification) transaction of an ISIR field.
 - Subject: A FAFSA applicant.
- The paired t-test compares the measurements within each subject (FAFSA applicant).

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Paired t-test

The hypotheses:

Ho: $D = 0$ (the mean difference between paired observations – before and after verification - is zero)

Ha: $D \neq 0$ (the mean difference is not 0)

Paired t-test

The hypotheses:

Ho: $D = 0$ (the mean difference between paired observations – before and after verification - is zero)

Ha: $D \neq 0$ (the mean difference is not 0)

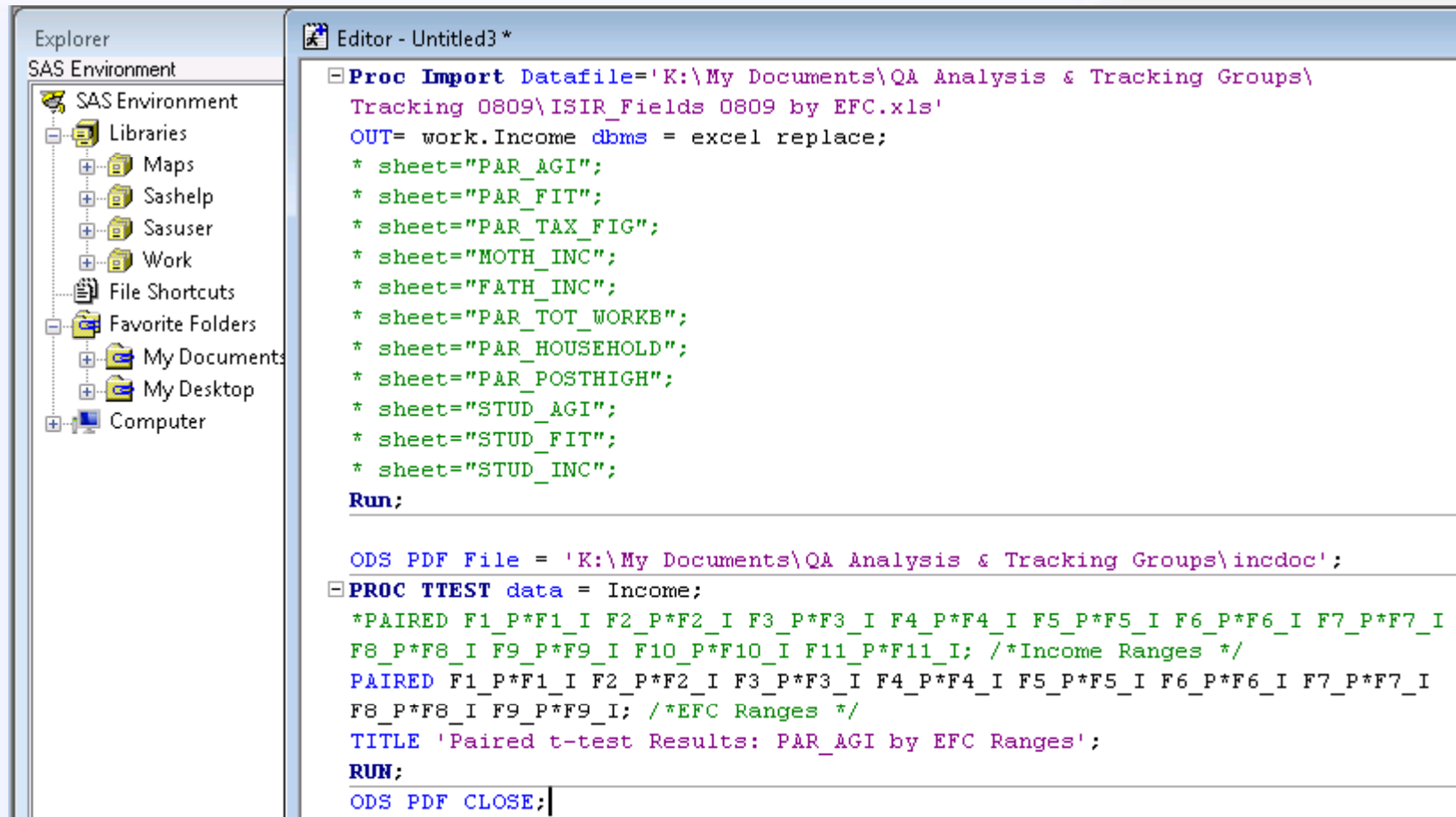
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Paired t-test

How the test works:

- The difference between the observations for an ISIR field is calculated for each sampled FAFSA applicant.
- The mean and standard error of these differences are calculated.
- Dividing the mean by the standard error of the mean yields a test statistic t
- The decision about the significance of the result is based on the p-value.

Paired t-test: SAS code



```
Explorer
SAS Environment
  SAS Environment
    Libraries
      Maps
      Sashelp
      Sasuser
      Work
    File Shortcuts
    Favorite Folders
      My Documents
      My Desktop
    Computer

Editor - Untitled3 *
Proc Import Datafile='K:\My Documents\QA Analysis & Tracking Groups\
Tracking 0809\ISIR_Fields 0809 by EFC.xls'
OUT= work.Income dbms = excel replace;
* sheet="PAR_AGI";
* sheet="PAR_FIT";
* sheet="PAR_TAX_FIG";
* sheet="MOTH_INC";
* sheet="FATH_INC";
* sheet="PAR_TOT_WORKB";
* sheet="PAR_HOUSEHOLD";
* sheet="PAR_POSTHIGH";
* sheet="STUD_AGI";
* sheet="STUD_FIT";
* sheet="STUD_INC";
Run;

ODS PDF File = 'K:\My Documents\QA Analysis & Tracking Groups\incdoc';
Proc TTEST data = Income;
*PAIRED F1_P*F1_I F2_P*F2_I F3_P*F3_I F4_P*F4_I F5_P*F5_I F6_P*F6_I F7_P*F7_I
F8_P*F8_I F9_P*F9_I F10_P*F10_I F11_P*F11_I; /*Income Ranges */
PAIRED F1_P*F1_I F2_P*F2_I F3_P*F3_I F4_P*F4_I F5_P*F5_I F6_P*F6_I F7_P*F7_I
F8_P*F8_I F9_P*F9_I; /*EFC Ranges */
TITLE 'Paired t-test Results: PAR_AGI by EFC Ranges';
Run;
ODS PDF CLOSE;
```

Paired t-test: SAS output

Paired t-test Results: PAR_HOUSEHOLD by EFC Ranges

The TTEST Procedure

Difference: F1_P - F1_I

N	Mean	Std Dev	Std Err	Minimum	Maximum
258	-0.0233	0.1959	0.0122	-2.0000	1.0000

Mean	95% CL Mean	Std Dev	95% CL Std Dev
-0.0233	-0.0473	0.1959	0.2144

DF	t Value	Pr > t
257	-1.91	0.0576

P-value



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Paired t-test

P-value Interpretation:

- The p-value indicates how likely it is that a significant difference in means arises by chance
- A low p-value for the statistical test points to rejection of the null hypothesis
- It provides a sense of the strength of the evidence against the null hypothesis. The lower the p-value, the stronger the evidence.

Paired t-test

Statistical versus Practical Significance

- By convention, the p-value cut-off (< 0.05)
- Statistical significance - the observed mean differences are not likely due to sampling error
- Practical significance - whether the mean difference is large enough to be of value in a practical sense

Paired t-test

Data and Procedure:

Step 1: Pulled ISIR data for fields that have an impact to the EFC for a sample of 1,500 FAFSA applicants and run t-test using SAS.

Step 2: Based on obtained p-values, the ISIR fields were narrowed down to those which were either Significant or Highly Significant.

Step 3: Additional t-test performed for those ISIR fields with statistically significant changes by Income and EFC ranges to further define our population

Paired t-test: Results

F1 – F2	EFC
F3 – F4	Parent AGI
F9 – F10	Dependency Status
F19 – F20	Students Total in Worksheet C
F21 – F22	Students Number in Household
F25 – F26	Parents Marital Status
F27 – F28	Students US Income Taxes Paid
F29 – F30	Students Tax Return Filed
F31 – F32	Parent's Tax Return Filed
F33 – F34	Parent's US Income Taxes Paid
F37 – F38	Total Income
F41 – F42	Student's AGI
F43 – F44	Parent's Number in Household
F45 – F46	Parent's Total Worksheet A
F47 – F48	Parent's Total Worksheet B
F49 – F50	Parent's Total Worksheet C
F51 – F52	Pell Award Amount
F53 – F54	Student's Total Worksheet A
F55 – F56	Student's Total Worksheet B
F57 – F58	Parent's Number in College

T-Tests			
Difference	DF	t Value	Pr > t
F1 - F2	285	-3.54	0.0005
F3 - F4	236	0.19	0.8504
F9 - F10	285	1.00	0.3182
F19 - F20	285	-1.16	0.2465
F21 - F22	56	1.00	0.3216
F25 - F26	238	-0.60	0.5496
F27 - F28	218	3.61	0.0004
F29 - F30	285	7.42	<.0001
F31 - F32	238	-10.94	<.0001
F33 - F34	236	1.55	0.1232
F37 - F38	285	-0.84	0.4026
F41 - F42	203	0.85	0.3976
F43 - F44	239	5.64	<.0001
F45 - F46	239	-1.59	0.1137
F47 - F48	239	-4.83	<.0001
F49 - F50	239	-0.55	0.5810
F51 - F52	285	1.46	0.1462
F53 - F54	285	-0.96	0.3379
F55 - F56	285	-0.86	0.3881
F57 - F58	238	4.56	<.0001

Paired t-test: Results...

Statistical Analysis of Financial Aid Data for Identifying the 0708 Tracking Groups

Summary of Paired t-test Results

<u>SAS Code</u>	<u>Field Description</u>	<u>Significance</u>
F1 – F2	EFC	Highly Significant
F3 – F4	Parent AGI	Not Significant
F9 – F10	Dependency Status	Not Significant
F19 – F20	Students Total in Worksheet C	Not Significant
F21 – F22	Students Number in Household	Not Significant
F25 – F26	Parents Marital Status	Not Significant
F27 – F28	Students US Income Taxes Paid	Highly Significant
F29 – F30	Students Tax Return Filed	Highly Significant
F31 – F32	Parent's Tax Return Filed	Highly Significant
F33 – F34	Parent's US Income Taxes Paid	Significant
F37 – F38	Total Income	Not Significant
F41 – F42	Student's AGI	Not Significant
F43 – F44	Parent's Number in Household	Highly Significant
F45 – F46	Parent's Total Worksheet A	Significant
F47 – F48	Parent's Total Worksheet B	Highly Significant
F49 – F50	Parent's Total Worksheet C	Not Significant
F51 – F52	Pell Award Amount	Significant
F53 – F54	Student's Total Worksheet A	Not Significant
F55 – F56	Student's Total Worksheet B	Not Significant
F57 – F58	Parent's Number in College	Highly Significant

Paired t-test: Results...

T-test results of selected variables by income ranges

Notes:

Student & Parent Total Income Ranges:

1. \$ 0 - \$10,000
2. \$10,001 - \$20,000
3. \$20,001 - \$30,000
4. \$30,001 - \$40,000
5. \$40,001 - \$50,000
6. \$50,001 - \$60,000
7. \$60,001 - \$70,000
8. \$70,001 - \$80,000
9. \$80,001 - \$90,000
10. \$90,001 - \$100,000
11. Over \$100,001

The last digit in the codes below refers to the income range number. For example, F271 – F281 means: F27 and F28 are the student income taxes paid before and after verification, respectively. The last digit refers to income range 1 (\$0-\$10001) and so forth.

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Paired t-test: Results...

EFC by Income Ranges

EFC

Statistics										
Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum	Maximum
F11 - F21	42	-588.8	1450.4	3489.7	5384.5	6544.1	8344.8	1009.8	-230	38315
F12 - F22	12	-637.2	738.58	2114.4	1534	2165.4	3676.6	625.1	-1538	5820
F13 - F23	20	-130.1	220.4	570.92	569.58	748.96	1093.9	167.47	-666	2254
F14 - F24	24	-771.5	-337.3	96.793	799.05	1028.1	1442.2	209.86	-3390	1204
F15 - F25	13	-1964	820	3603.8	3303.4	4606.6	7604.3	1277.7	-2742	15420
F16 - F26	28	-1088	37.893	1164.2	2296.4	2904.6	3953.6	548.92	-9712	5609
F17 - F27	20	-1229	-568.8	91.24	1072.4	1410.2	2059.7	315.33	-4126	970
F18 - F28	22	-3212	-1645	-76.96	2720.2	3535.7	5052.7	753.81	-11625	3550
F19 - F29	20	-2997	-1348	300.91	2679.4	3523.2	5145.9	787.81	-9785	6238
F110 - F210	18	-4101	-2558	-1014	2329.3	3104.1	4653.5	731.64	-9969	1042
F111 - F211	67	-5156	-3637	-2118	5321.8	6226.5	7504.8	760.69	-28341	2505

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Paired t-test: Results...

EFC by Income Ranges

Student & Parent Total Income Ranges:

1. \$ 0 - \$10,000
2. \$10,001 - \$20,000
3. \$20,001 - \$30,000
4. \$30,001 - \$40,000
5. \$40,001 - \$50,000
6. \$50,001 - \$60,000
7. \$60,001 - \$70,000
8. \$70,001 - \$80,000
9. \$80,001 - \$90,000
10. \$90,001 - \$100,000
11. Over \$100,001

T-Tests			
Difference	DF	t Value	Pr > t
F11 - F21	41	1.44	0.1585
F12 - F22	11	1.18	0.2623
F13 - F23	19	1.32	0.2038
F14 - F24	23	-1.61	0.1216
F15 - F25	12	0.64	0.5331
F16 - F26	27	0.07	0.9455
F17 - F27	19	-1.80	0.0872
F18 - F28	21	-2.18	0.0406
F19 - F29	19	-1.71	0.1033
F110 - F210	17	-3.50	0.0028
F111 - F211	66	-4.78	<.0001

Paired t-test: Results...

Parent's US Income Tax Paid by Income Ranges

Student & Parent Total Income Ranges:

1. \$ 0 - \$10,000
2. \$10,001 - \$20,000
3. \$20,001 - \$30,000
4. \$30,001 - \$40,000
5. \$40,001 - \$50,000
6. \$50,001 - \$60,000
7. \$60,001 - \$70,000
8. \$70,001 - \$80,000
9. \$80,001 - \$90,000
10. \$90,001 - \$100,000
11. Over \$100,001

T-Tests			
Difference	DF	t Value	Pr > t
F331 - F341	12	-0.59	0.5637
F332 - F342	5	1.00	0.3632
F333 - F343	18	1.17	0.2584
F334 - F344	22	0.00	0.9979
F335 - F345	10	1.29	0.2268
F336 - F346	20	-0.03	0.9751
F337 - F347	19	1.20	0.2448
F338 - F348	26	2.30	0.0296
F339 - F349	19	1.66	0.1128
F3310 - F3410	13	0.41	0.6914
F3311 - F3411	62	0.60	0.5510

Questions?



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