

Ethical Context and Ethical Decision Making: Examination of an Alternative Statistical Approach for Identifying Variable Relationships

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Abstract The purpose of this study was to investigate the relationship between organizational ethical context and the individual ethical decision-making process. In addition, a new statistical approach combining cluster and discriminant analyses was developed to overcome violations of regression assumptions, which are commonly not identified and/or ignored in behavioral and psychological research. Using regressions and this new alternative method, the findings indicated that ethical context does indeed influence the various components of ethical reasoning. However, social desirability was the strongest predictor of ethical decision making, which raises new concerns about how this bias can confound business ethics research. Finally, the findings showed that the alternative method provided more useful and interpretive results, indicating that it has the capacity to influence future empirical work in the field of business ethics, particularly when dealing with data that do not satisfy regression assumptions. The implications and limitations of the study are discussed, and several noteworthy suggestions for future research are provided.

Keyword · Ethical values · Ethical context · Ethical decision making · Statistical analysis

Introduction

The impact of corporate ethics on employees has received a great deal of attention in the organizational sciences (see Ford and Richardson 1994; Kish-Gephart et al. 2010; Loe et al. 2000; McClaren 2000; O'Fallon and Butterfield 2005). Indeed, the institutionalization of ethical practices often encourages individuals to believe more strongly that their employers are ethical. These beliefs often lead to a variety of positive job responses, including enhanced job satisfaction and organizational commitment (Deshpande 1996; Fritz et al. 1999; Herndon et al. 2001; Hunt et al. 1989; Jaramillo et al. 2006; Kelley and Dorsch 1991; Kim et al. 2010; Konmee et al. 2010; Rego et al. 2010; Stites and Michael 2011; Trevino et al. 1998; Turker 2009; Viswesvaran et al. 1998; Viswesvaran and Deshpande 1996; Vitell and Davis 1990), decreased turnover intentions (Herndon et al. 2001; Mulki et al. 2009; Valentine et al. 2006, 2011), and other positive work perceptions and tendencies (Herrbach and Mignonac 2007; Jaramillo et al. 2006; Moser 1988; Schwepker 1999; Sims and Keon 1997; Sims and Kroeck 1994; Valentine et al. 2002). Such beliefs also encourage workers to internalize ethical values, enhancing the likelihood that they will reason and behave more ethically (e.g., Douglas et al. 2001; Jones and Kavanagh 1996; Singhapakdi 1999; Singhapakdi and Vitell 1991; Singhapakdi et al. 2000; Wimbush et al. 1997). In this sense, ethical practices and policies work together to form an ethical context that establishes standards for appropriate decision making.

Despite the generalized acceptance that ethical context enhances the workplace, some research raises doubt about

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the ability of organizational ethics and compliance, including programs such as ethics codes and training, to consistently influence individual ethics (e.g., Izzo 2000; Paolillo and Vitell 2002; Schwartz 2000; Stevens 2008; Waples et al. 2009). For instance, some studies show that organizational ethics does not directly influence ethical decision making (Douglas et al. 2001; Paolillo and Vitell 2002), while other research shows that an ethical environment directly impacts only certain steps of the process (Barnett and Vaicys 2000; Valentine and Barnett 2007; Valentine et al. 2010a). Additionally, past work has not explored how the perceived importance of an ethical issue (PIE), a component of ethical reasoning that reflects how a person believes an ethical problem is noteworthy, might be affected by ethical context. Consequently, the purpose of this study was to investigate the degree to which three perceptual measures of ethical context, corporate ethical values (CEV), ethical culture (EC), and corporate social responsibility (CSR), are associated with PIE and three steps of ethical reasoning, including recognition of an ethical issue, ethical judgment, and ethical intention (see Fig. 1).

These relationships will also be comparatively examined using two distinct analytical approaches: (1) traditional regression/ordinary least squares (OLS) models and (2) an alternative statistical method that overcomes the inherent assumptions and limitations of regression. When using regression, observations should be independent from one another, and the data collected should be normally distributed (Yu 2012). The error terms should also be normal and, when summed, should produce a value of 0. Homoscedasticity should also exist so that the variance of the error term is constant (Crewson 2006).

Several studies have identified that violating these assumptions is common among researchers, as identified through literature reviews by Yu (2012). Yu refers to Glass et al.'s (1972) research that suggests violation of

assumptions do not critically affect parametric tests. Keselman et al. (1998) researched several statistical practices and analyzed their adherence to corresponding assumptions. It was determined that after analyzing researchers' use of statistical practices, researchers seldom assess the corresponding validity assumptions. Breckler (1990) studied the use of covariance structure modeling, which is commonly used to research psychology, marketing, and consumer behavior. It was found that researchers commonly violate the corresponding assumptions. In the 72 articles analyzed, only 14 verified the assumption of multivariate normality and only seven acknowledged that this assumption was indeed violated in their study (Breckler 1990). Micceri (1989) found that common parametric statistical tests "exhibit varying degrees of nonrobustness to certain violations of the normality assumption" (p. 156). At the alpha .01 significance level, a majority of the data collected in the behavioral sciences were found to be non-normal (Micceri 1989). Consequently, a statistical approach that identifies variable linkages without violating assumptions would be beneficial to ethics scholars.

From a practical perspective, this study is important because a strong relationship between ethical context and ethical reasoning suggests that organizations would be better served by developing programs and policies that institutionalize ethics in the workplace. By establishing a strong ethical culture/climate, companies should expect to see incremental improvements in employees' ability to make ethical decisions, leading to a more ethical workplace (and the potential for other positive consequences). From a research perspective, utilizing a statistical technique that compensates for violations of the regression assumptions would benefit the ethics literature. In particular, there is reason to believe that many of the basic assumptions associated with OLS models are often overlooked or ignored in research that explores human psychology and behavior. Indeed, a common and widely accepted practice

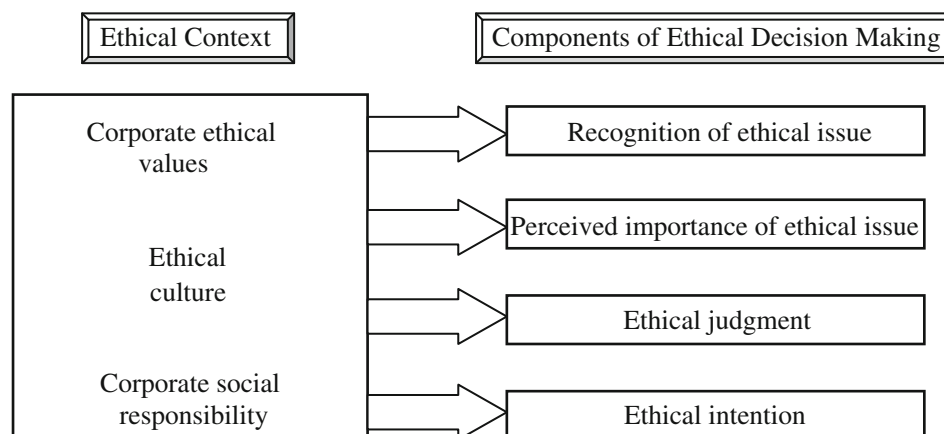


Fig. 1 Hypothesized relationships

is to assume that violations of regression assumptions will not significantly affect hypothesis testing, which may or may not be the case, particularly when dealing with marginally significant variable relationships. One aim of this research is to provide an alternative statistical approach that mitigates these concerns by using multi-method analyses to identify variable relationships.

Review of Literature

Ethical Context

Ethical context is comprised of the principles, social norms, and actions that support ethical decision making and behavior in the workplace (Hunt et al. 1989; Trevino et al. 1998; Valentine and Barnett 2007). These ethical values are “a composite of individual ethical values of managers and both the formal and informal policies on ethics of the organization” (Hunt et al. 1989, p. 79). Since ethical processes and beliefs are ideally institutionalized throughout the ranks of the organization (Sims 1991), ethical context includes the overall ethical culture of an organization, as well as the more specific ethical climates (or subcultures) that influence the behaviors of different groups employed in a company (Trevino et al. 1998; Victor and Cullen 1988). As such, an ethical environment can be supported by management’s efforts at all levels to reward appropriate conduct and to punish unethical acts (Ferrell et al. 2008; Hunt et al. 1989; Trevino and Nelson 2011). It can also be strengthened by a leadership team that supports a company ethics with their words and deeds (Jose and Thibodeaux 1999; Minkes et al. 1999; Mulki et al. 2009; Viswesvaran et al. 1998). Leaders can help strengthen an ethical context by acting as good ethical role models and articulating corporate values.

Ethical context is also established by an organization’s involvement in activities related to social performance, or actions that enhance stakeholder well-being and support philanthropic, ethical, legal, and economic responsibilities (Carroll 1979; Ferrell et al. 2008; McAlister et al. 2005; Trevino and Nelson 2011). For instance, Carroll (1979) developed a four-component model of social responsibility for organizations that highlight a number of key responsibilities, including “additional behaviors and activities that are not necessarily codified into law but nevertheless are expected of business by society’s members” (Carroll 1979, p. 500). These efforts ultimately enable an organization to promote greater legitimacy for itself because the expectations of various parties that have interests in the company are satisfied (Wood 1991; Zenisek 1979). If CSR is conducted in a strategic manner, both company and societal objectives can be met by recognizing the obligations the

different groups have to each other for the development of a collective well-being (McAlister et al. 2005).

Finally, ethical context is generally more robust when ethics programs are used (Chua and Rahman 2011; Kaptein 2011; Schwartz 2001; Weaver et al. 1999). For instance, developing ethics codes and introducing them to employees can strengthen corporate ethics (Adams et al. 2001; Somers 2001; Valentine and Fleischman 2008a; Valentine et al. 2010a, b). For example, Valentine and Barnett (2002) hypothesized that the existence of ethics codes within organizations can “strengthen employees’ perceptions of an organization’s ethical values and practices” (p. 193) and found that sales professionals whose organizations had an established code of ethics were more likely to perceive their employers were ethical compared to individuals whose organizations did not have an established ethics code. Organizations can also create ethics training sessions to introduce important business values and practices (Schwepker and Hartline 2005; Somers 2001; Valentine 2009; Valentine and Fleischman 2004). The overriding goal of these programs is to enhance the work context so that ethical decision making improves.

Ethical Decision Making

While conceptual variations exist, the ethical decision-making process is often represented by a four-component model developed by Rest (1986). Rest’s model implies that a person must (1) recognize an ethical issue or situation, (2) formulate a judgment about the morality of the issue or situation, (3) develop moral intentions as how to behave in regard to the issue, and (4) actually behave in the intended manner. Rest’s (1986) work suggests that the components of ethical decision making are functionally distinct, meaning that individuals may focus attention strongly on one part while paying less attention to other parts. However, the earlier steps of ethical reasoning tend to influence the later stages in a progressive manner (e.g., Barnett and Valentine 2004; Fleischman et al. 2007; Singhapakdi et al. 1996, 1999, 2000; Valentine and Barnett 2007; Valentine et al. 2010a, b; Valentine and Hollingworth 2012).

Recognizing an ethical issue or situation is essential to ethical decision making because a person becomes aware that he or she is facing an ethical problem in the workplace (Rest 1986). Many ethics frameworks note the importance of such awareness. For instance, the interactional model proposed by Trevino (1986) suggests that one must first acknowledge the existence of an ethical dilemma. In addition, Hunt and Vitell’s (1986) research proposed that an individual’s identification of an ethical dilemma depends on the person’s environment and individual factors. Research by Jones (1991) indicates that this first step of ethical decision making (along with other steps) is

affected by perceptions of “moral intensity” surrounding the ethical issue.

After an ethical problem is recognized, a person formulates judgments about the morality of the situation and analyzes the issue in question. Individual moral development, which essentially evolves over time, plays an imperative role in formulated judgments (Jones 1991; Rest 1986; Trevino 1986). One may think about what is most accepted within society, or one may prefer to reflect upon personal ethical values. More recent research suggests that individuals determine choices regarding ethical issues “in a more unconscious manner than the more conscious, controlled steps [presented by Kohlberg]” (Elm and Radin 2012, p. 316). Hunt and Vitell’s (1986) model suggests that the formulation of ethical judgments is based on individuals’ evaluations of the various outcomes of alternatives and behavioral norms, while Jones (1991) suggests that an individual will more strongly analyze an ethical issue depending on the level of moral intensity. An individual ultimately decides what is ethically right in regard to the issue.

The remaining two components represent the behavioral dimensions of ethical reasoning. Ethical intentions are established after a person formulates ethical judgments regarding an ethical dilemma and involves developing a direction about how to behave and commit to such action (Rest 1986; Hunt and Vitell 1986). There may be inconsistencies between an individual’s ethical judgment and ethical intent due to “preferred consequences” regarding certain alternatives. An individual may determine the best ethical alternative when making ethical judgments, but intend to act out another alternative due to the preferred consequences (Hunt and Vitell 1986). However, ethical judgments likely influence intentions to act because of immediate ethical evaluations (Valentine and Barnett 2007). Finally, a person behaves in the manner intended. In order to follow through with ethical intentions, a person must withstand interruptions and distractions (Rest 1986) and have the willpower to act on intentions. A study conducted by Thorne (2001) determined that individuals can be aware of the most ethical alternative but choose to behave unethically; the factors that cause such behavior must be mitigated.

PIE and Ethical Decision Making

While an understanding of the different steps of ethical reasoning is critical for the effective management of individual ethics, another factor is also important. Robin et al. (1996) developed the PIE construct and researched its relationship with both ethical judgment and ethical intention. PIE focuses on individual perceptions of dilemmas because ethical reasoning can differ based on the “ethical

sensitivity of the individual, the level of moral development of the individual, the organizational and individual values that are activated and situational pressures” (Robin et al., p. 17). Research by Robin et al. (1996) suggests that the idea of individual PIE poses a stronger relationship to ethical judgments and ethical intentions than Jones’ (1991) idea of moral intensity, as moral intensity relates one’s evaluation of situational (or issue-related) factors regarding an issue. Once an individual first recognizes an ethical issue or situation, his or her PIE will influence ethical judgments formulated, and consequently, the ethical intentions developed. The intentions to act ethically, as influenced by PIE, will then lead to the engagement in ethical behavior. Robin et al. (1996) also suggested that the PIE construct might affect ethical intention more so than it does ethical judgment because, between the steps of ethical judgment and ethical intention, individuals consider both ethical judgments and other contending influences. If PIE is low enough, it is assumed that individual might allow contending influences to control decisions regarding an ethical intention.

Empirical research supports the notion that PIE is related to the ethical reasoning process. For instance, Robin et al. (1996) found that PIE is positively related to ethical judgments and the behavioral intentions associated with an ethical issue. A similar research study conducted by Cronan et al. (2005) confirmed these findings. Haines et al. (2008) researched the role of PIE in the linkage between ethical judgment and ethical intention. It was suggested that PIE is related directly to ethical judgment, but that PIE does not directly affect ethical intention. Haines et al. (2008) also introduce the idea of moral obligation, which is an individual’s notion of “moral responsibility.” The model suggests that “after an individual makes an [ethical] judgment and prior to establishing an [ethical] intention,” moral obligation is considered by the individual (Haines et al. 2008, p. 391). The research determined that PIE predicted ethical judgment but not ethical intention. Organizations might therefore impact (1) ethical judgments by emphasizing PIE and (2) ethical intentions by emphasizing moral obligation. Finally, Valentine and Hollingworth (2012), using a sample of employees working for a financial services institution, found that PIE was positively related to both ethical issue recognition and ethical judgment.

Ethical Context, PIE, and Ethical Decision Making

Reviews of empirical research suggest that ethical decision making is influenced by unique individual factors (such as moral philosophies and personal values), and more specific to this study, situational and/or environmental factors (see Ford and Richardson 1994; Loe et al. 2000; McClaren

2000; O'Fallon and Butterfield 2005). Of particular relevance is the impact that organizational ethical context is believed to have on individual reasoning. While employees' ethical temperaments are shaped through moral development before entering an organization, "once in an organization, employees learn 'the right way' of behaving through formal and informal socialization" (Victor and Cullen 1987, p. 51). Many business researchers have developed models of ethical decision making that specify the "socio-moral atmosphere" of organizations as important in the process (Wyld and Jones 1997, p. 465). Consequently, the quality of decisions made by employees is likely reflective of corporate values (Bonczek 1992).

Previous research supports this idea. For instance, Sims and Keon (1999) hypothesized that expectations from supervisors and formal and informal policies, factors precipitating a "perceived organizational environment" are associated with employees' ethical decision making. It was found that an individual's perceived organizational environment is significantly associated with the individual's ethical decision. However, the "organizational characteristic the employee was most influenced by was situationally determined" (Sims and Keon 1999, p. 398). Therefore, while the organization can influence an employee's decision in the ethical decision-making process, it is important to note that the ethical issue or situation itself controls the relationship between the organization context and the individual's decision.

Singhapakdi et al. (1995), using a survey of American Marketing Association members, researched the effects of relativism, idealism, and CEV on the perceived importance of ethics and social responsibility, an individual ethical attitude that is conceptually similar to (and likely influences) PIE. Singhapakdi et al. (1995) found that idealism was positively related to marketing professional's ethical perceptions and that relativism was negatively related to these beliefs. CEV was also associated with a stronger belief that ethics and social responsibility were important company endeavors. In addition, Singhapakdi and Vitell (2007) reported that explicit/implicit ethics institutionalization determines individuals' perceived importance of ethics. Implicit institutionalization of ethics includes corporate culture, open communication, and ethical leadership, and explicit institutionalization of ethics includes formal ethical codes, ethics training, and ethics committees (Singhapakdi and Vitell 2007). Finally, Valentine and Fleischman (2008b, p. 657) reported that individual perceptions of CSR "partially mediate the positive relationship between perceived professional ethical standards and the believed importance of ethics and social responsibility," suggesting that CSR encourages PIE in a similar way.

The impact of ethical context on the core components of ethical reasoning has also been investigated. Singhapakdi

and Vitell (1991) and Singhapakdi (1999) found a positive relationship between different assessments of organizational ethics and perceptions of ethical problems. Similar findings have been identified when examining the relationship between ethical context and ethical judgment (e.g., Douglas et al. 2001; Nwachukwu and Vitell 1997; Valentine and Barnett 2007). Valentine and Godkin (2009) using information collected from employees working for a health science organization also found that perceptions of CSR were marginally associated with increased ethical judgments. Marta et al. (2012) reported that the CEV construct positively influenced ethical intentions in a study of managers from the USA, Turkey, and Thailand. In addition, it was suggested that personal moral philosophies could moderate CEV, in regard to the influence of CEV on ethical intentions (Marta et al. 2012). Other studies also indicate that ethical context is positively related to ethical intentions (Jones and Kavanagh 1996; Singhapakdi et al. 2000; Valentine and Barnett 2007). Finally, Eyun-Jung et al. (2012) concluded that public relations professionals employed in firms that utilized statements of ethics showed a greater inclination to act ethically. Peterson (2002) also found that the lack of codes in organizations leads to increased unethical actions and environments.

Ethical context should consistently influence ethical decision making. It is therefore reasonable to expect that by building elements of organizational ethics, employees' ethical reasoning should be enhanced. Consequently, the following hypotheses are presented:

Hypothesis 1: Stronger perceptions of an organization's ethical context will be associated with increased ethical issue importance.

Hypothesis 2: Stronger perceptions of an organization's ethical context will be associated with increased recognition of an ethical issue.

Hypothesis 3: Stronger perceptions of an organization's ethical context will be associated with increased ethical judgment.

Hypothesis 4: Stronger perceptions of an organization's ethical context will be associated with increased ethical intention.

Methods

Data Collection

A total of 187 fully or partially completed questionnaires were gathered from over 500 business professionals working for a financial services organization, which has several worksites located primarily in the Midwestern United States.

The questionnaire was e-mailed to the professionals multiple times over 6 weeks, generating an approximate response rate of 35.5 % (first wave—144 forms, second wave—27, and third wave—16). Comparisons across the waves using analysis of variance and cross-tabulations/chi-square statistics (Armstrong and Overton 1977) showed that differences were found for age and job tenure, suggesting that nonresponse bias was likely not a problem.

The business professionals had an average age of slightly less than 39 years. In addition, 99.3 % were white, 65.3 % were women, and 72.4 % were married. With regard to educational background, nearly 57 % of individuals had a bachelor's degree and 9.0 % had a graduate degree. Their average job and organization experiences were 6.25 years and 6.47 years, respectively. Just over 85 % of the professionals were employed full-time, and slightly more than 27 % were managers/supervisors. Some of the frequently cited professional classifications included sales/marketing (22.9 %), customer service (17.4 %), and operations (16.7 %). Almost 91 % of the individuals had been introduced to an ethics code, and they had been given an average of 1.63 hours of ethics training in the last year.

Measures

Ethical Context

Perceptions of ethical context were evaluated with a five-item CEV scale (Hunt et al. 1989), and after reverse coding several statements, scores were averaged so that higher overall values showed increased ethical values. The scale had a coefficient alpha of .83. A ten-item ethical environment measure developed by Trevino et al. (1998) was also used. Item scores were coded and averaged so that higher values showed increased ethical culture. The scale's coefficient alpha was .93. Finally, a five-item CSR measure was used (Valentine and Fleischman 2008a, b; Valentine and Godkin 2009). Scores were coded and averaged so that higher values showed increased CSR. The scale had an acceptable coefficient alpha value of .91.

Ethics Scenario

Ethical reasoning surveys often include scenarios so that subjects must react to questionable work situations (e.g., Alexander and Becker 1978; Barnett 2001; Reidenbach and Robin 1990; Singhapakdi et al. 1996). One such ethical scenario, adapted from an operations management textbook case (Taylor and Russell 2009), was used in this study:

Situation: As part of a regular maintenance plan, John Davis, manager of Prairie States Electrical Service, considers replacing an existing electrical transformer

that contains a hazardous chemical even though the part meets all current regulations. If the transformer fails, it could result in contamination of the surrounding area, and the firm could be held liable for cleanup and damages estimated at \$10–20 million. Despite these risks, the chances of part failure and chemical contamination are very low. A recent risk analysis revealed that replacing the transformer at a cost of \$85,000 eliminates the possibility of failure, while retaining the transformer has an estimated cost of only \$24,000.

Action: John keeps the existing transformer instead of replacing it with a newer part.

Ethical Decision Making

Based on reactions to the scenario, PIE was assessed with a four-item semantic differential measure (Robin et al. 1996). Item scores were coded to represent increased PIE and were averaged, and the coefficient alpha was .97. The ethical decision-making process was evaluated with three different scales. One item isolating whether the scenario involved an ethical issue, scaled on a seven-point semantic differential scale, was used to measure recognition of an ethical issue (REC; Barnett and Valentine 2004; Fleischman et al. 2007; Valentine and Barnett 2007). Ethical judgment (EJ) was measured with a four-item “moral equity” scale (Reidenbach and Robin 1990). Opinions were given on seven-point semantic differential scales. Items were coded so that higher scores showed increased ethical judgments, and values were averaged. The scale had a coefficient alpha of .95. Finally, a four-item scale assessed the (ethical) behavioral intentions (EI) construct (Barnett and Valentine 2004; Barnett et al. 1996; Valentine et al. 2010a, b). Individuals disclosed their intentions to act using four seven-point semantic differential scales. Coding was done so that higher scores showed increased ethical intentions (values were averaged). The scale's coefficient alpha was .98.

Social Desirability (Control)

Since impression management is often a concern in ethics studies (Randall and Fernandes 1991), a ten-item social desirability (SD) measure was used to check for bias (Crowne and Marlowe 1960; Fischer and Fick 1993; Strahan and Gerbasi 1972). Statements were evaluated with a seven-point scale anchored by 1 (strongly agree) and 7 (strongly disagree). Higher item scores were coded to represent increased SD, and values were added together to obtain composite measures. The scale had a coefficient alpha score of .71.

Modeling and Analysis

An analytical framework was developed to identify whether ethical context (CEV, CSR, and EC) was related to ethical decision making (PIE, REC, EJ, and EI), while controlling for SD. A total of 186 observations were analyzed (one questionnaire was discarded because of excessive missing data) using descriptive statistics, regressions, clustering, and discriminant analysis. Missing data on partially completed forms were replaced with the average score of the corresponding question. To assure that this approach did not affect the analysis, comparisons of correlations between missing values replaced versus missing values present were conducted. No substantial differences were observed. Average scores for PIE, REC, EI, and EJ were specified as dependent variables in separate models, and average scores for SD, CEV, CSR, and EC were specified as independent variables. Table 1 summarizes the abbreviated notations and symbols.

Variable descriptive statistics and correlations for each of the constructs are presented in Table 2. The relatively high mean values for CEV, EC, and CSR suggested that employees believed that their employer's ethical context was ethical. As expected, these three measures were strongly correlated in a positive manner. Likewise, REC, EJ, EI, and PIE were all highly interrelated with positive correlations. SD was correlated with some of the focal variables.

Results

Regression Models

For the regressions, we specified X_1 , X_2 , X_3 , and X_4 as predictor (independent) variables and Y_1 , Y_2 , Y_3 , and Y_4 as

Table 1 Abbreviated notations and symbols

	Measure	Number of items
Y_{1j}	Respondent j th average score of PIE	4
Y_{2j}	Respondent j th score of REC	1
Y_{3j}	Respondent j th average score of EJ	4
Y_{4j}	Respondent j th average score of EI	4
X_{1j}	Respondent j th average score of SD	10
X_{2j}	Respondent j th average score of CEV	5
X_{3j}	Respondent j th average score of CSR	5
X_{4j}	Respondent j th average score of EC	10

PIE perceived importance of ethical issue, *REC* recognition of ethical issue, *EJ* ethical judgment, *EI* ethical intention, *SD* social desirability, *CEV* corporate ethical values, *CSR* corporate social responsibility, *EC* ethical culture

dependent variables, respectively. The findings are presented in Table 3.

In order to avoid Type I/Type II errors and provide robust prediction, all five regression models were evaluated by three principal assumptions: (1) independence of the errors, (2) homoscedasticity (constant variance) of the errors, and (3) normality of the error distribution. It is important to check for the violations of the normality assumption because they may compromise the estimation of coefficients of independent variables and also cause confidence intervals to be too wide or too narrow. However, moderate departures of errors from the normal distribution do not seriously impact the reliability of coefficient estimation or the accuracy of confidence intervals.

Results of Regression Model

The first regression model included four independent variables SD, CEV, CSR, and EC, as well as the dependent variable PIE. This model was statistically significant, but the R^2 value was low. Two independent variables CEV and EC were statistically significant. The correlation between PIE and EC was 0.112, but the coefficient of EC was -0.3392 . The model violated the normality of the error distribution. The second regression model contained the same four independent variables and the dependent variable REC. This model showed no statistical significance, and the R^2 value was low. None of the independent variables were significantly associated with REC. Even though the correlation between REC and EC was 0.027, the coefficient of EC was -0.2927 . The model also violated the normality of the error distribution.

The third regression model included the four independent variables SD, CEV, CSR, and EC and the dependent variable EJ. This model was statistically significant but again had a low R^2 value. Only SD was statistically significant and positively related to the dependent variable. The correlation between EJ and EC was 0.101, but the coefficient of EC was -0.1611 . This model also violated the normality of the error distribution. Finally, the fourth regression model included the four independent variables and the dependent variable EI. This model was statistically significant but had a low R^2 value. As the third regression model, only SD was statistically significant and positively related to EI. The correlation between EI and EC was 0.143, but the coefficient of EC was -0.1649 . This model violated the normality of the error distribution.

In sum, the findings for the four regression models have presented at least two important issues that need to be considered for consistent interpretations of the data: (1) None of the regression models provided a satisfactory R^2 , and (2) none of those regressions met the condition of the normality assumption. From statistical perspective, one

Table 2 Variable descriptive statistics and correlations

Variable	<i>M</i>	<i>SD</i>	<i>N</i>	<i>PIE</i>	<i>REC</i>	<i>EJ</i>	<i>EI</i>	<i>SD</i>	<i>CEV</i>	<i>CSR</i>	<i>EC</i>
<i>PIE</i>	5.7206	1.0495	186	1.000							
<i>REC</i>	4.9878	1.7858	186	0.447	1.000						
<i>EJ</i>	4.5823	1.5239	186	0.426	0.328	1.000					
<i>EI</i>	4.9001	1.6250	186	0.443	0.272	0.807	1.000				
<i>SD</i>	5.1967	0.7128	186	0.137	0.056	0.262	0.236	1.000			
<i>CEV</i>	5.7054	1.0328	186	0.182	0.044	0.142	0.184	0.200	1.000		
<i>CSR</i>	6.0747	0.7587	186	0.195	0.094	0.120	0.158	0.091	0.604	1.000	
<i>EC</i>	5.4014	0.6737	186	0.112	0.027	0.101	0.143	0.125	0.823	0.748	1.000

Listwise $N = 186$; correlations $>.15$ are significant at the .05 level, correlations $>.19$ are significant at the .01 level

PIE perceived importance of ethical issue, *REC* recognition of ethical issue, *EJ* ethical judgment, *EI* ethical intention, *SD* social desirability, *CEV* corporate ethical values, *CSR* corporate social responsibility, *EC* ethical culture

Table 3 Regression results— $\hat{Y}_i = b_0 + b_1(X_1) + b_2(X_2) + b_3(X_3) + b_4(X_4)$

	$\hat{Y}_1$: <i>PIE</i>	$\hat{Y}_2$: <i>REC</i>	$\hat{Y}_3$: <i>EJ</i>	$\hat{Y}_4$: <i>EI</i>
b_0	3.1690**	2.9755**	0.5620	0.4608
b_1 : <i>SD</i>	0.1486	0.1211	0.5181**	0.4722**
b_2 : <i>CEV</i>	0.2595*	0.1025	0.1659	0.2347
b_3 : <i>CSR</i>	0.3600	0.3996	0.2104	0.2576
b_4 : <i>EC</i>	−0.3392*	−0.2927	−0.1611	−0.1649
Model <i>F</i>	3.76*	0.7894	4.04**	4.02**
R^2	0.077	0.0172	0.082	0.082
<i>N</i>	186	186	186	186

PIE perceived importance of ethical issue, *REC* recognition of ethical issue, *EJ* ethical judgment, *EI* ethical intention, *SD* social desirability, *CEV* corporate ethical values, *CSR* corporate social responsibility, *EC* ethical culture

** $p < 0.01$, * $p < 0.05$

way to deal with these issues is to use data transformations to establishing the normality of the error distribution. However, this procedure might alter the nature of the variables, making the interpretation of the results too complicated. Moreover, multifaceted processes of reversing the data transformations could reduce the accuracy of prediction (Osborne 2010; Sakia 1992). We suggest an alternative approach that incorporates clustering and discriminant analysis (or CLUSDIS) and facilitates the examination of variable relationships without being constrained by the regression assumptions.

Alternative Model

In this section, the new modeling process CLUSDIS, which combines clustering and discriminant analysis methods, is discussed. *REC*, *PIE*, *EI*, and *EJ* were specified as dependent variables and *SD*, *CEV*, *CSR*, and *EC* as independent variables. The two steps of CLUSDIS are as follows:

Step 1: Clustering the dependent variables based on similarity

Since subjects responded to seven-point scales, we decided to cluster them into high-score and low-score groups with similar characteristics. Our investigation to find the optimal number of clusters for this particular dataset suggested that this was reasonable. The basic idea of the clustering method is to identify the center respondent first, and then to create a group by selecting a corresponding respondent who is near to the determined center respondent. In order to find the two center respondents from a total set of 186 and assign the rest of the respondents into the nearest cluster center group, we defined the center 1 and center 2 as decision variables and set the equations for the nonlinear programming as follows:

$$\begin{aligned}
 \text{Min} \quad & \text{the total sum of the squared distances from all respondents} \\
 & \text{to the cluster centers to which they are assigned.} \\
 \text{s.t.} \quad & 1 \leq \text{center 1, and center 2} \leq 186 \\
 & \text{center 1 and 2 are integers}
 \end{aligned}$$

In the case of *PIE*, for example, we first standardized each of the four items by subtracting the mean of each question and dividing the difference by each question's standard deviation, and then performing nonlinear programming with the objective to minimize the sum of the squared distance from each respondent to the cluster center. From this output, two center respondents are defined: One is for the high-score group (center 1) and the other for the low-score group (center 2). The next is to measure how far each respondent is from the centers by using the usual Euclidean distance formula. Suppose that the 10th respondent's standardized score for the first item is 0.16, 0.95 for the second, 0.14 for the third, and 0.21 for the fourth. Further, suppose the standardized scores associated with center 1 for the first item are 0.17, 0.35 for the second, 0.14 for the third, and 0.27 for the fourth, respectively, and the standardized scores of center 2 for the

first item are -1.53 , -1.36 for the second, -1.45 for the third, and -1.48 for the fourth. Then, the distances to center 1 (DC1) and to center 2 (DC2) can be calculated as follows:

$$DC1 = \sqrt{(0.17 - 0.16)^2 + (0.35 - 0.45)^2 + (0.14 - 0.14)^2 + (0.27 - 0.21)^2} = 0.117, \text{ and } DC2 = 3.39$$

Since the DC1 is shorter than the DC2, the 10th respondent should be assigned into the center 1 cluster, the high-score group. In the same way, the rest of the respondents can be classified into one cluster or the other. For all other dependent variables such as EI, EJ, and REC, the same procedures can be applied to assign the respondents to either high-score or low-score clusters. The detailed clustering outcomes on all the dependent variables are computed by the Evolutionary Solver (Excel 2010) and summarized in Table 4 and “Appendix 1.”

Step 2: Conducting discriminant analysis

Unlike step 1 in which we obtained two respondent clusters based on the outputs of the dependent variables (Y_1 , Y_2 , Y_3 , and Y_4), in this step, we focused on the functions of the independent variables X_1 , X_2 , X_3 , and X_4 to classify the respondents into two groups. To measure how greatly each independent variable affects the dependent variable, we set the discriminant equation with weighted coefficients:

$$\hat{Y}_{ij} = w_0 \pm w_1X_{1j} \pm w_2X_{2j} \pm w_3X_{3j} \pm w_4X_{4j}$$

where $0 \leq w_k \leq 1$, $\sum_{k=1}^4 w_k = 1$, $i = 1, \dots, 4$, and $j = 1, \dots, 186$. (1)

The estimated value for w_0 represents the estimated intercept value, where $-\infty < w_0 < \infty$. The signs of w_1 , w_2 , w_3 , and w_4 in the discriminant equation were determined by the type of correlation between Y_i and X_1 , X_2 , X_3 , and X_4 , respectively. For example, if the correlation

between Y_1 and X_1 is negative, then the sign of w_1 is determined as negative ($-w_1$). If not, the sign of w_1 is determined as positive ($+w_1$). Regardless of the sign of the weight, the total sum of the weights must be equal to 1. For

the analysis purpose, we labeled the summation of $w_0 \pm w_1X_{1j} \pm w_2X_{2j} \pm w_3X_{3j} \pm w_4X_{4j}$ by “discriminant score.”

To find the optimal values of w_1 , w_2 , w_3 , and w_4 , we defined the sum square error (SSE):

$$SSE \text{ of } Y_i = \sum_{j=1}^{186} (Y_{ij} - \hat{Y}_{ij})^2 \quad (2)$$

$$\text{where } \hat{Y}_{ij} = w_0 \pm w_1X_{1j} \pm w_2X_{2j} \pm w_3X_{3j} \pm w_4X_{4j}$$

Since all of the correlations between the predictors and the dependent variables were positive as shown in Table 2, the discriminant equation to analyze our 186 observations was expressed:

$$\hat{Y}_{ij} = w_0 + w_1X_{1j} + w_2X_{2j} + w_3X_{3j} + w_4X_{4j} \quad (3)$$

Since we want to assign the discriminant scores into two clusters, we determined the cutoff score as a decisional standard. Based on the determined cutoff score, we sorted a respondent into high-score group if the person's discriminant score is above the cutoff score or low-score group if it is below the cutoff score. For the range of the cutoff scores, we assumed that they should be higher than the maximum score of the low-score group and lower than the minimum score of the high-score group because we grouped the dependent variables (Y_{ij}) into either high-score group or low-score group in step 1.

Having defined the discriminant Eq. (3), we set the following equations that allow us to not only identify the discriminant scores with respect to the 186 respondents, but also to examine whether the classification of the discriminant equation model is consistent with the outputs discovered in

Table 4 Clustering summary of PIE, REC, EJ, and EI

	Total number of respondent of high-score group	Total number of respondent of low-score group	Range of average score of high-score group	Range of average score of low-score group
PIE	136	44	5.25–7.00	1.00–5.00
REC	131	55	4.98–7.00	1.00–4.00
EJ	123	63	4.34–7.00	1.00–4.20
EI	129	57	4.50–7.00	1.00–4.25

PIE perceived importance of ethical issue, *REC* recognition of ethical issue, *EJ* ethical judgment, *EI* ethical intention

step 1. For the computation of these equations, we used both Evolutionary Solver and the nonlinear programming, which are available with the standard Excel 2010 solver. After Evolutionary Solver found possible optimal solutions, we used the GRG Nonlinear Solver to find a global optimal solution.

$$\begin{aligned} & \text{Min } \sum_{j=1}^{186} \{Y_{ij} - (w_0 + w_1X_1 + w_2X_2 + w_3X_3 + w_4X_4)\}^2 \\ & + \text{Min } \sum_{j=1}^{186} Z_{ij} \\ \text{s.t. } & w_1 + w_2 + w_3 + w_4 = 1 \\ & 0 \leq w_i \leq 1, \text{ where } i = 1, 2, 3, 4 \\ & 0 \leq w_0 \leq 7 \\ & \text{Maximum of low group score} < \text{Cutoff score} < \\ & \text{Minimum of high group score} \\ & Z_{ij} = \begin{cases} 1 & \text{if } j\text{th respondent's classification not matching} \\ 0 & \text{otherwise} \end{cases} \end{aligned} \quad (4)$$

From the computation of Eq. (4), the optimal weights for each independent variable including the intercept w_0 and the discriminant scores were determined. The function of $\sum_{j=1}^{186} \{Y_{ij} - (w_0 + w_1X_1 + w_2X_2 + w_3X_3 + w_4X_4)\}^2$ in Eq. (4) is to measure total sum of square errors that are the difference between each respondent's actual score and discriminant score. The function of $\sum_{j=1}^{186} Z_{ij}$ in Eq. (4) is to count the total number of mismatches. If the j th respondent of PIE-1, Y_{2j} was assigned into the high-score group based on the clustering analysis in step 1 whereas the same respondent was classified into the low-score group by the discriminant analysis in step 2, we regarded it as “mismatched ($Z_{2j} = 1$),” or the respondent was not correctly assigned into the group. Table 5 outlines the findings of the alternative model, and “Appendix 2” details the procedures.

Table 5 CLUSDIS results: $\hat{Y}_{ij} = w_0 + w_1(X_{1j}) + w_2(X_{2j}) + w_3(X_{3j}) + w_4(X_{4j})$

	$\hat{Y}_1$: PIE	$\hat{Y}_2$: REC	$\hat{Y}_3$: EJ	$\hat{Y}_4$: EI
w_0	0.1612	0.0000	0.0000	0.0000
w_1 : SD	0.5091	0.7465	0.9330	0.8210
w_2 : CEV	0.1258	0.0000	0.0000	0.0408
w_3 : CSR	0.3652	0.1088	0.0000	0.0076
w_4 : EC	0.0000	0.1446	0.0670	0.1307
% Correct	71.51	70.97	68.82	72.58
Cut-off	5.010	4.099	4.339	4.423
SSE	210	651	488	489

PIE perceived importance of ethical issue, REC recognition of ethical issue, EJ ethical judgment, EI ethical intention, SD social desirability, CEV corporate ethical values, CSR corporate social responsibility, EC ethical culture

Results of Alternative Model

The findings of the first model showed that PIE was influenced by SD, CEV, and CSR, providing support for Hypothesis 1. Among these three variables, SD was the highest contributor with the weight rate of 50.91 %. EC did not affect PIE. The accuracy level of this model was 71.51 %. The second model showed that REC was affected by the three independent predictors SD, CSR, and EC, which provided support for Hypothesis 2. Among the three factors, SD was the prevailing variable with a weight rate of 74.65 %. CEV was not a significant predictor of REC. The overall accuracy of the model was 70.97 %.

The third model indicated that EJ was affected by SD and EC, which only partially supported Hypothesis 3. The SD factor was the dominant variable with a rate of 93.3 %, while EC had an insignificant weight rate of 6.70 %. The other two predictors CEV and CSR were not related to EJ in this model. The accuracy level was 68.82 %. Finally, the fourth model showed that EI was affected by all of the four predictor variables, which supported Hypothesis 4. The contribution rates of these variables were 82.10 % for SD, 13.07 % for EC, 4.08 % for CEV, and 0.76 % for CSR, respectively, but the effects of CEV and CSR appeared to be insignificantly small. The accuracy of the model was 72.58 %. Overall, among the four independent variables, the SD variable alone was the most significant predictor of ethical decisions.

Discussion

Review of Findings

Table 6 summarizes the study findings. With respect to REC, the correlations and regressions provided no support for a relationship; however, CLUSDIS provided evidence that ethical context (EC, CSR) and SD were related to REC. All three analytical approaches showed that CEV is related to PIE. Furthermore, two of the three (correlations and CLUSDIS) also supported a CSR–PIE relationship. That the regression did not also confirm this relationship is likely a consequence of multicollinearity. Finally, with respect to PIE, neither the correlations nor the regressions showed a relationship between SD and PIE, but CLUSDIS did. All three forms of analysis showed that SD was related to EJ and EI, and two of the three approaches indicated that some measures of ethical context were also related to EJ; however, which measure was important varied from one analysis to the next. The correlation analysis found CEV to be marginally related to EJ, while the regression found no relationship between any of the ethical context variables

Table 6 Summary of findings

Method of analysis/component of ethical decision-making process	Correlations: missing = mean	Regression	CLUSDIS
REC	No relationships	No relationships	SD, EC, CSR
PIE	CEV, CSR	CEV, EC	SD, CSR, CEV
EJ	CEV (.053), SD	SD	SD, EC
EI	CEV, CSR, EC(.052), SD	SD	SD, CEV, EC, CSR

PIE perceived importance of ethical issue, *REC* recognition of ethical issue, *EJ* ethical judgment, *EI* ethical intention, *SD* social desirability, *CEV* corporate ethical values, *CSR* corporate social responsibility

and EJ (again, likely to due to multicollinearity among the predictor variables), and the CLUSDIS supported a relationship between EC and EJ, and EC and EI. All three approaches confirmed support for a relationship between SD and EI, and SD and EJ. Each of the analyses provides some insight, but they also raised a number of questions. However, taken together, the results generally supported the notion that ethical context of an organization influences the ethical decision-making process. In addition, the results also indicated a connection between social desirability and ethical decision making, which appears to be more pervasive than previously considered.

Employee perceptions of ethical context should positively affect the middle and later stages of ethical decision making. Significant relationships observed in the correlations between the measured variables tended to support this viewpoint. Results obtained from the regressions were not as supportive of the hypotheses, only providing support for a linkage with PIE. Due to concerns about multicollinearity among the predictor variables, as well as violations of regression assumptions, an alternate method of analysis was used. CLUSDIS not only minimizes errors between actual and predicted values, but also minimizes classification error. It correctly classified and predicted a substantial majority (approximately 70 %) of employees' ethical reasoning variables and highlighted the impact of ethical context and SD on this process.

Results indicated that social desirability (bias) was a strong predictor of PIE in all four components of ethical decision making, which has important implications for both research and practice. Our analysis also provided additional support for the idea that ethical context modestly impacts the stages of ethical reasoning. Contrary to the correlation and regression analyses, the organizational ethics variables accounted for nearly one-fourth of the weight in predicting ethical problem recognition. This result was not fully anticipated. More to our expectations and consistent with our hypotheses, about one-half of the weight in the model predicting PIE, and about one-fifth of the weight in the prediction of ethical judgment came from employee's perceptions of ethical context. Contrary to the regression,

but consistent with the correlations, perceived organizational ethics had a relatively small effect on EI.

Similar to the findings of Valentine and Barnett (2007) and Valentine et al. (2010a, b), but in contrast to Douglas et al. (2001) and Paolillo and Vitell (2002), this study provided evidence supporting a relatively modest, but significant direct effect of ethical context on components of ethical decision making. Conflicting research results may suggest that a more complex explanation is necessary to fully appreciate the nature of the phenomenon under consideration. One possible explanation relates to research conducted by Barnett and Vaicys (2000), who proposed (and found some evidence in support of) the proposition that ethical climate would moderate the ethical decision-making process. Additional perspective has been contributed by Martinov-Bennie and Pflugrath (2009), who found evidence that a stronger ethical environment raises awareness of ethical issues, but does not affect judgment, unless combined with reinforcement. While it is premature to conclude the existence or nonexistence of a direct effect of organizational ethics upon individual decision making, it would seem likely that if such an effect exists, its impact is modest (no studies have reported large effect sizes). A reasonable explanation of the conflicting results observed in the literature thus far is that organizational ethics may moderate relationships between the various steps of individual ethical decision making.

Managerial Implications

Based on our findings, organizational efforts to create and support an ethical climate matter, at least to the extent that employees believe that an employer operates ethically. Prior studies indeed show that the establishment and maintenance of a solid foundation of business ethics, which supports ethical and socially responsible behavior as a means of creating and sustaining an ethical climate in the firm, is valuable because it enhances individuals' ethical perceptions, thought processes, and behavioral intentions. Thus, the reinforcement of organization ethical values with codes of conduct and regular ethical training can provide a proper environment for ethical decision making. It is also

important for employees to actually perceive that the organization is ethical, not just that it “preaches” ethics to them through official channels of communication. Indeed, employees will base their perceptions of ethical climate not only on what they hear, but also on the behaviors that they observe within the organization. Consequently, it is also important for firms to take steps to ensure that all employees, especially those with formal authority in the organization, actively engage in ethical behavior. Furthermore, day-to-day actions need to demonstrate support for ethical conduct. Firms would be well advised to consider ethics when making recruiting, selection, promotion, and retention decisions so that everyone in the organization receives a clear message that appropriate behavior is valued.

That social desirability appears to be related to the steps of ethical decision making is not a surprise, since being ethical is a generally accepted behavior. However, it suggests that management needs to be aware that employees perceive others’ views of their actions (with respect to organizational ethics) as important. This has at least two implications. First employee’s perceptions of organizational ethics and their engagement in ethical decision making will be influenced by their peers and managers. It suggests that the ethical context may be either enhanced or damaged as employees observe how others in the organization act and react to employee and management ethical (and unethical) behavior. Second, if attempts are made to gauge the level of ethicality of the organization, care must be taken to consider and estimate how much employee responses are potentially inflated by the perceived social desirability of their responses, even when responses are privately and even anonymously obtained.

Implications for Future Research

This study provides some evidence that supports a modest direct relationship between individual perceptions of the organizational ethical context and ethical decision making. However, as previously noted, the literature also includes examples of indirect effects and/or no observed effect when examining these relationships. Our study provides additional support for direct effects, but does not rule out indirect influences as well. What is more clear is that whatever associations are present are not likely to be large.

The literature suggests that social desirability may confound research if it is present and not adequately controlled for in research design, data collection, data analysis, and interpretation (Randall and Fernandes 1991; Zerbe and Paulhus 1987). We measured social desirability and controlled for it in the present study. However, we were surprised by the extent to which social desirability affected the focal variables in this study. We were left to consider

whether the effects of social desirability are always prevalent in ethics research, or whether our results were somehow affected by something about this particular study. While no definitive conclusions can be made, it is possible that the way the survey was administered created the appropriate conditions for respondent social desirability, especially since the surveys were delivered through the participating firm’s information system. Regardless of the reason, the results suggest that social desirability can have a considerable confounding effect on ethics research. Since this is consistent with and adds to the body of findings of prior studies (Randall and Fernandes 1991; Zerbe and Paulhus 1987), it would seem prudent to suggest that future studies of ethics should seek to control for social desirability in design and delivery of data collection. In addition, such research should measure, assess, and control for social desirability.

The proposed alternate method of analysis (CLUSDIS) overcomes some of the weaknesses of regression and allows for the assessment of “messy” data that does not conform satisfactorily to its assumptions. Further application of this method may provide new insights that may have been inadvertently overlooked in past studies. This statement should not be misinterpreted to mean that past research is invalid; it is merely suggested that additional insights might be gained by evaluating both old and new data with this new methodology. CLUSDIS provides an opportunity for new and/or additional findings to be identified by using a different approach that compensates for violations of the basic assumptions of regression.

Limitations of Study

This study utilized data collected with a survey at essentially a single point in time. The cross-sectional nature clearly limits generalizations to causality. Specified relationships were based on prior research and understanding, yet any findings should be interpreted with caution because it is not possible to say with certainty that one variable caused a response in another variable. Furthermore, the data reflect self-reports from individuals, which are consistent with and considered (in the literature) as a reasonable approach for the type of research reported herein, when precautions are taken to minimize, control for, and report any inherent biases. In this study, data for both predictor and response variables originated within the same persons, creating the possibility of common-respondent bias. Furthermore, individual responses on studies of this kind are susceptible to social desirability bias. Finally, all the data used in this study were obtained via computer-based survey, suggesting the possibility of common-method bias. As previously mentioned, the design, conduct, and analysis of this study were performed and reported in a

manner to minimize such biases. While we did not find evidence suggesting that our data contained uncontrolled or influential biases, we note that they may be present, and any interpretation and application of this research should reflect appropriate caution in this respect.

Other limitations are also noteworthy. This study analyzes data obtained from employees at multiple locations of a single firm, which likely limits the variance of the data in the sample. However, since we were using employee perceptions of organizational ethics, individual perceptions provide variability that is meaningful and useful for investigating the questions that we considered herein. Again, caution in generalizing beyond the context wherein the data were collected is advised. Using individual perceptions of organizational ethics, as opposed to objective data, could be a weakness or strength, depending on perspective. We view it as a strength, as people will typically behave based on what they perceive and believe is real, not necessarily what is actually “real.” Consequently, employee perceptions of the organization provide useful and meaningful perspective into their decision making and behavior.

Suggestions for Future Research

This study adds to the body of literature that examines how the ethical context influences ethical decision making. As the present study, other research has observed modest effects, while still others have noted no effect, or an indirect effect. The ability of organizational ethics to influence individuals’ decision making and actions is not in contention. The more important issues have to do with more clearly identifying the likely multiple direct and indirect paths of influence for ethical climate on ethical reasoning. As future research seeks answers to these necessarily more complex issues, scholars and managers should gain a greater understanding of the importance of organizational

ethical context on individuals in firms. Future studies should consider the distinct possibility that ethical context may serve to moderate relationships between the various components of ethical reasoning. Future studies might carefully consider theoretical reasoning that would serve to explain how and why the relationships between steps of ethical reasoning might be enhanced by an ethical culture and diminished by the absence of one.

While a body of work exploring social desirability exists, it seems that most research has viewed it only in passing as a necessary control variable, and certainly not as a construct of significance. However, it would seem that an enhanced understanding of social desirability could add to the more general knowledge of ethical decision making. For example, how might social desirability be enhanced or diminished? Are there different ways to conceptualize or measure it, and if so, which are most appropriate under various conditions? Additional research should help answer these questions and expand understanding of this apparently important phenomenon.

Future research needs to use a broad range of methodologies to gain a clearer understanding of variable interrelationships, particularly with regard to the associations that exist between ethical context and ethical decision making. Additional research might also further develop and utilize the new statistical approach proposed in this study. In the alternative models, a two-cluster analysis was performed because it was assumed that the optimal number of the clusters for the 186 respondents was two. However, future research should explore a triple (or more)-cluster analysis that may generate slightly different findings.

Appendix 1: Calculations for Cluster Analysis of PIE: Spreadsheet Model Using Excel 2010

See Table 7.

Table 7 Cluster analysis excel spreadsheet

	A	B	C	D	E	F	G	H	I	k
1	Cluster	Respondent								
2	Center	Index	2	3	4	5				
3	74	74	0.2432	0.2862	0.2034	0.2830		H	136	
4	35	35	−1.5180	−1.5850	−1.6337	−1.5201		L	44	
5										
6							Q28	Q29	Q30	Q31
7	SSDT	369.75				AVE	5.7239	5.6941	5.7785	5.6861
8						SD	1.1356	1.0688	1.0886	1.1092
9										
10										
11		Q28	Q29	Q30	Q31	To 1	To 2	Min	Match	H or L

Table 7 continued

	A	B	C	D	E	F	G	H	I	k
12	1	-2.3986	-2.5207	-2.5523	-2.4217	29.7671	3.3075	3.3075	2	L
12	2	1.1238	1.2219	1.1220	1.1846	3.3075	29.7671	3.3075	1	H
14	3	-2.3986	-2.5207	-2.5523	-2.4217	29.7671	3.3075	3.3075	2	L
...										
196	185	1.1238	1.2219	1.1220	1.1846	3.3075	29.7671	3.3075	1	H
197	186	0.0000	0.0001	-0.0001	-0.0002	0.2626	9.7959	0.2626	1	H

(1) We create the standardized value for each column, enter the formula: = (each respondent's score - average of column)/(standard deviation of column)

(2) Lookup table. One key to the model is to have an index (1-186) for the respondents so that we can refer to them by index and then look up their characteristics with a VLOOKUP function. Therefore, define the range A12:E197 as LookupPIE using define names in Excel

(3) Decision Variables (B3:B4). The only changing cells appear in the Respondent Index of Fig. 1. They are the indices of the two respondents chosen as cluster centers 1 and 2. Enter any two integers from 1 to 186

(4) Corresponding respondents and standardized attributes. We find the respondent numbers and standardized attributes of the centers 1 and 2 with VLOOKUP functions. First, enter the function = VLOOKUP(B3,LookupPIE,1) in cell A3 and copy it to range A3:A4. Then enter the formula = VLOOKUP(\$B3,LookupPIE,C\$2) in C3 and copy it to the range C3:F4

(5) Square distances to centers. This step is to see how far each respondent is from each of the centers. Enter the formula = SUMXMY2(\$B12:\$E12,\$C\$3:\$F\$3) in cell F12 and copy it to the range F12:G196. (The function SUMXMY2 calculates the differences between the elements of the two range arguments and then sums the square of these differences)

(6) Assignments to cluster centers. Each respondent is assigned to the cluster center that has the smallest square distance. Therefore, find the minimum square distances in column H by entering the formula = MIN(F12,G12) in cell H12 and copy it down. Enter the formula = MATCH(H12,F12:G12,0) in cell I12 and copy it down

(7) Sum of squared distances. The objective is to minimize the sum of square distances from all respondents to the centers 1 and 2 to which they are assigned. Calculate this objective in cell A7 with the formula = SUM(H12:H197)

(8) Open solver dialog box (click data on menu, click solver), then enter B7 in set cell box, click Min, enter B3:B4 in by changing cells box, enter B3:B4 ≤ 186, B3:B4 ≥ 1 and B3:B4 = integer in subject to the constraints box

(9) Choose Evolutionary Solver option in select a solving method box

Appendix 2: Discriminant Analysis: Spreadsheet Model Using Excel 2010

See Table 8.

Table 8 Discriminant analysis excel spreadsheet

	A	B	C	D	E	F	G	H	I	J
1	w0	w1	w2	w3	w4	Correct	SSE	Total	% of correct	
2	0.161	0.509	0.126	0.365	0.000	4.000	11.596	15.596	0.022	
3										
4			Weight		Cutoff					
5			1.000		5.000					
6										
7	PIE-2	H or L	SD	CEV	CSR	EE	Score	Classified	Correct	Difference
8	3.000	L	5.700	4.600	5.000	4.300	5.467	H	N	6.0S7
9	7.000	H	5300	6.400	5.800	6.300	5.782	H	Y	1.4S3
10	3.000	L	4.400	5.000	4.200	4.400	4.564	L	Y	2.445
...										
193	7.000	H	5.197	5.704	6.076	5.568	5.743	H	Y	1.5S1

Table 8 continued

	A	B	C	D	E	F	G	H	I	J
194	5.721	H	5.197	5.704	6.076	5.568	5.743	H	Y	0.000

- (1) Enter the clustering outcomes (K12:K197 forms the previous clustering analysis in Fig. 1) in cell B8:B194
- (2) The decision variables are the weights (A2:E2) used to form discriminant scores and cutoff value (E5) for classification. Enter any values for these in the cell A2:E2 and E5
- (3) Discriminant scores. Each discriminant score is a weighted combination of the respondent's SD, CEV, CSR, and EC. To calculate these in column G, enter the formula = SUMPRODUCT(\$A\$2:\$E\$2,C8:F8) in cell G8 and copy it down
- (4) Classifications. We classify a respondent as a low-score class if the respondent's discriminant score is below the cutoff value; otherwise, the respondent is classified as a high-score group. Enter the formula = IF(G8 < Cutoff, "L", "H") in cell H8 and copy it down
- (5) Count correct classification. Check whether each classification using discriminant score is correct by entering the formula = IF(H8 = B8, "Y", "N") in cell I8 and copying it down
- (6) Sum of squared error. The objective is to minimize the sum of square difference from all respondents' average PIE score to discriminant scores based on SD, CEV, CSR, and EC. Enter the formula = (A8-G8)² in cell J8 and copy it down. The total SSE = SUM(J8:J194) and enter this formula in cell G2
- (7) Tallies. Count how many respondents are correctly classified. Enter the formula = COUNTIF(I8:I194, "Y") in cell F2 and calculate the percentage of all respondent classified correctly in cell I2 with the formula = COUNTIF(I8:I194, "Y")/186
- (8) Because the sum of weight equal to one, enter the formula = SUM(B2:E2) in cell C5
- (9) The objective is to minimize both the sum of square error (G2) and the number of mismatching (186-F2). Enter the formula = (186-F2) + G2 in cell H2
- (10) Open solver dialog box (click data on menu, click solver), then enter H2 in set cell box, click Min, enter B2:E2 in by changing cells box, enter $E5 \leq$ Maximum of Low score from cluster analysis, $E5 \geq$ Minimum of High score from cluster analysis, $B2:E2 \leq 1$, and $A2 < 7$ in subject to the constraints box
- (11) Choose Evolutionary Solver option in select a solving method box
- (12) After Evolutionary Solver has found a good solution, we can use GRG Nonlinear Solver to try to find or confirm a global optimal solution or to find a slightly better solution

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