Maximizing and Counterfactual Thinking in Academic Major Decision-Making

**Purposes**

This study explores the role of decision making maximization and counterfactual thinking in a students’ satisfaction with their college major, motivation in courses associated with their major, and academic performance. The purposes of this investigation were: 1) to explore whether decision making maximization relates to students’ satisfaction, task value, perceptions of competence, and autonomous regulation in courses related to their college major, as well as their overall academic performance, 2) to explore whether counterfactual thinking might explain the relations between maximization and college major satisfaction, motivation-related outcomes, or academic achievement, and 3) to examine if students vary in their decision making experiences, academic satisfaction, motivation, or achievement outcomes as a function of their chosen college major.

**Theoretical framework**

Academic major satisfaction refers to “satisfaction with one’s field of study” (Nauta, 2007, p. 447). Satisfaction with a decision-making outcome can be best defined as “a post-consumption evaluation of a product or service that results in feelings of fulfillment” (Healey, 2005, p. 88). Traditional thinking suggests that one will experience satisfaction with a decision when the option selected has met the individual’s needs, based on what he or she wanted initially (Healey, 2005). However, people may differ in the goals and strategies they pursue while making a choice and these individual differences may affect subsequent decision satisfaction. More specifically, individuals may fall into one of two general orientations toward decision-making: maximizing and satisficing (Schwartz, 2004; Schwartz, Ward, Monterosso, Lyubomirsky, White,
Maximizers seek to find the best option among alternatives. They believe there is a perfect match to their wants and needs and seek to determine that option. In contrast, satisficers are content with the option that meets their minimum requirements. For their efforts, maximizers often find the best decision but often experience less satisfactions with the outcomes of these decisions (Iyengar, Wells, & Schwartz, 2006; Polman, 2010; Schwartz, 2004; Schwartz, et al., 2002).

One potentially detrimental consequence of adopting a maximizing decision making strategy is the tendency to re-evaluate a decision after it has been made (Schwartz et al., 2002). Counterfactual thinking may occur when one is re-confronted with alternative options after a decision has been made (Schwartz et al., 2002) and thinks about how things might have turned out differently if an alternative option had been selected (Epstude & Roese, 2008; Roese, 1994, 1997; Roese & Olson, 1995). Counterfactual thoughts can be downward, comparing the option selected to a less desirable alternative, or upward, comparing the option selected to a more desirable alternative (Epstude & Roese, 2008, Roese, 1994, 1997; Roese & Olson, 1995). Upward counterfactuals have been linked to guilt, shame, distress, regret, disappointment, and sadness (e.g., Davis, Lehman, Wortman, Silver, & Thompson, 1995; Mandel, 2003; Niedenthal, Tangney, & Gavanski, 1994).

The present study examines the extent to which decision-making maximizing and counterfactual thinking relates to students’ satisfaction with their decision of college major, as well as adaptive motivation and performance outcomes (e.g. task value, perceived competence, autonomous regulation and grade point average). We predicted that individuals who engage in greater maximizing would experience more upward counterfactual thinking about their decision.
of college major and would subsequently feel less satisfaction and lower adaptive motivation and performance in turn.

**Methods**

Participants were 378 juniors and seniors from a large tier-one research university in the southwest region of the country. Juniors and seniors were the focus of the study because students at this university would have already made decisions about their college major. In order to make analyses more parsimonious, we choose to collapse the university major colleges into 3 categories: Liberal/Fine Arts, Natural Sciences, and Applied Sciences. Participants completed a single 114-item survey online that contained demographic questions and seven measures, requiring approximately 30 minutes.

**Materials**

The seven measures included a scale of counterfactual thinking explicitly designed for the purposes of this study based on previous research (Epstude & Roese, 2008; Roese, 1997), Academic Major Satisfaction Scale (AMSS) (Nauta, 2007), The Maximization Scale (Schwartz, et al., 2002), a brief measure of subjective task value (Wigfield, et al., 1997), the Perceived Competence subscale from the Activity-Feeling Scale (Reeve & Sickenius, 1994), and the Learning Self-Regulation Questionnaire (LSRQ) (Black & Deci, 2000). The established scales produced acceptable to good reliability coefficients ($\alpha > .68$) similar to those reported in the development stage of the measures.

Using the literature on counterfactual thinking, we designed a survey which would assess the extent to which student’s experience upward counterfactual thoughts about their academic major decision (e.g.“I often consider how other majors would have allows me more career opportunities/options”). Participants were asked to indicate on a 7-point Likert-style scale the
extent to which each statement was representative of them (7=very much like me to 1=not at all like me). Fourteen items were submitted to an exploratory factor analysis using principal axis extraction with oblique (oblimin) rotation. After removing 3 problematic items that both loaded on the first factor and cross-loaded on a second factor, a one factor solution was found (Eigenvalue = 5.88; all items loaded > .48 on the single factor). Items were averaged to form a counterfactual thinking score with higher values indicated increased likelihood to engage in upward counterfactual thoughts. The scale had excellent reliability with a Cronbach’s alpha of .92.

Results

We conducted a series of one-way analyses of variance (ANOVA) to determine if participants varied on the any of the variables depending on their college major (Applied Sciences, Liberal/Fine Arts, and Natural Sciences). Tukey’s adjustment was used in post-hoc comparisons to interpret specific group differences. Analyses suggested that students varied on four of the seven variables as a function of their chosen major: counterfactual thinking ($F(2, 375) = 9.03, p < .001$), major course value ($F(2, 375) = 5.03, p < .05$), autonomous regulation ($F(2, 375) = 6.84, p = .001$), and GPA ($F(2, 375) = 3.21, p < .05$). Students in Applied Arts displayed fewer upward counterfactual thoughts and greater autonomous regulation than students in either Liberal/Fine Arts and Natural Sciences. Further, students in Applied Arts demonstrated greater value for tasks related to their majors than those in Liberal/Fine Arts and higher GPAs than Natural Science majors. No other comparisons were statistically significant.

A significant positive relationship between GPA and major satisfaction was found. Not surprisingly, a positive relationship was also observed between satisfaction in one’s college major and value, perceived competence, and autonomous regulation for courses and activities
related to one’s major. Likewise, strong positive relations were observed among all three of the motivational variables. Further, both value and perceived competence related to GPA. In line with the expectation that maximizing may be related to greater upward counterfactual thinking, a positive correlation was observed between the two variables. A significant negative relationship was found between maximization and satisfaction, as well as between satisfaction and upward counterfactual thinking. Further, counterfactual thinking was negatively correlated with students’ value, perceived competence, and autonomous regulation for courses and activities related to one’s major, as well as their overall GPA.

Hierarchical regression analyses were conducted to determine if maximization and counterfactual thinking significantly predicted satisfaction, task value, perceived competence, autonomous regulation for one’s academic major, as well as overall GPA, above and beyond the contribution of one’s chosen major college. For all outcomes variables, the addition of maximization and counterfactual thinking significantly increased the amount of variance accounted for above and beyond the contribution of major college. Further, counterfactual thinking negatively predicted value for major coursework, perceived competence in activities related to one’s major, autonomous regulation in activities related to one’s major and overall GPA. That is, students who to a greater extent experienced upward counterfactual thinking felt less satisfaction, value, and competence for activities related to their major, engaged in less autonomous regulation for major activities, and had overall lower academic achievement. Maximizing positively predicted only autonomous regulation when both major college and counterfactual thinking were included in the model. Of particular note, the addition of counterfactual thinking and maximization accounted for 65% of the variance in satisfaction.
Finally, we examined the hypothesis that maximization would predict counterfactual thinking, and that those thoughts would in turn predict academic satisfaction, motivation, and performance. For these analyses, we utilized Baron and Kenney’s (1986) criteria for determining mediation and conducted a series of hierarchical regression analyses to test for these criteria. We began by examining the relation between maximization and satisfaction without the mediator in the model, controlling for major college. Maximization was a significant negative predictor of satisfaction ($\beta = -0.24, p < .001$). Next, we examined the relation between maximization and counterfactual thinking, controlling for major college. Maximization significantly positively predicted counterfactual thinking ($\beta = 0.27, p < .001$). Finally, we estimated the full model with both maximization and counterfactual thinking as predictors of satisfaction with college major. As was already observed in the prior hierarchical regression analyses, counterfactual thinking was a significant negative predictor of satisfaction ($\beta = -0.82, p < .001$). However, the relation between maximizing and satisfaction became nonsignificant ($\beta = -0.02, p = .45$), suggesting that counterfactual thinking fully mediated the relation of maximization and satisfaction. To confirm mediation, the Sobel test (1982) indicated that the decrease in the strength of the relationship between maximization and satisfaction (from $\beta = -0.24$ to $-0.02$) when counterfactual thinking was added to the model was statistically significant ($z = -5.33, p < .001$). Maximization failed to predict the motivation and academic performance outcomes; therefore, mediation effects were not tested.

**Scholarly significance**

Adding to the body of research on counterfactual thinking, results suggested that students who thought about the benefits of other major options to a greater extent reported lower satisfaction. Our results also indicated that thinking favorably about alternative options
negatively influenced students’ value for academic tasks related to major, perceived competence in academic major courses, the extent to which students engaged in autonomous regulation in activities related to their major and academic performance, as measured by self-reported GPA. For students who engage in greater counterfactual thinking, the intrinsic reasons for engaging in major related coursework are diminished. Given the consequences of this maladaptive post-decision thinking, it is little wonder that their overall GPA also suffers.

Further, our results suggested that counterfactual thinking indeed mediated the relationship between maximization and satisfaction. Schwartz et al. (2002) found that maximizers engage in more counterfactual thinking than satisficers and also experience more regret and unhappiness, which our findings replicated. Our results suggest that through upward thoughts, maximizers experience less satisfaction with their academic major decision. Surprisingly, ones likelihood to maximize on his or her decisions did not predict value for major-related coursework, perceived competence or academic performance and positively predicted autonomous regulation in activities related to one’s major. This may be due to the possibility that although maximizing may have a number of negative side effects, maximizers may also be more likely to be highly attentive and even perfectionistic in all their academic pursuits, rendering the relations between maximizing, motivation, and academic achievement negligible.

At a practical level, it is worth noting that our results revealed differences in satisfaction, motivation and academic performance across majors. Specifically, Applied Arts majors appeared to have higher task value, more autonomous regulation, and higher reported GPAs than the other majors in our study. This finding seemed intuitively appealing as it is easy to imagine that students in applied fields may more easily acknowledge the utility value of their courses. Our findings suggest that Applied Arts majors may be more intrinsically motivated to succeed in their
courses and perform better academically than other majors. An interesting result was that Liberal/Fine Arts majors produced more upward counterfactual thoughts than other majors. These students may be concerned about employment opportunities within these fields and questioning the benefits of the courses they have taken.

Finally, this is the first study to our knowledge to examine the role of either maximizing or counterfactual thinking in students’ decision of college major. Future research should work to better establish causal relations and long-term effects among these constructs in longitudinal designs.
References


Figure 1. Model Illustrating Counterfactual Thinking as a Mediator in the Relation between Maximization and Satisfaction.

Note. Paths are all standardized regression weights.