

A Comparison of Ethical Perceptions of Business and Engineering Majors

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ABSTRACT. Previous research has reported that ethical values of business students are lower than those of their peers in other majors. The purpose of this study was to investigate whether a self-selection bias with respect to ethical values exists among students enrolled as business majors when compared with students planning to enter the engineering profession. Engineering students are exposed to a similar technical orientation in academic curricula and also supply the market for managers.

A survey instrument was administered to 195 students enrolled in undergraduate business and engineering programs and a graduate business program. The research instrument measured how business and engineering students perceive their own ethical beliefs and actions and how they perceived the ethical beliefs and actions of their peers.

The results indicate a perceptual trap, or the self-versus-others disparity exists for the entire sample. However, there was a divergence between the two groups on the issue of "whistle blowing." Engineers may be more sensitive to this issue. It was concluded that if a self-selection process exists, it is present for both business and engineering professional tracks with implications for educators in both disciplines.

It is not enough to teach a man a specialty. Through it he may become a kind of useful machine, but not a harmoniously developed personality. It is essential that the student acquire an understanding of and a lively feeling for values. He must acquire a vivid sense of the beautiful and of the morally good. Otherwise he — with his specialized knowledge — more closely resembles a trained dog than a harmoniously developed person. He must learn to

understand the motives of human beings, their illusions, and their sufferings in order to acquire a proper relationship to individual fellow men and to the community.

— Albert Einstein

Introduction

The ethical development of today's managers is an area of recent major concern. The press has published numerous reports of the unethical conduct of top executives on Wall Street, in the savings and loan industry, in the defense industry, and at the university level. The Ivan Boesky—Michael Milken scandals, Charles Keating and the "Keating Five", BCCI, Morton Thiokol, and suspected misuse of research grant funds at Stanford University are but a few of the many incidents of unethical practices captured by the media. In many cases the actions were not only unethical but also illegal, while in others the behavior would, at a minimum, be considered shady. The need to address the development of ethical values is widely accepted across professions. Given the significant number of ethics violations that involve professionals in business careers, a question exists as to whether the individuals who pursue careers in business have less developed ethical values than other professions.

Previous research has reported that the ethical values of business students are lower than those of their peers in other majors. The purpose of this study is to investigate whether a self-selection bias with respect to ethical values exists among students who enroll in business majors when compared with students planning to enter the engineering profession. Do students with less developed ethical beliefs self-select into a business career track?

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Many of today's managers have received their professional training and education in the business or engineering disciplines. The students graduating from academic programs in business and engineering are similar in their preparation to enter a profession. Both disciplines emphasize respective technical specialties along with the requisite skills and knowledge. However, the pre-professional manager or engineer may be inadequately prepared to be a professional without a fully developed value system reflecting an appropriate sense of public welfare.

The development of major professions such as medicine, law, engineering, and accounting has followed a common path in history. Beginning in the latter half of the nineteenth century their members formed professional associations, established educational standards and curricula requirements, adopted codes of ethics, and controlled licensing and regulation procedures within the states. Many of the early codes of ethics were restricted to considerations of responsibilities of the professional. After World War II, many codes were revised to show concern for public welfare. In contrast to medicine and law, the contemporary business and engineering curricula requirements do not include mandatory courses in ethics.

Business majors include management, marketing, finance, business administration, economics, and accounting. Accountants are perceived as members of one of the most ethical professions (Touche Ross, 1988). Members of the accounting profession are guided by a Professional Code of Conduct, as are professional engineers. Accountants, however, have not been spared from recent headline coverage of unethical practices (WSJ, July 23, 1991). Studies that have compared the ethical values of accounting students with other business students revealed no significant difference exists and in one case accounting majors scored lower than their peers in other business majors (Arlow and Ulrich, 1980; Fulmer and Cargile, 1987).

Few business schools have separate required courses in business ethics and The Hastings Center reported in 1980 that no more than 20 out of 250 engineering schools in the country have separate courses devoted to engineering ethics (pp. 40–43). In recognizing the need for ethics in education, many business and engineering programs have inte-

grated the discussion of ethics into multiple courses. Accredited electrical engineering curricula specifically require that ethical issues be addressed in a design course. Both professions lack people trained and experienced in ethics in their respective professions. Cohen and Pant (1989, pp. 78–80) concluded that current coverage of ethics depended upon the initiative of individual professors. As a result, there is a shortage of coherent, scholarly literature in applied ethics related to the respective disciplines of business and engineering.

Motivation for the study

Both business and engineering professionals face essentially parallel discordances in all levels of the work environment. These discordances arise from personal ethical dilemmas associated with whistle blowing, charging work time to other accounts (known as bootlegging in engineering), padding expense accounts, accepting or giving kickbacks, competitive bidding, bribery, confidentiality, and conflicts of interest.

Newstrom and Ruch (1975) surveyed managers who were enrolled in a professional development course. The authors reported that little scholarly attention has been directed toward analysis of micro-level unethical behaviors and that persons who actively practice or condone "small" indiscretions may have an eventual tendency to become engaged in more serious activities. The present study investigates the ethical perceptions of business and engineering students related to behaviors that are not illegal but would certainly be considered questionable practices.

The purpose of this study is to analyze, compare and contrast the ethical perceptions and behaviors of business and engineering students in undergraduate and graduate level courses with respect to work related situations involving personal choice with ethical ramifications. Given the similarities that exist between the two professions with respect to technical training and ethical dilemmas encountered in the work environment, this study investigates the similarities and differences in ethical perceptions between students selecting these respective professional careers. Previous research has reported that

business students exhibit lower ethical values than other majors (Newstrom and Ruch, 1976; Goodman and Crawford, 1974; Hawkins and Cocanougher, 1972; Shuptrine, 1979). It would be interesting to know if this finding is maintained when the ethical perceptions of business majors are compared to those in a specific major, such as engineering, where two distinct similarities exist: (1) the technical emphasis of academic preparation for the profession, and (2) both disciplines supply the market for managers. The question regarding the ethical beliefs of these two groups is first investigated at the undergraduate level. The ethical development of students trained in business and engineering academic programs is then compared at the graduate level in order to determine if increased exposure to the work environment will impact their ethical perceptions.

On-the-job research of business ethics has revealed a self-versus-other disparity or a perceptual trap. People perceive themselves to be more ethical than their peers. (Baumhart, 1961; Newstrom and Ruch, 1975; Ferrell, 1978). Newstrom and Ruch (1975) contend that peer groups provide a strong negative reference model for individual behavior, making it difficult to change individual codes of ethics. This contention suggests that "ethics is personal" due to an individualized set of ethical standards.

There is a belief that educators have an opportunity to influence ethical behavior because of the differences in the ethical perceptions between students and managers. In the studies involving students and managers as subjects, the consensus reported that business practitioners are less tolerant of questionable business practices than students (Purcell, 1972; Hollon and Ulrich, 1979; Arlow and Ulrich, 1980; and Stevens, 1984).

The present study extends previous research by investigating the ethical perceptions of business and engineering students to determine if differences exist prior to completion of their education. This study also examines the ethical perceptions of these two groups at the graduate level.

Methodology

In order to investigate similarities and differences in the beliefs, behaviors, and perceptions of students

who major in business versus engineering, a questionnaire was administered at three midwestern universities. The research instrument was completed during class time in accounting courses, engineering courses, and an MBA managerial accounting course with voluntary participation and assured anonymity. The next section describes the student participants and is followed with a discussion of the research instrument.

Subjects

A total of 218 students participated in this study but, after screening for incomplete questionnaires and eliminating majors other than business or engineering, the responses of 195 students were analyzed. The median age of the 195 participants was twenty-three. Sixty percent were at the undergraduate level and 40% were graduate students enrolled in an MBA program. The undergraduate students indicated the major in which they were enrolled and the MBA students were asked to provide the specific area in which an undergraduate degree had been earned. Seventy-eight percent of the undergraduate participants were male and 70% of the MBA students were male. Since there were only three female engineering majors, the sample population was skewed toward male dominance.

Undergraduate business majors were surveyed at one university, undergraduate engineering majors at a second university, and MBA students at the third. Cronbach's α was calculated for each variable measure across the three locations to test for reliability. For all variables but one, α was ≥ 0.67 . The participants at the undergraduate level had a median class rank of junior with 57% declared as business majors and 43% majoring in electrical engineering. Included in the sample of graduate students were 22% with an undergraduate degree in engineering and 78% with an undergraduate business degree. The average number of working years for graduate students was 7.9 (median of 6.5 years) and 73% had experience at the manager level. Forty-six percent of the undergraduate students had management experience and the students had worked an average of 5.7 years (median of 5). Sixty-seven percent of the entire sample had been employed by small firms (50

employees or less) and 33% had worked for large companies (more than 50 employees).

Research instrument

The questionnaire that was used in this study was a modification of a survey instrument administered to managers enrolled in a professional development program (Newstrom and Ruch, 1975).¹ The questions were designed to measure how business and engineering students perceive their own ethical beliefs and actions and how they perceive the ethical beliefs and actions of their peers.

Twelve behavioral situations were described, none of which included an overt unethical act. For each of the twelve situations the participant was asked to respond to the situation from four perspectives: (1) personal belief as to whether the act is unethical, (2) perception of co-workers' beliefs as to whether the act is unethical, (3) how frequently they had engaged in the behavior, and (4) how frequently they thought their peers engaged in the behavior. Responses were measured on a five point Likert-type scale. The first two questions regarding beliefs were anchored at "unethical" (1) and "not unethical" (5). Responses to the latter two questions with respect to frequency of actions of the participants and their perceptions of peers actions were anchored at "never" (1) and "frequently" (5). The behavioral situations varied on the dimensions of number of individuals involved and the degree of active/passive involvement. All the actions represented some degree of "cheating" and many could be interpreted as in a "grey" area rather than blatant unethical behavior. An analysis of the results of this study is presented in the following section.

Results

Table I presents the mean scores for undergraduate business majors, comparing personal beliefs with perceived beliefs of co-workers; personal actions with perceived actions of co-workers. Significant differences in mean scores were measured using a two-tail t-test. In all situations, except item (5), differences were significant at a $p < 0.01$ level. Respondents indicated they believe each situation to

be a more unethical behavior than they think their peers view the behavior to be. Likewise, they reported that they personally engage in the behavior less frequently than they think their co-workers do. The "most" unethical situations were believed to be (2) passing blame for errors to an innocent co-worker and (4) claiming credit for someone else's work, with corresponding less frequent practice of those behaviors. Comparison of mean scores for item (5), not reporting others' violations of organization policies, indicated no significant difference in the way respondents believed/acted and the way they thought their peers believed/acted. This behavior (not whistle-blowing) was ranked as one of the most "not unethical" situations and also the most frequent behavior (of the twelve). The participants feel little ethical responsibility to report others' violations and frequently do not report such violations.

An analysis of the comparisons of beliefs and behavior of undergraduate engineering majors with their perceived beliefs and behaviors of co-workers (Table II) reveals similar findings. The undergraduate engineers also indicate that they believe the action to be more unethical than they think co-workers believe it to be. They, too, report practicing the behavior less frequently than they think their peers practice the behavior. The most distinct difference between undergraduate business and engineering respondents is with respect to item (5). Undergraduate engineers indicate a significant difference for this item in their perceptions of their own beliefs/actions when compared to the beliefs/actions of their co-workers ($p < 0.05$). This finding indicates that engineering students believe it is more unethical than they think their peers do to "not whistle blow" with corresponding perceptions regarding frequency of action.

Both undergraduate business and engineering majors exhibit the self-versus-other disparity in each of the evaluated situations except for the "whistle blowing" issue. Undergraduate business majors indicate no significant difference between the manner in which they, themselves, perceive the ethics of the issue and the way their peers perceive it. This finding implies that to not report others infractions is the accepted norm. The ethical implications of "not whistle blowing" are more cognizant to the engineering students. This group may be more sensitive to the type of violations of organizational policy that

TABLE I
Comparison of respondents own beliefs and behavior with perceived beliefs and behavior of co-workers
Undergraduate business majors (mean score)^c

	What I believe ^a	What co-workers believe ^a	What I do ^b	What co-workers do ^b
1. Accepting gifts/favors in exchange for preferential treatment	1.83	2.45	1.88	2.43
2. Passing blame for errors to an innocent co-worker	1.18	2.00	1.46	2.48
3. Giving gifts/favors in exchange for preferential treatment	1.76	2.21	1.79	2.24
4. Claiming credit for someone else's work	1.21	2.04	1.42	2.67
5. Not reporting others' violations of organization policies	2.93*	2.99*	3.03*	3.07*
6. Divulging confidential information	1.55	2.27	1.72	2.55
7. Calling in sick to take a day off	2.57	3.60	1.85	3.36
8. Pilfering organization material and supplies	1.78	2.89	1.93	2.85
9. Doing personal business on organization time	2.46	3.22	2.39	3.24
10. Concealing one's errors	2.52	3.12	2.66	3.15
11. Taking extra personal time (lunch hours, breaks, early departure)	2.61	3.30	2.36	3.46
12. Using organization services for personal use	2.75	3.31	2.40	3.16

^a A low mean score indicates the behavior is believed to be unethical.

^b A low mean score indicates the behavior is practiced infrequently.

^c Mean score for "I believe" is compared with mean score for "co-workers believe; Likewise, "I do" compared with "co-workers do"; differences between mean scores are significant at < 0.01 for all comparisons except "*"s which are not significant.

co-workers might commit that could cause physical harm to innocent parties. The engineering students also view themselves as significantly more ethical than their peers with respect to this issue.

In Table III, comparisons of the mean beliefs, perceptions, and behaviors of MBA students are reported. Again, these comparisons are similar to the results reported in Table I with respect to undergraduate business majors. Differences between beliefs/perceived beliefs and frequency of behavior/perceived frequency are not significant for item (5) but all other comparisons are significant at $p < 0.01$. However, graduate students do not view this action (not reporting others' violations of organizational policies) as the least unethical. Taking extra personal time is reported as believed to be the least unethical

act but "not whistle blowing" is still the most frequently reported personal behavior and perceived behavior of peers.

The responses of all three groups revealed the self-perception trap. This recurring phenomenon across the entire sample is clearly illustrated in Figure 1. The subjects report that they engage in the action (Q1 to Q12) significantly less frequently than they think their co-workers do for each of the situations except the "whistle blowing" issue (Q5) previously discussed.

In order to facilitate interpretation of the findings of this study, the data were examined by applying factor analysis (principal components) and three significant constructs emerged.² One construct included those actions that affected only the individual

TABLE II
Comparison of respondents own beliefs and behavior with perceived beliefs and behavior of co-workers
Undergraduate engineering majors (mean score)^c

	What I believe ^a	What co-workers believe ^a	What I do ^b	What co-workers do ^b
1. Accepting gifts/favors in exchange for preferential treatment	1.86	2.33	1.78	2.34
2. Passing blame for errors to an innocent co-worker	1.22	1.96	1.30	2.38
3. Giving gifts/favors in exchange for preferential treatment	2.04	2.44	1.86	2.32
4. Claiming credit for someone else's work	1.38	2.12	1.44	2.38
5. Not reporting others' violations of organization policies	2.38*	2.78*	2.54*	2.78*
6. Divulging confidential information	1.54	2.02	1.66	2.14
7. Calling in sick to take a day off	2.38	3.28	1.68	3.04
8. Pilfering organization material and supplies	1.82	2.66	2.14	2.64
9. Doing personal business on organization time	2.08	2.86	2.14	2.98
10. Concealing one's errors	2.30	2.88	2.32	2.98
11. Taking extra personal time (lunch hours, breaks, early departure)	2.28	3.00	2.30	3.04
12. Using organization services for personal use	2.64	3.02	2.34	2.94

^a A low mean score indicates the behavior is believed to be unethical.

^b A low mean score indicates the behavior is practiced infrequently.

^c Mean score for "I believe" is compared with mean score for "co-workers believe; Likewise, "I do" compared with "co-workers do"; differences between mean scores are significant at < 0.01 for all comparisons except "*"s which are significant at < 0.05 .

(items 1 and 3). A second construct included those items that would impact co-workers (items 2, 4 and 6). The remaining items (5, 7, 8, 9, 10, 11, 12) are actions that are directed against the "company" rather than individuals. The respondents' mean beliefs and self-reported frequency of behavior were analyzed with respect to each of these constructs. Results of this analysis are reported in Tables IV and V.

Comparisons of the mean beliefs and self-reported behavior of business majors with engineering majors, at both the undergraduate and graduate level, are reported in Table IV. Analysis of these comparisons reveals a significant difference ($p < 0.05$) in the beliefs of business versus engineering students re-

garding actions that apparently harm the company only. Both undergraduate and graduate business students are more tolerant of these actions than the engineering students.

At the graduate level, there is a significant difference ($p < 0.01$) between the two majors in two constructs: (1) graduate students with a business background believe actions that affect peers are less unethical than the reported belief of graduate students with an engineering background; (2) the business majors report engaging in behavior that affects their personal advancement (giving/taking gifts) more frequently than the engineering majors report practicing this behavior. The latter finding may be due to business managers encountering this par-

TABLE III
Comparison of respondents own beliefs and behavior with perceived beliefs and behavior of co-workers
Graduate students majors (mean score)^c

	What I believe ^a	What co-workers believe ^a	What I do ^b	What co-workers do ^b
1. Accepting gifts/favors in exchange for preferential treatment	1.75	2.32	1.63	2.33
2. Passing blame for errors to an innocent co-worker	1.14	1.95	1.18	2.36
3. Giving gifts/favors in exchange for preferential treatment	1.96	2.48	1.88	2.33
4. Claiming credit for someone else's work	1.21	2.24	1.31	2.59
5. Not reporting others' violations of organization policies	2.96*	2.99*	2.77*	2.98*
6. Divulging confidential information	1.42	1.96	1.48	2.16
7. Calling in sick to take a day off	2.74	3.37	1.92	2.99
8. Pilfering organization material and supplies	2.12	2.80	2.18	2.90
9. Doing personal business on organization time	2.75	3.23	2.67	3.23
10. Concealing one's errors	2.57	3.00	2.13	2.91
11. Taking extra personal time (lunch hours, breaks, early departure)	3.08	3.48	2.62	3.32
12. Using organization services for personal use	2.88	3.30	2.43	2.99

^a A low mean score indicates the behavior is believed to be unethical.

^b A low mean score indicates the behavior is practiced infrequently.

^c Mean score for "I believe" is compared with mean score for "co-workers believe; Likewise, "I do" compared with "co-workers do"; differences between mean scores are significant at <0.01 for all comparisons except "*"s which are not significant.

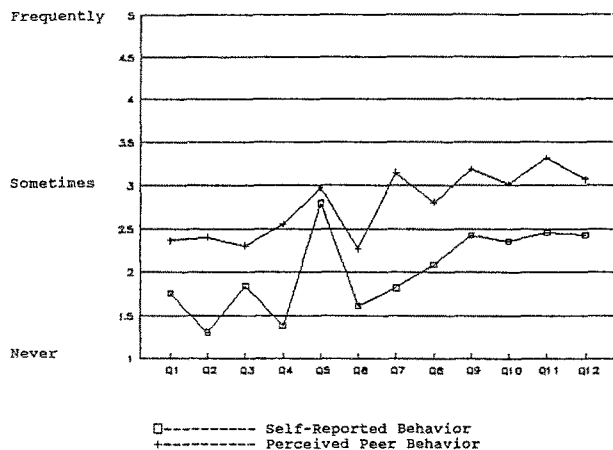


Fig. 1. Mean frequency of self-reported and peer behavior.

ticular situation more frequently than engineers. A typical engineer may not be in a position to affect personal advancement by giving/taking gifts.

Table V presents comparisons of mean beliefs and actions of undergraduate students with graduate students for both majors. The higher mean belief score of MBA students, with a business undergraduate degree, indicates that they are more tolerant of actions that involve "cheating" the company than the undergraduate business majors ($p < 0.01$). There are no other significant differences in mean beliefs or behaviors between undergraduate and graduate business majors.

When responses of undergraduate engineering majors were compared with those of MBA students with an engineering background, a significant differ-

TABLE IV
Comparison of mean beliefs and behavior
Business majors with engineering majors

	Undergraduate		Graduate	
	Business	Engineering	Business	Engineering
Belief — individual effect only	3.58	3.90	3.88	3.00
Belief — co-worker effect	3.94	4.14	3.82**	3.12**
Belief — company effect	17.57*	15.88*	19.98*	17.18*
Do — individual effect only	3.67	3.64	3.82**	2.59**
Do — co-worker effect	4.60	4.40	4.17	3.53
Do — company effect	16.61	15.46	17.15	15.59

* Difference between mean scores is significant at < 0.05 .

** Difference between mean scores is significant at < 0.01 .

Note: The lower mean score for belief constructs indicates a higher belief that the behavior is unethical. The lower mean score for the conduct constructs indicates a lower frequency of practicing the behavior.

TABLE V
Comparison of mean beliefs and behavior
Undergraduates with graduates

	Business majors		Engineering majors	
	Undergrad	Graduate	Undergrad	Graduate
Belief — individual effect only	3.58	3.88	3.89	3.00
Belief — co-worker effect	3.94	3.82	4.14*	3.12*
Belief — company effect	17.57**	19.98**	15.88	17.18
Do — individual effect only	3.67	3.82	3.64**	2.59**
Do — co-worker effect	4.60	4.17	4.40*	3.53*
Do — company effect	16.61	17.15	15.46	15.59

* Difference between mean scores is significant at < 0.05 .

** Difference between mean scores is significant at < 0.01 .

Note: The lower mean score for belief constructs indicates a higher belief that the behavior is unethical. The lower mean score for the conduct constructs indicates a lower frequency of practicing the behavior.

ence ($p < 0.05$) was found with respect to beliefs and corresponding frequency of behavior related to actions that affect co-workers. Undergrads are more tolerant of these actions than the graduate students and report practicing this behavior more frequently. There is also a significant difference ($p < 0.01$) in the frequency of action with respect to acts that affect only the individual engaging in the behavior. Undergraduate engineers are more likely to give/accept gifts for personal advancement than graduate students with an undergraduate engineering major.

Previous research has reported that managers are less tolerant of unethical behavior than students (Purcell, 1972; Hollon and Urich, 1979; Arlow and Ulrich, 1980; and Stevens, 1984). In the present study, the beliefs and actions of participants with management experience were compared with those of subjects who reported no experience as managers. The comparisons were made for the entire sample and also for undergraduate and graduate levels with no significant differences occurring in any of the constructs.

Given the results reported above regarding the differences in beliefs between business and engineering students with respect to reporting others' violations of company policy, the responses to this one question were compared across majors and across class level. This particular situation was the only one (of the twelve) that was passive, rather than active in dimension. The results of these comparisons are reported in Table VI.

TABLE VI

A comparison of respondents mean beliefs and actions with respect to not reporting others' violations of organizational policy

	What I believe ^a	What I do ^b
Undergraduate: Business majors	2.93**	3.03**
Engineering majors	2.38**	2.54**
Graduate: Business majors	2.98	2.79
Engineering majors	3.06	2.71
Business majors: Undergraduate	2.93	3.03
Graduate	2.98	2.79
Engineering majors: Undergraduate	2.38*	2.54
Graduate	3.06*	2.71

^a A low mean score indicates the behavior is believed to be unethical.

^b A low mean score indicates the behavior is practiced infrequently.

* Difference between mean scores is significant at < 0.05 .

** Difference between mean scores is significant at < 0.01 .

At the undergraduate level, there was a significant difference ($p < 0.01$) in the beliefs and actions of business students versus the beliefs and actions of engineering students. The engineering students are less tolerant of "not reporting" and also indicate a higher tendency to report others' violations than the business students. There was no significant difference between the two majors at the graduate level.

When a comparison was made within the major across class level, there was no significant difference between the beliefs/actions of undergraduate business majors and graduate business majors. Graduate engineering majors are significantly ($p < 0.05$) more

tolerant of "not reporting" than undergraduate engineering majors, but there is no significant difference in their self-reported actions. These results imply that although the business students report a lower ethical value regarding this action at the undergraduate level, the difference no longer exists at the graduate level. The shift is apparently due to the engineering majors lowering their ethical perceptions of this action and becoming more tolerant of not "whistle blowing," as indicated in Table VI.

Summary and implications

The results of this study replicate the findings reported by Newstrom and Ruch (1975). Both business and engineering majors perceive themselves to be more ethical than their peer group in beliefs and actions, with one exception. Perceptions of the "whistle blowing" issue differ between groups. Business majors believe they share a common belief with their co-workers on the "whistle blowing" issue whereas engineering majors believe their peers are more likely to "not whistle blow" than they, themselves, are. Both groups considered "not reporting others" to be generally acceptable behavior relative to the other situations that were evaluated.

The source of bias that exists in all the other behavioral situations remains to be determined. Are the respondents less ethical than they indicated or are their peers more ethical than they are perceived? If an "everybody's doing it but me" perception exists, the individual may be more likely to conform to what he/she considers the norm. With respect to "whistle blowing," consequences associated with this ethical dilemma, such as physical harm due to faulty product design, are more likely to be encountered by the professional engineer and, therefore, this group may be more sensitive to the particular issue.

Harris (1990) reported that more experienced subjects tend to be less tolerant of unethical behavior. This finding is only partially validated by the results presented above. MBA students with undergraduate business degrees are more tolerant than the undergraduate business majors of unethical actions, particularly those situations that involve stealing from the company, an impersonal organization. Whereas, MBA students with undergraduate degrees in engineering are less tolerant than undergraduate

engineering majors of unethical acts that are personal or harm their co-workers. These results indicate that ethical values vary on multi-dimensional levels.

The differences between the ethical values and corresponding actions of undergraduate business and engineering majors were generally not significant. If a self-selection process exists it is present for those choosing either professional career track. Since previous studies have reported that business students have lower ethical values than other majors, this "no difference" finding is not a particularly favorable finding for the engineering students. This result, however, is not surprising given the previously mentioned similarities between these two disciplines. This finding with respect to similar ethical perceptions serves to re-emphasize the need for educators to address ethical issues in undergraduate curricula in both professions.

MBA students with business training reported lower ethical values than those with engineering backgrounds. A shift in ethical perceptions had occurred but the cause of the shift was not explored. The shift in ethical values was in both directions. MBA students with an undergraduate business degree were more tolerant of unethical acts while MBA students with an engineering degree were less tolerant of unethical acts when compared to undergraduate majors in the respective disciplines. Future research should investigate the factors that cause these changes.

External validity of the results of this study is limited by several factors. The sample population was limited to three midwestern universities. The male dominance of the subject population further limits generalizability and precludes an investigation of the gender issue. An expanded sample population to other locations and including more female participants is recommended for future studies. This area of research could also benefit from an extended attempt to isolate the source of the self-perception trap. This study identified similar ethical perceptions between the two groups at the undergraduate level but not at the graduate level. However, this research did not investigate if the ethical beliefs, perceptions, and actions of these two groups differ from those of other majors, such as students enrolled in a liberal arts curriculum.

The ethical implications of the behavioral situa-

tions investigated in this study varied in magnitude. They were not overt illegal acts but each presented an ethical dilemma that could typically be encountered in the work environment. Individuals who tolerate and practice small infractions are more likely to condone more serious acts. The educational programs for business and engineering must expand beyond their narrow technical focus. Preparation of students to be professional managers encompasses more than providing technical expertise. Educators need to overcome their self-satisfaction with cursory coverage of ethics in the respective curricula. A required course in professional ethics may be a first step toward developing managers who are ethical thinkers with "an understanding and lively feeling for values" (Einstein, 1952). In addition to a required course, discussions of ethical implications should be integrated in course work throughout the curriculum. To do so will require an investment of time and capital to train faculty who are qualified to discuss and analyze ethics issues in the classroom. Students need to think about ethical issues and how they as individuals will deal with them before they are confronted with the situation in the work environment.

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Notes

- ¹ Used with permission of the authors.
- ² Varimax rotation and Eigen value > 1.

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