

## Prospect Theory and Gain-Framing: The Relationship Between Cost Perception and Satisfaction

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### **Abstract**

This paper considers insights from Prospect Theory (Kahneman & Tversky, 1979) and the importance of framing in the evaluation of student satisfaction. Specifically, the focus of this paper is to clarify the association between cost perceptions and satisfaction as they relate to college students. Based on a significant body of research related to college student satisfaction, hypotheses were developed that connect student satisfaction to specific college experiences. Insights from Prospect Theory were used to develop an additional “gain-frame” perception of college costs hypothesis. Survey results from a class of graduating college seniors were used to test these expected associations. The results of this study suggest gain-frame perception of costs adds additional explanation to the variance in student satisfaction beyond that explained by traditional measures of college experiences.

*Keywords:* Prospect Theory; Gain-Frame; Student Satisfaction

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### **I. Introduction**

Student satisfaction has been a research topic of significant interest within higher education over the past few decades. Student satisfaction has been linked to student learning and other measures of student success, and thus has become one tool for schools seeking to improve student outcomes. Measures of student satisfaction have also been used by funding agents, accrediting agencies, and governing boards as an indication of institutional effectiveness. As such, universities and academic programs have financial and reputational incentives to identify predictors of student satisfaction. Retention and alumni offices also consider student satisfaction when predicting student persistence and alumni giving.

The “gain/loss” framing of costs and associated influence on satisfaction has also been the subject of considerable research across several disciplines. Whether considering the impact of insurance rebates and deductibles (Johnson, Hershey, Meszaros & Kunreuther 1993) or the importance of gain-loss framing in examining the satisfaction in close relationships (Berger &

Janoff-Bulman, 2006), the way in which costs are framed has been shown to impact perception and satisfaction. The focus of this paper is to extend the topic of cost framing to satisfaction as it relates to college students. Specifically, the more students associate money spent on college as an investment in their future (gain frame), the greater will be their satisfaction with their education.

Based on a review of literature of student satisfaction, four hypotheses are developed that connect college experiences with student satisfaction. Insights from Prospect Theory (Kahneman & Tversky, 1979) are used to develop an additional “gain-frame” perception of college costs hypothesis. Control variables for gender and major are included. Multiple regression analysis is used to determine the degree to which the entire variable set accounts for the variance in student satisfaction, while stepwise regression analysis is used to identify the most efficient set of predictors of student satisfaction.

Utilizing survey results from a university’s graduating business administration and accounting seniors, this study provides evidence that each of the independent variables correlates in the expected direction with satisfaction, and that the gain-frame correlation is statistically significant. The paper also outlines through regression analysis that the variables make a statistically significant contribution to the prediction of satisfaction. And, finally, the results demonstrate that the gain-frame perception of cost variable is one of three variables retained in the stepwise prediction of student satisfaction.

The remainder of the paper is organized in the following sections. Section II provides a conceptual model linking gain-frame perceptions of college costs to existing theoretical models of student satisfaction. Section III provides a review of prior research and the development of hypotheses. Section IV describes the data and methodology used for testing the hypotheses. Section V provides an analysis of the data, and Section VI provides discussion and suggestions for future research.

## **II. A Conceptual Model Linking Gain-Frame Cost Perception to Existing Models on Student Satisfaction**

A significant body of research exists on how college affects students (Astin, 1977; 1993b; Pascarella & Terenzini, 1991; 2005). Student success has been defined in numerous ways over the years, to include such outcomes as persistence, academic achievement, and satisfaction, to name a few (Kuh, Kinzie, Buckley, Bridges & Hayek, 2006, p. 7). Early work on predictors of student success have suggested that student success is related both to characteristics of the student as well as to features of the institution of higher learning. Referred to by Astin (1993a) as an I-E-O model, for input-environment-outcome, and by Tinto (1993) as an “interactional” model, these authors focused on the interaction of what students bring to college and how differing experiences once the student gets to college differentially affect student outcomes.

The specific features of student experiences in college that affect outcomes such as satisfaction are well documented. As summarized by Kuh et al. (2006), “The single best predictor of student satisfaction with college is the degree to which they perceive the college environment to be supportive of their academic and social needs” (p. 40). And, the importance of the institutional environment in influencing student satisfaction is greater than that of the student’s pre-entering characteristics (Astin, 1993b, p. 277) Chickering and Gamson (1987; 1991) distilled from research several principles of good practice in education at the undergraduate level, two of which include encouraging student-faculty contact and setting high

academic expectations. Institutional environments where academic performance expectations are set at “reasonably high levels” are related to student satisfaction (Kuh, 2003, p.1). National surveys of student satisfaction have revealed that academic advising and instructional effectiveness are rated as the most important aspect of students’ educational experience (Noel-Levitz, 2009a).

The relationships between these concepts can be expressed with the following propositions:

Proposition 1: Satisfaction with one’s education is associated with the experience of knowledgeable and approachable advisors.

Proposition 2: Satisfaction with one’s education is associated with the experience of good teaching.

Proposition 3: Satisfaction with one’s education is associated with the experience of appropriately challenging curriculum.

Proposition 4: Satisfaction with one’s education is associated with the experience of supportive faculty.

As mentioned earlier, these models regarding impact of student experiences on student satisfaction are well established. The primary purpose of this study is to relate a second strand of research, that of Prospect Theory (Kahneman & Tversky, 1979), to the existing student satisfaction scholarship. The impact of framing costs in positive terms has been the subject of considerable research across several disciplines (Kahneman & Tversky, 1984). This research suggests the way in which costs are framed affects perceptions of those costs. Research by Johnson, Hershey, Meszaros, and Kunreuther (1993) considered the impact of rebate and deductible frames in insurance decisions. This research showed consumers placed a higher value on rebate policies (gain frame) than policies with deductibles (loss frame) even though the consumer was economically worse off with the rebate policies assuming a positive rate of return on money. Rothman and Salovey (1997) looked at the impact of framing health recommendations as gains or losses on subsequent health behavior. Berger and Janoff-Bulman’s (2006) work testing cost and satisfaction in close relationships found gain-loss framing was important in identifying the connection between costs and satisfaction. “When costs are attached to valued outcomes, they are perceived as gains or investments; otherwise they are perceived as losses” (2006, p. 53). Thaler’s (1999) work on mental accounting extends insights of Prospect Theory to an evaluation of how individuals keep track of their financial activities, and how this mental accounting affects perception of expenditures. In a study on advanced purchases, Thaler demonstrates how respondents favored coding purchases as investments rather than expenditures, thus “decoupling” the purchase and its perceived cost (1999, p. 252).

The expected relationship between perception of costs and expressed satisfaction levels can be articulated with the following propositions<sup>1</sup>:

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<sup>1</sup> As the current investigation is limited to students at only one institution, expenditures for degree attainment and rewards received (degree) were considered to be objectively similar across subjects.

Proposition 5: Satisfaction with one’s education is associated with perceptions of money spent on college as an investment.

Proposition 6: Satisfaction with one’s education can be predicted with measures of advisement, instruction, curriculum, faculty support, and perceptions of expenditures as investments.

Thus, the research model for this study is as follows:

$$SATED_i = f(\beta_1 ADVISOR_i + \beta_2 TEACH_i + \beta_3 CURRIC_i + \beta_4 FACSUPP_i + \beta_5 INVEST_i) + \varepsilon_i \quad (1)$$

where  $SATED_i$  is the dependent variable, and ADVISOR, TEACH, CURRIC, FACSUPP, and INVEST are the independent variables. Control variables (GENDER and MAJOR) are also included. Variable explanation and measurement are summarized in Table I.

(Table I here)

### III. Review of Prior Research

In the following section, a review of research is provided, and hypotheses regarding the model are developed.

#### *Academic Advising*

Past research has found academic advising to be an important predictor of student satisfaction. According to results from the 2005 National Survey of Student Engagement, the quality of academic advising was the “single most powerful predictor of satisfaction... for students at 4-year schools” (Kuh et al., 2006, p. 60). Further supporting these findings are results of the 2009 national Student Satisfaction Inventory in which students at four-year public colleges rated academic advising as “the most important aspect of their educational experience” (Noel-Levitz, 2009a, p. 3).

**H<sub>1</sub>.** Advisor knowledge and approachability is associated with satisfaction.

#### *Instructional Effectiveness*

Research related to college teaching has linked student satisfaction to instructional effectiveness. The results of student surveys at four-year public colleges and universities indicated instructional effectiveness as the second most important aspect of student’s educational experience (Noel-Levitz, 2009a, p. 3). Positive classroom learning experiences, including being intellectually challenged, are associated with student satisfaction (Volkwein & Cabrera, 1998).

**H<sub>2</sub>.** Strength of teaching is associated with satisfaction.

#### *Curriculum*

Research related to curriculum and student satisfaction suggests the rigor of the curriculum is important, and that setting expectations at “reasonably high levels” is associated with student satisfaction (Kuh, 2003, p. 3). Belcheir’s (2001, p. 8) research indicates students’ satisfaction with educational experiences is connected to how hard students worked to meet instructor standard.

**H<sub>3</sub>.** Challenge of curriculum is associated with satisfaction.

#### *Faculty Support*

Research findings suggest the quality of a student’s relationship with a faculty member is associated with satisfaction with their overall educational experience (Belcheir, 2001, p. 8). Similarly, positive interactions with faculty have been linked to student satisfaction (Amelink, 2005).

**H<sub>4</sub>.** Support from faculty is associated with satisfaction.

#### *Framing Costs as Investment*

Research outside the scope of college student satisfaction has suggested that gain-loss framing was important in identifying the connection between costs and satisfaction (Berger & Janoff-Bulman, 2006). Applying similar reasoning to student satisfaction, the following relationship is hypothesized:

**H<sub>5</sub>.** Cost as investment (gain-frame) is associated with satisfaction.

#### *Gender*

Satisfaction levels of female students have been found to be higher than those of male students at four-year institutions (Noel-Levitz, 2009b).

**H<sub>6</sub>.** Satisfaction will be higher for female students than male students.

#### *Overall Model and Control Variables*

The overall model will be tested with the following hypothesis:

**H<sub>7</sub>.** Variables measuring advisor knowledge, teaching strength, curricular challenge, support from faculty, and cost as investment, controlled for gender and major, are predictors of satisfaction.

## **IV. Data and Methodology**

This research employs a cross-sectional survey design. The subjects are spring 2009 graduating seniors from the business administration and accounting programs at a state university in the U.S. Data were collected during the last three weeks of spring semester and one week following the conclusion of finals. Graduating students (n=97) were contacted by email with instructions to complete the survey via an online survey resource. A link to the online survey was provided. This graduating senior survey is an assessment requirement for graduating

seniors and is used by the business administration and accounting departments for evaluation and continuous improvement purposes.

Completed surveys were received from 79 respondents. The breakdown by gender was 40 male and 39 female. The breakdown by major was 61 business administration majors and 18 accounting majors. Table II provides information regarding characteristics of the population and the sample. Tests of proportion differences between the sample and population are provided in Table III and show the sample is representative of the population in terms of the gender and major make-up.

(Tables II and III here)

## **V. Analysis of Data**

Table IV provides the means, standard deviations, and correlation coefficients for the variables for each of the 79 students in this study<sup>2</sup>. Testing of the univariate hypotheses ( $H_1$ ,  $H_2$ ,  $H_3$ ,  $H_4$ , and  $H_5$ ) requires analysis of correlations between each predictor of satisfaction and the measure of satisfaction. The correlation analysis contained in Table IV reveals correlation between measures of satisfaction ( $M=4.20$ ,  $SD = .807$ ,  $N=79$ ) and measures of teaching effectiveness ( $M=4.18$   $SD=.615$ ) was highly significant,  $r=.650$ ,  $p<=.001$ . Other measures which were significantly correlated with satisfaction included measures for curriculum challenge ( $M=4.15$ ,  $SD=.681$ ,  $r=.667$ ,  $p<=.001$ ), measures for faculty support ( $M=4.20$ ,  $SD=.648$ ,  $r=.411$ ,  $p<=.001$ ), and measures for cost as investment ( $M=4.57$   $SD=.547$ ,  $r=.548$ ,  $p<=.001$ ). These results provide support for  $H_2$ ,  $H_3$ ,  $H_4$ , and  $H_5$ . The correlation between satisfaction and measures for advising ( $M=4.28$ ,  $SD=.800$ ) was not significant ( $r=.070$ ), thus not supporting  $H_1$ . A further examination of the data in Table IV reveals that while the measure for cost as investment is not the single best predictor of satisfaction, it is a respectable third out of five.

(Table IV here)

An ANOVA test was used to identify if any significant difference in satisfaction exists between males and females ( $H_6$ ). The results are included in Table V. The 40 male students had an average satisfaction measure of 4.125 ( $SD=.911$ ) while the 39 female students had an average satisfaction measure of 4.282 ( $SD=.686$ ). The difference in satisfaction was not significant,  $F(1,77) = .746$ ,  $p=.390$ , and  $H_6$  is not supported.

(Table V here)

While the review of literature did not suggest a difference in satisfaction between business administration and accounting majors, such analysis was of interest to the researcher for program evaluation purposes. The ANOVA test results for business and accounting majors is included in Table VI. The 61 business administration majors had an average satisfaction

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<sup>2</sup> While parametric statistical procedures assume interval data, in a review of the literature on the topic of ordinal Likert scale items, Jaccard and Wan (1996: 4) summarize, "for many statistical tests, rather severe departures (from intervalness) do not seem to affect Type I and Type II errors dramatically." Jaccard, James and Choi K. Wan (1996). LISREL approaches to interaction effects in multiple regression. Thousand Oaks, CA: Sage Publications.

measure of 4.262 (SD=.794) while the 18 accounting majors had an average satisfaction measure of 4.000 (SD=.840). The difference in satisfaction was not significant,  $F(1,77) = 1.478, p=.228$ .

(Table VI here)

Multiple regression analysis was used to determine the degree to which the entire variable set accounted for the variance in student satisfaction. Table VII provides these results and shows a good fit ( $R^2 = 59.8\%$ ) of the variance in satisfaction scores, which was highly significant,  $F(7,71) = 15.087, p<=.001$ . The variables which emerged as statistically significant predictors of satisfaction, in order of coefficient size, include: CURRIC ( $\beta=.362, p<=.001$ ), INVEST ( $\beta=.319, p<=.001$ ), , and TEACH ( $\beta=.274, p=.034$ ). FACSUPP, ADVISOR, MAJOR, and GENDER did not emerged as statistically significant.

(Table VII here)

Finally, stepwise regression analysis was used to identify the most efficient set of predictors of student satisfaction. In Table VIII, we see that three variables, CURRIC ( $\beta=.381, p<=.001$ ), INVEST ( $\beta=.309, p<=.001$ ), and TEACH ( $\beta=.254, p=.021$ ), were retained in the stepwise regression as the only variables at the  $p<.05$  significance level. These three variables alone provided a good fit ( $R^2 = 58.8\%$ ) of the variance in satisfaction levels, which was highly significant,  $F(3,75) = 35.728, p<=.001$ . It is interesting to note that gain-frame perception of cost (INVEST) is retained as the second variable in the step-wise analysis.

(Table VIII here)

## **VI. Discussion and Suggestions for Future Research**

Each of the independent variables correlated in the expected direction with satisfaction, although the correlation between satisfaction and advisor knowledge and approachability was not statistically significant. A review of the correlation analysis revealed that gain-frame perception of costs was not the single-best predictor of satisfaction, but was a respectable third out of the five. The regression analysis provided evidence that this set of variables makes a statistically significant contribution to the prediction of satisfaction. Combined, the variables explain nearly 60% of the variance in satisfaction scores. With regard to the stepwise regression, only curricular challenge, gain-frame perceptions of cost, and strength of teaching and instruction were retained as variables at the  $p<.05$  significance level. These three variables accounted for nearly 59% of the variance in satisfaction levels. Gain-frame perception of cost represents the second variable retained in the stepwise regression.

In the end, the hypothesized association between perception of money spent as an investment and student satisfaction was supported. The addition of the INVEST variable to the traditional higher education research model on student satisfaction made a positive and significant contribution to explanation of the phenomenon. The results of this study suggest insight from Prospect Theory adds an additional layer of explanation to the variance in student satisfaction.

One limitation of this study is that the design of the research was cross sectional. As such, other interpretations of the data cannot be precluded, for example, higher satisfaction might

produce a sense that expenditures are positive in nature. Another limitation of this study is that all subjects had majored in business administration or accounting, and the results may not apply to a broader spectrum of majors. A third limitation of this study is that all students had attended a public university. These findings may not be applicable across other institutional types.

Several suggestions can be made for future studies. Future research may seek to determine whether the predictive value of gain-frame perceptions on satisfaction applies in other contexts, including students from other majors and other institution types. By incorporating a sample of students across several institutions and institutional types, future research could also explore differences in costs and rewards associated with obtaining a college degree and how differences in these variables affect student satisfaction. Future studies may also benefit from longitudinal research designs that allow for determination of causal relationships.



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Table I. Variables Examined

Variable Name	Variable Explanation	Measurement
SATED	Indicator of student's satisfaction with their education at the subject institution	I am satisfied with my education at [university name] <sup>a</sup>
ADVISOR	Indicator of student's experiences regarding major advisor	My business administration/accounting advisor has been knowledgeable and approachable <sup>a</sup>
TEACH	Indicator of student's experiences regarding teaching strength	The quality of teaching and instruction from the business administration and accounting faculty has been good <sup>a</sup>
CURRIC	Indicator of student's experiences of curricular challenge	The business administration/accounting curriculum has been appropriately challenging <sup>a</sup>
FACSUPP	Indicator of student's experiences regarding faculty supportiveness	The quality of support from the business administration/accounting faculty has been strong <sup>a</sup>
INVEST	Indicator of student framing of college expenditures as an investment (i.e. "gain-frame")	I view the money I spent on my college education as an investment in my future <sup>a</sup>
GENDER	Dummy variable	Women = 1
MAJOR	Dummy variable	Accounting = 1

<sup>a</sup>Response Scale: (1) strongly disagree to (5) strongly agree.

Table II. Summary of Population and Sample Characteristics

Description	Population	Sample
N	97	79
Male	49 (50.5%)	40 (50.6%)
Female	48 (49.5%)	39 (49.4%)
BUAD	76 (78.4%)	61 (77.2%)
ACCT	21 (21.6%)	18 (22.8%)

Table III. Comparison of Gender and Major Makeup for Population and Sample

Group	Population		Sample		Std. err	Z
	Proportion	N	Proportion	n		
Males	.505	97	.506	79	.056	.018 <sup>ns</sup>
BUAD	.784	97	.772	79	.046	.261 <sup>ns</sup>

<sup>ns</sup> Non Significant. Zcv = 1.96 at alpha.05.

Table IV. Descriptive Statistics: Means, Standard Deviations, and Correlations

Measures	N	Mean	Std.	SATED	INVEST	FACSupp	TEACH	ADVISOR	CURRIC
			Deviation						
SATED	79	4.20	.807	--					
INVEST	79	4.57	.547	.548***	--				
FACSupp	79	4.20	.648	.411***	.321**	--			
TEACH	79	4.18	.615	.650***	.420***	.616***	--		
ADVISOR	79	4.28	.800	.070	.189*	.484***	.237*	--	
CURRIC	79	4.15	.681	.667***	.350***	.452***	.700***	.110	--

\*\*\*p<=.001; \*\*p<=.01; \*p <= .05

Table V. Differences in Satisfaction between Males and Females

Groups	Count	Sum	Average	Variance
MSATED	40	165	4.125	0.830128
FSATED	39	167	4.282051	0.470985

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.487058	1	0.487058	0.746004	0.390427	3.965094
Within Groups	50.27244	77	0.652889			
Total	50.75949	78				

Table VI. Differences in Satisfaction between Business Admin and Accounting Majors

Groups	Count	Sum	Average	Variance
BUADSAT	61	260	4.262295	0.630055
ACCTSAT	18	72	4	0.705882

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.956215	1	0.956215	1.478388	0.227741	3.965094
Within Groups	49.80328	77	0.646796			
Total	50.75949	78				

Table VII. Multivariate Regression Predicting Student Satisfaction

<i>Variable</i>	<i>Standardized Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-	-1.518	0.133
INVEST	.319	3.812	0.000
FACSUPP	.037	.338	0.736
TEACH	.274	2.168	0.034
CURRIC	.362	3.312	0.001
ADVISOR	-.110	-1.251	0.215
MAJACCT	.021	.257	0.798
GENDER	-.011	-.139	0.890

Dependent variable: SATED; Total model  $R^2 = .598$ ; Total model adjusted  $R^2 = .558$ ; Total model F value = 15.09; Total model  $p > F$ : .000.

Table VIII. Stepwise Multiple Regression Predicting Student Satisfaction

<i>Variable</i>	<i>Partial <math>r^2</math></i>	<i>Model <math>r^2</math></i>	<i>F change</i>	<i>Model F</i>
CURRIC	.444	0.444	61.610***	61.610***
INVEST	.113	0.558	19.463***	47.923***
TEACH	.031	0.588	5.572*	35.728***

Dependent variable: SATED; Total model  $R^2 = .588$ . Total model adjusted  $R^2 = .572$ ; Final model standardized coefficients: CURRIC ( $\beta = .381$ ,  $p = .000$ ), INVEST ( $\beta = .309$ ,  $p = .000$ ), TEACH ( $\beta = .254$ ,  $p = .021$ )

\*\*\* $p < .001$ ; \* $p < .05$