Using the SAS® System to Measure Factors Determining Success by Those majoring in Theatre at the University Level

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ABSTRACT

The purpose of this paper is to present a methodology in which the SAS System may be used to investigate the Attribute Characteristics Profile of a population of university/college theatre arts students. The paper presents the results of a state-wide questionnaire investigation of the physical, personal, family and academic characteristics of theatre students in Kansas. The SAS System was used as the primary tool of investigation. In addition to using the traditional crosstabulations and descriptive statistics provided by PROC FREQ and PROC UNIVARIATE, the study employs the statistically powerful techniques of PROC CORR, PROC REG, PROC STEPWISE and PROC RSQUARE. An econometric model is developed using student grade point average in theatre courses as the number of theatre courses taken, male/female, and numerous other variables. Along with the various econometric results developed, will be a discussion of the ease and short learning cycle of the SAS System as it is learned and applied by academics in the area of theatre arts.

INTRODUCTION/METHODOLOGY

As a teacher of performance theory and technique, as well as dramatic literature, I regularly encounter students who differ greatly from one another in motivation, dependability and talent. These students, as might be expected, meet with varying degrees of success both in the classroom and in auditions and productions. The question of what factors contribute to the successful university or college theatre student as well as an interest in establishing a profile of said student led me to develop a questionnaire which was distributed to university and college theatre departments in Kansas. The institutions taking part in the survey response were: Emporia State University, the University of Kansas, Wichita State University, Butler County Community College and Johnson County Community College. The Student Profile Survey included questions relating to: 1) Physical Characteristics, 2) Personal Perception, 3) Family Background, 4) High School Years, 5) College Years. There were 117 responses to the Survey. From the study the following data was derived:

Theatre Variable Definitions

Computer Variable Name	Extended name of variable	Range of Values
	A: Physical Characteristics:	
SEX	Sex of respondent	0 = male 1 = female
HT	Height of respondent	0 to ∞
WT	Weight of respondent	0 to ∞
EYES	Color of Eyes	0 = blue 1 = brown
HAIR	Color of Hair	0 = dark 1 = light
HAND	Hand used	0 = right 1 = left
	B: Personal Perception:	
EXTINT	Extrovert or Introvert	1 to 10
EMOTRAT	Emotional / Rational Scale	1 to 10
JUDG	Judgmental / Non-Judgmental Scale	1 to 10
COMPET	Competitive / Non-Competitive Scale	1 to 10
SORIENT	Success Oriented Scale	1 to 10
HAPPY	Happy or Unhappy Scale	1 to 10
	C: Family Background:	
PTSALIVE	Parents Alive	0 = alive 1 = not-alive
DIVORCED	Parents Divorced	0 = no 1 = yes
AGEDIVOR	Age of divorce	0 to ∞
PINVTH	Parents involved in theatre	0 = no 1 = yes
PRANKINV	Parents rank of involvement in theatre	1 to 10
PATTDTH	Parents attend theatre productions	0 = no 1 = yes
FREQACMP	Frequency of attendance	1 to 10
ECONSTS	Economic Status of parents	0 to 100
BORSIS	Brothers or sisters	0 = yes 1 = no
POSITION	Position in birth order	1 to ∞
BSINTER	Brothers or sisters inter or involved theatre	0 = no 1 = yes
SIBSTDY	Siblings currently studying theatre	0 = no 1 = yes
PLCESTDY	Where siblings are studying	1 = high school, 0 = college, both, other
AGEINTER	Age first interested in theatre	0 to ∞
ROLEMODL	Influence of role models in decision to study theatre	1 to 10
	D: High School:	
ACT	ACT composite score	0 - 36
ACTENG	ACT English score	0 - 36
ACTREAD	ACT Reading score	0 - 36
ACTMATH	ACT Math score	0 - 36
ACTSCI	ACT Science Reasoning score	0 - 36
HSGPA	High School Grade point average	0 to 4.0
DCRSHS	Number of high school drama courses	0 to ∞
HSDRMGPA	GPA in HSdrama courses	0 to 4.0

HSPLAYS	Number of HS plays participated in	0 to
OUTSHY	Outgoing / Shy Scale	1 to 10
CONINSEC	Confident / Insecure Scale	1 to 10
POPLONER	Popular / Loner Scale	1 to 10
THEXP	Extent of Theatre Experience	1 to 10
OTHERTNG	Other Experience / Training	0 = no 1 = yes
COMMTH	Community theatre	0 = no 1 = yes
PARKREC	Park or recreational theatre	0 = no 1 = yes
CHURCH	Church theatre	0 = no 1 = yes
CAMP	Camp theatre	0 = no 1 = yes
SELFPROD	Self-produced theatre	0 = no 1 = yes
OTHEREXP	Other experience	0 = no 1 = yes
	E: College:	
COLLEGE	University or CC 0 = University 1 = Community College	
COLGPA	College GPA	0 to 4.0
CRSTHTR	Number of college theatre courses completed	0 to
THRGPA	GPA in theatre courses	0 to 4.0
HRSTV	Current per day TV viewing	0 to
HRSREAD	Current reading per day	0 to
CAREER	Plan to pursue career in theatre	0 = no 1 = yes
TYPE	Type of career 0 = educational and other 1 = professional	
GRADFOUR	Will you graduate in 4 years	0 = no 1 = yes

In order to analyze the questionnaire data, I used the SAS System due to its widely known efficacy and short learning curve. As Ronald Cody and Jeffrey Smith illustrate in 'Questionnaire and Design Analysis' in Applied Statistics and the SAS Programming Language, SAS has also been shown to be particularly effective in analyzing questionnaire data. To determine Summary Statistics PROC MEANS was employed. In addition, PROC CORR was run to estimate correlations between the questionnaire variables. Then to determine causality, numerous regression procedures were used. These included: PROC STEPWISE and PROC REG. I concluded the study by developing a multiple regression model, the purpose of which was to determine the factors which have influenced student performance in theatre courses.

Econometric Model

The variable selected to measure student performance for this model is university or college Grade Point Average (GPA). In order to explain variations in theatre GPA of the students in the survey, the following econometric model was specified:

$$\begin{aligned} THRGPA = {} & a + b\,COLGPA + c\,SEX + d\,DCRSHS + e\,EXTINT \\ & + f\,HSGPA + g\,SORIENT + h\,DIVORCED + I\,ACT \\ & + J\,HSDRMGPA + k\,THEXP + l\,ECONSTS + m\,PINYTH \\ & + n\,POSITION + o\,HAPPY + u \end{aligned}$$

It is expected that there will be a strong direct relationship between current success in university or college theatre study and success during previous levels of study.

EMPIRICAL RESULTS:

The following summary statistics were derived:

Theatre Data: Summary Statistics

N Obs	Variable	N	Minimum	Maximum	Mean	Std De
117	THRGPA	98	2.5000000	4.0000000	3.6180612	0.4077463
	COLGPA	108	1.3000000	4.0000000	3.2727130	0.4851597
	SEX	117	0	1.0000000	0.6495726	0.4791559
	DCRSHS	113	0	13.0000000	2.9690265	2.3963171
	EXTINT	116	1.0000000	9.0000000	4.1379310	2.2376096
	HSGPA	112	2.0000000	4.0000000	3.3212500	0.4330758
	SORIENT	115	1.0000000	9.0000000	3.1130435	1.9455988
	DIVORCED	110	0	1.0000000	0.4090909	0.4939163
	ACT	77	12.0000000	32.0000000	24.6103896	3.3956468
	HSDRMGPA	89	0	4.0000000	3.7415730	0.7339003
	THEXP	117	1.0000000	10.0000000	4.6752137	3.0023814
	ECONSTS	114	0	100.0000000	55.2631579	16.6807885
	PINYTH	117	1.0000000	1.0000000	0.2905983	0.4559913
	POSITION	100	1.0000000	8.0000000	2.1500000	1.2257754
	HAPPY	116		10.0000000	3.5172414	2.1967674

The ensuing statistical results were derived using PROC REG:

Model: Theatre GPA

Dependent Variable: THRGPA

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	14	5.28566	0.37755	6.015	0.0001
Error	29	1.82022	0.06277		
C Total	43	7.10588			

Root MSE	0.25053	R-square	0.7438
Dep Mean	3.67432	Adj R-sq	0.6202
C.V.	6.81845		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.643981	0.55748541	1.155	0.2575
COLGPA	1	0.504082	0.13117555	3.843	0.0006
SEX	1	-0.025990	0.11401273	-0.228	0.8213
DCRSHS	1	-0.018180	0.02711704	-0.670	0.5079
EXTINT	1	-0.039540	0.02324087	-1.693	0.1012
HSGPA	1	0.220877	0.14923220	1.480	0.1496
SORIENT	1	-0.064836	0.03052910	-2.124	0.0423
DIVORCED	1	0.012552	0.10061263	0.125	0.9016
ACT	1	0.024678	0.01608656	1.534	0.1359
HSDRMGPA	1	0.166214	0.08420419	1.974	0.0580
THEXP	1	0.003213	0.02337111	0.137	0.8916
ECONSTS	1	-0.000972	0.00274440	-0.354	0.7258
PINYTH	1	-0.036416	0.09920076	-0.367	0.7162
POSITION	1	-0.112959	0.05098991	-2.215	0.0347
HAPPY	1	0.017313	0.02632094	0.658	0.5159

CONCLUSIONS:

The SAS System led to the determination that the successful university or college theatre student is one who, 1) has a high cumulative college GPA, 2) is more extroverted that introverted, 3) did well in high school according to his/her high school GPA, 4) characterizes himself/herself as success oriented according to the question concerning motivation, 5) did well on overall high school ACT scores, 6) had a high GPA in high school theatre courses and, 7) was either an only child or came early in the birth order -- the earlier he/she was born the more likely he/she is to do well in theatre courses.

Things which were found to NOT affect performance significantly were: sex, number of drama courses taken in high school, whether or not parents were divorced, the perception each student had of their amount of theatre experience prior to college in relation to other students, parents economic status, whether or not the parents were involved in theatre and finally, how the student perceived his/her level of general happiness.

SAS Program Used to Analyze Questionnaire:

```
data a;
input  sex   ht   wt   eyes   hair hand   extlat   emotrat   judg compet
       sorient    happy   ptsalive   divorced   agedliver   plavth  prankiny
       partnth    freqattd   freqacad   econsts   borsis   position  bslater  sibstdy
       picestdy   sgelster   relsmodl   act  actreng   actread   actmath  actsci
       hsgpa  dcrshs      hsdramgpa   hsplays   outshy   conlsec  poploser  thexp
       otherlng  comnth   partrec   church   camp  selfprod   otherexp
       college   colgpa   crsthtr   thrgpa   hrstv  hrsread   careef
       type  gradtour ##;
cards;

            [  Data  ]
;

proc means;
   var  thrgpa  colgpa sex   dcrshs extlnt hsgpa
        sorient   divorced   act  hsdramgpa  thexp
        econsts plavth position happy;
run;


proc corr;
   var  thrgpa   colgpa sex   dcrshs extlnt hsgpa
        sorient    divorced    act  hsdramgpa   thexp
        econsts  plavth position  happy;
run;



proc reg;
   model thrgpa = colgpa sex  dcrshs extlnt hsgpa
      sorient  divorced   act  hsdramgpa  thexp
      econsts plavth position happy ;
run;
```

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